

March 2013

Wildlife Hazard Assessment

for

Brunswick Golden Isles Airport

Glynn County, Georgia



Environmental
Resource Solutions

Our Science. Your Success.



Prepared by:

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**WILDLIFE HAZARD ASSESSMENT
BRUNSWICK GOLDEN ISLES AIRPORT
Glynn County, Georgia
ERS Job No. 11082**

PREPARED FOR:

**GLYNN COUNTY AIRPORT COMMISSION
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BRUNSWICK, GEORGIA 31525-7801**



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MARCH 2013

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LIST OF PREPARERS

This Wildlife Hazard Site Visit was conducted by a "qualified airport wildlife biologist" per 14 CFR Part 139.337(c) and A/C 150/5200-36A "Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports." A list of preparers is provided below:

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Kim has 22 years of experience in the environmental consulting field. Her experience includes, but is not limited to, Environmental Impact Statement (EIS) and Environmental Assessment (EA) preparation following NEPA guidelines, Wildlife Hazard Assessments, Airport Master Planning, Project Development and Environmental (PD&E) studies, Development of Regional Impact (DRI) evaluations, habitat and wildlife assessment; and endangered species assessments. Kim's public sector experience is unsurpassed. She has evaluated and permitted hundreds of roadway projects and a multitude of aviation projects. She has managed many large-scale aviation related projects including the redevelopment of the 18,000-acre Cecil Commerce Center (Former Naval Air Station) and the 20-year master plan for Jacksonville International Airport. She is also Principal-in-Charge of Wildlife Hazard Assessments (WHA) at Jacksonville International Airport (JAX), Gainesville Regional Airport (GNV), Ocala International Airport (OCF), Spirit of St. Louis Airport (SUS), Texarkana Regional Airport (TXK), Malcolm McKinnon Airport (SSI), Arlington Municipal Airport (GKY), Victoria Regional Airport (VCT), Cecil Airport (VQQ), Jacksonville Executive at Craig Airport (CRG) and WHA mentoring projects in Texas and California. Kim routinely speaks on wildlife hazard issues at various aviation conferences and to special interest groups. She recognizes the importance of balancing aviation growth and resource protection. Kim was responsible for the review of this document.

Amy Johnson, Environmental Resource Solutions, Inc. – Project Manager and Qualified Airport Wildlife Biologist

While Amy has experience in many aspects of environmental consulting, she specializes in endeavors that involve wildlife hazards at airports such as wildlife hazard assessments (WHA), wildlife hazard management plans (WHMP), wildlife hazard management training, and annual WHMP audits. In 2007, she became certified as an Associate Wildlife Biologist with The Wildlife Society. She completed the FAA-approved Airport Wildlife Hazard Management Workshop course at Embry-Riddle Aeronautical University (ERAU) in May 2009 and is considered a Qualified Airport Wildlife Biologist per A/C 150/5200-36B. Amy has received SIDA training and security authorization for badges at several airports. For the past 5 years, she has been responsible for ensuring that the four Jacksonville Aviation Authority airports are compliant with FAA wildlife regulations. She has conducted WHAs in Florida, Georgia, Texas, Missouri and Arkansas. Amy was a speaker at the 2011 Birdstrike North America Conference in Niagara Falls, Canada. She is recognized by The Wildlife Society, Embry-Riddle Aeronautical University, and the Florida Fish and Wildlife Conservation Commission as qualified to handle and properly identify wildlife. Amy conducted field surveys and wildlife hazard training at BQK during this WHA. She also reviewed this document.

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David has over 13 years of experience in the environmental consulting field. He is a certified Wildlife Biologist with The Wildlife Society. He completed the FAA-approved Airport Wildlife Hazard Management Workshop course at Embry-Riddle Aeronautical University (ERAU) in June 2010 and is currently qualifying to become a Qualified Airport Wildlife Biologist per A/C 150/5200-36B. David has received SIDA training and security authorization for badges at several airports. He has assisted Amy Johnson on several WHAs including: Ocala International Airport (OCF), Cecil Airport (VQQ), Jacksonville Executive at Craig Airport (CRG), and Malcolm McKinnon Airport (SSI). He is recognized by The Wildlife Society, Embry-Riddle Aeronautical University, and the Florida Fish and Wildlife Conservation Commission as qualified to handle and properly identify wildlife. David conducted field surveys at BQK and produced this report.

1.0 INTRODUCTION

Aircraft collisions with wildlife, also commonly referred to as wildlife strikes, cost the civil aviation industry an average of \$123 million dollars annually based on damage reported to the Federal Aviation Administration (FAA) Wildlife Strike Database. When taking into consideration that at least 60% of strikes are not reported, the cost could be as high as \$614 million dollars per year. Since 1990, there have been 54 civil aircraft either destroyed or damaged beyond repair. The economic costs of wildlife strikes can be extreme; however, the cost in human lives (23 fatalities since 1990) when aircraft crash because of a wildlife strike best expresses the need for a Wildlife Hazard Assessment (WHA) and the development of a Wildlife Hazard Management Plan (WHMP).

Per the strike database, the first reported bird strike was by Orville Wright in 1905 and 55 years later, the bird strike that resulted in the largest loss of life occurred on October 4, 1960. Eastern Air Lines Flight 375 was struck by a flock of European starlings during takeoff. All four engines were damaged and the aircraft crashed into Boston Harbor, resulting in 62 fatalities. Since the creation of the FAA Wildlife Strike Database, there have been almost 120,000 (Civil and U.S. Air Force) wildlife strikes (1990-2011). Since 1990, there have been a total of 23 fatalities and 257 injuries attributed to wildlife strikes with US civil aircraft.

A WHA is defined as an ecological study conducted by a wildlife biologist that provides the scientific basis for the development, implementation, and refinement of a WHMP.

According to the Code of Federal Regulations [CFR Part 139.337 (b)(1-4)], a WHA is mandated when any of the following events occurs on or near the airport:

- a. An air carrier aircraft experiences multiple wildlife strikes;
- b. An air carrier aircraft experiences substantial damage from striking wildlife;
- c. An air carrier aircraft experiences an engine ingestion of wildlife; or
- d. Wildlife of a size, or in numbers, capable of causing one of the above-mentioned events is observed to have access to any airport flight pattern or aircraft movement area.

In September 2011, Environmental Resource Solutions, Inc. (ERS) initiated a WHA at Brunswick Golden Isles Airport (BQK). ERS was tasked with evaluating the specific wildlife hazards known to exist on, or near, the airport. BQK is located in Brunswick, Georgia and is surrounded by residential and commercial development, forested uplands/wetlands, Federal Law Enforcement Training Center (FLETC), and open water ponds. BQK has reported 15 wildlife strikes since August 1995. Fortunately, only 1 of the strikes reported damage to aircraft. This strike reported on August 19, 1992, was with an unknown large bird and caused minor damage to the leading edge of the vertical stabilizer.

2.0 OBJECTIVES

The objectives of conducting the WHA at BQK are as follows (per CFR 139.337 (c)(1-5)):

1. Analyze the event or circumstances that prompted the study.
2. Identify the wildlife species observed, and their numbers, locations, local movements, and daily and seasonal occurrences.
3. Identify and locate features on and near the airport that attract wildlife.
4. Provide a description of the wildlife hazards to air carrier operations.
5. Recommend actions for reducing identified wildlife hazards to air carrier operations.
6. **This WHA does not authorize impacts to jurisdictional wetlands or critical habitat for protected species.**

3.0 BACKGROUND

3.1 Description of BQK and surrounding land uses

BQK, previously known as Glynco Jetport, is located approximately five miles north of the business district of Brunswick, a city in Glynn County, Georgia (Exhibit 1). BQK property is approximately 2,400 acres, county-owned, and is operated by Glynn County Airport Commission. It is located specifically at 31°15'32" North latitude and 81°27'59" West longitude. BQK experiences humid subtropical weather with an average low of 42°F, occurring in January and February, and the average high is 92°F, occurring in July and August. August exhibits the highest average rainfall of approximately 6.9 inches (<http://www.city-data.com/city/Brunswick-Georgia.html>, August 2012).

BQK is predominantly surrounded by residential and commercial development and forested uplands/wetlands (Exhibit 2); however, it should be noted that BQK is located along the coastline of Georgia and is in close proximity to the Intracoastal waterway, which includes: Buttermilk Sound to the northeast, Manhead Sound to the southeast, and Brunswick Sound to the southwest.

BQK experiences 28,000 aircraft movements annually (approximately 80 movements per day). It has one runway designated 7/25 with dimensions of 8,001 feet by 150 feet (2,439 m x 46 m) asphalt and concrete surface. Runway 7/25 is served by an Instrument Landing System (ILS) and a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) at approach. BQK has an active general aviation (GA) community and is also served by Delta Airlines. GA flights (both local and transient) make up 84% of total aircraft movements at BQK, with air taxi/commercial flights accounting for approximately 13% of total aircraft movements and military accounting for 2% of BQK operations (www.airnav.com, January 2013).

3.2 Identifying Wildlife Attractants

Wetlands/Surface Waters & Ditches

Wetlands/surface waters include natural forested and herbaceous wetlands, created wetland areas, man-made stormwater treatment ponds and ditches, and areas of standing water in the AOA. These areas are attractive to many species of wildlife, including wading birds, beavers, turtles, and alligators that depend on wetlands and surface waters for nesting, roosting, and foraging opportunities. Small mammals also use these areas for fresh water sources, thereby attracting larger predators, such as hawks, foxes, and coyotes.

Ditches provide preferable conditions for nesting waterfowl, especially if the vegetation along a ditch is allowed to grow and become dense. Vegetation in and along ditches provides ideal nesting habitat with access to food, water, and cover; the three essential factors wildlife need to survive and thrive. The presence of young waterfowl is attractive to a variety of larger predators, such as foxes, coyotes, and raccoons. Ditches also provide corridors for beavers and turtles to navigate from pond to pond. Common ditch vegetation includes cattail (*Typha* sp.), willow (*Salix* spp.), various rushes (*Juncus* spp.); and sedges (*Rhynchospora* spp.).

Open Grass Fields

Open grass fields provide good foraging habitat for many grassland species such as cattle egrets, sparrows, and meadowlarks. The FAA recommended height for grasses in the AOA is between 6 and 12 inches. Intermediate grass height disrupts inter-flock communication, obscures insect food sources, limits predator detection, impedes ease of movement, out-competes weedy vegetation, has a slower growth rate, and requires less frequent mowing. Grass fields also include substantial weedy vegetation (non-grass species) that is preferred by most wildlife. These “weeds” produce flowers and seeds that attract insects, birds, etc. However, true grasses (kept between 6 and 12 inches) are considered indigestible by most wildlife and therefore, not an eligible food source. Maintaining not only an intermediate grass height, but also a dense field of true grass, is recommended to help naturally eliminate these “weed” species.

Bare Areas

Bare areas include movement areas, mower ruts, access routes, and old operating surfaces. These areas can be highly attractive to gulls, as bare ground increases gulls’ visibility during storms. They also provide ideal nesting habitat for killdeer and serve as a food source for doves and pigeons (birds that must ingest grit to aid in digestion). Allowing vegetation to grow through cracks and/or voids in these surfaces makes these areas especially attractive and should be avoided.

Facilities & Structures

Facilities and structures include, but are not limited to, hangars, terminal buildings, antenna and radar systems, and runway/taxiway lights and signs. These areas are particularly attractive for perching and nesting. Many bird species, including hawks and crows, use these structures to perch and hunt for prey on the AOA. This not only leads to large birds crossing movement areas to travel

from their perches to their prey and back, but also leaves the structures covered in feces or "white wash".

Hangars and buildings provide excellent nesting sites for birds, particularly mourning doves, European starlings, swallows, and house sparrows. Building eaves, rooftops, chimneys, window sills, ledges, and any support beam structures are ideal places for these birds to build nests and raise young. These areas provide protection from the elements and predators, as well as supplying the adults with a near-by food source. Nesting not only creates a mess of bird feces and nesting materials, but also encourages a dramatic bird population increase on the airfield in the late summer when the nestlings will be ready to fledge (leave the nest). After fledging, the airport becomes their primary feeding grounds and they will be likely to build their own nests nearby in the following nesting season.

Airport Landscaping

Planted or maintained plants in landscape settings can produce food, harbor insects, and provide roosting, denning, and nesting opportunities, and thus attract a wide range of wildlife. Many species of birds are attracted to open water such as ponds, and often roost gregariously on certain trees or groups of trees near water sources. Large birds of prey prefer to survey from an exposed perch, as they are attracted to prey such as mice, rats, rabbits, and other birds. Since, these prey animals are, in turn, attracted by the food and shelter provided by the planted vegetation, consideration of plant selection, installation, design, and maintenance should be taken into account when attempting to reduce the population of incidental wildlife of all kinds. It is important to note that if the species is native, has large or bountiful fruit or seeds, dense growth, and is in close proximity to other attractants it will increase the likelihood of usage by wildlife. Natural, naturalistic, or dense and unmaintained settings are usually more productive and attractive to wildlife than highly maintained settings. In addition, for trees, horizontal branching and height also increase usage.

Trees with branching structure that is highly conducive to perching, roosting, or nesting, or those that are commonly used by birds for this purpose, are highly attractive. Oaks, specifically fall into this category and should be avoided. Shrubs, vines, and groundcover species are more desirable to wildlife based on the thickness of typical growth. Thickness of shrubs and groundcover influences the preference wildlife has for burrowing or nesting sites. Most importantly, plants commonly used for landscaping produce a high volume of mast, or food. For example, squirrels may eat buds, shoots, bark, seeds, and nuts. Raccoons and opossums eat fruit and nuts, often climbing the trees to get them. Deer and hogs eat fruit, seeds, and nuts on the ground. Coyotes will eat many kinds of fruit and nuts, and will of course eat any smaller animals they find eating such material. Some birds eat insects from rotting trees (woodpeckers). Some eat sap from living trees (sapsuckers). Others eat insects that live on and in trees, shrubs, and the ground, and still others eat fruit and berries. Some winter migrants eat berries that resident birds will not. Plants that attract insects (as a source of food, cover, or both) can be attractive to animals that eat insects and should be avoided. Airport landscaping must be analyzed for wildlife attractiveness before any planting takes place.

Man-made Waste

Human-produced garbage attracts a variety of wildlife species, including crows, raccoons, pigeons, and gulls. Outside of the terminal building, hangars, FBO, and restaurants are common places to find these species. Making sure all trash is properly disposed of and contained is a simple, but efficient, way to eliminate this potential attractant.

Small Mammals

Small mammals, including rats, mice, and rabbits, are not generally wildlife hazards, but rather are wildlife attractant risks. Large birds of prey (hawks, eagles, owls, falcons, etc.), which are potential strike hazards, are highly attracted to small mammals as prey. If there is an abundance of small mammals in a particular area, a significant number of predators are likely to be in the area as well. Small mammals make up the majority of most predator birds' diets.

Off-Airport Attractants

Wildlife hazards at airports frequently are attributable to off-site attractants, such as wetlands, restaurants, golf courses, parks/recreational facilities, and landfills. Birds and other wildlife will cross the airfield en route to these off-site attractants, causing a hazard within the AOA. FAA issued an Advisory Circular (A/C 150/5200-33B *Hazardous Wildlife Attractants on or Near Airports* on August 28, 2007) to identify land use practices that attract or sustain hazardous wildlife and recommend minimum separation criteria for those land uses to the vicinity of airports (Appendix A). FAA recommends a separation distance of at least 5,000 feet between hazardous wildlife attractants and airports serving piston-powered aircraft, at least 10,000 feet between attractants and airports serving turbine-powered aircraft, and a distance of five (5) miles between any airports' AOA and the hazardous wildlife attractant *if* the attractant could cause wildlife movement into or across the airspace. A/C 150/5200-33B outlines the following land uses as hazardous wildlife attractants: landfills, water management facilities, wetlands, spoil containment areas, agricultural activities, golf courses, and landscaping.

Historically, landfills have been of greatest concern as they attract very large numbers of vultures and gulls. For this reason, FAA issued an additional Advisory Circular on January 26, 2006 (A/C 150/5200-34A *Construction or Establishment of Landfills near Public Airports*) to provide guidance to airport operators, aviation planners, and local agencies on minimizing this specific wildlife attractant (Appendix B). In general, the A/C states that persons considering construction or establishment of a landfill must first determine its proximity to public airports. The A/C specifies a minimum separation distance of six (6) miles between a new landfill and a public airport.

3.3 History of Wildlife Strikes at BQK

Per A/C No. 150/5200-32A *Reporting Wildlife Aircraft Strikes* (Appendix C), a wildlife strike has occurred when:

1. A pilot reports striking one or more birds or other wildlife;
2. Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;
3. Personnel on the ground report seeing an aircraft strike one or more birds or other wildlife;
4. Bird or other wildlife remains, whether in whole or in part are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified; or
5. The animal's presence on the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, or aircraft left pavement area to avoid collision with animal).

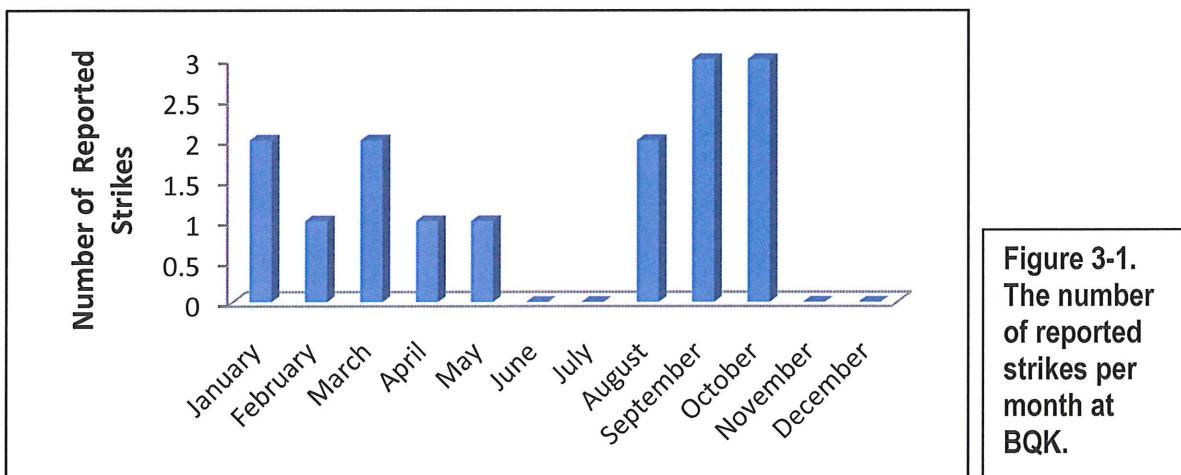
According to the FAA National Wildlife Strike Database (<http://wildlife.faa.gov>), BQK has reported 15 wildlife strikes from April 1, 1995 through May 7, 2012. The following table summarizes the (reported) strike history at BQK.

Table 1: Reported wildlife strikes at BQK from April 1995 through May 2012 (according to the FAA National Wildlife Strike Database). Strikes with minor or uncertain damage (1) are highlighted in pink.

Date	Species	Number Struck	Damage	Comments
8/19/1992	Unknown bird – Large	1	Minor	Small dent in leading edge of vertical stabilizer.
8/12/1999	Unknown bird – Medium	1	None	Airport Facility Directory has note regarding birds in the area.
3/9/2009	Eastern Meadowlark	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
8/25/2009	Killdeer	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
9/10/2009	Killdeer	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
10/12/2009	Brown-headed Cowbird	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.

Date	Species	Number Struck	Damage	Comments
2/7/2010	Unknown bird – Small	1	None	Aircraft inspected by flight crew upon arrival in Atlanta. No damage found.
3/8/2010	Killdeer	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
9/6/2011	Mourning Dove	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
9/11/2011	Snowy Egret	1	None	Bird found on RWY during night RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
10/14/2011	Sparrows	Unknown	None	Military Aircraft. Strike reported by BASH.
10/20/2011	Wilson's Snipe	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
1/10/2012	Eastern Meadowlark	1	None	Bird found on RWY during morning RWY inspection. Bird strike had not been reported to airport staff the day of strike. Bird identified by Smithsonian.
1/26/2012	Mourning Dove	1	None	Bird found on RWY during morning RWY inspection. Bird strike was reported to airport staff the day of strike. Bird identified by Smithsonian.
5/7/2012	Cattle Egret	1	None	Bird identified by Smithsonian.

According to the database, most reported strikes correspond to the fall migrations, specifically September and October (Figure 3-1).



To analyze the bird data, the various species were organized into groups. The groupings were based on similar behavior and/or habitat preferences, and not necessarily species relationships. These groupings are explained further in the Results section. For a list of all bird groups and associated species, see Appendix D. The most commonly identified species group struck at BQK, according to the FAA strike data, is Shorebirds (Figure 3-2). The shorebirds category was composed of three Killdeer strikes and one Wilson's snipe strike. Together, this group makes up 27% of all reported BQK strikes. This data may be skewed; however, since 20% of all strikes listed an "unknown" species.

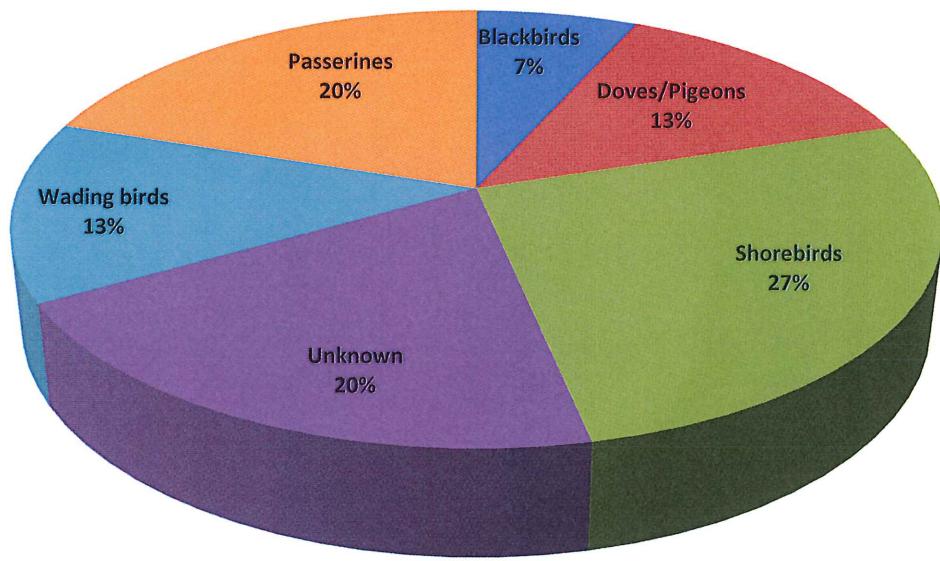


Figure 3-2. Percentage of wildlife strikes at BQK divided into species groups. Note that 27% of all strikes are listed as shorebird species.

Fortunately, a majority of the strikes at BQK (93%) reported there was no damage to the aircraft or passengers (Figure 3-3). However, there was one strike reported that resulted in minor amount of damage to the aircraft.

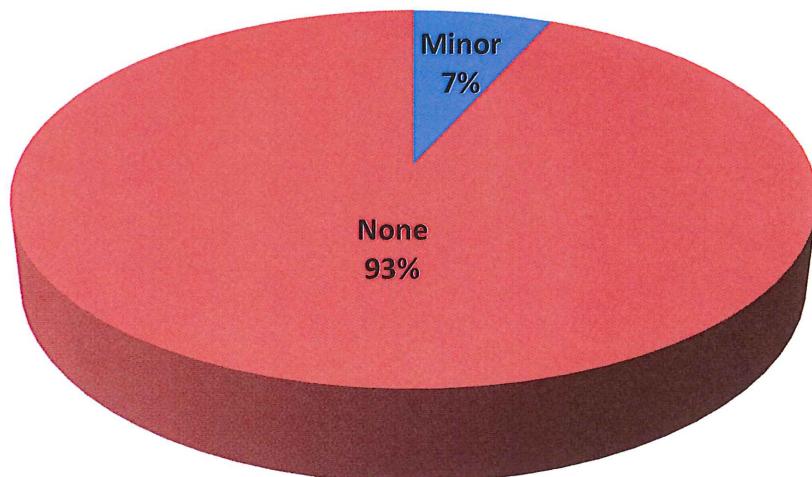


Figure 3-3.
Percentage of strikes at BQK with severity of damage to aircraft. Note 7% of strikes reported minor damage to aircraft as a result of the strike.

3.4 Existing wildlife hazard management techniques at BQK

Passive management techniques utilized by BQK staff prior to/during this WHA include regular mowing, perimeter fence inspections, and repairing fence breaches. BQK staff also utilized several active management techniques prior to starting this WHA. Lethal takings (shooting) and trapping have been used on deer, coyote, and other mammals (e.g. skunks, beaver, etc.) when necessary. In addition, operations personnel regularly use pyrotechnics ("bird bangers and screamers") to harass/disperse hazardous wildlife away from the airfield, particularly flocking birds such as American crows, cattle egrets, and Canada geese.

4.0 LEGAL STATUS OF WILDLIFE AND REQUIRED PERMITS

Approximately 90% of all bird strikes involve species protected under the United States Fish and Wildlife Service (USFWS) Migratory Bird Treaty Act of 1918 (MBTA). A copy of the MBTA is included as Appendix E. A migratory bird is defined as any species of bird that lives, reproduces, or migrates within or across international borders at some point during their life cycle. The MBTA makes it illegal for people to "take" migratory birds, their eggs, feathers, or nests without necessary permits. "Take" is defined as any attempt at hunting, pursuing/harassing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. In total, 836 bird species are protected by the MBTA, including bald eagles, crows, cattle egrets, and vultures. The USFWS issues a Depredation Permit to airports that allow the take of migratory birds that pose a threat to human safety. BQK currently possesses a USFWS Depredation Permit (see Appendix F). It is renewed on an annual basis and expires December 31, 2013.

The Endangered Species Act of 1973 (ESA) also protects over 1,800 species of flora and fauna throughout the United States (see Appendix G). Although Incidental Take Permits (ITP) can be

issued by USFWS allowing for the taking of federally endangered and threatened species, these permits are more difficult to obtain. Killing of endangered species should be avoided; however, public safety is still paramount. USFWS has signed a Memorandum of Agreement (MOA) with FAA, and other federal agencies, acknowledging the risk that wildlife strikes pose to safe aviation and agreeing to coordinate their missions to more effectively address environmental conditions contributing to aircraft-wildlife strikes (Appendix H). To date, no federally endangered species have been struck at BQK, nor does BQK currently possess a USFWS ITP. The only Federal/State listed species that was observed at BQK during this WHA was the wood stork (*Mycteria Americana*). Wood storks are listed as Endangered by both the USFWS and Georgia Department of Natural Resources (GDNR). Additional species protected by the ESA that have the *potential* to be struck at BQK are: the piping plover (*Charadrius melanotos*) in St. Simons Island, Glynn County; Kirtland's warbler (*Dendroica kirtlandii*) with sightings on St. Simons Island, Glynn County; red-cockaded woodpecker (*Picoides borealis*) with the nearest population in Okefenokee National Wildlife Refuge, Charlton, Ware, and Clinch Counties; and the Florida panther (*Felis concolor coryi*) with the closest known occurrence is in Troup County (where one was shot by a hunter in 2008).

The Bald and Golden Eagle Protection Act of 1940 (BAGEPA) adds another layer of protection to native eagles (Appendix I). Although the bald eagle is no longer listed as an endangered species, and therefore not protected by the ESA, they are still afforded protection under MBTA and BAGEPA. BAGEPA prohibits anyone (without a permit) from taking, possessing, selling, purchasing, bartering, offering to sell, purchase, or barter, transporting, exporting or importing eagles, alive or dead, including their parts, nests, or eggs. BAGEPA defines "take" as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" an eagle. Furthermore, "disturb" is defined as "to agitate or bother an eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

The GDNR has regulatory authority over BQK's wildlife within the state. They do not require additional permits for taking migratory birds as long as BQK is operating under a current USFWS Depredation Permit. However, GDNR is responsible for regulating hunting and the take of other mammals. BQK has obtained a Depredation Permit from GDNR to legally control deer and coyote on the airfield (Appendix J). BQK does not have permission to take Federal or State listed species. For a complete list of protected species provided by GDNR please see Appendix K.

5.0 METHODOLOGY

Prior to conducting the WHA, ERS reviewed pertinent background information to gain familiarity with the natural surroundings that might imply the types of wildlife that may be expected to cause hazards. True color aerial photography [source: Bing Maps (2012) obtained from ArcGIS Online] aided in the assessment process. The current aerial photographs provided an overall view of the airport property in relation to its natural surroundings or manmade facilities (e.g. landfills) that may pose as wildlife hazards. Once the remote data sources were reviewed, the information was summarized and used as reference material during the airport personnel interviews and field assessments.

The ERS Team conducted interviews with the airport director, airport operations, and airport maintenance staff, and collected wildlife strike data from the FAA Wildlife Strike Database along with observation accounts from BQK staff to determine previous wildlife observations or strike occurrences. At the time of the interviews, ERS also conducted a detailed site visit of BQK property to gain knowledge of property boundaries, fencing locations, and to inspect areas where previous wildlife observations have occurred. This effort was initiated in September 2011.

ERS initially determined the location of fourteen (14) monitoring stations which would be routinely inspected during the monitoring iterations (Photo 5-1). The stations were chosen based on the potential for wildlife hazards in the areas comprising desirable habitat such as wetlands, forested areas within and adjacent to the perimeter fence, perching/nesting structures, areas of inundation, bare areas and herbaceous fields.

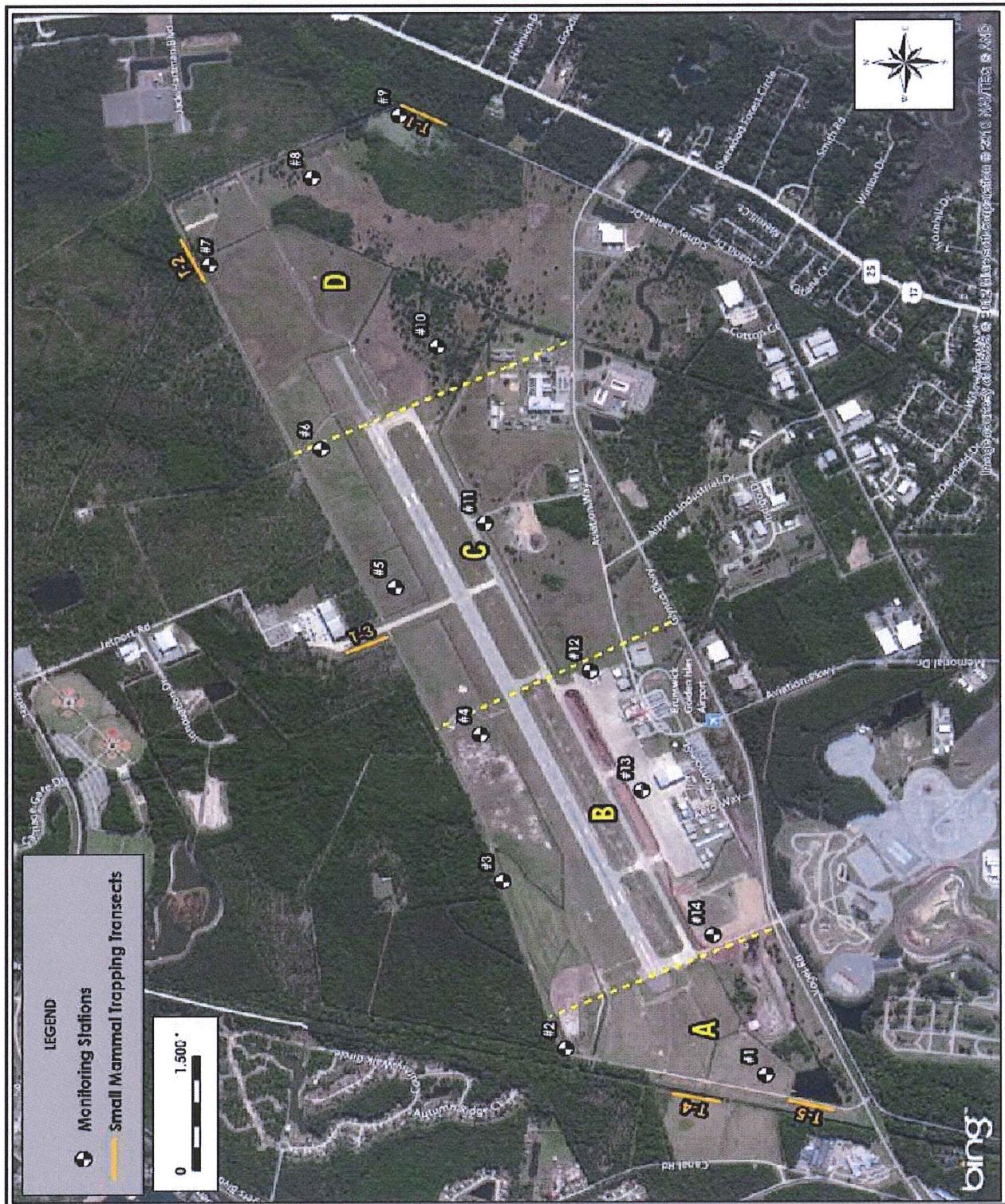


Photo 5-1. BQK Monitoring Stations (#1 through #14), Wildlife Zones (A through D), and Small Mammal Trapping Transect locations (T1 through T5).

Station 1

Station 1 is located at the western side of the air field, near a pond site (Photo 5-2). The habitat in this area includes mowed grass, open water, ditches, Altamaha-Brunswick Canal, paved trail road, and forested areas. The approach of runway 7 was easily observed from this location. Station 1 is in Zone A.



Photo 5-2. View from Station 1 facing southwest. Photo depicting cattle egrets perched on a snag at the pond's edge.

Station 2

Station 2 is located north of the approach end of Runway 7. Habitat in this area includes a mowed grass, ditches, runway, and woodlands. Station 2 is in Zone A.

Station 3

Station 3 is located along the northern fence line at the edge of the forested woodlands. This point provides a clear view of the majority of the airfield, intersection of two ditches, and open grass areas adjacent to Runway. Station 3 is in Zone B.



Station 4

Station 4 is located along the northern fence line, near the midpoint of Runway 7/25 (Photo 5-3). Habitats in this area include mowed grass, ditches, and forested woodlands. Station 4 is in Zone B.

Photo 5-3. View from Station 4 facing south. Photo shows view of terminal.

Station 5

Station 5 is near the Stambaugh Aviation, Inc. hangar, along the northern fence line. This station provides a view of the intersection of Stambaugh's taxiway and Runway 7/25, wood line, ditches, and mowed grass areas. Station 5 is in Zone C.

Station 6

Station 6 is located at the approach end of Runway 25. This location provides a good view of the runway approach, wood line, ditches, and mowed grass areas. Station 6 is on the border of Zone C and D.

Station 7

Station 7 is located along the northern fence line, near a small forested area (Photo 5-4). This station provides views of the small forest area, mowed grass areas near glide path of Runway 25, and ditches. Station 7 is in Zone D.



Photo 5-4. View from Station 7 to the southeast. View shows small forested area along ditch.

Station 8

Station 8 is located eastern end of the airport between two large forested wetlands. This station has a view of both forested wetlands, mowed grass areas, and a forested oak area. Station 8 is in Zone D.

Station 9



Station 9 is located on the eastside of the airport, along the perimeter fence. This station provides views of the large vegetated marsh (Photo 5-5). Many wading birds, beavers, and white tailed deer are frequently observed at this station. Station 9 is in Zone C.

Photo 5-5. View from Station 9 to the northeast. Photo depicts view of open vegetated marsh.

Station 10

Station 10 is positioned just south of the approach of Runway 25, within a sparsely forested pine/oak area. This station has views of mowed grass areas, ditches, forested area, and approach of Runway 25. Station 10 is in Zone D.



Photo 5-6. View from Station 11 to the north. Photo depicts red-shouldered hawk perching on the top of the stop sign at the intersection of the maintenance road and Taxiway A.

Station 11

Station 11 is located at the intersection of the maintenance road and Taxiway A (Photo 5-6). This station provides views of the both Taxiway A and Runway 7/25, mowed grass areas, and forested wetland system to the south. Station 11 is in Zone C.

Station 12

Station 12 is located at the eastern end of the terminal tarmac. This station provides views of the terminal tarmac, Taxiway A, Runway 7/25, mowed grass areas, and associated hangers. Station 12 is on the border of Zones B and C.

Station 13

Station 13 is located within the mowed grass infield between Runway 7/25 and Taxiway A. This station provides views of the entire terminal tarmac, Taxiway A, Runway 7/25, mowed grass areas, and associated hangers (Photo 5-7). Station 13 is in Zone B.



Photo 5-7. View from Station 13 to the north. Photo depicts several Turkey Vultures riding an air thermal directly above Runway 7/25.

Station 14

Station 14 is located south of the approach of Runway 7, near the intersection of the service road and Taxiway A. This station provides a view of Taxiway A, approach of Runway 7, mowed grass areas, dry retention pond, and wooded areas to the west. Station 14 is on the border between Zones A and B.

The bulk of the WHA was spent conducting twelve months of surveys to identify the species utilizing BQK property, seasonal variation in species occurrence, and species movements and patterns on-site, as well as off-site.

The survey methods included:

a) Fixed-Point Surveys: Amy Johnson, ERS' Qualified Airport Wildlife Biologist, and David Yow, ERS' Certified Wildlife Biologist, conducted fixed-point surveys bi-weekly for one year (September 2011 through September 2012) at pre-determined "Monitoring Stations". The monitoring stations are located along a survey circuit throughout the BQK AOA (Photo 5-1/Exhibit 3). Each bi-weekly survey consisted of three separate surveys (one each at dawn, midday, and dusk) conducted over a two day period. Morning surveys began at dawn (approximately 15 minutes before sunrise) and dusk surveys started approximately 2 hours prior to sunset. Midday surveys took place between 10:00 am and 2:00 pm and lasted approximately 1-2 hours. Starting points along the circuit were always chosen randomly. Bird counts took approximately 2 hours to complete. A minimum of 48 dawn and dusk fixed-point surveys were conducted during the WHA at BQK. The biologists recorded all species observations within a 5 minute interval at each observation station. All observations are recorded on an "Airport Observation Sheet" (Appendix L). One survey iteration is defined as, a visit to each observation station on the survey circuit for the designated time interval. Binoculars were used to observe and identify species.

An assumption of this survey method is that all birds are seen and identified. This assumption was likely defied due to the presence of small, solitary species that occasionally went unnoticed, or were too fleeting for a positive identification. However, the intent of the survey was to record the occurrence and behavior of larger-bodied and/or flocking birds that pose a risk to aircraft, therefore this oversight is acceptable.

b) General Observations: General observations included any incidental wildlife observations made when not conducting a fixed-point survey at a station, e.g., observations made while traveling between stations or while conducting other activities on BQK property. These observations were recorded and included in the WHA report. General observations also include an inspection of the interior and exterior perimeter fences adjacent to the AOA.

c) Night Spotlight Surveys: Spotlight surveys were conducted once or twice a month following a fixed-point dusk survey, approximately 1-2 hours after sunset. Biologists drove along runways, taxiways, and service and perimeter roads on BQK property, and recorded all wildlife observations. A minimum of 18 spotlight surveys were conducted during the WHA at BQK.

d) Small-mammal Transects: ERS established several small-mammal trapping transects in order to determine the presence or absence of small mammals on the airfield. Ten (10) Sherman live-traps were set along five transects, for a total of 50 traps (See Exhibit 3 for a map of the transect locations). Small-mammal transects were surveyed twice during the 12 month assessment, once each during the spring and fall seasons. Transects T1 through T5 were surveyed in both spring and fall 2012. Small-mammal data was recorded and is included in the WHA.

In addition to individual species, habitat types, and human activities, other environmental factors influence the occurrence of potentially hazardous wildlife at BQK. FAA AC No. 150/5200-33B

Hazardous Wildlife Attractants On or Near Airports (Appendix A) provides guidance to help identify potential attractants on-site. To identify these wildlife attractants and their locations, ERS also utilized the following data sources and on-site reconnaissance:

- a) Recent aerial photographs: ERS reviewed aerial photographs of BQK and the surrounding area to gain information regarding the location of on-site and nearby wetlands and surface waters, as well as the location of other potential wildlife attracting features in the surrounding areas. Of particular interest were the three adjacent Intracoastal waterways, Buttermilk Sound to the northeast, Manhead Sound to the southeast, and Brunswick Sound to the southwest (Exhibit 2). All of these are potential wildlife attractants that may promote the presence of wildlife and the movement of wildlife on or over the airfield.
- b) Interviews with airport personnel: David Yow of ERS conducted brief meetings with BQK airport personnel throughout the assessment to become more familiar with specific wildlife issues and obtain a general idea of any daily and/or seasonal patterns that airport personnel have had the opportunity to observe.
- c) Habitat observations during the fixed-point surveys: While conducting the fixed-point surveys and traveling between the monitoring stations, ERS biologists took note of ditches, overgrown vegetation, low areas on the airfield, fence breaches, trees (also towers and signage) suitable for nesting or roosting on or near the airfield, and food sources (crayfish, small mammals, waste, etc.) that could potentially attract wildlife on BQK property. All of the observations were noted.
- d) General inspections of on-site and off-site areas: On-site inspections included inspections of the hangars and other buildings or structures on the airfield that contained nesting or roosting sites; inspection of dumpsters and other waste receptacles that may be attracting small mammals and birds. Off-site inspections of open water bodies, surrounding woodlands, and marsh areas, etc. were observed periodically throughout the assessment.

6.0 RESULTS

During the WHA, a minimum of 66 species of birds, 14 species of mammals, and 5 species of reptiles were observed and identified on or adjacent to the AOA.

6.1 Birds

A minimum of 66 species of birds were observed at BQK from September 2011 through September 2012. There are 3 categories listed below of “unidentified species”. These birds were identified to species group (e.g. “unidentified Duck” or “unidentified hawk”) and; therefore, could still be included in the data set. See Table 2 for a complete list of species.

Table 2: Bird species observed at BQK during this WHA (September 2011 through September 2012), including scientific name, alpha code, bird group, number of individuals, and average flock size.

Common Name	Scientific Name	Alpha Code*	Group	Number of Individuals	Average Flock Size
American Kestrel	<i>Falco sparverius</i>	AMKE	Raptors	43	1
American Bittern	<i>Botaurus lentiginosus</i>	AMBI	Wading Bird	1	1
American Crow	<i>Corvus brachyrhynchos</i>	AMCR	Corvids	336	3
American Goldfinch	<i>Spinus tristis</i>	AMGO	Passerines	30	30
American Robin	<i>Turdus migratorius</i>	AMRO	Passerines	1719	59
Anhinga	<i>Anhinga Anhinga</i>	ANHI	Waterfowl	2	1
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BAEA	Raptors	3	1
Barred Owl	<i>Strix varia</i>	BADO	Raptors	4	1
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	BCNH	Wading Birds	1	1
Belted Kingfisher	<i>Megaceryle alcyon</i>	BEKI	Waterfowl	2	1
Brown-headed Cowbird	<i>Molothrus ater</i>	BHCO	Blackbirds	375	38
Blue Grosbeak	<i>Passerina caerulea</i>	BLGR	Passerines	1	1
Black Vulture	<i>Coragyps atratus</i>	BLVU	Raptors	29	3
Black-necked Stilt	<i>Himantopus mexicanus</i>	BNST	Wading Birds	25	25
Brown Thrasher	<i>Toxostoma rufum</i>	BRTH	Passerines	3	2
Boat-tailed Gackle	<i>Quiscalus major</i>	BTGR	Blackbirds	90	23
Cattle Egret	<i>Bubulcus ibis</i>	CAEG	Wading Birds	1862	23
Canada Goose	<i>Branta Canadensis</i>	CANG	Waterfowl	160	18
Chimney Swift	<i>Chaetura peligica</i>	CHSW	Aerial Foragers	30	4
Cooper's Hawk	<i>Accipiter cooperii</i>	COHA	Raptors	1	1
Common Moorhen	<i>Gallinula chloropus</i>	COMO	Waterfowl	10	2
Common Nighthawk	<i>Chordeiles minor</i>	CONI	Aerial Foragers	11	1
Double Crested Cormorant	<i>Phalacrocorax auritus</i>	DCCO	Waterfowl	15	5
Eastern Kingbird	<i>Tyrannus tyrannus</i>	EAKI	Passerines	4	2
Eastern Meadowlark	<i>Sturnella magna</i>	EAME	Passerines	359	7
Eastern Phoebe	<i>Sayornis phoebe</i>	EAPH	Passerines	2	1
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	EATO	Passerines	1	1
European Starling	<i>Sturnus vulgaris</i>	EUST	Blackbirds	349	16
Fish Crow	<i>Corvus ossifragus</i>	FICR	Corvids	2	2
Great Blue Heron	<i>Ardea herodias</i>	GBHE	Wading Birds	31	1
Great Horned Owl	<i>Bubo virginianus</i>	GHOW	Raptors	1	1
Glossy Ibis	<i>Plegadis falcinellus</i>	GLIB	Wading Birds	30	30
Gray Catbird	<i>Dumetella carolinensis</i>	GRCA	Passerines	1	1
Great Egret	<i>Ardea alba</i>	GREG	Wading Birds	47	2

Common Name	Scientific Name	Alpha Code*	Group	Number of Individuals	Average Flock Size
Green Heron	<i>Butorides virescens</i>	GRHE	Wading Birds	5	1
Herring Gull	<i>Larus argentatus</i>	HERG	Gulls	1	1
House Finch	<i>Carpodacus mexicanus</i>	HOFI	Passerines	40	20
Hooded Merganser	<i>Lophodytes cucullatus</i>	HOME	Waterfowl	12	2
House Sparrow	<i>Passer domesticus</i>	HOSP	Passerines	45	23
Killdeer	<i>Charadrius vociferous</i>	KILL	Shorebirds	173	6
Little Blue Heron	<i>Egretta caerulea</i>	LBHE	Wading Birds	3	1
Loggerhead Shrike	<i>Lanius ludovicianus</i>	LOSH	Passerines	1	1
Mississippi Kite	<i>Ictina mississippiensis</i>	MIKI	Raptors	44	5
Mourning Dove	<i>Zenaida macroura</i>	MODO	Doves/Pigeons	886	7
Northern Cardinal	<i>Cardinalus cardinalus</i>	NOCA	Passerines	4	4
Northern Harrier	<i>Circus cyaneus</i>	NOHA	Raptors	2	1
Northern Mockingbird	<i>Mimus polyglottos</i>	NOMO	Passerines	10	1
Osprey	<i>Pandion haliaetus</i>	OSPR	Raptors	8	1
Pied-billed Grebe	<i>Podilymbus podiceps</i>	PBGR	Waterfowl	14	2
Pileated Woodpecker	<i>Dryocopus pileatus</i>	PIWO	Passerines	2	2
Ringed-billed Gull	<i>Larus delawarensis</i>	RBGU	Gulls	15	15
Rock Dove/Pigeon	<i>Columba livia</i>	ROPI	Doves/Pigeons	10	2
Royal Tern	<i>Thalasseus maximus</i>	ROYT	Gulls	1	1
Red-shouldered Hawk	<i>Buteo lineatus</i>	RSHA	Raptors	14	1
Red-tailed Hawk	<i>Buteo jamaicensis</i>	RTHA	Raptors	29	1
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	RWBL	Blackbirds	476	11
Snowy Egret	<i>Egretta thula</i>	SNEG	Wading Birds	6	1
Turkey Vulture	<i>Cathartes aura</i>	TUVU	Raptors	374	4
Unidentified Duck	Anatinae (gen, sp)	UNDU	Waterfowl	15	3
Unidentified Hawk	Accipitridae (gen, sp)	UNHA	Raptors	1	1
Unidentified Sparrow	Emberizidae (gen, sp)	UNSP	Passerines	60	20
Unidentified Swallow	<i>Tachycineta (gen, sp)</i>	UNSW	Aerial Foragers	1108	25
White Ibis	<i>Eudocimus albus</i>	WHIB	Wading Birds	33	17
Wild Turkey	<i>Meleagris gallopavo</i>	WITU	Game Birds	33	2
Wood Duck	<i>Aix sponsa</i>	WODU	Waterfowl	153	5
Wood Stork	<i>Mycteria Americana</i>	WOST	Wading Birds	5	1

*Bird species are listed here by Four-letter (English Name) Alpha Codes for 2055 Bird Species prepared by Peter Pyle and David F. DeSante at The Institute for Bird Populations (www.birdpop.org).

To analyze the bird data, the various species were organized into groups. The groupings were based on similar behavior and/or habitat preferences, and not necessarily species relationships. For example, hawks and vultures were grouped together as "Raptors". The "Passerines" group comprises northern cardinals, eastern meadowlarks, northern mockingbirds, brown thrashers, sparrows, etc. While some of these birds may be taxonomically different and have different diets, they typically behave in similar ways and are found in similar vegetative habitats. For a list of all bird groups and associated species, see Appendix D. Tracking birds of similar behavioral characteristics was important in determining which species of birds were most likely to be involved in bird-aircraft strikes. Also, birds of similar behavior tend to respond to the same control methods such as habitat modification, hazing, or types of exclusion. For each group, descriptions, attractants, risks, legal status, location, control measures, and strike history are presented. Groups appear in the order of most abundant to least abundant at BQK; however, that does not imply that groups which were observed infrequently were less of a strike hazard. Although the biologists attempted to identify all wildlife to the species level, this was not always possible.

The species diversity observed at BQK was typical for the region. Most of the species recorded are common residents of, or migrants through, Georgia. The most commonly observed group of birds at BQK were raptors (vultures, hawks, eagles, and kestrels), followed by wading birds, doves/pigeons, passerines, corvids, black birds, waterfowl, aerial foragers, shorebirds, game birds, and gulls (Figure 6-1).

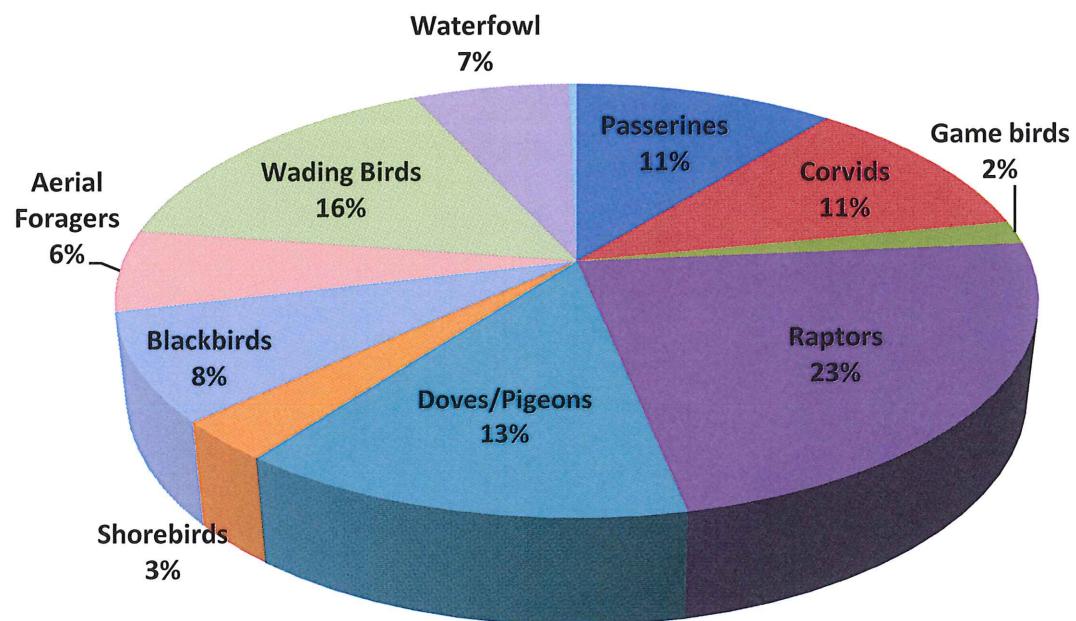


Figure 6-1. Number of sightings per each bird group observed at BQK from September 2011 to September 2012. Gulls are not labeled as they total less than 0% of all observations.

However, when looking at the number of individuals counted on and around BQK, passerines make up a quarter (25%) of all the birds counted (Figure 6-2). Passerines are followed by wading birds, blackbirds, aerial foragers, doves/pigeons, raptors, corvids, waterfowl, shorebirds, game birds and gulls.

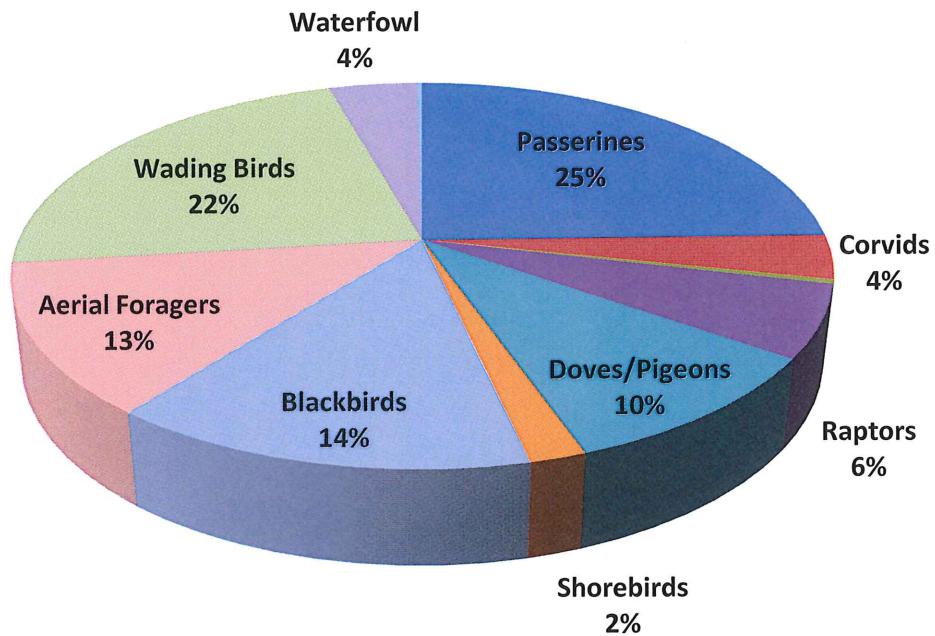


Figure 6-2. The number of individuals counted per each bird group at BQK from September 2011 to September 2012. Gulls are not labeled as they total less than 0% of all birds counted.

DeVault, et. al. (2011) ranked 77 bird and mammal species (1 being the most hazardous, 77 being the least hazardous) as to relative individual hazard to aircraft in airport environments (i.e. less than 500 feet AGL) and termed this as the composite rank. Composite rank was determined based on 3 variables: the percentage of total strikes for that species that caused damage, the percentage of total strikes that caused substantial damage and the percentage of strikes that caused an effect on flight for strikes that occurred in the United States from 1990 to 2009. From these ranks, a Relative Hazard Score (RHS) was calculated by summing the scores of the 3 hazard criteria (% of strikes with damage, % of strikes with substantial damage, and % of strikes with a negative effect on flight) for each species (or species-group) and scaling to a maximum of 100. Mule deer were determined the most hazardous wildlife species in the U.S. and therefore given the highest score, 100. All other wildlife were ranked in relation to the mule deer.

Table 3 provides a list of the top 16 species most frequently observed (by count) by the ERS team at BQK and the total number of individuals counted for each category in order of corresponding RHS. The top 16 species listed in this table accounted for 82% of all individuals counted at BQK. Using the factors outlined by DeVault et. al. (2011) and the number of individuals counted per

species (or species-group) during the WHA, ERS determined Relative Risk Values for the species specific to BQK.

Table 3. Most frequently observed species (top 16) by Relative Hazard Score (DeVault, et. al., 2011). Species are scored from 0 to 100 with 100 being the most hazardous score.

Species	Alpha Code	Number of Individuals Counted	Relative Hazard Score
Wood Duck	WODU	153	48
Turkey Vulture	TUVU	374	44
Wild Turkey	WITU	33	40
Great Blue Heron	GBHE	31	31
Great Egret	GREG	47	28
Red-tailed Hawk	RTHA	29	25
Cattle Egret	CAEG	1862	23
American Crow	AMCR	336	12
Mourning Dove	MODO	886	10
Red-winged Blackbird	RWBL	476	9
European Starling	EUST	349	9
Killdeer	KILL	173	7
American Kestrel	AM.KE	43	6
American Robin	AMRO	1719	5
Eastern Meadowlark	EAME	359	5
Unidentified Swallows	UNSW	1108	1

Risk values were then calculated for the above listed species by using the following equation:

$$\text{Relative Risk Value} = (N) (\text{RHS}) (\text{frequency of strikes})$$

N = total number of individuals counted for each species

RHS = Relative Hazard Score outlined above (DeVault, et. al., 2012)

Frequency of strikes = number of strikes recorded in FAA National Wildlife Strike Database from 1990 through 2009 that occurred at or below 500 ft AGL divided by the total number of species identified strikes that meet the criteria (23,503 strikes total, recorded in DeVault, et. al., 2011)

The top 10 most hazardous species at BQK are listed and ranked from highest risk value to lowest.

Table 4. The top 10 most hazardous species or species-groups at BQK ranked from highest relative risk value to lowest.

Rank	Species	Number of Individuals Counted (N)	Relative Hazard Score (RHS)	Frequency of Strikes	Relative Risk Value
1	Mourning Dove	886	10	0.0559	495
2	Cattle Egret	1862	23	0.0068	206
3	European Starling	349	9	0.0599	188
4	Red-winged Blackbird	476	9	0.0415	178
5	Turkey Vulture	374	44	0.0068	112
6	American Robin	1719	5	0.0068	58
7	Killdeer	173	7	0.0235	28
8	Eastern Meadowlark	359	5	0.0154	28
9	Wood Duck	153	48	0.0033	24
10	American Crow	336	12	0.0060	24

Based on the calculated Relative Risk Value, mourning doves were determined to be the most hazardous bird species at BQK. The Relative Risk Value reveals that mourning doves are approximately 2.5 times more hazardous at BQK than cattle egrets and 10 times more hazardous at BQK than the American crow (least hazardous on Table 4). It is important to note that the risk values above are relative to the other species listed on the table and are only valid at BQK because they are based on the number of observations of each species at BQK. They only depict relationships between the species observed at BQK using the risk severity for each species (RHS) and the risk likelihood for each species (how often they're struck nationally x how often they occur at BQK).

The greatest number of observations at BQK occurred during the spring (Figure 6-3), with the greatest number of total observations recorded in May. This is likely due to spring migrations. Many birds return north for the summer during this time. Also, species are flocking less at this time of year to prepare for nesting season (i.e. they are forming mated pairs).

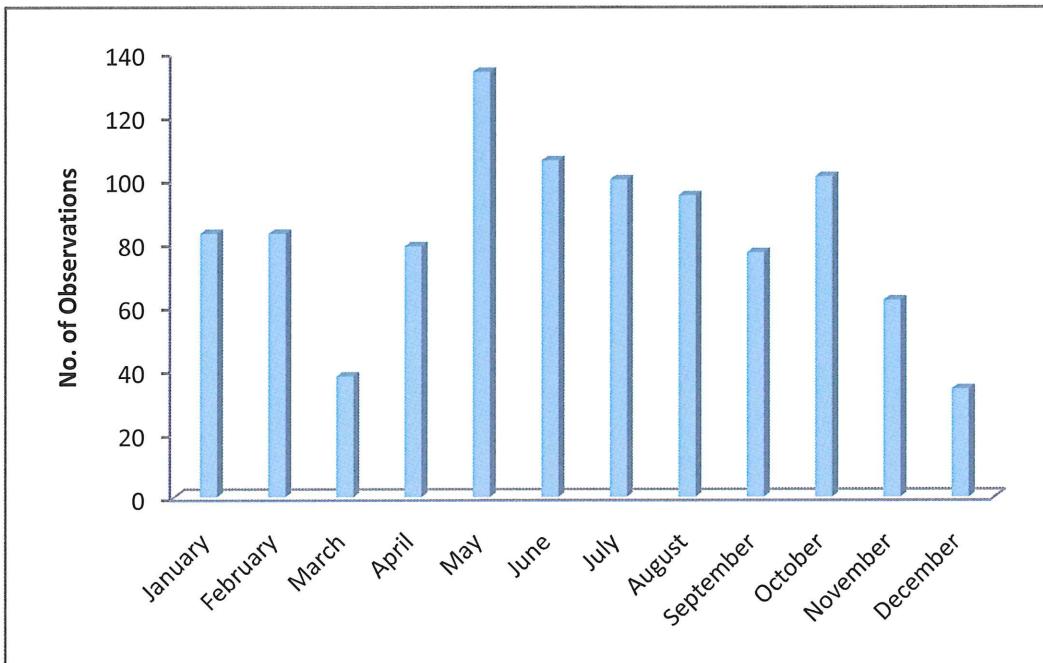
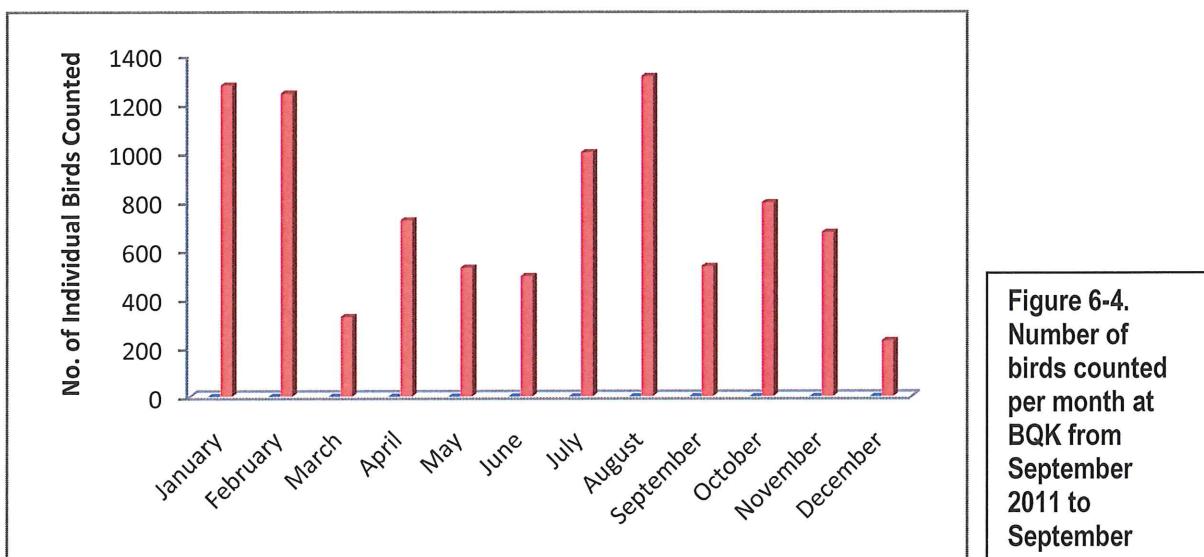


Figure 6-3. The number of bird observations made per month at BQK from September 2011 to September 2012.

However, when looking at the number of individual birds counted during each month (Figure 6-4), a large number of individuals were counted during January and February, with the highest counts in August. This spike in August is due to the combination of large flocks of cattle egrets that follow the late summer grass mowers and the beginning of the fall migration.



The majority of birds were observed in Zone B (Figure 6-5). Zone A includes the approach end of Runway 7, Zone B includes western half of the runway/taxiway A, and associated airport hangars and terminal, Zone C includes eastern half of the runway/taxiway A, and Zone D encompasses the approach end of Runway 25, the localizer road, and the adjacent wetland.

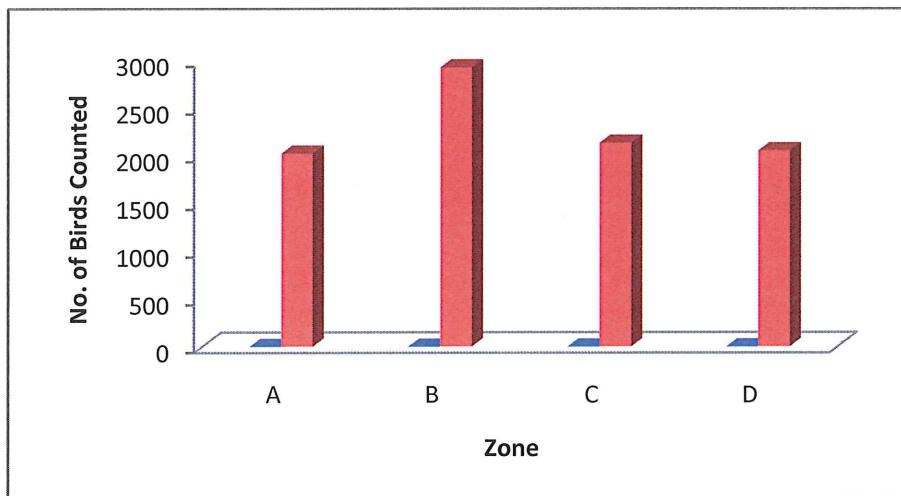


Figure 6-5. The number of birds counted per Monitoring Zone at BQK from September 2011 to September

Among the various available habitats at BQK, the majority of birds (59%) were observed on or over the short grass, which encompasses the majority of the AOA infields and safety areas (Figure 6-6). Birds were observed crossing the entire AOA, meaning they flew over a majority of the airfield, 18% of the time. Birds were also observed flying over or perching on trees within the woodlands (8%), loafing or flying over the taxiway (3%), and loafing, perching or swimming in the ditches (3%). Approximately 3% of birds were seen perching on structures throughout the AOA (e.g. directional signs, antennas, hangars, perimeter fence, etc.).

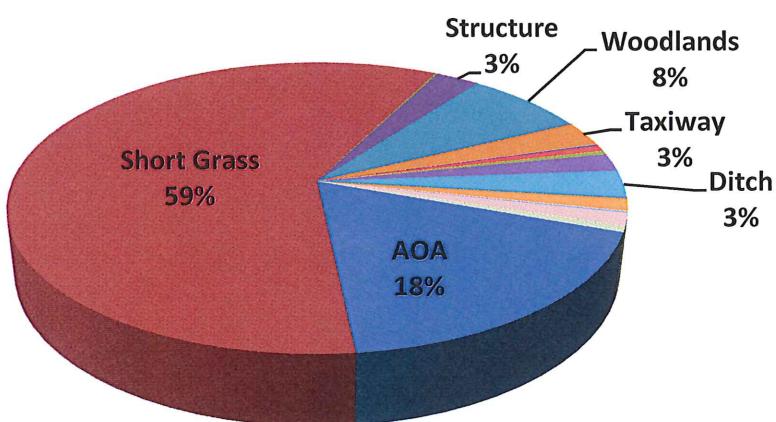


Figure 6-6. The percentage of total birds observed per each location at BQK. Runways, ramp, trees/shrubs, asphalt, pond, temporary standing water, and unpaved surfaces are not labeled because they each accounted for less than 2% of observations.

Behavior of all birds at BQK was recorded with each observation (Figure 6-7). Flying (locally) can be defined as: hunting aerially, flying from one part of the airfield to another, defending territories, performing mating displays, etc. These birds were not leaving the airfield, just flying around the property. Those that were recorded as flying (pass over) were crossing a portion, or all, of the AOA from one side to another. They did not stop to land or loaf on the airfield. Loafing is defined as standing on the ground, sleeping, possibly feeding, or resting. When a bird is observed loafing in a pond, it is recorded as swimming.

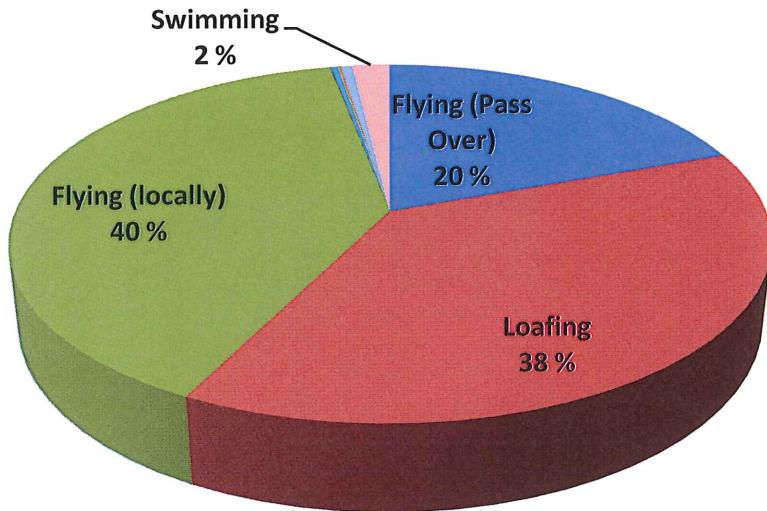
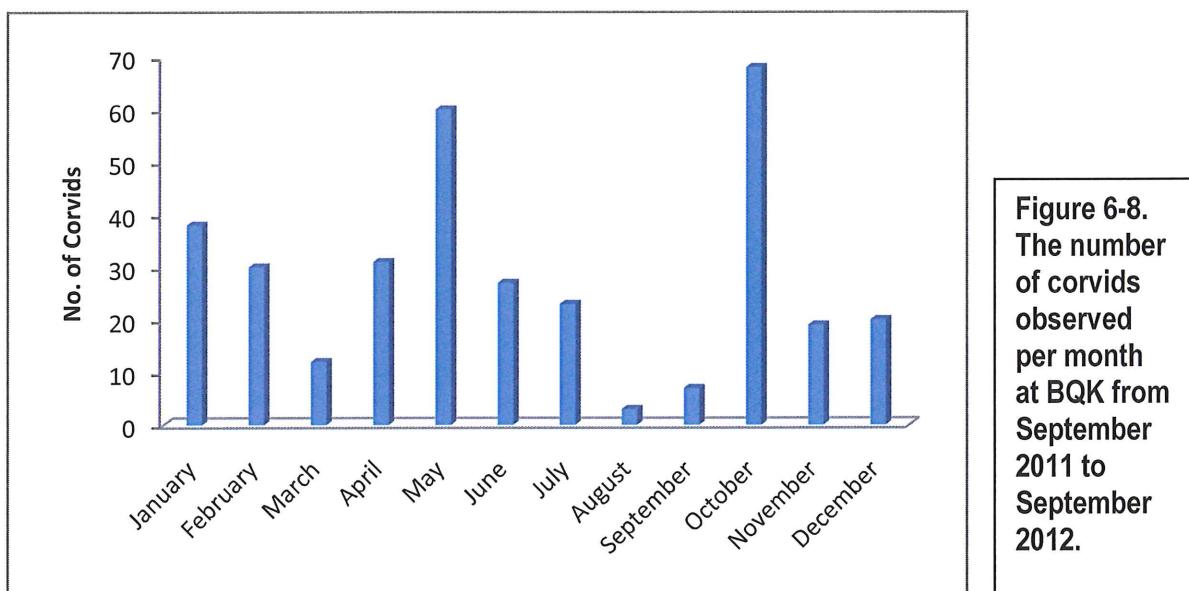


Figure 6-7. Percentage of total observations per bird behavior at BQK. Loafing, flying (locally), flying (pass over), and swimming were the most common activities, comprising over 99% of all observations.

Vocalizing, feeding, running, and perching were additionally recorded behaviors; however, each of these categories comprised 1% or less of the total recorded activities. Therefore, they are not labeled on the graph. The behaviors are not mutually exclusive since birds that were vocalizing might also have been flying, etc. Birds were characterized by their most obvious action(s). Approximately 59% of bird observations were noted as "flying". Flying is considered the most hazardous behavior because of the increased chance of an aircraft collision.

6.1.1 Corvids

Description Two species of crows were observed at BQK during this WHA: American crows and fish crows. Both species, males and females, look almost identical. They are large birds with all black plumage, a short tail, and broad wings. American crows weigh approximately 1 lb (450g) and have a 39 inch wingspan. Fish crows are slightly smaller with a longer tail, weighing approximately 10 oz (280g) and having a wingspan of 36 inches. However, the two species are best distinguished by voice. American crows make a stereotypical "crow" call (*carr* or *caaaw*), whereas fish crows have a short, nasal call, "*cah-ah*" or "*uh-uh*" (Sibley, 2000). American crows were observed more frequently at BQK than fish crows, so they will be the focus of this discussion. American crows were the second most frequently observed species at BQK. Corvids were observed during every survey, month, season, and time of day, but they were observed in the greatest numbers in the month of October (Figure 6-8).



Attractants American crows are truly omnivorous, eating anything and everything. They easily adapt different food habits to changing seasons and availability of food. They are equally skilled at hunting, pirating, and scavenging for food. One-third of a crow's annual diet consists of animal matter, including insects, worms, herps (reptiles and amphibians), eggs, small birds, and carrion (e.g. road kill). The remainder of their diet (two-thirds) comes from vegetable or plant matter, including grains, nuts, fruits, and garbage. Therefore, it would be hard to eliminate a food source for these birds. Reducing the amount of seed-producing vegetation (e.g. grass, trees, weeds, etc.), removing carrion from the movement areas, and ensuring all dumpster lids are secure can help to reduce the amount of available food located on the AOA. Also, portions of the airfield have open bare areas. These areas allow for higher range of visibility for predator detection and foraging for insects (Photo 6-1). The ideal habitat of an American crow is a mixture of open fields where food can be found (e.g. the AOA) and woodlands where there are trees for nesting and roosting. However, they are highly adaptable and are found in many urban or suburban areas (Hygynstrom et. al., 1994).



Photo 6-1. American crow feeding throughout the bare ground areas near monitoring station #7. These areas are ideal for American crows due to high visibility and ease of foraging for small insects and grubs.

Risks Corvids are large birds and could cause significant aircraft damage if struck. They are not commonly observed in large flocks; however, they will form large congregations of smaller flocks in the fall and throughout winter. During the nesting season (February to May) they are seen only in pairs or in small family groups. Their large population sizes are likely to persist as they are highly intelligent and adaptable, can lay 2 broods per year of 4 to 6 young each, and have very few natural predators as adults. Despite these facts, crows are a relatively low hazard risk at airports. Because of their intelligent, cautious behavior, crows are able to avoid collisions with aircraft. They move quickly out of the way of a plane during takeoff or landing and are not commonly found soaring at high elevations with aircraft. Proof of this can be observed on highways where crows are frequently found scavenging on carcasses, but rarely found as road kill themselves (Hggynstrom et. al., 1994). Crows are ranked 10 out of the top 10 hazardous species at BQK (Table 4).

Legal Status American and fish crows are protected by MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. There is no additional state protection for any of these species.

Location Crows were mostly observed in Zones B and C near many of the airport hangars and open grass areas. This is likely due to the presence of human garbage and bare or short grassy areas for abundant food sources (insects and grubs).

Control Measures Frightening techniques are proven effective in dispersing crows; however, a combination of several tactics used together must be employed to avoid habituation. This is true with all birds, but especially crows that are highly intelligent. Dispersing crows also requires patience and persistence as they will continue to return to their same feeding/roosting grounds

(Hoggstrom et. al., 1994). Pyrotechnics and shooting (as reinforcement) should be employed when crows are loafing in large numbers and/or creating a hazard on the airfield (e.g. large flocks or individual birds consistently crossing the movement areas). Ensuring the airfield can properly drain, bare areas are kept to a minimum, and the grass is kept at an intermediate height should also help reduce the number of crows at BQK.

Strike History Nationally, crows/ravens account for approximately 1% of all known species bird strike reports. The majority of the strikes listed in the database under the corvid group are American crows (60% of crow strikes). American crows have caused approximately \$1,327,873 (0.4%) in damage (Dolbeer et. al., 2012).

6.1.2 Passerines

Description Please see Appendix D for a complete listing of all species included in this group. It is best to consult a field guide for the specifics on these species; however, in general, passerines are small perching songbirds that are typically found alone or in pairs during the breeding season (summer) and in flocks during the non-breeding months (winter). The most commonly observed passerines at BQK were eastern meadowlarks, and American robins; therefore, they will be the focus of this discussion (Figures 6-9 and 6-10).

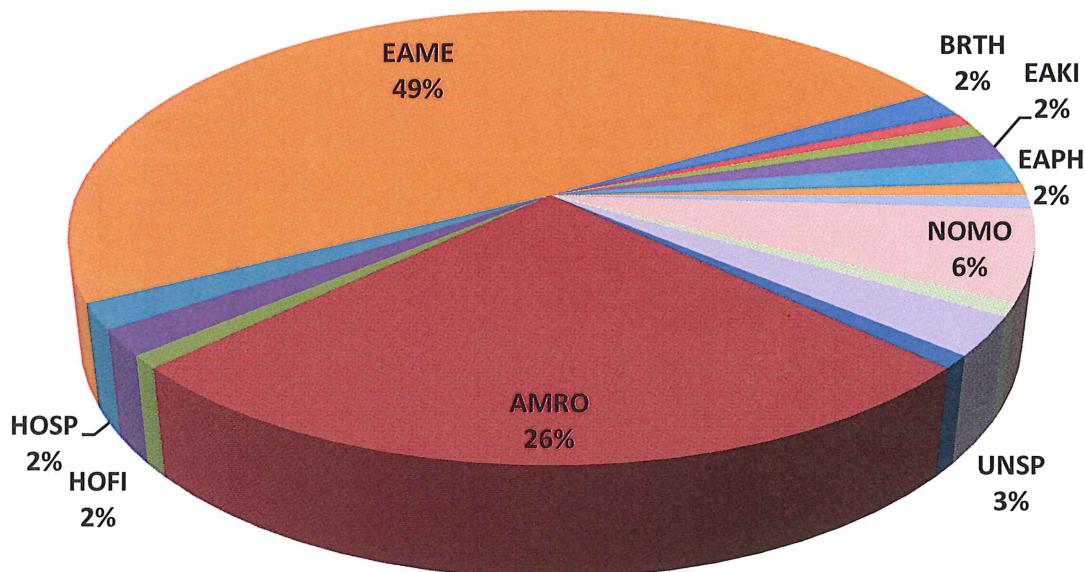


Figure 6-9. The percent of observations of passerines at BQK from September 2011 to September 2012. Eastern meadowlarks comprised nearly half of the individuals counted in this group.

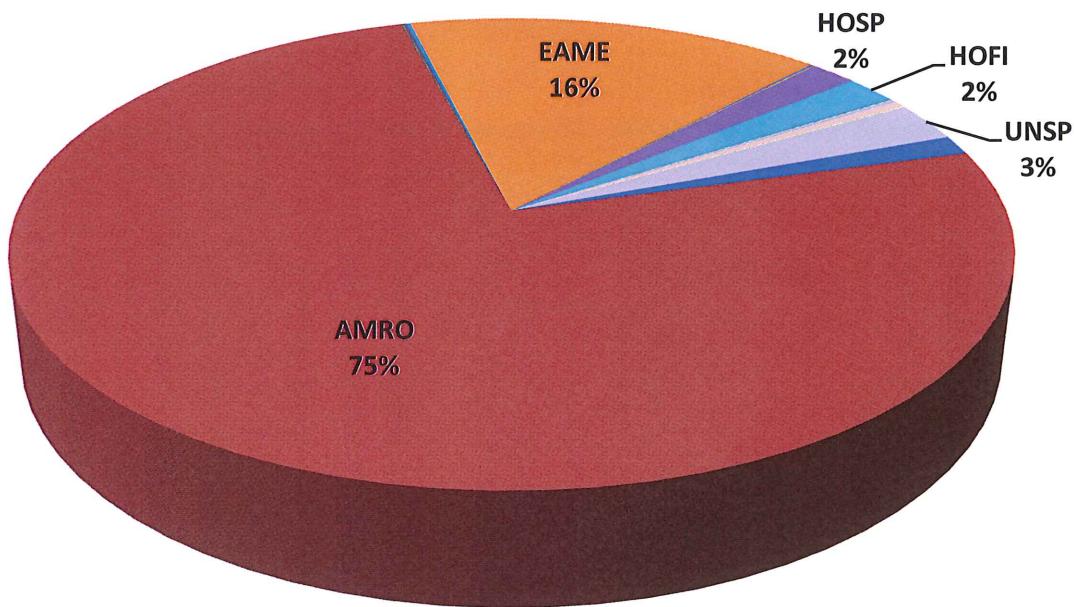


Figure 6-10. The percentage of individuals counted in the passerines group at BQK from September 2011 to September 2012. American robins comprised 75% of all individuals counted in this group.

American robins are large and sturdy, with long legs and fairly long tail; plain orange breast and grayish back distinctive in all plumages (Sibley, 2000). Eastern meadowlarks are heavy-bodied, short-tailed, and long-billed. Their underside is almost completely yellow with a distinct black "bib" or "V". They have white outer tail feathers that are obvious in flight. Quite often, meadowlarks are heard but not seen. Their song is a simple, clear whistle sounding like seeeeeooaaaa seeeeeadoo. American robins were only present during the colder months, specifically October thru March. Robins typically form large flocks during the winter (Figure 6-12). Eastern meadowlarks were present every month; however, the highest numbers were recorded in the colder months, likely during migration (Figure 6-11).

Attractants Robins prefer to loaf and feed on grassy lawns (e.g. the AOA), but are found in a variety of habitats from tundra to woodlands. In the spring and summer, robins eat large numbers of earthworms and insects, however, in the winter they primarily fruit and berries. Also, in the winter, they will form large roosts of up to a quarter million birds in woodlands (allaboutbirds.org). Eastern meadowlarks are found in open, grassy habitats, often perched on fences or other objects, and in small, disconnected flocks. They build domed nests of grass on the ground. Their preferred food source is insects (especially grasshoppers) and their larvae (allaboutbirds.org). For these reasons, the AOA is very attractive to meadowlarks. Any perching structure in a grass field also attracts meadowlarks, as they often perch to search for food, defend territories, or attract a mate.

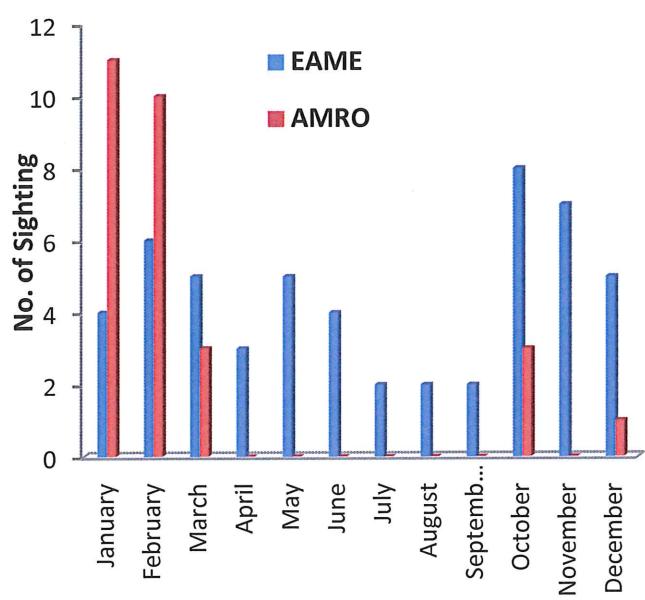


Figure 6-11. The number of eastern meadowlark and American robin sightings per month at BQK from September 2011 to September 2012.

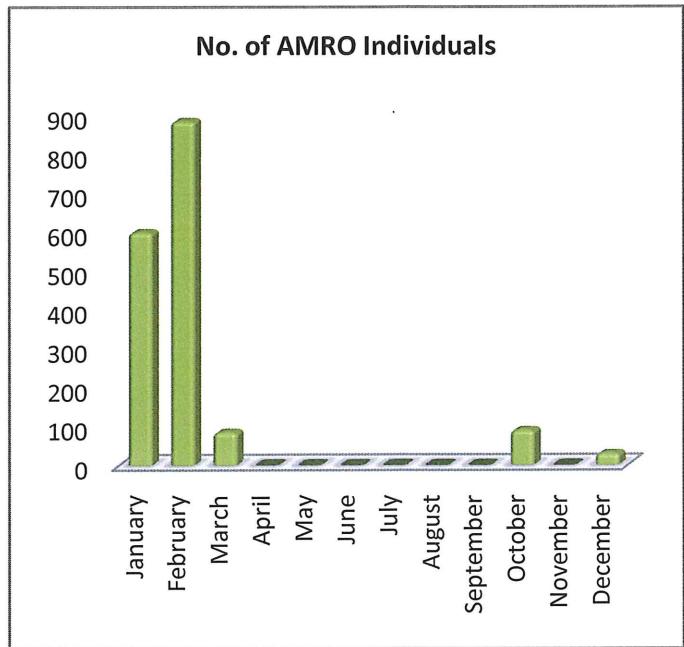


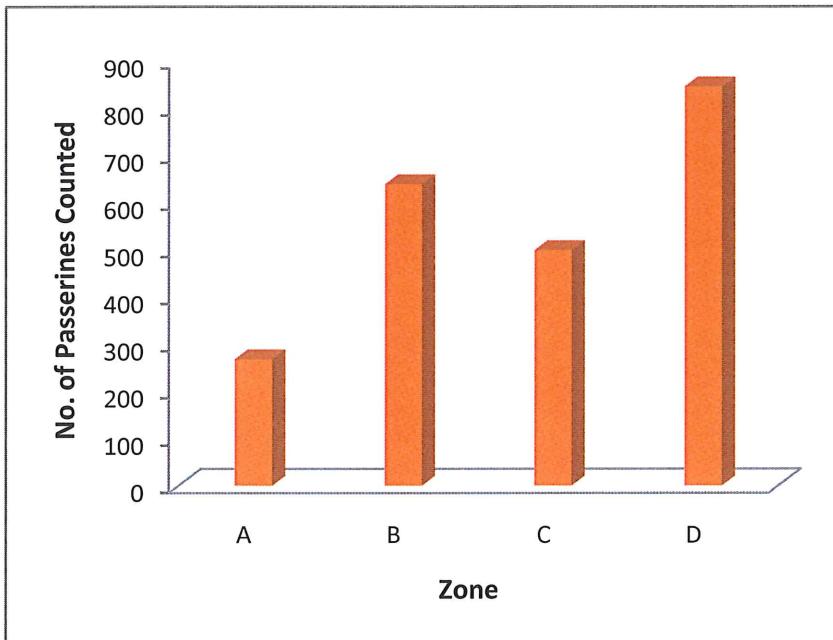
Figure 6-12. The number of American robin individuals counted per month at BQK from September 2011 to September 2012.

Risks Eastern meadowlarks and American robins are a common species on most airports. Eastern meadowlarks are a medium-sized bird, weighing approximately 3.2 oz (90g) and having a 14 inch wingspan. Robins are large for a thrush. They weigh approximately 2.7 oz (77 g) and have a 17 inch wingspan (Sibley, 2000). Because of these species attraction to short grass, they are likely to be found loafing near or crossing the movement areas, which increases their risk of an aircraft collision. However, one bird is not likely to cause significant damage to an aircraft. Larger flocks (up to 300 individuals) of robins were found on the airfield in the winter. A flock of that size is a significant risk to aviation safety and should be dispersed. In summary, eastern meadowlarks and American robins are at a high risk of being struck, but a low risk for causing substantial damage.

Legal Status All members of the “passerines” group observed at BQK are protected by the MBTA and require a USFWS depredation permit to remove, take, kill, or possess. There is no additional state protection for any of these species.

Location Passerines were most commonly observed in Zone D, the approach end of Runway 25 (Figure 6-13).

Figure 6-13. Number of individual passerines counted in each Zone at BQK from September 2011 to September 2012.



Control Measures Maintaining a tall, dense monoculture of true grass will help reduce the attractiveness of the airfield to meadowlarks and robins. The goal is to eliminate the weedy species that produce the berries that the birds are consuming and reduce the available bare ground where these birds can easily forage for earthworms, insects, etc. Keeping the grass height at a minimum of 6 inches will help reduce their ability to see each other and their food sources. The taller the grass, the less attractive it will be to these birds (a consistent 12 - 14 inches is preferable). There was no observed evidence of these species nesting on the AOA, but if nests are found, they should be destroyed. Adding perching deterrents (bird spikes, bird spiders, etc.) to structures (runway signs, antennae, lights, etc.) will help eliminate those perching opportunities for meadowlarks and robins. They use these perches to gain perspective when searching for insects to capture. As meadowlarks are mostly ground-dwellers, pyrotechnics and shooting are not recommended control methods. However, when large flocks of robins are loafing, feeding, or flying over the AOA, pyrotechnics can be a very effective method of dispersal.

Strike History Eastern meadowlarks account for approximately 1.3% of all known species bird strike reports and have caused \$130,000 (0.04%) in total damages. Eastern meadowlarks account for at least 43% of the bird strikes in the "meadowlark" group. American robins account for almost 1% of known species bird strikes and have caused a reported \$476,252 (0.14%) in damages (Dolbeer et al., 2012).

6.1.3 Blackbirds

Description Red-winged blackbirds, European starlings, boat-tailed grackles, and brown-headed cowbirds comprise the "blackbirds" group observed at BQK. Red-winged blackbirds are small birds with rounded wings and a fairly short tail. The male is black with bright red and yellow shoulder patches, while the female is brownish and looks like a large sparrow (Photo 6-2). European starlings are small, dark birds with light speckles on their feathers. At times, their feathers appear iridescent. The bill is yellow during mating season and dark in the winter. Their bodies are chunky, tail is very short, and wings are triangular shaped in flight. Both males and females look the same.

Boat-tailed grackles are similar to great-tailed grackles; however, have shorter tails and rounder heads. They have relatively long legs, long, slender bills and distinctive voice. Adult females are rufous-brown and adult males are usually greenish-blue iridescence on their bodies. Brown headed cowbirds are slightly smaller than a red-winged blackbird and males have black, slightly iridescent bodies and dark brown heads. They have a stout bill, short tail, and pointed wings. The females are dull gray-brown overall (Sibley, 2000). Red-winged blackbirds comprised 54% of all blackbirds counted at BQK (Figure 6-14).

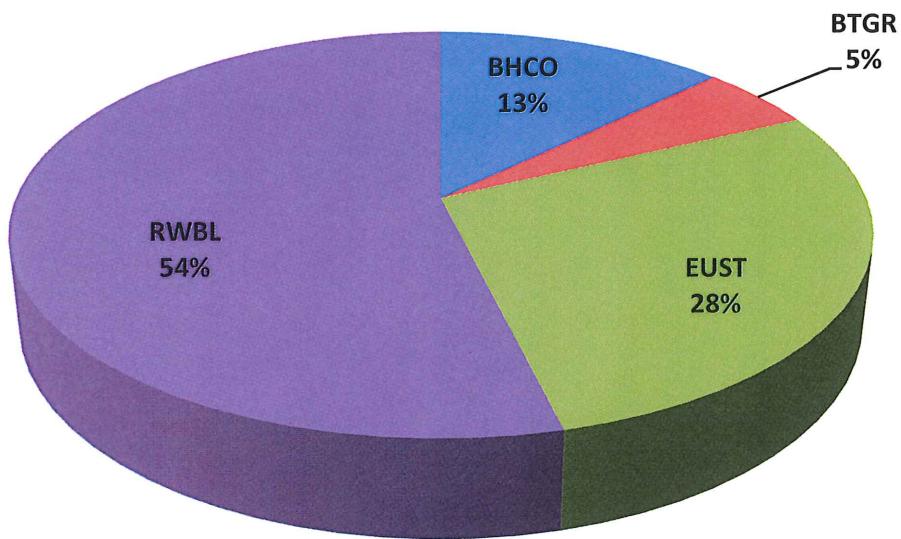


Figure 6-14. Percentage of blackbirds counted by species at BQK from September 2011 to September 2012.

In the winter, all species of blackbirds will form mixed flocks and congregate in large roosts containing up to several million birds at nighttime. Therefore, blackbirds were seen in the greatest numbers (i.e. number of individual birds) throughout the colder months, especially January and October (Figure 6-15). This is when the blackbirds are forming their large mixed flocks for roosting. They spend their days feeding and then come together at one location to roost for the evening. This collective roosting provides thermal cover and helps to shelter them from the cold.

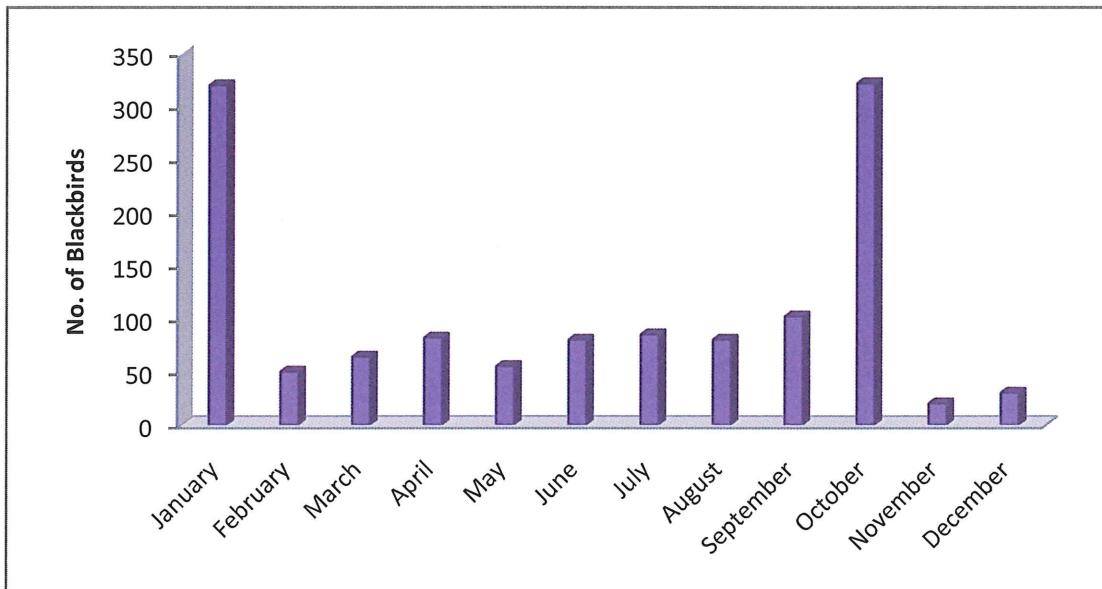


Figure 6-15. Number of individual blackbirds counted per month at BQK from September 2011 to September 2012.



Photo 6-2.
Red-winged
blackbird
perching on
approach
light at
BQK.

Attractants Blackbirds eat a wide variety of different items. Most eat insects during the breeding season and fruit, grass seeds, grain, and weed seeds in late summer and throughout the winter. Grackles are more predatory and occasionally eat small fish, field mice, songbird nestlings, and eggs. Their larger bills also help them to eat acorns and other tree fruits. Both starlings and grackles have been known to eat human waste out of dumpsters as well. Red-winged blackbirds

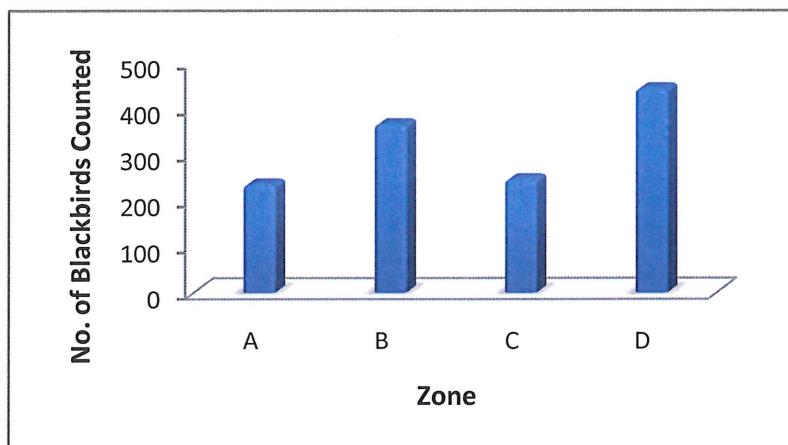
nest in most wet, brushy or marshy areas throughout most of North America. They are especially attracted to cattails and ditches for nesting. Females may nest more than once in a single breeding season. Starlings are attracted to a wide variety of habitats throughout North America including cities, towns, farms, woodlands, fields, and lawns. Their ideal habitat includes structures that have cavities available for nesting (e.g. hangars) and short grass for foraging (e.g. safety areas). In the winter, they prefer structures for daytime loafing (e.g. signs, antennas) and nighttime roosting, e.g. oak trees (Hgynstrom et. al., 1994). Grackles are found in a variety of habitats from open fields to woodlands to urban parks and parking lots. They are attracted to airports due to the availability of open foraging habitat and possible human waste. There was no observed evidence of grackles nesting at BQK. Brown-headed cowbirds like open meadows, edge habitats, and areas of mowed grass. They are ground feeders and will eat seeds, insects, and even shells for added calcium. They do not build nests, but rather lay their eggs in the nests of other species and leave their offspring to be raised by "foster parents". This allows the females to produce more eggs in one breeding season than other birds (allaboutbirds.org).

Risks All blackbirds are relatively small birds ranging from the brown-headed cowbird (1.5oz or 44g) to the boat-tailed grackle (8oz or 215g), and do not pose a major threat to aircraft as individuals. The risk comes from their flocking behaviors. Blackbirds are comfortable in large winter flocks, the largest of which at BQK was approximately 100 brown-headed cowbirds observed in October circling around the pond, near the approach of Runway 7. European Starlings are ranked 54 out of 108 species hazardous to aircraft with 1 being the most hazardous species. Blackbirds are ranked 46 out of 77 (DeVault, et. al., 2011). Although blackbirds as a group were the third most commonly observed species-group at BQK, they were determined be the second highest risk to aircraft by Relative Risk Value. Starlings were ranked the 3rd most hazardous species and red-winged blackbirds ranked 4th most hazardous species at BQK (Table 4).

Legal Status All of the species discussed above, except the European starling, are protected by MBTA and requires a USFWS depredation permit to remove, take, kill, or possess. Starlings were introduced by humans to New York City in the 1890s from Europe (Hgynstrom et. al., 1994). As they are not a native species, they are afforded no protection. There is no additional state protection for any of these species.

Location The majority of blackbirds were seen in Zones B and D (Figure 6-16). This could be due to the close proximity to open grasslands near forested upland and wetlands.

Figure 6-16.
Number of
blackbirds
per Zone at
BQK from
September
2011 to
September
2012.



Control Measures Most of the blackbirds observed during the WHA tended to only fly past or only land and loaf for short periods of time. These birds did not appear to feed or forage during these short visits on the BQK airport. Although a roost was never located during the WHA, it is likely that the birds spend the daytime feeding offsite and were only passing thru to more suitable foraging sites. The best way to control the "fly-over" birds is with pyrotechnics. Using a variety of different frightening tactics (pyrotechnics) and persistence is the key for this to be effective. After persistent and consistent harassment, the birds may find another route (around the airport) from feeding/roosting sites.

Blackbirds should never be allowed to loaf on the AOA in large flocks. If this behavior is observed, pyrotechnics can be used continuously until the flock is completely dispersed. Shooting is also an effective dispersal technique and can reinforce other scare tactics. However, shooting may be difficult and is not recommended as a method to reduce population size. Thinning the interior branches of landscaping trees, especially oaks, will eliminate available thermal cover and roosting habitat for blackbirds on the airport. Starlings are cavity nesters and therefore attracted to any small openings in various structures. Excluding starlings from hangars and other buildings may help reduce their presence on the AOA. Close all openings larger than 1 inch (2.5cm) to exclude starlings. Perching deterrents such as bird spikes and bird spiders or soft, sticky repellents consisting of polybutenes can help reduce the number of starlings and grackles loafing or roosting on airport structures (e.g. power lines and hangars) throughout the day (Hygynstrom et. al., 1994). Starlings are also attracted to shorter grasses for feeding. Maintaining a consistent grass height of 6 to 12 inches throughout the AOA, including the safety areas, may help reduce starling populations feeding on the airfield. Taller grass is much less attractive to blackbirds.

Starlicide is a registered toxicant for blackbirds and starlings. It is pelletized bait containing the active ingredient, 3-chloro-p-toluidine hydrochloride. It is a slow-acting toxicant that kills the birds 1 to 3 days after ingestion. This method usually requires a period of observation and prebaiting to ensure no protected birds are present to feed on the toxic bait. That is, you must first attract the birds to the airport before distributing the poison. This toxicant is typically used to keep blackbirds away from agricultural land uses and is not commonly used at airports, but is an available method. Trapping can be a successful method for controlling local populations; however, it can be very labor intensive. Large decoy traps made of poultry wire and containing 10 to 20 decoy birds (other blackbirds/starlings), food (usually dog food), and water, are typically used (Hygynstrom et. al., 1994). However, building and checking these traps may not be a cost effective method to control blackbirds at BQK, especially since most of the birds are simply flying over the AOA.

Strike History Blackbird species observed at BQK account for approximately 2.9% of all known species bird strike reports. They have caused as much as \$870,202 (0.3%) in damages. Grackles account for approximately 0.4% of all known species bird strike reports. They have caused at least \$178,000 (0.06%) in damages to aircraft. European starlings account for approximately 5.1% of all known species bird strike reports. They have caused as much as \$5,036,105 (1.5%) in damage since 1990 (Dolbeer et. al., 2012). In 1960, an aircraft leaving Boston collided with a flock of starlings, resulting in a crash landing and 62 fatalities. This was the first bird strike to receive national recognition. Blackbirds and starlings are ranked 20 on the list of the top 25 most hazardous species groups to aircraft (Cleary and Dolbeer, 2005).

6.1.4 Raptors

Description The following raptors were observed at BQK during this WHA: red-tailed hawk, red-shouldered hawk, barred owl, great horned owl, American kestrel, northern harrier, bald eagle, Cooper's hawk, osprey, Mississippi kite, black vulture, and turkey vulture. These species are all predatory birds that possess hooked bills and talons for catching and killing prey. They are very aerial birds and commonly soar for long distances in search of food. The variations in wing shapes and body proportions are related to their hunting styles and preferred prey. Buteos (red-tailed and red-shouldered hawks) have very broad wings and a short tail. They are often seen perched or soaring. Falcons (kestrel) and accipiters (harrier, Cooper's hawk) have longer, narrow wings that come to more of a point than a buteo. Harriers also have long tails and commonly fly low with their wings in a "V" formation. Northern harriers are easily recognized by a conspicuous white rump patch (Sibley, 2000). Two species of vultures were observed at BQK: turkey vultures and black vultures. They are often seen soaring or roosting in groups together, however, they are easily distinguished by shape, underwing, and wingbeats. Turkey vultures are all brown birds with a small red head, long tail, and silvery flight feathers (underneath entire wing). They soar in a pronounced "V" shape with clumsy, slow wingbeats. Turkey vultures are commonly solitary (Photo 6-3 and 6-4). Black vultures have black backs and wings with a black head, short tail, and silvery patches on the outer primaries (underneath wing tips only). They soar with a slight "V" shape and have quick, choppy wingbeats. Black vultures are more social, and commonly found in groups. Both species are typically silent. It is important to note that vultures are commonly referred to as "buzzards" in the United States, whereas in Europe, a "buzzard" is a common name for a hawk (Sibley, 2000). When referring to one of these birds, it is best to use the term vulture, to avoid any confusion. Turkey vultures were the most commonly observed species in this group at BQK (Figure 6-17).

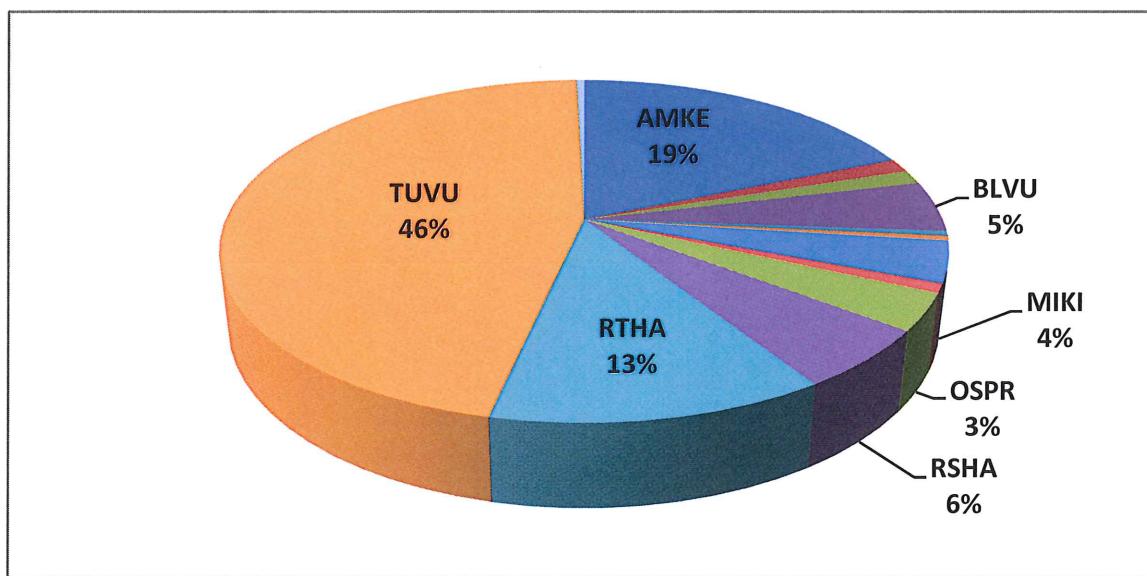


Figure 6-17. Percentage of sightings of each raptor species at BQK. Bald eagle, Cooper's hawk, great horned owl, barred owl, northern harrier, and unidentified hawk are not labeled because they each accounted for 1% or less of raptor observations



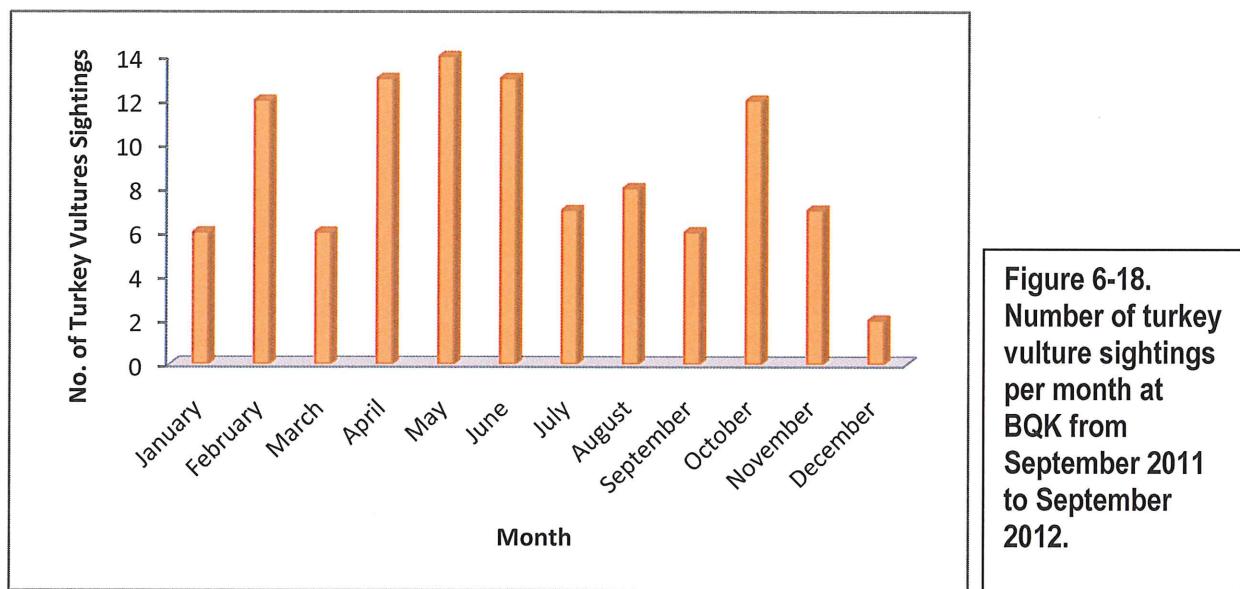
Photo 6-3.
Two turkey vultures perched on the light beacon tower at BQK.

Attractants All birds of prey are chiefly attracted to an available food source. For most species, this means a healthy population of small mammals (rodents and rabbits). However, kestrels will prey on larger insects (grasshoppers and beetles) and herps (anolies, frogs, etc.). Vultures are carrion-feeders and are especially attracted to roadkill. Turkey vultures are one of the few birds that possess a keen sense of smell. They use this heightened sense to find carcasses in the area. Vultures will follow other vultures to find food too, so they are somewhat attracted to one another. Besides carrion, they are also highly attracted to thermal columns or "thermals" (allaboutbirds.org). Thermals are columns of rising air created by the uneven heating of earth's surface. The sun warms the ground, which heats the air directly above it. This warmer air expands (becoming less dense) and rises, creating a column of rising air. Birds (and glider pilots) use these thermals to soar with little to no effort. Dark earth, urban areas, and asphalt are good sources of thermals. Large asphalt-paved runways and taxiways surrounded by open fields are ideal conditions for "riding thermals" (allaboutbirds.org).



Photo 6-4. Several turkey vultures feeding on carrion at BQK. Note freshly mowed grass in photo. Carrion may have been result of contact w/mower blade.

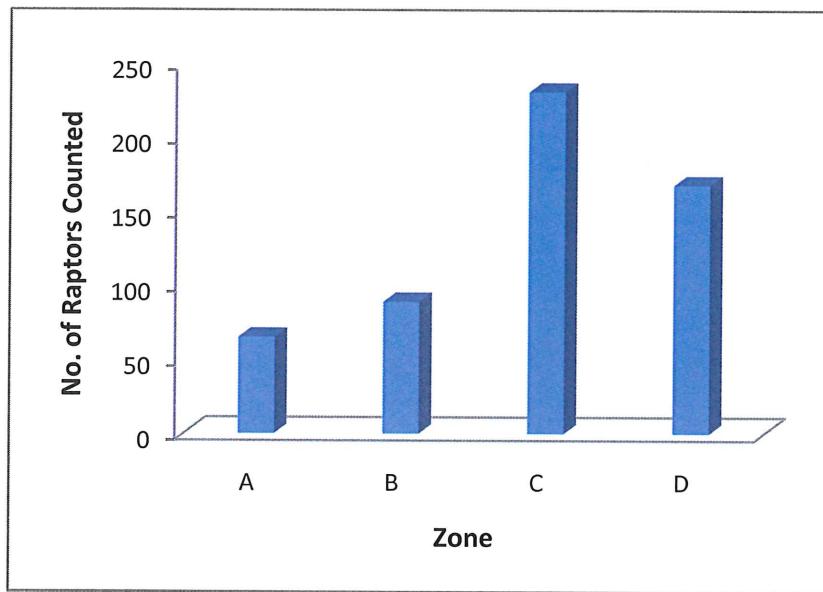
Another common attractant for raptors are perching structures (Photos 6-3). There is evidence that red-tailed hawk distribution is linked to a combination of available prey, low-density plant cover (e.g. vegetation that easily exposes rodents to predation, like short grass), and perch availability (Blackwell and Wright, 2006). Raptors also seek out available nesting habitat where there are plentiful food resources. Red-tailed hawks, American kestrels, black vultures, and turkey vultures commonly breed in South Georgia and can be found in the state year-round. Preferable nesting habitat for most raptors consists of dense forest areas or woodlots, where their nests can be easily concealed (Hgynstrom et. al., 1994). They often nest in tall, mature trees, preferably near water. Although present year-round, the turkey vultures observed at BQK were more common during the spring migration periods (Figure 6-18). Contrary to what most people think, vultures are a migratory species and migration could be the cause for the spike (April, May, & June) in the observations. Also, rain is more frequent during these months and thermals are easily formed over runways.



Risks Although most raptors are found flying solo or in pairs, they pose a significant threat to aircraft due to their extremely large size. The species observed at BQK range in weight from 4.1 oz (American kestrel) to 9.5 lbs (bald eagle), with an average weight of almost 3 lbs. Wingspan's range from 22 in to 80 in, with an average wingspan of almost 4 feet (Sibley, 2000). Also, these birds are generally observed soaring or hunting in flight and, therefore, have a higher risk of colliding with aircraft. Kestrels "hover" before grabbing their prey. They rapidly beat their wings and remain stationary over prey, until finally dropping down on them. Red-tailed hawks commonly hunt from a perch, but will spend time soaring over open areas, especially during midday. They use thermal columns to soar like vultures. Vultures are most commonly seen slowly soaring close to the earth searching for carrion. Their size and behavior make them a high risk for an aircraft collision with significant damage. Turkey vultures were the 3rd most commonly observed species at BQK and ranked 5th most hazardous species at BQK on Table 4. They are ranked 5 out of 77 species hazardous to aircraft (DeVault, et. al., 2011). Raptors should not be allowed to loaf on the airfield or soar in and around flight paths.

Legal Status All raptors, including vultures, are protected by MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. The bald eagle observed at BQK has additional protection under the BAGEPA (see Appendix I).

Figure 6-19 (right).
Number of Raptors
counted per zone at
BQK from September
2011 to September
2012.



Location In general, most raptors were seen in Zone C (Figure 6-19). Vultures were commonly observed riding thermals and American kestrels were often seen perching and/or foraging in this zone.

Control Measures The solution to raptor hazards is to make the airfield, and surrounding airspace, unattractive by eliminating perching/nesting opportunities and food sources. Most hawks will perch on a snag or large, isolated tree before attacking their prey. In the cases of airports, they will also use man-made structures such as windsocks, instrument antennas, and lighting systems. Adding perching deterrents, such as bird spiders, to man-made structures or removing snags and tall trees from wooded areas can eliminate these perching opportunities. Small mammals (common raptor prey) were present throughout the AOA at BQK. Reducing small mammal populations on the AOA will reduce the birds' primary food source. This is discussed further in the mammal section (Section 6.2.1). Shooting to kill is never recommended for any hawks, eagles, or falcons. It can create negative press for the airport and is removing an important member from the surrounding biological community. A preferred alternative to lethal control is trapping and relocating these birds, especially red-tailed hawks. There is evidence that relocating hawks at least 70 km (43.5 miles) away from the airfield can be a successful strategy to eliminate potential strikes with aircraft (Wernaart, et. al., 1999).

To reduce the number of vultures circling the airfield, no carrion should be allowed to remain on airport property (Photo 6-3). BQK should perform daily checks for carrion on all grounds inside the perimeter fence. Any carcasses found should be removed and buried. If the birds are present, an aggressive and persistent program should be implemented to continuously frighten the birds away

from the AOA. Unfortunately, BQK staff will not be able to keep thermals from forming over the airfield, but when vultures are observed soaring in flight paths, they should be immediately dispersed with pyrotechnics or shooting. For best results, pyrotechnics should be fired in intervals, several minutes apart, until the vultures are out of sight. Vultures are not likely to habituate quickly to pyrotechnics, however, occasional shooting is recommended as reinforcement (Hygynstrom et. al., 1994).



Photo 6-5.
Example:
Turkey
vulture effigy
suspended in
"death pose"
from VOR at
GNV.

For a more permanent solution, BQK staff can consider hanging an effigy from a high place on the AOA (e.g. beacon, antenna, hangar, etc.). Vultures are one of the few species that are frightened by a dead bird effigy. That is, a dead vulture (obtained from a taxidermist) hung upside down with its wings spread open ("death pose") from a conspicuous location (Photo 6-5). This has been proven to effectively deter vultures from a specific area.

Strike History Nationally, "Raptors", which include hawks, eagles, and vultures, account for approximately 7.6% of all known species bird strike reports. Strikes with raptors have caused as much as \$72,208,800 (20.9%) in damages (Dolbeer et al., 2012). Clearly, a strike with a raptor is likely to cause damage. The vast majority of the strikes in this group were vultures, red-tailed hawks, and kestrels. Red-tailed hawks are responsible for 35% of the total reported raptor strikes and 17.7% of the total raptor damages. Vultures account for 19% of the total reported raptor strikes and are responsible for 26% of all raptor damages (Dolbeer et. al., 2012).

6.1.5 Shorebirds

Description Killdeer were the only species identified at BQK within the shorebirds group. Killdeer are upland plovers, which are commonly found far from water on airports, farmland, city parks, etc. They do not share the same habitat preferences as their "shorebird" relatives and are not typically found on beaches. They are tall for plovers (10.5 in), have slender wings, a long tail with an orange rump, and a distinctive double breast band (most plovers have a single breast band). They are

often heard, but not seen, and are identifiable by their high-pitched, drawn out call (*teeeee di di di*, repeated). The call can sound like they are saying their own name, “*kill deer, kill deer*”. Killdeer were recorded every month at BQK. However, they appeared in the greatest numbers in the months of June, July, and November (Figure 6-20). This could be a result of mowing activities and fall migrations. Overall, killdeer were the ninth most commonly observed species at BQK during this WHA.

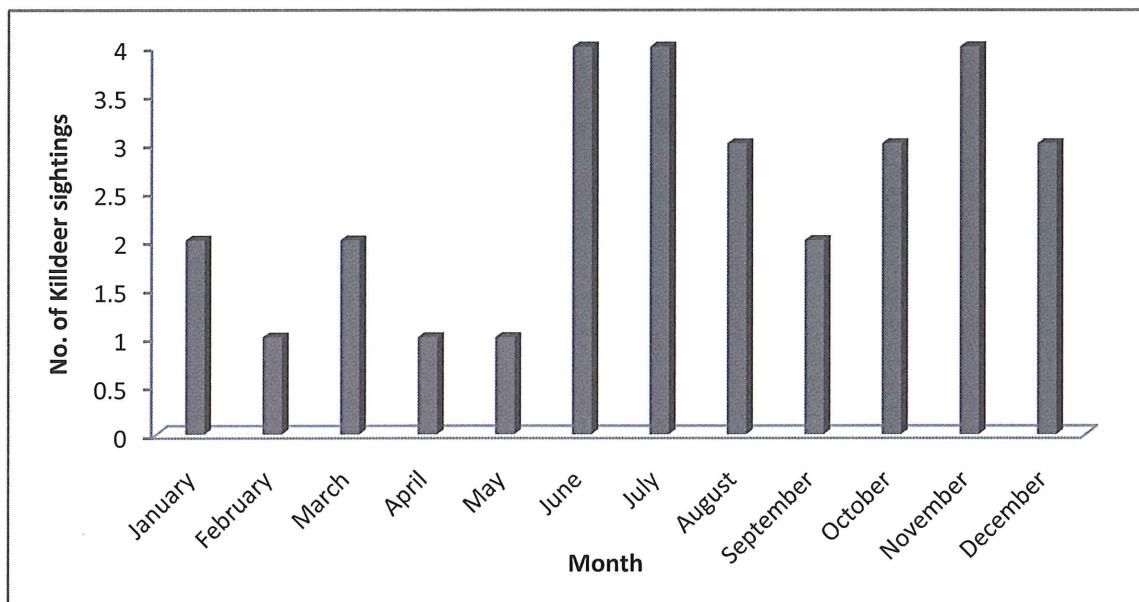


Figure 6-20. The number of killdeer sightings per month at BQK from September 2011 to September 2012.

Attractants Killdeer are particularly attracted to open areas with short grass and bare ground. They can be found in mudflats or near water, but are more commonly found in dry, urban areas, such as golf courses, airports, grazed fields, and athletic complexes. Killdeer prefer the bare ground for nesting, where they simply make a few scrapes in the substrate and lay their eggs (Photo 6-6). After the clutch (4 to 6 eggs) is laid, pieces of rock, gravel, asphalt, and/or shells may be added to the nest. They eat mostly invertebrates including earthworms, crayfish, snails, and insects, however, they are opportunistic and will eat seeds, amphibians, and fish as well (allaboutbirds.org). They commonly follow the tractor when mowing to catch any earthworms or insects that may have been disturbed.



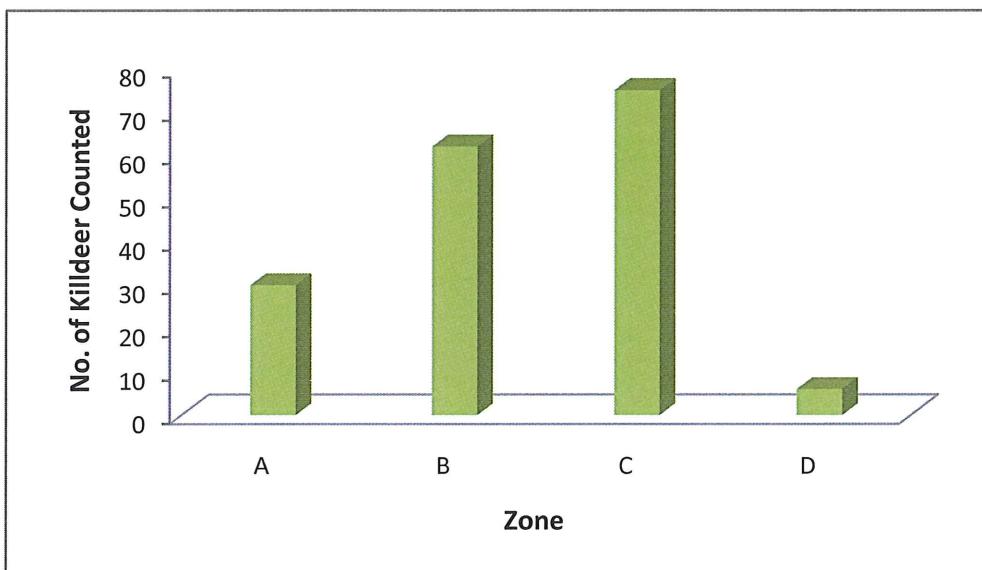
Photo 6-6.
Example of
Killdeer
nest found
on another
airfield.

Risks Killdeer are medium-sized birds weighing an average of 3.3 oz (95 g) and having a wingspan of approximately 24 inches. Singly, they are not a significant threat to aircraft; however, they can form larger flocks (more than 20 individuals) during the winter months (Sibley, 2000). Unfortunately, their tendency to prefer open habitats with bare ground make them a prime culprit for being found on the runways/taxiways or in the safety areas at airports. Loafing and nesting on or near movement areas makes them a greater risk for aircraft collisions. However, a behavioral benefit of the killdeer is that they do not fly often or for long distances. Overall, this "ground loving" species is a relatively low risk to aircraft at BQK, but should be dispersed if large flocks are observed loafing on the movement areas. Killdeer are ranked 7th most hazardous species at BQK based on Relative Risk Value (Table 4).

Legal Status Killdeer are protected under MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. There is no additional level of state protection for this species.

Location Killdeer were mostly observed in Zones B and C (Figure 6-21). Killdeer were often seen loafing and flying locally along Taxiway A and movement areas surrounding the terminal. These areas are ideal habitat for the killdeer that prefer short grass and paved surfaces. Temporary standing water is also present in this area following heavy rain events, which further increases the attractiveness to killdeer.

Figure 6-21.
Number of
Killdeer
counted
per Zone at
BQK from
September
2011 to
September
2012.



Control Measures The best way to control killdeer is habitat modification. Eliminating all bare areas will reduce potential nesting habitat. Keeping all grass at a minimum height of 6 or 7 inches and maintaining a dense monoculture of grass will reduce available foraging habitat. This is especially important around the runways and taxiways. Killdeer will only forage in short grass. If a killdeer nest is found, it should be destroyed. It is best to destroy the nest as soon as eggs are laid. Shaking or oiling the eggs and placing them back in the nest is most beneficial. Egg "shaking" or oiling will cause them to be infertile, but reduce the chances of a re-nesting attempt. The female will continue to incubate the eggs after they have been shaken. As birds tend to nest in the same location every year, previous nesting sites should be checked throughout the nesting season.

(spring and summer) every year to ensure new nests are not being constructed (Hygynstrom et. al., 1994). Killdeer pairs will commonly raise two broods per year (allaboutbirds.org). Scare tactics (pyrotechnics, cannons, etc.) are not proven effective on killdeer as they habituate quickly and are comfortable in noisy, urban environments.

Strike History Nationally, killdeer account for approximately 4.7% of all known species bird strike reports. Strikes with killdeer have caused as much as \$3,170,233 (1%) in damages to aircraft. Killdeer account for 59% of all shorebird strikes and 73% of reported damages caused by shorebirds (Dolbeer et. al., 2012).

6.1.6 Doves/Pigeons

Description Mourning doves and rock doves a.k.a. feral pigeons were the only species in this group observed at BQK. Mourning doves are the most abundant dove in the United States and are common year-round in southern Georgia. They are the most slender dove, with a long, pointed tail, narrow pointed wings and a gray-brown color overall. They are often

mistaken for a falcon in flight, a game bird on the ground, and an owl by song. Their name comes from their mournful hooting “ooAAH coo coo coo” (Sibley, 2000). Mourning doves were observed in the greatest numbers in May, July, August, and September. These months are pre and post nesting season (Figure 6-22). Mourning doves accounted for 96% of the dove/pigeon observations at BQK, therefore they will be the focus of this discussion.

Attractants Like most wildlife, doves are attracted to food, water, and cover. They are ground foragers and prefer open lands that provide easy access to their needs (Photo 6-7). Doves feed almost exclusively on seeds including, small grains, millet, wild peas, sedges, sunflower seeds, and pokeweed. Bare ground on which seeds are available is preferred over areas containing heavy, dense vegetation (allaboutbirds.org). Grasses and weeds growing throughout the AOA provide abundant food sources. Areas disturbed by prior construction activities throughout the AOA provide the bare ground that they prefer to loaf, feed, and swallow grit (required as a digestion aid). Areas of temporary standing water are also used more frequently if found near bare ground. Mourning doves nest approximately 10 to 30 feet above the ground and will build nests in a variety of places, including maintenance equipment, hangars, lights, terminal buildings, aviation radar

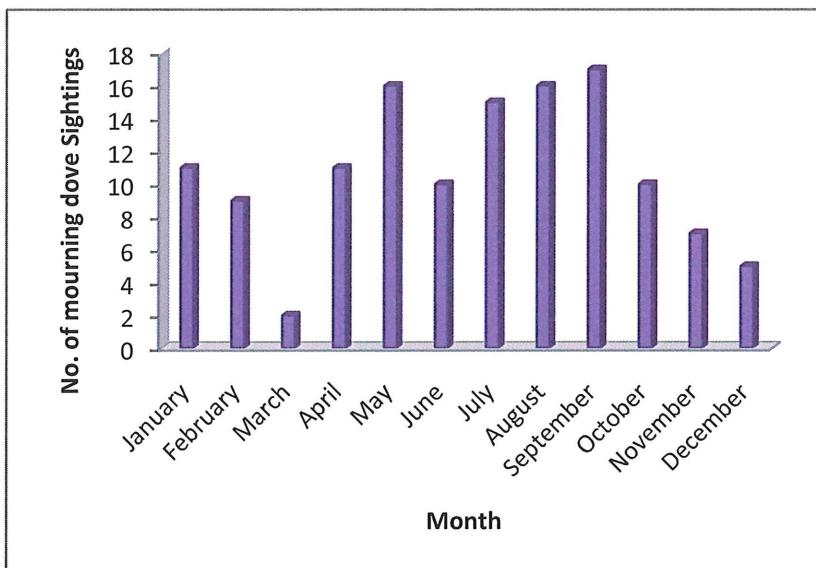


Figure 6-22. Number of mourning dove observations per month at BQK from September 2011 to September 2012.

structures or antennas, etc. Pigeons also readily eat food unintentionally left by people in addition to their typical diet of seeds. Their archetypal habitat is rocky cliffs, but they're more commonly seen around cities, towns, and farmland. They prefer to nest in nooks and crannies of buildings or cliffs (allaboutbirds.org).

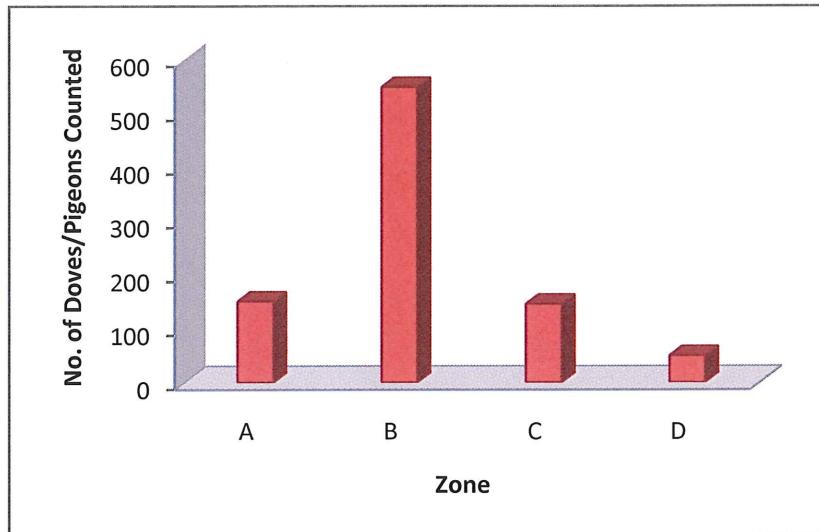


Photo 6-7.
Several
mourning
doves
foraging on
bare ground
area, just
south of
Runway 7-25.

Risks Mourning doves are slightly larger and more dense-bodied than the average perching bird found on the airfield. Overall, they are still a small bird weighing approximately 4.2 oz (120g) and having a wingspan of 18 inches (Sibley, 2000). Individually, they do not pose a large threat to aircraft; however, they may flock whenever nesting is not occurring. The greatest risk with mourning doves comes from their preference for open habitat and bare areas. Thus, not only do they form larger flocks, but the flocks prefer to feed, roost, and loaf on or near the movement areas. This puts them at a greater risk of an aircraft collision. Rock doves (pigeons) are slightly larger than mourning doves weighing 9 oz (270g) and having a wingspan of 28 inches (Sibley, 2000). Their tendency to form large flocks makes them a greater risk to aircraft. When alarmed, flocks suddenly fly into the air and circle several times before coming down again (allaboutbirds.org). Rock doves are ranked 30 and mourning doves are ranked 45 out of 77 hazardous species to aircraft (DeVault, et. al., 2011). Mourning doves were ranked number one (1) most commonly observed species at BQK and most hazardous species at BQK based on Relative Risk Value (Table 4).

Legal Status Mourning doves are protected under MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. They are not protected by state law. Rock doves (pigeons) are a non-native species and therefore not protected by any federal or state laws.

Figure 6-23. Number of doves/pigeons counted per Zone at BQK from September 2011 to September 2012.



Location Doves/pigeons were most commonly seen in Zone B (Figure 6-23). This is likely due to their attraction to the bare ground areas located just south of Runway 7-25. These areas of bare ground are due to the recent construction activities associated with the vault ditch system. Once grass has reclaimed these bare areas, the attraction factors will be limited.

Control Measures Habitat management is the best long term solution. Habitat management techniques to control doves include maintaining a consistent grass height greater than 6 inches throughout the airfield, creating a dense monoculture of grass to outcompete the weedy, seed-producing vegetation, and eliminating bare ground where possible. In addition, any found nests should be destroyed, especially around the ramp areas and on navigation equipment/lighting. Excluding doves from buildings and hangars by keeping doors closed or installing strip doors of vinyl plastic is an effective way to keep them from roosting and nesting in these areas (Hygynstrom et. al., 1994). Removing any excess or unused maintenance equipment and supplies from the airfield will also reduce nesting and roosting sites. Installing perching deterrents (e.g. bird spikes or bird spiders) will eliminate perching opportunities on taxiway and runway signs, lights, and antennas throughout the AOA.

Visual and auditory frightening devices are usually not effective over time for doves and pigeons. They typically thrive in very urban environments and quickly adapt to any loud noises, bright lights, etc. During the WHA, the doves were not observed dispersing when planes were departing or approaching. Some auditory devices (e.g. pyrotechnics and cannons) may be more effective when occasionally coupled with lethal control (shooting) to maintain a level of fear in the birds and prevent habituation. The use of lasers (e.g. Bird Blazer) inside buildings is an effective option.

Strike History Nationally, doves and pigeons account for approximately 14.6% of all known species bird strike reports. Strikes with doves or pigeons have caused as much as \$15,219,640 (4.4%) in damage from 1990 through 2011 (Dolbeer et. al., 2012). Mourning doves account for more than half (58%) of all dove/pigeon strikes and 39% of all costs attributed to doves/pigeons. Rock doves account for less than one third (27%) of all dove/pigeon strikes, but are still responsible for more than half (56%) of all costs associated with dove/pigeon strikes.

6.1.7 Wading Birds

Description The wading birds observed at BQK include: American bittern, black-crowned night-heron, black-necked stilt, cattle egret, great blue heron, glossy ibis, great egret, green heron, little blue heron, snowy egret, white ibis, and wood stork. It is best to consult a field guide for the specifics on these species; however, in general, herons and egrets have long legs, long necks, and long, pointed bills. The majority (52%) of wading bird observations were cattle egrets (Figure 6-24); therefore, they will be the focus of this discussion. Cattle egrets were observed in the greatest numbers during May through August (Figure 6-25). This coincides directly with the peak mowing season at BQK. Cattle egrets are most commonly found following mowers and catching the insects that flush in the wake of the mowers (Photo 6-8).

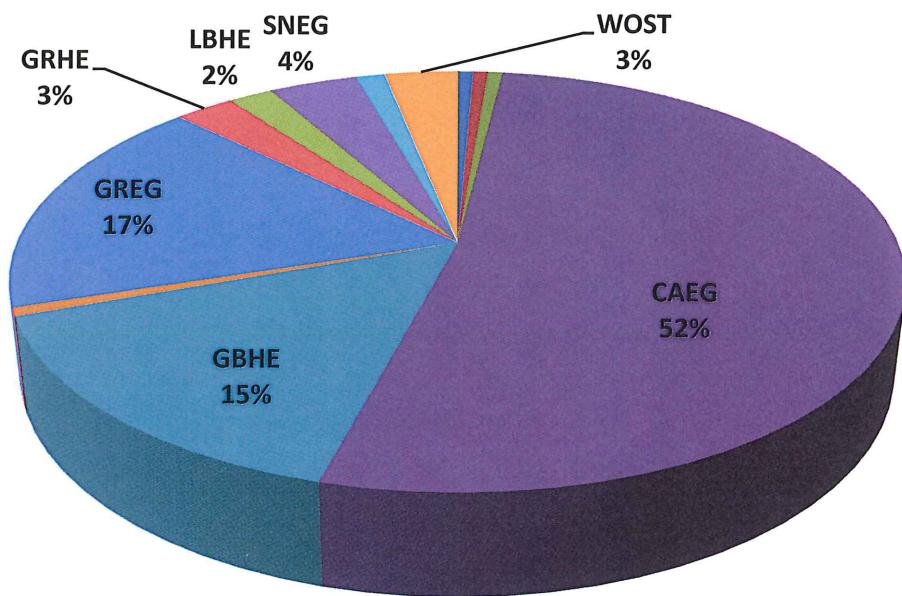


Figure 6-24. The percentage of wading bird sightings at BQK from September 2011 to September 2012. American bittern, black-crowned night-heron, black-necked stilt, glossy ibis, and white ibis were not labeled because they each accounted for 1% or less of the wading bird observations.

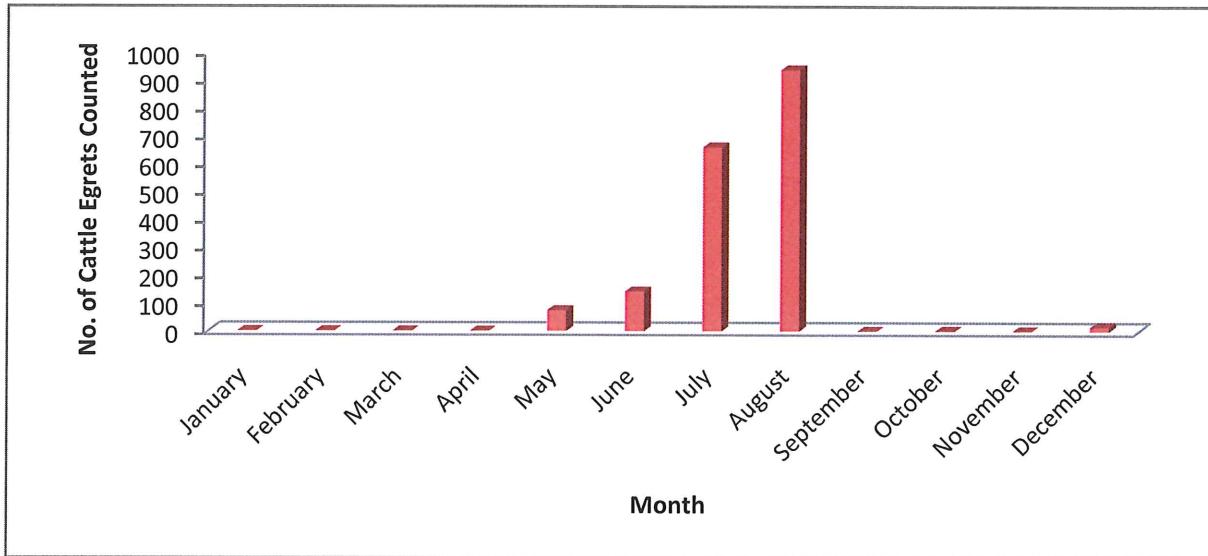


Figure 6-25. Number of cattle egrets counted per month at BQK from September 2011 to September 2012.

Attractants Cattle egrets have different habitat and food requirements than most egrets or “wading birds”. They are typically found in dry, upland habitats, often near livestock where they follow behind the livestock catching the insects they disturb when grazing. Cattle egrets prefer open grass fields and feed primarily on insects, often in large flocks. Short grass and open, mowed fields are the major attractants to airports for cattle egrets. They prefer to follow a mower and catch any insects that may get disturbed along the way. They have also been known to stand at the end of runways, catching insects that are disturbed by planes during take-off.

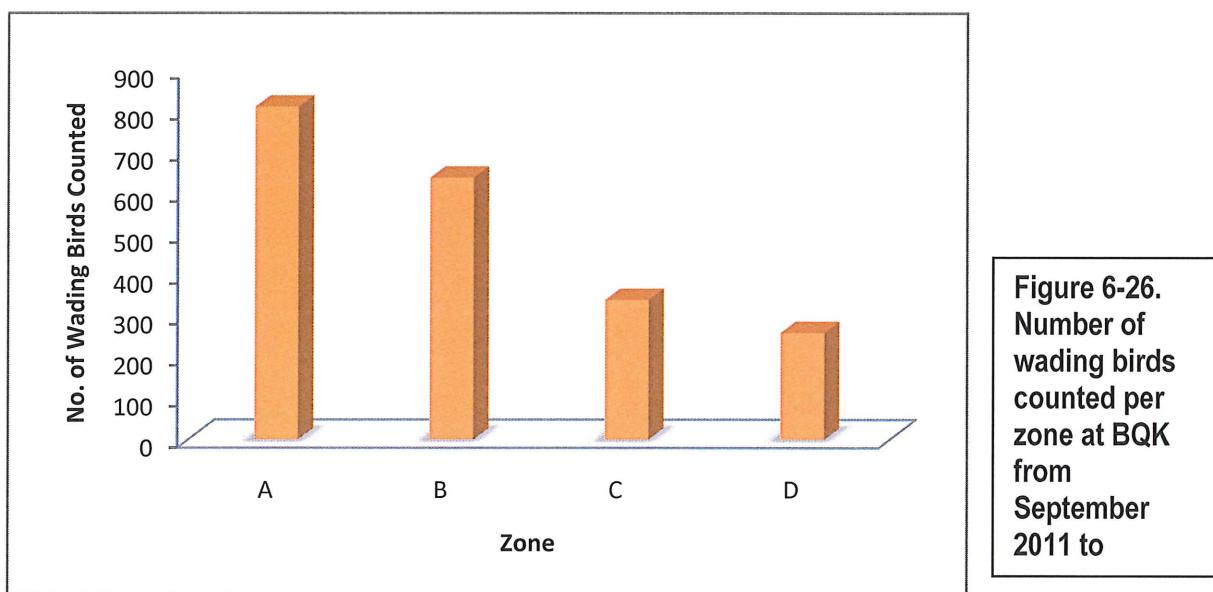


Photo 6-8. Cattle egrets foraging in the short grass near the approach of Runway 7.

Risks Cattle egrets are medium-sized birds weighing approximately 12 oz (340 g) and having a wingspan of 3 feet (Sibley, 2000). They are most often found in flocks. Cattle egrets were seen in flocks of up to 250 individuals loafing and foraging in the short grass near the approach of Runway 7. Cattle egrets have slow, generally low flight and forage mainly on the ground using a "stand and wait" approach (allaboutbirds.org). Their foraging preferences often put them in close proximity to the movement areas as well. Due to these behaviors, they are a more serious risk to aircraft. Herons and egrets can also be a high risk to aircraft due to their large size and slow, low flying behaviors. When a wading bird roosting colony (rookery) occurs near an airport, these birds become a greater risk. Fortunately, no evidence of a wading bird rookery was found adjacent to BQK. Cattle egrets were ranked the 2nd most hazardous species at BQK by Relative Risk Value (Table 4).

Legal Status All wading birds observed at BQK are federally protected by MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs.

Location Wading birds were most often seen in Zones A and B (Figure 6-26). Cattle egrets were most often observed loafing or feeding in the infields along Taxiway A and Runway 7-25 throughout midday. Great blue herons, great egrets, little blue herons, and tri-colored herons were most commonly observed loafing and foraging along the banks of the airport ditches.



Control Measures One way to reduce the number of cattle egrets loafing and feeding on the AOA is to eliminate their food source (insects). Keeping the grass height between 6 and 12 inches may not reduce the amount of prey, but will help to reduce the egret's prey visibility, and their ability to see one another in the flock. Maintaining a dense stand of grass may increase the number of invertebrates in the fields, however, it will make prey capture more difficult. Finally, if cattle egrets are seen following the mower in large numbers (flocks greater than 10 individuals), it would be best to mow only at night. Cattle egrets only feed during the day and return to their roost at night. If mowing cannot be conducted at night, it should be conducted as close to dawn as possible. Cattle egrets will typically arrive at the airfield 1-2 hours after dawn and leave the airfield approximately

one hour before dusk (allaboutbirds.org). Spraying insecticides throughout the summer may help to reduce the egret prey populations as well, but can be very costly and a temporary solution. There was no evidence of cattle egrets roosting or nesting on airport property during this study.

Harassment and lethal control can be incorporated into the cattle egret control program. If the birds are made to feel unsafe while flying over (or foraging on) the airfield, they will eventually look elsewhere for corridors and feeding grounds. As with all methods of frightening wildlife, patience and persistence are required to keep the egrets off of the AOA. Pyrotechnics will not work alone and should be combined with lethal methods (shooting). Propane cannons may be useful for scaring cattle egrets if it is relocated to a new part of the AOA often (i.e. at least once per week). Cattle egrets should not be allowed to loaf or feed on the airport for any length of time (Hygynstrom et. al., 1994).

Strike History Nationally, cattle egrets account for less than 1% of all known species bird strike reports. Cattle egrets have caused approximately \$70,575 in damages (Dolbeer et. al., 2012).

6.1.8 Aerial Foragers

Description The aerial foragers found at BQK include common nighthawks, swallows, and chimney swifts. These species have erratic flight patterns and feed and drink almost exclusively while in flight. Based on documents and research on the migration patterns of swallows, the unidentified swallows observed during surveys were probably barn and tree swallows. These birds are difficult to indentify in the field, due to their quick and erratic flying habitats. Tree and barn swallows both have small, slender bodies with long, pointed wings. Chimney swifts are small, short-tailed swifts and are aptly described as "cigars with wings". They roost and nest in cavities such as hollow trees or chimneys (Sibley, 2000). Common nighthawks are larger and have longer wings than other nighthawks. All nighthawks have a distinguishing white bar near the base of their primaries. Common nighthawks make a characteristic rasping, nasal call that sounds like the word "beans". Aerial foragers had two distinct spikes in observations in April and November. The data suggests that the spike in observations in April coincide to the spring migration of the barn swallows and the elevated numbers in November are consistent with the winter migration of the tree swallows (Figure 6-27).

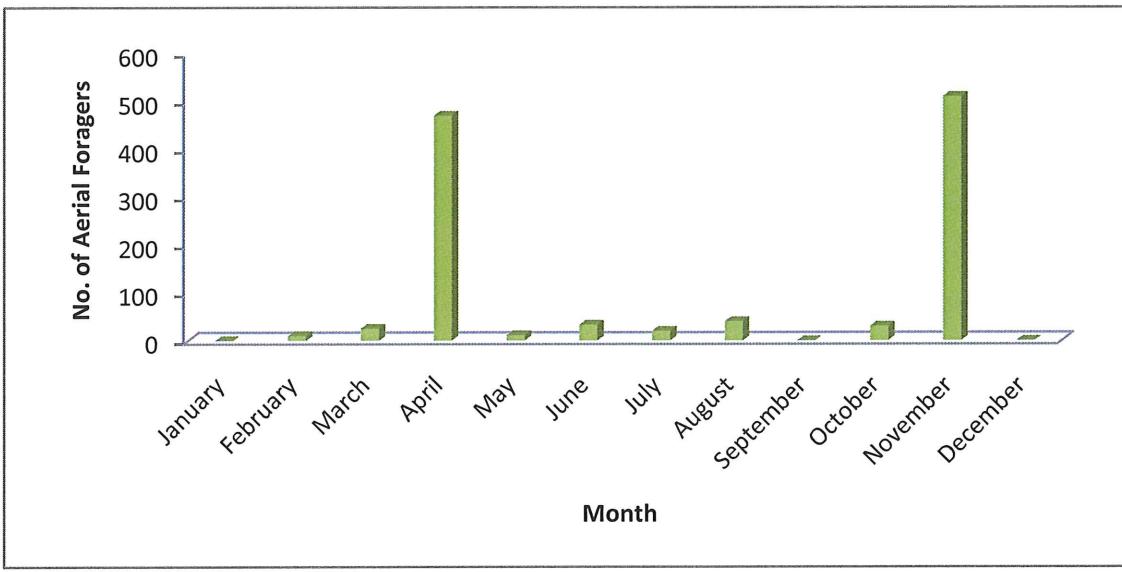


Figure 6-27. Number of aerial foragers counted per month at BQK from September 2011 to September 2012.

Attractants Aerial foragers are almost exclusively insectivores. Therefore, they are attracted to any area containing open space to hunt and insects to eat. A barn swallow's diet is made up mostly of insects from the Order Diptera (flies). All aerial foragers feed on small flying insects, not larger grasshoppers, etc. When the weather is agreeable, swifts and nighthawks will forage at high elevations, possibly creating a greater risk to aircraft. Barn swallows are attracted to nesting sites that have four basic conditions: an open habitat for foraging, a good nesting location under an overhang or ledge (e.g. hangars, highway overpasses), a supply of mud for nest building, and water for drinking. For this reason, open buildings and water bodies (e.g. ponds and ditches), will also attract swallows (Hygynstrom et. al., 1994).

Risks Swallows commonly occur in strike reports because they spend a large portion of their time in flight. They will also hunt close to the ground, which makes them susceptible to strikes during the take-off and landing phases of flight. However, they are small birds (approximately 0.7 oz or 20 g) and were only seen in large flocks in the months of April and November (the average flock size was 25 individuals), and are not likely to cause substantial damage. The biggest risk occurs when swallows begin forming nesting colonies on or near the airport. This could cause a significant population increase and raise concern; however, the results of this WHA do not indicate they are a critical hazard at BQK. No nesting colonies were observed on the airport. Chimney swifts are ranked 76 out of 77 and Barn swallows are ranked 54 out of 77 hazardous wildlife species to aircraft (1 = most hazardous; DeVault, et. al., 2011).

Legal Status All of the aerial foragers observed at BQK are protected by the MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. There is no additional state protection for any of these species.

Location Most aerial foragers were seen in Zones B and D (Figure 6-28), hawking insects in the large open infields and the approach end of Runway 25. The open and maintained safety zone is ideal for hawking insects. The lack of aerial foragers observed in Zone A might have been due to the location of the monitoring stations and not lack of their presence.

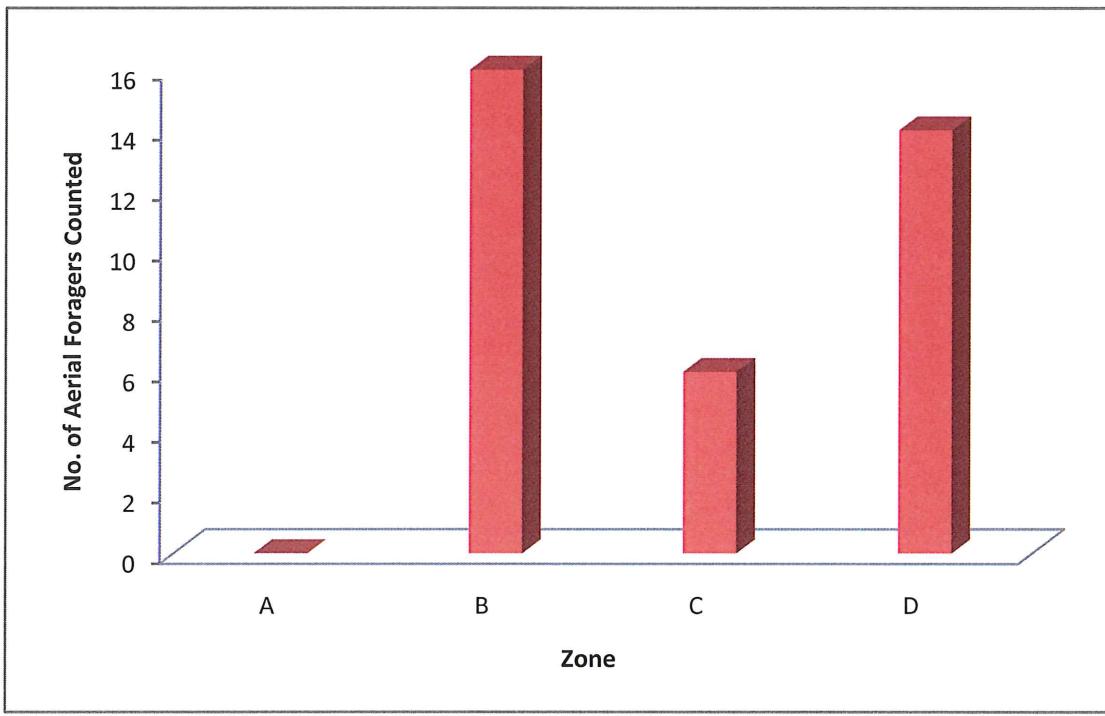


Figure 6-28. Number of aerial foragers counted per zone at BQK from September 2011 to September 2012.

Control Measures Most control measures for swallows focus on eliminating nesting and roosting sites. However, scare tactics, chemical repellents, toxicants, trapping, and shooting have proven ineffective at removing entire nesting colonies. The best methods for eliminating nests are exclusion (keeping hangars and buildings completely secured) and nest removal (washing nests down with a water hose). No breeding activity was documented on the airport property during this WHA, but it was undetermined if the swallows are breeding in the area. If nests are found, they should be removed at the first sign of building. BQK staff should be aware of the increased populations of aerial foragers during April and November. Using pyrotechnics to discourage foraging behavior on the airfield may help to reduce their occurrence.

Strike History Nationally, swallows account for approximately 7% of all known species bird strike reports. However, strikes with swallows have only caused \$58,893 (0.02%) in damage (Dolbeer et al. 2012). This illustrates that although these species are commonly struck, they are not likely to cause significant damage. Barn swallows account for 48% of all swallow strikes and 74% of all damages attributed to swallows.

6.1.9 Waterfowl

Description The waterfowl species observed at BQK include: pied billed grebe, anhinga, common moorhen, wood duck, belted kingfisher, double-crested cormorant, unidentified duck, Canada geese, and hooded merganser. (Figure 6-29). Canada geese are large birds with all black necks, brownish breasts, and white cheeks. They can weigh up to 20 lbs and have a wingspan of 4 to 6 feet (allaboutbirds.org). Double crested cormorants weigh almost 4 lbs and have a wingspan of over 4 feet. They often form flocks that fly high and in "V formation", like geese. They're mostly dark brown with a pale breast and bright orange chin/bill. Wood ducks are short-legged, and prefer sheltered water with trees, such as wooded swamps and creeks. They can weigh up to 1.3 lbs and have a wingspan of 30 inches. Anhingas are medium sized birds with heron-like neck and bills, fan-shaped tails, and long, pointed wings. They can be distinguished from the cormorants by their swimming techniques. Anhingas swim with only their heads exposed and cormorants swim with half of their body above the water (Sibley, 2000). Waterfowl were observed most commonly in the warmer months (May through September), with September being the peak in the number of recorded Canada geese (Figure 6-30). This likely coincides with migration habits. Wood ducks made up the majority of waterfowl observations (43%). While the Canada geese made up only 14% of the waterfowl observations, it will be the focus of this discussion, due to their size and strike hazard risk.

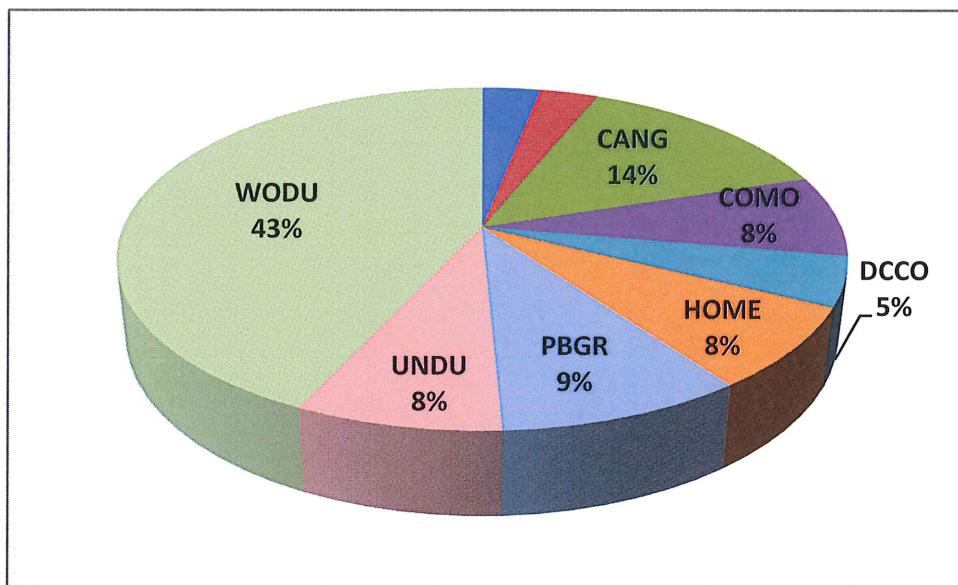


Figure 6-29. Percentage of each waterfowl species observed at BQK from September 2011 to September 2012. Belted kingfisher and anhinga were not labeled because they each accounted for 1% or less of the waterfowl observations.

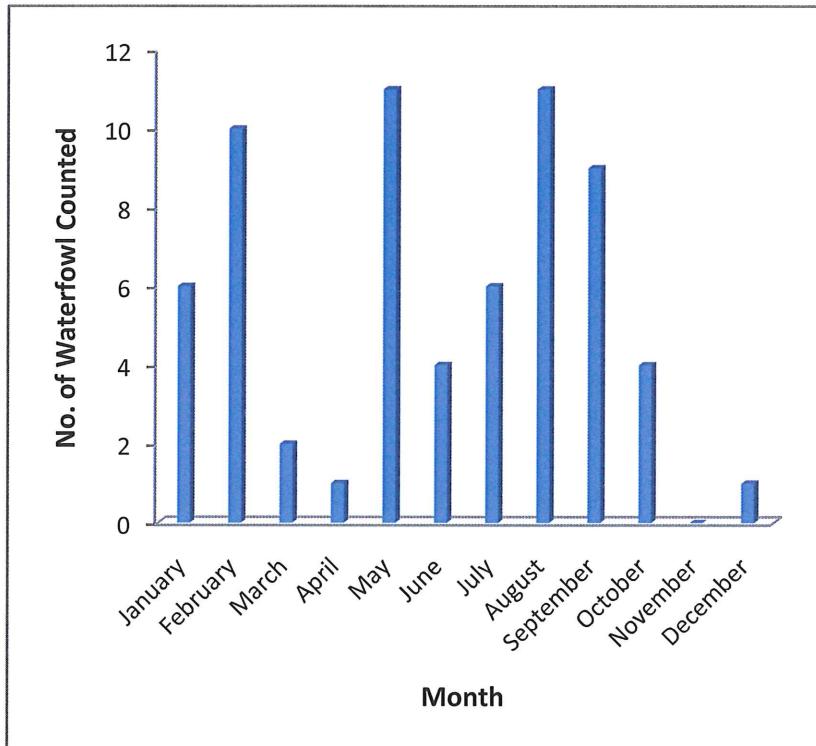


Figure 6-30. Number of waterfowl counted per month at BQK from September 2011 to September 2012.

Attractants Waterfowl, as their group title suggests, are most attracted to water. Most of these species feed on fish, aquatic vegetation, or aquatic invertebrates (insects, insect larvae, etc.). They prefer to nest near or along the water's edge. Canada geese are attracted to short, mowed grass in open fields adjacent to standing water (e.g. airport infields, golf courses, etc.). Grass is indigestible to most species, except geese. Geese eat primarily grasses, or other weedy or aquatic vegetation, and agricultural wastes (wheat, corn, etc.). They also prefer open areas where they can easily see potential predators from a distance (allaboutbirds.org). Canada geese are one of the few species that can digest true grasses.

Risks Canada geese can weigh up to 20 lbs with a wingspan of 4 to 6 feet (Photo 6-9). Unfortunately, these large birds are also commonly found in flocks, making them a double threat to aviation safety. For this reason, they are considered one of the greatest risks to aircraft and can cause significant damage, including the loss of all engines.

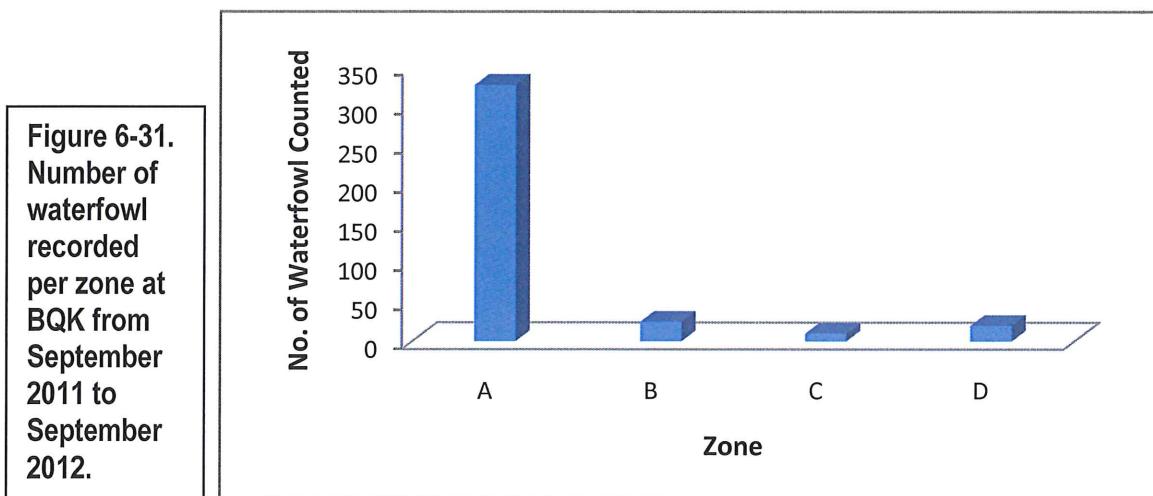
Photo 6-9. Canada geese foraging in the short grass, just east of the terminal building at BQK.



BQK should adopt a zero-tolerance policy towards geese on the AOA and they should be immediately removed or dispersed when sighted. Canada geese are ranked 5th out of 77 hazardous species to aircraft (1 = most hazardous) and ducks are ranked 7 out of 77 (DeVault, et. al., 2011). Due to their abundance, wood ducks are listed as the 9th most hazardous species at BQK by Relative Risk Value (Table 4).

Legal Status All waterfowl observed at BQK are federally protected by MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. Resident (non-migratory) Canada geese are not technically protected under MBTA, however it is impossible to distinguish between the migratory and resident populations by appearance alone. Only a DNA test can reveal a resident bird from a migratory bird. Consequently, resident geese are protected by "similarity of appearance". No additional state permit is required by GDNR to take these species.

Location Waterfowl were most commonly seen in Zone A (Figure 6-31). This is primarily due to Zone A having two large water attractants: the pond and the Altamaha-Brunswick Canal. These water bodies are where the majority of the waterfowl on BQK were observed foraging, swimming, and loafing.



Control Measures Since waterfowl were observed utilizing the open water areas and ditches on the airfield, it is advised to keep these water features free of aquatic vegetation, to lessen the amount of food and cover available. Pyrotechnics are another option to frighten the birds when they are observed on the airport. After persistent scaring, the birds will likely not feel comfortable and take a different route. Geese in particular should never be allowed to loaf or feed on the AOA. At a minimum, it is essential to make everyone aware (ATC, pilots, operations staff, etc.) when large flocks of these birds are observed on the airport. BQK staff should continue to document these occurrences and disperse these flocks whenever possible.

Strike History Nationally, waterfowl (ducks, geese, and swans) account for approximately 7.0% of all known species bird strike reports. Strikes identifying Canada geese alone account for approximately 2.4% of all known species bird strike reports. Strikes with waterfowl have caused as much as \$164,102,483 in damage (48% of the total damages). Canada geese account for 35% of

all waterfowl strikes and 55% of all damages caused by strikes with waterfowl. Wood ducks ranked 9th most hazardous species at BQK (Table 4).

6.1.10 Gulls

Description The gull species group observed at BQK include: herring gull, ring-billed gull, and royal tern (Figure 6-29). Gulls are extremely difficult to identify to the species level. Most species are similar looking, medium to large-sized birds, that have some combination of white and gray on them. Herring gulls and ring-billed are two of the most widespread gulls in North America. Ring-billed gulls are slightly smaller in size (1.1 lbs) and have shorter bills, thinner and more pointed wings than the herring gulls, which weigh up to 2.5 lbs (Sibley, 2000). Royal terns are slender (1 lb), with long-winged, and typically have a distinct black band or cap on their head (Sibley, 2000). A field guide must always be consulted when identifying gulls. Gulls were only observed at BQK during the months of February, March, and August. Gulls are present throughout the southern U.S. year-round; however, they are more common in the south during the winter months.

Attractants Although, gulls prefer open areas near water, such as beaches and ponds, they are also attracted to landfills, dams, restaurants, and other man-made structures where there could be potential food sources. They are omnivorous and will form large mixed flocks where food is present. Most species nest in close association on the ground in a depression in sand, or a nest made of seaweed or sea grasses. There is no evidence of gulls nesting on or near BQK. During coastal storms, gulls are often attracted to the safety of higher inland grounds. Large, open spaces allow them to see potential predators and weather the storms. Gulls view this as protection. They commonly loaf on airport movement areas throughout the country during heavy rain events.

Risks Gulls are fairly large (weighing approximately 1 lb and having a 3-5 feet wingspan), flocking birds that can cause severe damage to aircraft (Sibley, 2000). As they were seen so infrequently during this WHA, they may not be an immediate threat to aircraft at BQK. However, please note that a one-year study may not be representative of every year at an airport and precaution should still be taken towards these species.

Legal Status Gulls are protected by the MBTA and require a USFWS Depredation Permit to pursue, capture, take, kill, or possess them or their nests and eggs. There is no additional state protection for any of these species.

Location All gulls were observed flying over the AOA headed in various directions. No gulls were observed loafing on airport property during these surveys.

Control Measures The most effective way to deter gulls from the airport is to eliminate all food sources. This can easily be done by keeping trash contained, removing all animal and insect carcasses from the AOA, and reducing the amount of standing water on the airfield. Pyrotechnics should be used to disperse gulls when they are observed loafing on or around BQK. Shooting one or two individuals can help to reinforce the frightening device. Gulls have also been known to respond to dead gull effigies suspended in the "death pose" (see "Vultures" Control Measures for further explanation). The gulls observed at BQK were only flying over the airfield, not loafing or feeding on the AOA itself. The most effective way to encourage the birds to take a different route around the airport is by shooting pyrotechnics at the flock.

Strike History Nationally, gulls are the most frequently struck species reported to the FAA Strike Database. Gulls and jaegers (gull-like seabirds) account for approximately 16% of all bird strike reports. Strikes with gulls have caused as much as \$39,394,374 (11.4%) in damage (Dolbeer et. al., 2012). The majority (67%) of the strikes in this group were reported just as "gulls", followed by ring-billed gulls (12%) and herring gulls (11%).

6.2 Mammals

Fourteen species of mammals were observed at BQK from September 2011 through September 2012. The most commonly observed mammal at BQK was the white-tailed deer, followed by coyote, beaver, armadillo, opossum, and raccoon (Figure 6-32). Feral cat, feral dog, eastern cottontail, fox squirrel, cotton mouse, cotton rat, gray squirrel, and red fox were also observed.

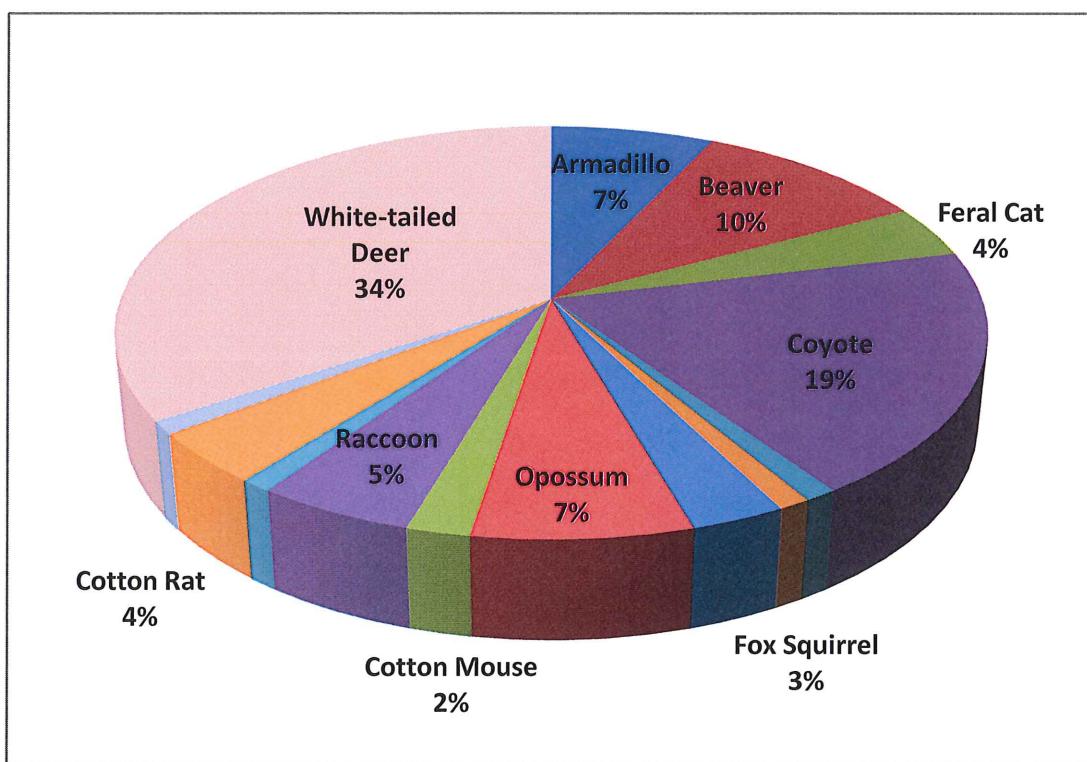


Figure 6-32. The percentage of mammal observations per species at BQK from September 2011 to September 2012. Eastern cottontail, feral dog, red fox, and gray squirrel are not listed as they each accounted for 1% or less of total mammal observations.

Risk values were also calculated for mammal species using the same equation described in Section 6.1. *Birds*:

$$\text{Relative Risk Value} = (N) (\text{RHS}) (\text{frequency of strikes})$$

N = total number of individuals counted for each species

RHS = Relative Hazard Score outlined above (DeVault, et. al., 2011)

Frequency of strikes = number of strikes recorded in FAA National Wildlife Strike Database from 1990 through 2009 that occurred at or below 500 ft AGL divided by the total number of species identified strikes that meet the criteria (23,503 strikes total, recorded in DeVault, et. al., 2011)

For the purposes of these calculations, armadillos, beavers, feral cats, feral dogs, cotton mice, cotton rats, fox squirrels, red fox, and gray squirrels were removed because a RHS is not provided for this species. The results of these calculations are presented in Table 5 below. The most hazardous mammal species at BQK are listed and ranked from highest risk value to lowest.

Table 5. The most hazardous mammal species or species-groups at BQK ranked from highest relative risk value to lowest.

Rank	Species	Number of Individuals Counted (N)	Relative Hazard Score (RHS)	Frequency of Strikes	Relative Risk Value
1	White-tailed Deer	66	88	0.0346	201
2	Coyote	29	22	0.0098	6.25
3	Raccoon	5	20	0.0009	0.09
4	Eastern Cottontail	1	13	0.0033	0.04
5	Opposum	8	0	0.0010	0

Based on the calculated Relative Risk Value, white-tailed deer were determined to be the most hazardous mammal species at BQK. The Relative Risk Value reveals that deer are 33 times more hazardous at BQK than coyotes and 200 times more hazardous at BQK than raccoons. It is important to note that the risk values above are relative to the other species listed on the table and are only valid at BQK. They are based on the number of observations of each species specifically at BQK. They only depict relationships between the species observed at BQK using the risk severity for each species (RHS) and the risk likelihood for each species (how often they're struck nationally x how often they occur at BQK).

6.2.1 Small Mammals: Squirrels, Mice, Rats, and Rabbits

Description Eastern cottontails (*Sylvilagus floridanus*) were only observed at BQK on one occasion, however; based on the coyote population, their numbers are probably relatively high. Cottontails weigh approximately 2.5 lbs, have an orange and black grizzled back, a white belly and a cottony white tail below (Reid, 2006). Four cotton rats (*Sigmodon hispidus*) were trapped during small mammal trapping at BQK. Cotton rats have short tails and thick grizzled fur (Photo 6-10). Mice weigh approximately 1 oz and typically have a dark brown back with a gray-white belly. Two cotton mice (*Peromyscus gossypinus*) were trapped during small mammal trapping at BQK. Cotton mice have dark brown, almost black on upper backs and sides of orange-brown, bellies are white.



Photo 6-10. Cotton rat (*Sigmodon hispidus*) just released from trapping at BQK.

Eastern gray squirrels (*Sciurus carolinensis*) are medium sized squirrels with gray upperparts and yellow-brown wash on the upper back and head. Bellies are typically white with a tail yellow-orange at center, mixed with black and edged with white (Reid, 2006). Eastern fox squirrels (*Sciurus niger*) are the largest squirrel in the east (weighing 1-3 lbs) with grizzled yellow-brown above and a pale orange to black belly and feet (Photo 6-11). They typically travel and rest in the trees, but can be seen feeding on the ground (Reid, 2006).



Photo 6-11. Fox squirrel (*Sciurus niger*) running across the top of the perimeter fence at BQK.

Attractants Small mammals are attracted to any habitat that provides plenty of safe cover e.g. dense grass, burrows, brush piles, thickets, edges of woodlands, trees, logs, abandoned buildings, vegetated ditches, etc. They often utilize fallen trees, "weedy" fence lines, ditches, and culverts as corridors to travel unnoticed between one location and the next. Their goal is to avoid predators; therefore, they are predominantly nocturnal. Small mammals rely on thick cover to create nests and raise young as well. Their diet is mostly plant materials (seeds, fruits, nuts, grains, grasses, etc.), but they will also feed on human waste and animal foods (Reid, 2006).

Risks Small mammals are an extremely low risk for damaging aircraft. However, they are a high predator attractant risk. Eliminating small mammals from the AOA will greatly reduce the presence of hawks, crows, kestrels, and coyotes. The population of small mammals at BQK appears to be healthy as evidenced predators (coyotes and birds of prey) commonly observed loafing or feeding on the airfield. Cottontails (adults and juveniles) were only observed on a couple of surveys, however; are relatively common on airfields and the edges of woodlands. Cottontails are likely the main food source for these predators. They are ranked the 4th most hazardous mammal species at BQK (Table 5).

Legal Status The small mammals observed at BQK are not protected by federal or state laws.

Location Two cotton mice and four cotton rats were trapped during the fall trapping event (Photo 5-1/Exhibit 3). Transects were set along ditches, swales, and along woodlands throughout BQK. Rodents are often attracted to water, so they are commonly found in and around ditches.

Control Measures Eliminating all areas of potential cover will help decrease the small mammal population. Examples include, keeping the fence line clear of vegetation, removing brush piles and/or "junk" piles, excluding wooded areas where possible, and removing any unused materials being stored on the AOA.

Strike History Nationally, rabbits and cottontails account for approximately 14.7% of all terrestrial mammal strike reports; however, strikes with rabbits and cottontails have caused less than 1% in total damages caused by terrestrial mammals (Dolbeer et. al., 2012). Small mammals are not a damage risk, but an attractant risk.

6.2.2 Coyotes

Description Coyotes (*Canis latrans*) weigh between 20 and 50 pounds and have pale tawny fur with long legs, large ears, and a narrow muzzle. It is important to note, they run with their tails held down, which can help distinguish them from domestic dogs at a distance (Reid, 2006). Coyotes or their sign were observed throughout the year, with the most individuals counted in the months of July through October (Figure 6-33).

Attractants Coyotes live in a wide range of habitats throughout North America, but prefer an area with mixed or edge habitat. They are less likely to be found in large tracks of unbroken forest. They require hollow logs or burrows to build dens for their young and will often modify an existing burrow rather than excavate a new one. They eat a wide variety of foods including small mammals, birds, snakes, insects, fruits, berries, and vegetable matter (Reid, 2006). Small mammals (including

rabbits), areas for cover (taller vegetation and stored materials), and water sources (ditches/wetlands) are likely attracting coyotes to BQK.

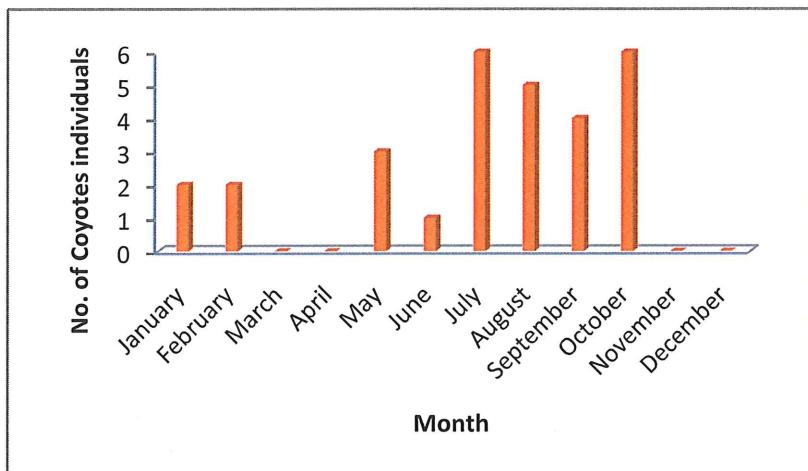


Figure 6-33. Coyote observations at BQK from September 2011 to September 2012.

Risks Coyotes are medium-sized animals that are usually solitary or found in pairs. They can cause significant damage to aircraft, especially when a large population is present inside the perimeter fence and individuals regularly cross the movement areas. The coyotes at BQK stay mainly within the wooded areas, although they have been seen crossing the movement areas. They were not only observed during spotlight surveys but during dawn and dusk surveys as well. Coyotes are fast, smart, and typically elusive. Regardless, the presence of coyotes should be continuously monitored and all coyotes found within the perimeter fence should be removed. Coyotes are ranked 29 out of 77 hazardous wildlife species to aircraft (1 = most hazardous; DeVault et. al., 2011) and they are ranked the 2nd most hazardous mammal species at BQK (Table 5).

Legal Status Coyote populations are vast and expanding. They are not protected by federal laws. However, BQK does possess a state depredation permit issued by GDNR to legally take coyote in the vicinity of the airport (Appendix J).

Location Coyotes and their tracks were observed throughout BQK. BQK staff also reported coyote sightings and takings during this WHA.

Control Measures The most effective way to control coyotes is exclusion. A secure perimeter fence, with no breaches or gaps, will eliminate a coyote problem. Also, reducing available food (small mammals), water, and cover from the airfield will make the airport appear less attractive to coyotes. Removing "junk piles" and brushy areas, which provide potential hunting and denning sites, will reduce coyote and small mammal habitat. If coyotes are seen inside the perimeter fence, they should be taken whenever possible.

Strike History Nationally, coyotes account for approximately 13.7% of all known terrestrial mammal strike reports. Strikes with coyotes have caused as much as \$2,776,090 (7%) in damages attributed to terrestrial mammals (Dolbeer et. al., 2012).

6.2.3 Mesomammals: Beavers, Red foxes, Raccoons, Armadillos, and Opossum

Description Together, mesomammals account for approximately 30% of the mammal species observed at BQK during this WHA. The American beaver (*Castor canadensis*) are the largest rodents in North America. They weigh between 35-70 lbs and have glossy fur in shades of red to brown. Red fox (*Vulpes vulpes*) are medium sized, with long legs and long bushy tails. They weigh 8-15 lbs and with fur typically of orange-red with black stockings and black ears. The familiar Northern raccoon (*Procyon lotor*) weighs from 5 to 33 lbs, has a black nose and mask, grayish fur, and a banded tail. Virginia opossums (*Didelphis virginiana*) weigh 2-15 lbs and have long, scruffy hair with a naked nose, ears, and rat-like tail. The nine-banded armadillo (*Dasypus novemcinctus*) is commonly seen throughout the warm southern states. They weigh between 6-16 lbs and have a gray, scaly body with 8-9 moveable, overlapping bands on their backs (Reid, 2006). It should also be noted that feral cats were observed on 4 occasions and there was one observation of a feral dog.

Attractants Raccoons are highly adaptable and will live in a variety of habitats; however, they prefer wetlands, damp woods, or suburban areas. They will eat a wide variety of plant and animal material and often hunt along streams and creeks. They are also attracted to human waste. Opossums are found in a variety of habitats from agricultural fields to urban areas. They are omnivorous and will eat almost anything remotely edible, including eggs, garbage, plant materials, carrion, etc. They prefer to den in hollow logs, rocks, or burrows made by other animals. Red foxes are mainly nocturnal or crepuscular, but may hunt by day, especially in the winter. They mainly feed on small rodents, rabbits, birds, insects, fruit, and berries. Beavers eat mostly bark in the winter, roots and green vegetation in the summer. These rodents are most commonly known for creating dams to keep water levels high enough to maintain open water below the ice in the winter. Armadillos are found in woodlands, fields, scrub, and brushy areas. They prefer edge habitat where there are often exposed roots. Armadillos feed primarily on invertebrates, but will eat small vertebrates, fruits, and carrion. They can be seen rooting through the dirt for grubs (Reid, 2006).

Risks Mesomammals are a minimal wildlife strike risk at BQK. Raccoons, beavers, red foxes, opossum, and armadillos are typically solitary, nocturnal animals. They are not likely to loaf on the movement areas, but are more commonly seen around the wood line and in the infields. However, they can be an attractant risk as large raptors (hawks and owls) and larger mammals (coyotes) may prey on these species. It is important to monitor the AOA for potential mesomammal carcasses, as they can become a vulture attractant risk. Additionally, mesomammals can burrow and create dams (beavers) that can cause drainage issues on the AOA. BQK staff should routinely inspect ditches and potential breaches under the perimeter fences. These breaches allow other animals, possibly coyotes and cottontails, to easily pass under the fence and onto the AOA. Raccoons, and opossums were ranked the 3rd and 5th, respectively, most hazardous mammal species at BQK (Table 5).

Legal Status Mesomammals found at BQK are not protected by any federal laws; however, red foxes, raccoons, and opossum are considered furbearers and have regulated seasons. Beavers are considered nuisance and have no closed season for hunting in Georgia.

Location Beavers were the most commonly observed mesomammals (10%). Beavers were seen throughout most of the ditches on the airfield, but especially in Zones A, where they were commonly seen in the pond and within the Altamaha-Brunswick Canal.

Control Measures The most effective way to keep these animals off of the airfield is by exclusion. It is critical that the perimeter fence be checked for breaches daily and that all known breaches are repaired. Ideally, an apron of fencing material (chain-link, chicken wire, hog wire, etc) should be attached around the bottom of the fence, bent out at an angle and then buried wherever breaches persist. If the fence is secure and mesomammals are still observed on the AOA, it is best to trap and euthanize these individuals. Carbon monoxide (CO) cartridges can be placed in burrows to poison the inhabitants and then the burrow can be filled, burying the carcass. When using this method, be sure not to place cartridges in gopher tortoise burrows. There is not much an airport can do to keep beavers out of drainage ditches, aside from eliminating all surrounding vegetation. If there is no available wood for the beavers to eat or create their dams and lodges, they will not be capable of staying in the ditches for long. If vegetation removal is not an option, the beavers can be actively removed. The most effective way to remove a beaver is by trapping it with a beaver trap. However, shooting can also be an option. Unfortunately, once a beaver is removed, another beaver will likely move into the vacated territory if habitat conditions are favorable. Removing all available woody vegetation is the only long-term solution.

Strike History Nationally, raccoons account for approximately 3% of all terrestrial mammal strike reports. Strikes with raccoons have caused as much as \$35,000 in damage. Armadillos comprise 0.9% of terrestrial mammal strikes and have caused an estimated \$1000 in damage. Beavers comprise less than 0.1% of terrestrial mammal strikes and have caused no measurable damage. Red foxes account for approximately 4% of all terrestrial mammal strike reports. Strikes with red foxes have caused as much as \$52,000 in damage (Dolbeer et. al., 2012). Opossums were not listed on strike data.

6.2.4 White-tailed Deer

Description White-tailed deer (*Odocoileus virginianus*) have a reddish brown coat and a long tail with a white underside. They weigh approximately 50-300 lbs and are highly variable in size. Deer are mostly nocturnal or crepuscular (active at dawn and dusk) and were observed most commonly during night surveys (Reid, 2006). Deer were observed in the highest numbers during the month of February (Figure 6-34). Deer are typically most active in the fall during the "rut" (deer mating season). This is when males are marking their territory and attracting females with their scent. Their focus becomes more on mating than finding food or hiding from predators. They will travel longer distances to find a female or cover a larger territory. The "rut" peaks in October and November, and most deer strikes nationally are reported during this time. In the warmer climates (southern U.S.) the rut often occurs early (September and October). Patterns at BQK do not mirror that of the typically white-tailed deer. This could be due to constant hunting pressures and human interactions.

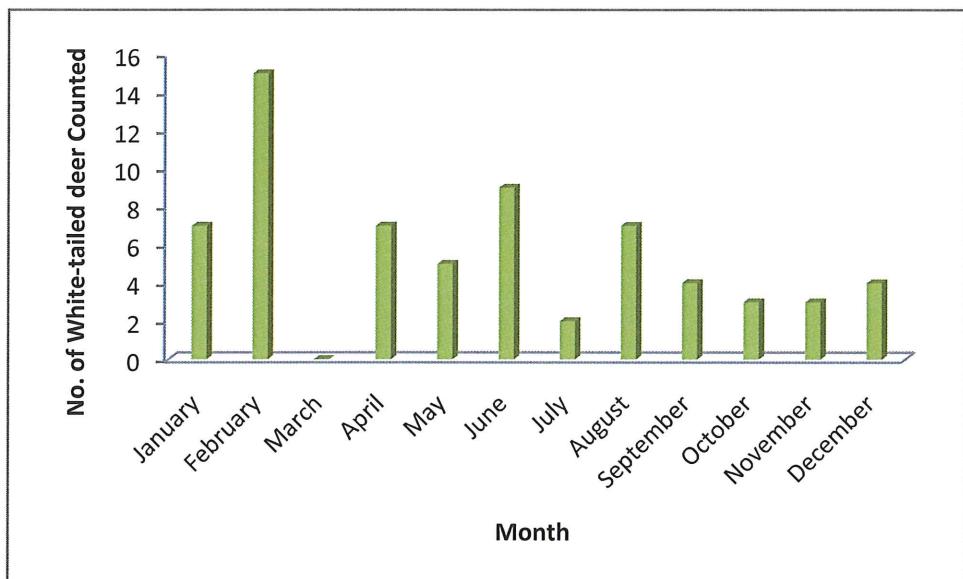


Figure 6-34. Number of deer counted per month at BQK from September 2011 to September 2012.

Attractants Deer can be found anywhere there are woodlands for cover and open areas for foraging. They tend to prefer low-lying, fragmented deciduous forest with riparian corridors for water and cover. Deer feed on various plant materials, including leaves, twigs, nuts, berries, and fungi. They often prefer managed grass plots or agricultural crops (Reid, 2006). Short, maintained grasses (like those on the airport) retain their “sweetness” and therefore provide a popular food source.

Risks Deer are capable of causing substantial damage to aircraft. They are large animals that are commonly found in groups and will erratically dash in front of an aircraft unexpectedly. This same behavior is why they are often involved in collisions with automobiles. White-tailed deer are ranked 2 out of 77 hazardous wildlife species to aircraft (1 = most hazardous). Only mule deer (*Odocoileus hemionus*) are ranked more hazardous than white-tailed deer (DeVault, et. al., 2011). White-tailed deer are considered the most hazardous mammal species at BQK (Table 5).

Legal Status Deer are not protected by federal laws, but do require a state permit to be hunted. BQK maintains a deer and coyote depredation permit from GDNR (Appendix J).

Location The deer were most commonly observed in and around the forested areas in Zones C and D.

Control Measures The most effective way to control deer is exclusion. FAA Certalert No. 04-16 states, “Proper fencing is the best way of keeping deer off aircraft movement areas. The FAA recommends a 10-12 foot chain link fence with 3-strand barbed wire outriggers. In some cases an airport may be able to use an 8-foot chain link fence with 3-strand barbed outriggers, depending upon the amount of deer activity in a local area. All fencing must be properly installed and maintained. A 4-foot skirt of chain-link fence material, attached to the bottom of the fence and

buried at a 45° angle on the outside of the fence will prevent animals from digging under the fence and reduce the chance of washouts. This type of fencing also greatly increases airport security and safety. The fence line right-of-way must be kept free of excess vegetation. The fence line should be patrolled at least daily, and any washouts, breaks or other holes in the fence repaired as soon as they are discovered. Gates should close with less than 6-inch gaps to prevent entry by deer." Unfortunately, large tracks of woodlands are currently within the BQK perimeter fence. These wooded areas are perfect habitat providing cover and forage. Therefore, it is important that deer found within the perimeter fence be taken immediately. Lethal take will reduce the number of deer that feel comfortable loafing or feeding on the airfield.

Strike History Nationally, white-tailed deer account for at least 34% of all terrestrial mammal strike reports. Strikes with white-tailed deer have caused a minimum of \$31,094,261 (75%) in damages (Dolbeer et. al., 2012).

6.3 Wildlife Attractants at BQK

The attractants described in this section were identified during the WHA at BQK from September 2011 to September 2012. Airports and their wildlife are dynamic and their attractants may change over time. Therefore, this should not be viewed as a permanent identification of the wildlife situation at BQK. Any modifications to BQK property should take into consideration the effects that these changes may have on wildlife. The attractants are listed in no particular order.

6.3.1 On-site Attractants

Woodland areas inside the perimeter fence. There are extensive wooded areas inside the perimeter fence that provide food sources (acorns, berries, etc.), cover, perches, and roosting sites for crows, coyote, deer, small mammals, hawks, blackbirds, etc. The wooded area north of runway 7-25 encompasses over a hundred acres and is an attractant to just about every wildlife species (Photo 6-12). Coyotes, deer, and hawks are commonly seen foraging along these woodland habitats.



Photo 6-12.
Woodland area
located along
the northern
edge of the
mowed airfield.
Deer and
coyotes were
frequently
observed in and
around this
area.

Large areas of very short or very tall grass mixed with weedy vegetation. There are large areas of very short grass around movement areas (safety zone) and hangars/ramps (Photo 6-13). These areas are highly attractive to birds, especially meadowlarks, cattle egrets, starlings, killdeer, and mourning doves and deer also prefer to forage on the short grass. In addition, there are periods of time where areas of very tall grass are found throughout the airfield. This tall grass attracts small mammals such as mice and rabbits. The small-mammal species in turn attract predators such as, coyotes and hawks. The grassy fields are mixed with "weedy" species that produce seeds and flowers (Photo 6-14). This attracts a variety of seed and fruit eating birds (such as blackbirds and robins). The mix of short and tall grass also creates an edge habitat that is attractive to numerous wildlife including rodents, cottontails, meadowlarks, crows, and coyotes. The tall grass provides cover and a corridor that allows the predators to hunt undiscovered while searching for prey in the shorter fields. Meanwhile, the prey species use the tall grass as a nearby cover for hiding when feeding in the short grass. The result of mowing short in the safety areas and allowing the ditch edges to grow taller is that the birds are actually attracted towards these areas that are commonly found near runways and taxiways. The FAA recommends maintaining a consistent grass height between 6" – 12" throughout the AOA.



Photo 6-13. Short grass and tall grass creating an edge effect near the approach of Runway 25 at BQK.

Photo 6-14. Weedy vegetation located within a ditch at the approach end of Runway 7. Weeds produce edible fruits and seeds that attract blackbirds, robins, sparrows, etc.



Abundance of available perching and nesting structures. Many birds are attracted to perching and nesting in and around the airport facilities. Starlings are especially attracted to the hangars and the power lines adjacent to the ramp area. Meadowlarks, flycatchers, mourning doves, hawks, crows, and vultures utilize runway/taxiway signs, the beacon, antennas, windsocks, the perimeter fence, lights, and miscellaneous structures throughout the airfield for perching and establishing territories (Photo 6-15).

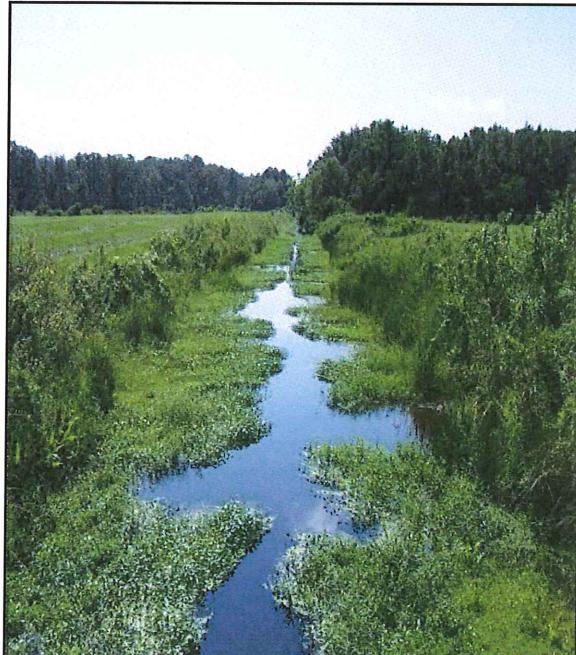


Photo 6-15. Red-tailed hawk perched on approach light at BQK.

Areas of brush and dense vegetation. Shrubby vegetation or "brush" provides excellent cover for small mammals, large mammals, and nesting/perching opportunities for birds. Brush throughout the airfield allows wildlife to travel between locations undetected (Photo 6-16).



Photo 6-16.
Brushy area
of vegetation
located near
the marsh
area at the
eastern side
of the airfield.



Obstructions in and along drainage ditches. It is important to keep all ditches free of vegetation. Many birds use these areas to nest (red-winged blackbirds) and forage (geese and ducks). Mammals, such as rodents, raccoons, beavers, and coyotes will use these ditches as travel corridors or as hunting/feeding grounds to find prey/vegetation. BQK has ditches and canals throughout the airfield and they should be maintained and inspected regularly to ensure proper drainage (Photo 6-17, left). It was noted that during the WHA, one beaver dam was identified in one of the ditches and was subsequently dismantled. Beaver dams create water flow issues that result in standing water within the wetlands and nearby movement areas.

Areas of standing water throughout the AOA. Standing water is highly attractive to most birds. Groundwater remained at or above the surface for extended periods during the rainy season, making it difficult to drive and mow. Mowers and vehicles create ruts in these areas. The ruts and lower areas hold water and attract mourning doves, cattle egrets, crows, vultures, and killdeer (Photo 6-18).



Photo 6-18.
Low area of
standing water
on the airfield
at BQK.

Bare areas. There are bare areas of exposed soil and grit on the airfield (Photo 6-19). These bare areas contain grit, often hold water, and have vegetation growing through them. Bare spaces are highly attractive to killdeer for nesting and loafing and to doves/pigeons for feeding on grit.



Photo 6-19. Bare area
with exposed soil at BQK.

Carrión on the airfield. On occasion, carrión was found on the airfield (Photo 6-20). Carrión is highly attractive to a wide variety of animals, specifically vultures. The airfield should be checked for carrión daily and carcasses should be removed from the airport.



Photo 6-20.
Turkey vultures
feeding on
carrión on the
airfield at BQK.

Collection of unused materials mixed with overgrown vegetation. Some areas have become overgrown with dense vegetation and shrubs (Photos 6-21 & 6-22). The vegetation provides excellent cover and hunting opportunities for small mammals, coyotes, and birds of prey. It also prevents proper vegetative maintenance, as the mowers cannot easily navigate around the materials to manage the overgrown vegetation.

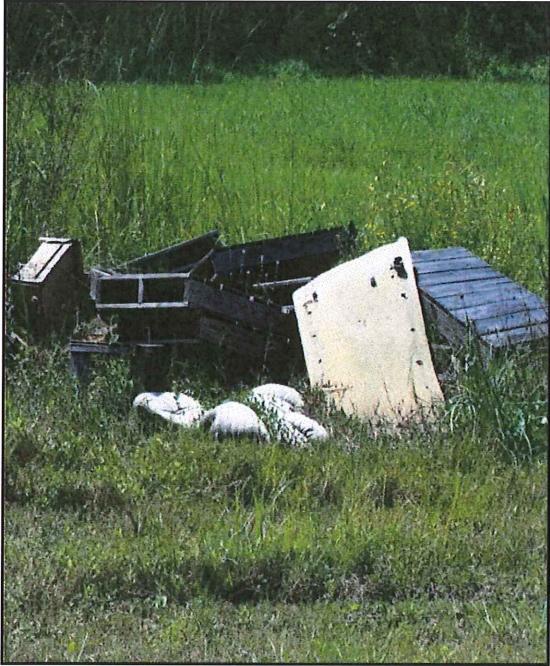


Photo 6-21 (left). Pallets and used office furniture. Photo 6-22 (right). Concrete pipes along with overgrown vegetation.

6.3.2 Off-site Attractants

There are several potential off site attractants located around BQK including, but not limited to, open water bodies (Buttermilk sound, Brunswick sound, and Manhead sound), stormwater ponds, and Country Club Estates Golf Club (Exhibits 2). Based on observations made during the WHA, it was noted that many of the wading birds flying over in the early mornings and late evenings are probably foraging in and around the surrounding intracoastal waterways; however, numbers of birds and flock sizes are relative low.

7.0 RECOMMENDATIONS

Summary

Passive Management Actions

- Remove wooded areas from inside the perimeter fence and/or add an interior “wildlife fence” that excludes the wooded areas
- Add fence near Stambaugh hangar for airport safety and wildlife control
- Regularly inspect perimeter fence/gates for breaches
- Address drainage issues in any low areas of standing water within the AOA
- Inspect ditches for signs of beaver dam and vegetation obstructions
- Maintain a consistent grass height of 6 to 12 inches throughout the airport property
- Ensure mowing blades are raised to 6 inches or above
- Install perching barriers on signs, lights, antennas, etc.
- Remove unnecessary perching and nesting structures
- Keep all facilities closed and doors secured when able
- Remove brush and debris pile(s)
- Establish suitable turf in bare areas
- Remove carrion promptly

Active Management Actions

- Aggressively harass and/or shoot Canada geese, white-tailed deer, coyotes, cattle egrets, vultures and other hazardous wildlife from the AOA
- Trap and/or remove mesomammals when necessary
- Remove nesting material and nests whenever found

Administrative Recommendations

- Adopt a Zero-Tolerance Policy towards hazardous wildlife
- Report all wildlife strikes and document all wildlife management actions
- Continue to obtain necessary permits to control wildlife
- Consult a qualified airport wildlife biologist when drafting new construction plans
- Develop a Wildlife Hazard Management Plan (WHMP)
- Continue to train personnel in wildlife identification and management procedures
- Continue to monitor wildlife behavior and abundance at BQK

7.1 Passive Management Actions

7.1.1 Remove wooded areas from inside the perimeter fence and/or add an interior “wildlife fence” that excludes the wooded areas

Removing all of the wooded areas from the AOA may not be possible; however an interior wildlife fence would assist BQK in providing safe airport operations and exclude the woodlands from the movement areas. BQK staff are currently employing many active and passive wildlife management techniques including (but not limited to) vegetation maintenance, maintaining recommended grass heights throughout safety areas, using pyrotechnics as a scare device, conducting vehicle patrols for wildlife and fence breaches, and using lethal control when necessary. However, these efforts are only minimally effective, as there is significant available habitat (wooded areas) inside the BQK perimeter fence to properly manage the populations of deer, coyote, and mesomammals regardless of which management techniques are implemented. These animals are a potential threat to aviation and can only be controlled in the long-term with secure wildlife fencing.

7.1.2 Add fence near Stambaugh hangar for airport safety and wildlife control

If an interior wildlife fence cannot be installed, it is recommended that the existing perimeter fence be completed (in area along entrance drive to Stambaugh aviation) and properly maintained. In CertAlert 04-16, “the FAA recommends a 10-12 foot chain link fence with 3-strand barbed wire outriggers. A 4-foot skirt of chain-link fence material attached to the bottom of the fence and buried at a 45° angle on the outside of the fence will prevent animals from digging under the fence and reduce the chance of washouts. This type of fencing also greatly increases airport security and safety.” The guidance continues, “All fencing must be properly installed and maintained” with the “fence line right-of-way kept free of excess vegetation”. Ensuring the perimeter fence at BQK is complete around the entire AOA will help reduce or eliminate the number of large mammals found on the airfield.

7.1.3 Regularly inspect perimeter fence and gates for breaches

FAA recommends daily fence patrols and any breaches be repaired as soon as they are discovered. This includes any spaces in gates, which should close with less than 6-inch gaps. Concrete “speed bumps” are recommended as a permanent solution to fill any spaces under gates. Sand bags and asphalt millings can be used as effective temporary methods.

7.1.4 Address drainage issues in any low areas of standing water within the AOA

The turf in some areas remains saturated during the wet season and attracts wading birds, crows, killdeer, coyotes, deer, and geese. It also becomes difficult for maintenance equipment to navigate through the soaked ground. Drainage ditches blocked by beaver activity and aquatic vegetation should be cleared to allow the ditches to drain the airfield quickly after a rain event. If ditches are cleared and inundation continues, BQK should consider assessing the jurisdictional status of these “wet” areas and, if jurisdictional, seeking appropriate permits from the U.S. Army Corps of Engineers to add fill where needed.

7.1.5 Inspect ditches for signs of beaver dam and vegetation obstructions

It is best to keep all signs of beaver dams and vegetation obstructions clear from ditches and culverts. No vegetation should be allowed to persist in the ditches as it provides feeding opportunities for beavers and waterfowl. This vegetation also impedes drainage, creating areas of standing water, another wildlife attractant at BQK. Ditches and culverts should be made as sterile as possible. Ensuring that the ditch has steep sides can help deter wildlife and accelerate drainage as well.

7.1.6 Maintain a consistent grass height of 6 to 12 inches throughout the airport property

It is imperative that the grass height always be kept between 6 and 12 inches. This is the key to a successful wildlife strike reduction program and most wildlife programs start with grass management as the baseline. There are several benefits to maintaining an intermediate grass height: it disrupts visual inter-flock communication, obscures insect food sources, limits predator protection, impedes the ease at which wildlife can move, and taller grass out-competes edible, weedy vegetation and it has a slower growth rate, which in turn requires less frequent mowing. True grasses (without seed heads) are indigestible to most birds. Birds are only attracted to "weedy" and seed-producing vegetation. When mowing, it is recommended to mow in several directions and only when the ground is dry. This will help to avoid ruts or cause bare areas from tractor tires. The recommended height is to be applied to the entire AOA, including areas around any hangars, lights, and signs, to avoid causing edge effects or bare areas. If necessary, concrete pads should be used around the base of lights and signs. Installation of concrete pads, lessens maintenance, as well as decreases areas of bare ground that attract birds. Maintaining an intermediate grass height will be effective against killdeer, meadowlarks, cattle egrets, mourning doves, and European starlings.

7.1.7 Ensure mowing blades are raised to 6 inches or above

On the AOA, grass should never be shorter than 6 inches (closer to 12 inches is actually preferable). While taller grass has the potential to house more insects and small mammals, birds have a more difficult time seeing their prey and navigating through taller grasses. Meadowlarks, killdeer, starlings, mourning doves, and crows are all attracted to shorter grass. If an increase in raptors hunting on the airfield is observed, grass height may need to be reassessed.

7.1.8 Install perching barriers on signs, lights, antennas, etc.

Anti-perching devices are used to discourage loafing and roosting around facilities and are recommended for the beacon, windsock, MALSR, signage, and hangars where birds are commonly seen perched or roosting. The most effective anti-perching devices are "bird spiders" and "bird spikes", but non-drying sticky gel repellents can be applied to these surfaces as well.

7.1.9 Remove unnecessary perching and nesting structures

To deter birds such as kestrels, meadowlarks, crows, starlings, and doves from loafing, nesting, and hunting on the airfield, it is recommended that BQK staff remove all unnecessary structures that birds use as perches, such as unused antennas, parked equipment, and inapplicable signage

7.1.10 Keep all facilities closed and doors secured when able

Airport terminal buildings, hangars, and equipment are good places to use exclusion techniques. It is imperative that these buildings remain closed when not in use. Keeping all doors closed is the simplest and most practical exclusion technique. Any points of entry in these buildings should be identified and secured to prevent wildlife from entering.

7.1.11 Remove brush and debris pile(s)

Brush and debris piles are ideal places for birds to nest, small mammals to hide, and predators (raptors and coyotes) to hunt. They also make it difficult to mow. These overgrown areas are unnecessary and can be unsightly. Removing brush and debris piles will make it easier to maintain the vegetation within the perimeter fence.

7.1.12 Establish suitable turf in bare areas

Bare areas occur at BQK. These areas provide ideal nesting habitat for killdeer and serve as a food source for doves and pigeons (birds that must ingest grit to aid in digestion).

7.1.13 Remove carrion promptly

Many potentially hazardous wildlife species, including vultures, crows, and eagles, depend on carrion as a primary food source. Any carcass found on the AOA (small or large) should be removed immediately and disposed of properly (buried). Daily inspections for carrion are recommended.

7.2 Active Management Actions

7.2.1 Aggressively harass and/or shoot Canada geese, white-tailed deer, coyotes, blackbirds, crows, vultures, and other hazardous wildlife from the AOA

Most wildlife is highly adaptable and will habituate to non-lethal harassment measures (e.g. effigies, pyrotechnics, etc.) over time. However, lethal control can help to reinforce these non-lethal methods. Often following lethal control, wildlife responds favorably to harassment with pyrotechnics once again. Harassment and lethal control need to be used together and persistently, especially in the colder months, when bird populations are at their highest. If possible, shooting and harassment should be conducted with more than one person so that there is staff available to move quickly around the airfield if necessary, especially when dispersing a large flock. Of course, harassment and shooting should be limited if air traffic is heavy.

Shooting can be labor intensive and is a sensitive activity to the public. However, the benefits achieved from this type of control generally outweigh the negative impacts. When performed by staff with bird identification skills, shooting should be target specific. Therefore, endangered species or other non-target species are not placed at risk. ERS will provide bird identification training to airport personnel if requested, but it is recommended that a bird field identification guide be kept in the operations and maintenance vehicles as well.

7.2.2 Trap and/or remove mesomammals when necessary

Although mesomammals are a minimal threat to aviation, trapping and relocating or taking beavers, and armadillos can be an effective method for reducing their populations on the airfield (if desired). It is recommended that BQK staff enlist the assistance of an animal control professional or a member of the USDA Wildlife Services to safely conduct trapping efforts. It is not recommended to take or trap and relocate bobcats as they can be influential in reducing the number of small mammals on the airfield. Reducing the small mammal population can eliminate the available prey base for more hazardous wildlife such as hawks and coyotes.

7.2.3 Remove nesting material and nests whenever found

The AOA must be monitored for nesting and all nests should be removed and eggs destroyed. Hangars on the west end of the ramp, ornamental landscape trees/scrubs around the terminal, and the maintenance sheds and unused equipment are of particular concern for nesting activities.

7.3 Administrative Recommendations

7.3.1 Adopt a Zero-tolerance Policy towards hazardous wildlife

A zero-tolerance policy should be adopted towards all hazardous wildlife on the airfield, including, but not limited to, coyotes, deer, vultures, and Canada geese. This strict approach establishes a position for operations personnel and helps to prioritize events as they occur.

7.3.2 Report all wildlife strikes and document all wildlife management actions

Before a problem can be solved, it must be understood. The collection and analysis of accurate and detailed data from each of the airports is an essential step to understanding the wildlife hazards that are specific to BQK. The FAA has a standard form (FAA Form 5200-7 Bird/Other Wildlife Strike Report) for the voluntary reporting of bird and other wildlife strikes with aircraft that can be completed and mailed (Appendix M) or submitted electronically on their website (<http://wildlife.faa.gov>). Pilots, airport operations personnel, aircraft maintenance personnel, and anyone else who has knowledge of a wildlife observation or strike should report it. It is important to include as much information as possible such as species, location of observation, the time of day, the date, and what, if any, action was taken. The identification of the species is particularly important and identification guides should be available to assist personnel with this task. It is recommended to carry pocket field guides with the pictures and names of commonly observed species during all perimeter fence and AOA inspections. Regular carcass searches should be performed throughout the movement areas and any found carcasses (within 200' of the movement area) should be reported as a strike. It is recommended to send unidentified remains to the Bird Identification Lab at the Smithsonian Institute in Washington, D.C. for proper identification. This service is free to all airports. Please see Appendix N for guidelines for submitting bird remains.

All wildlife management actions, especially lethal control, taking place at BQK should be recorded in a "Wildlife Management Log". See Appendix O for an example of a log data sheet. If wildlife are dispersed or taken from the AOA it should be recorded in the log and reported to USFWS when renewing BQK's Depredation Permit. Significant wildlife sightings (e.g. coyotes, deer, large birds, large flocks, etc.), nest and egg removal, destroying dams, trappings, and filling of burrows (except gopher tortoise burrows) should be recorded in the management log as well. Data sheets should be kept in operations and maintenance vehicles.

7.3.3 Continue to obtain necessary permits to control wildlife

BQK currently possess the necessary depredation permits required by the state for controlling deer and coyote and a USFWS Depredation permit to take migratory birds protected by the MBTA. Both permits need to be renewed annually.

7.3.4 Consult a qualified airport wildlife biologist when drafting new construction plans

If large projects or changes to the landscape are being considered at BQK, a qualified airport wildlife biologist should be contracted for input on the changes' impact on wildlife at the airport. A

multi-disciplinary approach encourages pre-planning, which can prevent problems and lead to cost savings in the future.

7.3.5 Develop a Wildlife Hazard Management Plan (WHMP)

As defined in 14 CFR Part 139.337 (d), the WHA must be submitted to the FAA Safety Certification Inspector or "Administrator" for approval and determination of the need for a WHMP. It is the opinion of ERS biologists that a plan is necessary at BQK. The plan provides the framework for an active habitat management and bird dispersal program. The plan will outline the regular wildlife patrols that must be implemented to manage any current wildlife hazards that may occur on the AOA and who is responsible for these measures. Because airports are dynamic environments, the plan should be revisited at least annually to determine if changes are necessary and to evaluate the success of the wildlife deterrent program. ERS is available to assist with the development of a plan and to conduct annual reviews of the plan.

7.3.6 Continue to train personnel in wildlife identification and management procedures

Staff should be trained to recognize and respond to potential wildlife hazards in an appropriate manner. They should be familiar with the damage caused by wildlife and how to respond to potentially hazardous situations. Responding may require active harassment or shooting, or simply that the employee documents the attractant or hazard and notifies the operations supervisor. ERS is available to assist with annual wildlife hazard management training.

7.3.7 Continue to monitor wildlife behavior and abundance at BQK

It is important to recognize that the presence and behavior of wildlife on airports is influenced by many variables that may change from one year to the next. Conclusions based on wildlife populations during this study are meant to be a guide. Data from this WHA will provide a baseline for comparison in the future. BQK should continue to perform these dawn and dusk surveys (with less frequency, perhaps seasonally) to help monitor the current wildlife situation. BQK should adopt a continual monitoring program that can be specified in the WHMP.

8.0 CONCLUSION

Managing wildlife hazards on and around airports is essential for maintaining safe and timely airport operations. The goal of this WHA is to help BQK prevent wildlife strikes before they occur. Surveying was conducted for the purpose of determining which wildlife hazards/attractants exist at BQK, and what measures should be taken to improve current conditions as well as prevent potential future hazards. Surveys took place during dawn, midday, and dusk at fourteen established monitoring stations for 12 consecutive months. Wildlife, signs of wildlife activity, and potential attractants of wildlife were observed and documented.

There are many techniques available for managing wildlife hazards and BQK is currently utilizing a few of these techniques. Trapping, pyrotechnics, shooting, and fencing are proven effective methods; however, they are not the only options available. When aiming to discourage wildlife from occupying airport properties, it is best to use a combination of deterrents. Wildlife become accustomed to repeated control methods and are likely to become unresponsive over time. Since the control methods vary in cost, a cost/ benefit analysis should be conducted before adding a new technique to the wildlife management strategy. Inexpensive techniques include introducing dead bird effigies, installing perching deterrents, and limiting vegetation growth with routine mowing/grass height maintenance. Wildlife control methods are most successful when used as preventative measures. Most importantly, wildlife hazard management should become a routine and ongoing effort undertaken by BQK to identify and address new and continuing issues that have been identified in this report as being specific to airport property and its environs.

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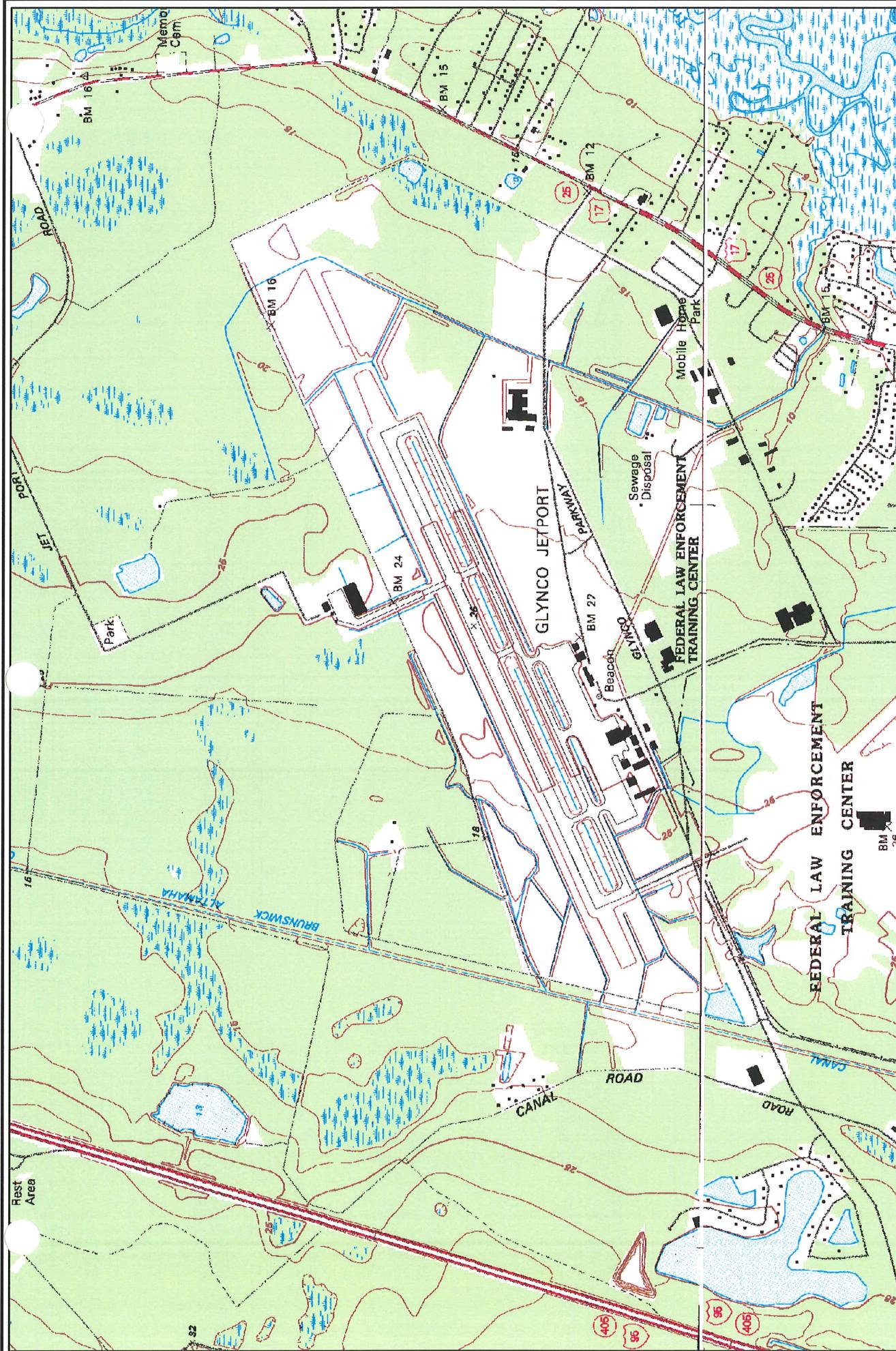
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Exhibits

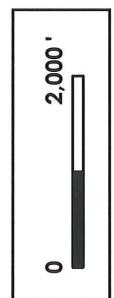


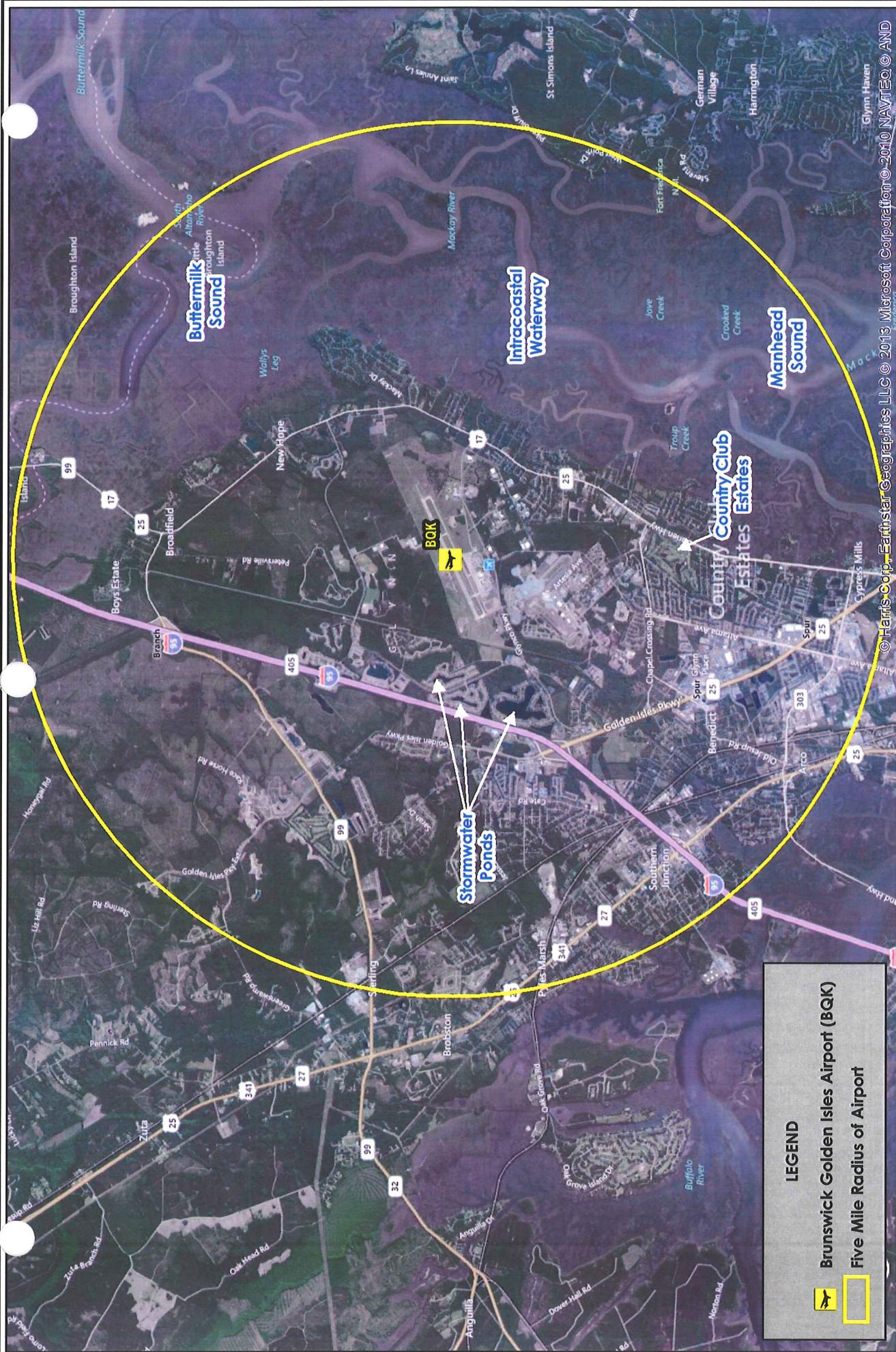
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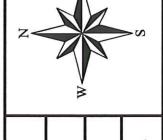
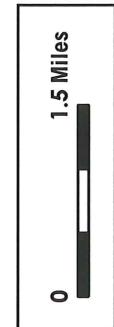




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 Environmental Resource Solutions Our Science. Your Success.	Brunswick Golden Isles Airport Monitoring Stations and Small Mammal Trapping Transects		
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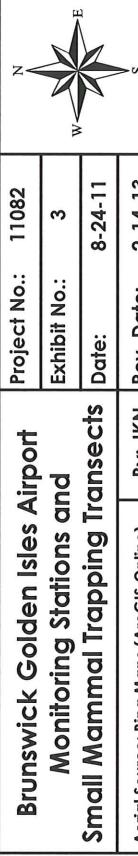
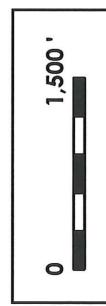


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Appendix A



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

**Subject: HAZARDOUS WILDLIFE
ATTRACTANTS ON OR NEAR
AIRPORTS**

Date: 8/28/2007

AC No: 150/5200-33B

Initiated by: AAS-300 Change:

1. PURPOSE. This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. APPLICABILITY. The Federal Aviation Administration (FAA) recommends that public-use airport operators implement the standards and practices contained in this AC. The holders of Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D (Part 139), may use the standards, practices, and recommendations contained in this AC to comply with the wildlife hazard management requirements of Part 139. Airports that have received Federal grant-in-aid assistance must use these standards. The FAA also recommends the guidance in this AC for land-use planners, operators of non-certificated airports, and developers of projects, facilities, and activities on or near airports.

3. CANCELLATION. This AC cancels AC 150/5200-33A, *Hazardous Wildlife Attractants on or near Airports*, dated July 27, 2004.

4. PRINCIPAL CHANGES. This AC contains the following major changes, which are marked with vertical bars in the margin:

- a. Technical changes to paragraph references.
- b. Wording on storm water detention ponds.
- c. Deleted paragraph 4-3.b, *Additional Coordination*.

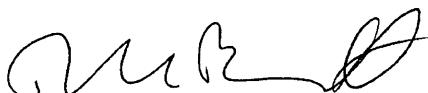
5. BACKGROUND. Information about the risks posed to aircraft by certain wildlife species has increased a great deal in recent years. Improved reporting, studies, documentation, and statistics clearly show that aircraft collisions with birds and other wildlife are a serious economic and public safety problem. While many species of wildlife can pose a threat to aircraft safety, they are not equally hazardous. Table 1

ranks the wildlife groups commonly involved in damaging strikes in the United States according to their relative hazard to aircraft. The ranking is based on the 47,212 records in the FAA National Wildlife Strike Database for the years 1990 through 2003. These hazard rankings, in conjunction with site-specific Wildlife Hazards Assessments (WHA), will help airport operators determine the relative abundance and use patterns of wildlife species and help focus hazardous wildlife management efforts on those species most likely to cause problems at an airport.

Most public-use airports have large tracts of open, undeveloped land that provide added margins of safety and noise mitigation. These areas can also present potential hazards to aviation if they encourage wildlife to enter an airport's approach or departure airspace or air operations area (AOA). Constructed or natural areas—such as poorly drained locations, detention/retention ponds, roosting habitats on buildings, landscaping, odor-causing rotting organic matter (putrescible waste) disposal operations, wastewater treatment plants, agricultural or aquaculture activities, surface mining, or wetlands—can provide wildlife with ideal locations for feeding, loafing, reproduction, and escape. Even small facilities, such as fast food restaurants, taxicab staging areas, rental car facilities, aircraft viewing areas, and public parks, can produce substantial attractions for hazardous wildlife.

During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage. Hazardous wildlife attractants on and near airports can jeopardize future airport expansion, making proper community land-use planning essential. This AC provides airport operators and those parties with whom they cooperate with the guidance they need to assess and address potentially hazardous wildlife attractants when locating new facilities and implementing certain land-use practices on or near public-use airports.

6. MEMORANDUM OF AGREEMENT BETWEEN FEDERAL RESOURCE AGENCIES. The FAA, the U.S. Air Force, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture - Wildlife Services signed a Memorandum of Agreement (MOA) in July 2003 to acknowledge their respective missions in protecting aviation from wildlife hazards. Through the MOA, the agencies established procedures necessary to coordinate their missions to address more effectively existing and future environmental conditions contributing to collisions between wildlife and aircraft (wildlife strikes) throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety while protecting the Nation's valuable environmental resources.



DAVID L. BENNETT
Director, Office of Airport Safety
and Standards

Table 1. Ranking of 25 species groups as to relative hazard to aircraft (1=most hazardous) based on three criteria (damage, major damage, and effect-on-flight), a composite ranking based on all three rankings, and a relative hazard score. Data were derived from the FAA National Wildlife Strike Database, January 1990–April 2003.¹

Species group	Ranking by criteria			Composite ranking ²	Relative hazard score ³
	Damage ⁴	Major damage ⁵	Effect on flight ⁶		
Deer	1	1	1	1	100
Vultures	2	2	2	2	64
Geese	3	3	6	3	55
Cormorants/pelicans	4	5	3	4	54
Cranes	7	6	4	5	47
Eagles	6	9	7	6	41
Ducks	5	8	10	7	39
Osprey	8	4	8	8	39
Turkey/pheasants	9	7	11	9	33
Herons	11	14	9	10	27
Hawks (buteos)	10	12	12	11	25
Gulls	12	11	13	12	24
Rock pigeon	13	10	14	13	23
Owls	14	13	20	14	23
H. lark/s. bunting	18	15	15	15	17
Crows/ravens	15	16	16	16	16
Coyote	16	19	5	17	14
Mourning dove	17	17	17	18	14
Shorebirds	19	21	18	19	10
Blackbirds/starling	20	22	19	20	10
American kestrel	21	18	21	21	9
Meadowlarks	22	20	22	22	7
Swallows	24	23	24	23	4
Sparrows	25	24	23	24	4
Nighthawks	23	25	25	25	1

¹ Excerpted from the *Special Report for the FAA, “Ranking the Hazard Level of Wildlife Species to Civil Aviation in the USA: Update #1, July 2, 2003”*. Refer to this report for additional explanations of criteria and method of ranking.

² Relative rank of each species group was compared with every other group for the three variables, placing the species group with the greatest hazard rank for ≥ 2 of the 3 variables above the next highest ranked group, then proceeding down the list.

³ Percentage values, from Tables 3 and 4 in Footnote 1 of the *Special Report*, for the three criteria were summed and scaled down from 100, with 100 as the score for the species group with the maximum summed values and the greatest potential hazard to aircraft.

⁴ Aircraft incurred at least some damage (destroyed, substantial, minor, or unknown) from strike.

⁵ Aircraft incurred damage or structural failure, which adversely affected the structure strength, performance, or flight characteristics, and which would normally require major repair or replacement of the affected component, or the damage sustained makes it inadvisable to restore aircraft to airworthy condition.

⁶ Aborted takeoff, engine shutdown, precautionary landing, or other.

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SECTION 1.**GENERAL SEPARATION CRITERIA FOR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.**

1-1. INTRODUCTION. When considering proposed land uses, airport operators, local planners, and developers must take into account whether the proposed land uses, including new development projects, will increase wildlife hazards. Land-use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife strikes.

The FAA recommends the minimum separation criteria outlined below for land-use practices that attract hazardous wildlife to the vicinity of airports. Please note that FAA criteria include land uses that cause movement of hazardous wildlife onto, into, or across the airport's approach or departure airspace or air operations area (AOA). (See the discussion of the synergistic effects of surrounding land uses in Section 2-8 of this AC.)

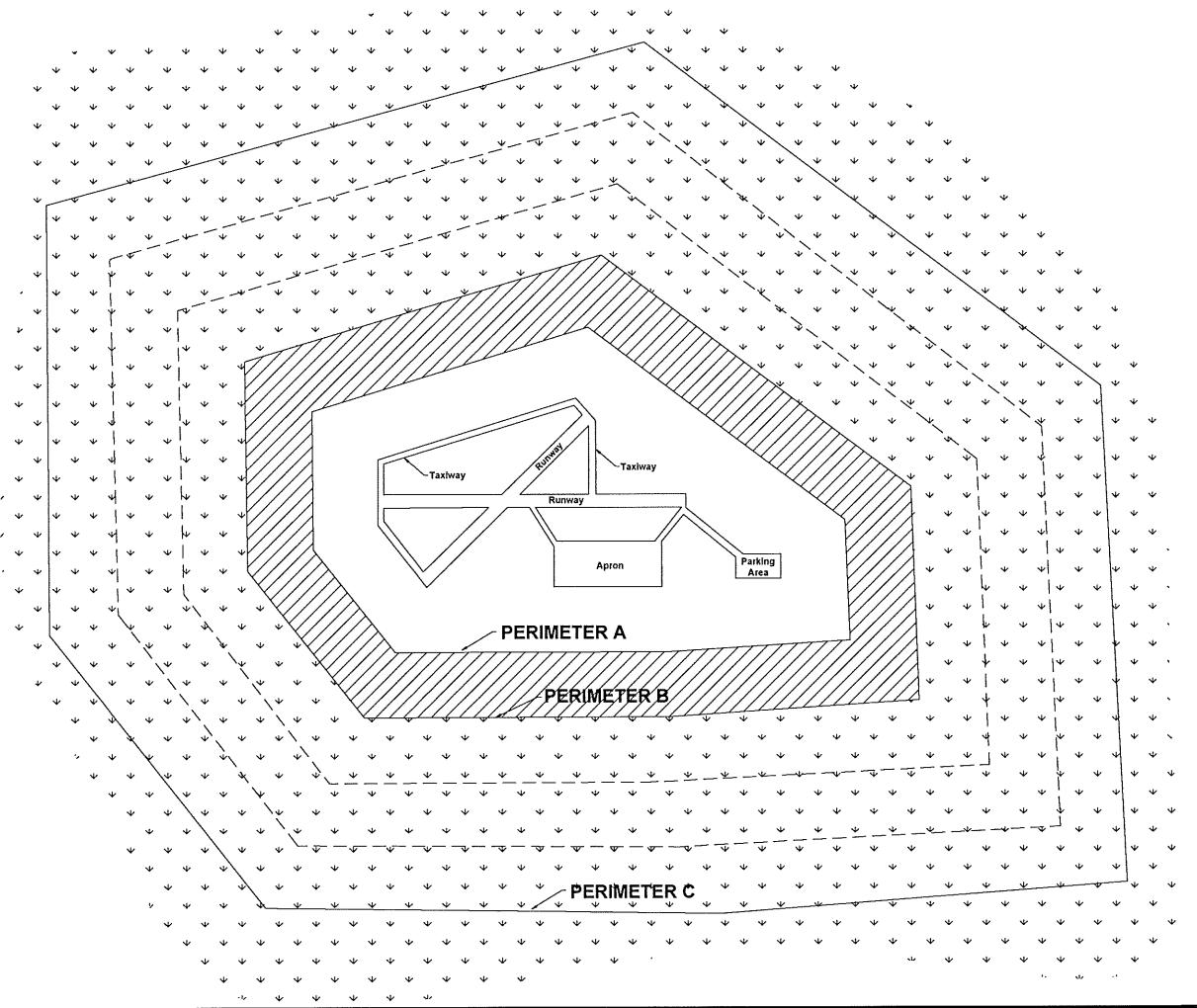
The basis for the separation criteria contained in this section can be found in existing FAA regulations. The separation distances are based on (1) flight patterns of piston-powered aircraft and turbine-powered aircraft, (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet and 90 percent occur under 3,000 feet above ground level), and (3) National Transportation Safety Board (NTSB) recommendations.

1-2. AIRPORTS SERVING PISTON-POWERED AIRCRAFT. Airports that do not sell Jet-A fuel normally serve piston-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 5,000 feet at these airports for any of the hazardous wildlife attractants mentioned in Section 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between an airport's AOA and the hazardous wildlife attractant. Figure 1 depicts this separation distance measured from the nearest aircraft operations areas.

1-3. AIRPORTS SERVING TURBINE-POWERED AIRCRAFT. Airports selling Jet-A fuel normally serve turbine-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 10,000 feet at these airports for any of the hazardous wildlife attractants mentioned in Section 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between an airport's AOA and the hazardous wildlife attractant. Figure 1 depicts this separation distance from the nearest aircraft movement areas.

1-4. PROTECTION OF APPROACH, DEPARTURE, AND CIRCLING AIRSPACE. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's AOA and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace.

Figure 1. Separation distances within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.



PERIMETER A: For airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest air operations area.

PERIMETER B: For airports serving turbine-powered aircraft, hazardous wildlife attractants must be 10,000 feet from the nearest air operations area.

PERIMETER C: 5-mile range to protect approach, departure and circling airspace.

SECTION 2.

LAND-USE PRACTICES ON OR NEAR AIRPORTS THAT POTENTIALLY ATTRACT HAZARDOUS WILDLIFE.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment vary considerably, depending on several factors, including land-use practices on or near the airport. This section discusses land-use practices having the potential to attract hazardous wildlife and threaten aviation safety. In addition to the specific considerations outlined below, airport operators should refer to *Wildlife Hazard Management at Airports*, prepared by FAA and U.S. Department of Agriculture (USDA) staff. (This manual is available in English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: <http://wildlife-mitigation.tc.FAA.gov>). And, *Prevention and Control of Wildlife Damage*, compiled by the University of Nebraska Cooperative Extension Division. (This manual is available online in a periodically updated version at: ianrwww.unl.edu/wildlife/solutions/handbook/.)

2-2. WASTE DISPOSAL OPERATIONS. Municipal solid waste landfills (MSWLF) are known to attract large numbers of hazardous wildlife, particularly birds. Because of this, these operations, when located within the separations identified in the siting criteria in Sections 1-2 through 1-4, are considered incompatible with safe airport operations.

- a. **Siting for new municipal solid waste landfills subject to AIR 21.** Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) (AIR 21) prohibits the construction or establishment of a new MSWLF within 6 statute miles of certain public-use airports. Before these prohibitions apply, both the airport and the landfill must meet the very specific conditions described below. These restrictions do not apply to airports or landfills located within the state of Alaska.

The airport must (1) have received a Federal grant(s) under 49 U.S.C. § 47101, et seq.; (2) be under control of a public agency; (3) serve some scheduled air carrier operations conducted in aircraft with less than 60 seats; and (4) have total annual enplanements consisting of at least 51 percent of scheduled air carrier enplanements conducted in aircraft with less than 60 passenger seats.

The proposed MSWLF must (1) be within 6 miles of the airport, as measured from airport property line to MSWLF property line, and (2) have started construction or establishment on or after April 5, 2001. Public Law 106-181 only limits the construction or establishment of some new MSWLF. It does not limit the expansion, either vertical or horizontal, of existing landfills.

NOTE: Consult the most recent version of AC 150/5200-34, *Construction or Establishment of Landfills Near Public Airports*, for a more detailed discussion of these restrictions.

- b. Siting for new MSWLF not subject to AIR 21.** If an airport and MSWLF do not meet the restrictions of Public Law 106-181, the FAA recommends against locating MSWLF within the separation distances identified in Sections 1-2 through 1-4. The separation distances should be measured from the closest point of the airport's AOA to the closest planned MSWLF cell.
- c. Considerations for existing waste disposal facilities within the limits of separation criteria.** The FAA recommends against airport development projects that would increase the number of aircraft operations or accommodate larger or faster aircraft near MSWLF operations located within the separations identified in Sections 1-2 through 1-4. In addition, in accordance with 40 CFR 258.10, owners or operators of existing MSWLF units that are located within the separations listed in Sections 1-2 through 1-4 must demonstrate that the unit is designed and operated so it does not pose a bird hazard to aircraft. (See Section 4-2(b) of this AC for a discussion of this demonstration requirement.)
- d. Enclosed trash transfer stations.** Enclosed waste-handling facilities that receive garbage behind closed doors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles generally are compatible with safe airport operations, provided they are not located on airport property or within the Runway Protection Zone (RPZ). These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations. The FAA considers these facilities incompatible with safe airport operations if they are located closer than the separation distances specified in Sections 1-2 through 1-4.
- e. Composting operations on or near airport property.** Composting operations that accept only yard waste (e.g., leaves, lawn clippings, or branches) generally do not attract hazardous wildlife. Sewage sludge, woodchips, and similar material are not municipal solid wastes and may be used as compost bulking agents. The compost, however, must never include food or other municipal solid waste. Composting operations should not be located on airport property. Off-airport property composting operations should be located no closer than the greater of the following distances: 1,200 feet from any AOA or the distance called for by airport design requirements (see AC 150/5300-13, *Airport Design*). This spacing should prevent material, personnel, or equipment from penetrating any Object Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway. Airport operators should monitor composting operations located in proximity to the airport to ensure that steam or thermal rise does not adversely affect air traffic. On-airport disposal of compost by-products should not be conducted for the reasons stated in 2-3f.

- f. **Underwater waste discharges.** The FAA recommends against the underwater discharge of any food waste (e.g., fish processing offal) within the separations identified in Sections 1-2 through 1-4 because it could attract scavenging hazardous wildlife.
- g. **Recycling centers.** Recycling centers that accept previously sorted non-food items, such as glass, newspaper, cardboard, or aluminum, are, in most cases, not attractive to hazardous wildlife and are acceptable.
- h. **Construction and demolition (C&D) debris facilities.** C&D landfills do not generally attract hazardous wildlife and are acceptable if maintained in an orderly manner, admit no putrescible waste, and are not co-located with other waste disposal operations. However, C&D landfills have similar visual and operational characteristics to putrescible waste disposal sites. When co-located with putrescible waste disposal operations, C&D landfills are more likely to attract hazardous wildlife because of the similarities between these disposal facilities. Therefore, a C&D landfill co-located with another waste disposal operation should be located outside of the separations identified in Sections 1-2 through 1-4.
- i. **Fly ash disposal.** The incinerated residue from resource recovery power/heat-generating facilities that are fired by municipal solid waste, coal, or wood is generally not a wildlife attractant because it no longer contains putrescible matter. Landfills accepting only fly ash are generally not considered to be wildlife attractants and are acceptable as long as they are maintained in an orderly manner, admit no putrescible waste of any kind, and are not co-located with other disposal operations that attract hazardous wildlife.

Since varying degrees of waste consumption are associated with general incineration (not resource recovery power/heat-generating facilities), the FAA considers the ash from general incinerators a regular waste disposal by-product and, therefore, a hazardous wildlife attractant if disposed of within the separation criteria outlined in Sections 1-2 through 1-4.

2-3. WATER MANAGEMENT FACILITIES. Drinking water intake and treatment facilities, storm water and wastewater treatment facilities, associated retention and settling ponds, ponds built for recreational use, and ponds that result from mining activities often attract large numbers of potentially hazardous wildlife. To prevent wildlife hazards, land-use developers and airport operators may need to develop management plans, in compliance with local and state regulations, to support the operation of storm water management facilities on or near all public-use airports to ensure a safe airport environment.

- a. **Existing storm water management facilities.** On-airport storm water management facilities allow the quick removal of surface water, including discharges related to aircraft deicing, from impervious surfaces, such as pavement and terminal/hangar building roofs. Existing on-airport detention ponds collect storm water, protect water quality, and control runoff. Because they slowly release water

after storms, they create standing bodies of water that can attract hazardous wildlife. Where the airport has developed a Wildlife Hazard Management Plan (WHMP) in accordance with Part 139, the FAA requires immediate correction of any wildlife hazards arising from existing storm water facilities located on or near airports, using appropriate wildlife hazard mitigation techniques. Airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.

Where possible, airport operators should modify storm water detention ponds to allow a maximum 48-hour detention period for the design storm. The FAA recommends that airport operators avoid or remove retention ponds and detention ponds featuring dead storage to eliminate standing water. Detention basins should remain totally dry between rainfalls. Where constant flow of water is anticipated through the basin, or where any portion of the basin bottom may remain wet, the detention facility should include a concrete or paved pad and/or ditch/swale in the bottom to prevent vegetation that may provide nesting habitat.

When it is not possible to drain a large detention pond completely, airport operators may use physical barriers, such as bird balls, wires grids, pillows, or netting, to deter birds and other hazardous wildlife. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office.

The FAA recommends that airport operators encourage off-airport storm water treatment facility operators to incorporate appropriate wildlife hazard mitigation techniques into storm water treatment facility operating practices when their facility is located within the separation criteria specified in Sections 1-2 through 1-4.

- b. New storm water management facilities.** The FAA strongly recommends that off-airport storm water management systems located within the separations identified in Sections 1-2 through 1-4 be designed and operated so as not to create above-ground standing water. Stormwater detention ponds should be designed, engineered, constructed, and maintained for a maximum 48-hour detention period after the design storm and remain completely dry between storms. To facilitate the control of hazardous wildlife, the FAA recommends the use of steep-sided, rip-rap lined, narrow, linearly shaped water detention basins. When it is not possible to place these ponds away from an airport's AOA, airport operators should use physical barriers, such as bird balls, wires grids, pillows, or netting, to prevent access of hazardous wildlife to open water and minimize aircraft-wildlife interactions. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office. All vegetation in or around detention basins that provide food or cover for hazardous wildlife should be eliminated. If soil conditions and other requirements allow, the FAA encourages

the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

- c. Existing wastewater treatment facilities.** The FAA strongly recommends that airport operators immediately correct any wildlife hazards arising from existing wastewater treatment facilities located on or near the airport. Where required, a WHMP developed in accordance with Part 139 will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should encourage wastewater treatment facility operators to incorporate measures, developed in consultation with a wildlife damage management biologist, to minimize hazardous wildlife attractants. Airport operators should also encourage those wastewater treatment facility operators to incorporate these mitigation techniques into their standard operating practices. In addition, airport operators should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.
- d. New wastewater treatment facilities.** The FAA strongly recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in Sections 1-2 through 1-4. Appendix 1 defines wastewater treatment facility as "any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes." The definition includes any pretreatment involving the reduction of the amount of pollutants or the elimination of pollutants prior to introducing such pollutants into a publicly owned treatment works (wastewater treatment facility). During the site-location analysis for wastewater treatment facilities, developers should consider the potential to attract hazardous wildlife if an airport is in the vicinity of the proposed site, and airport operators should voice their opposition to such facilities if they are in proximity to the airport.
- e. Artificial marshes.** In warmer climates, wastewater treatment facilities sometimes employ artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. The FAA strongly recommends against establishing artificial marshes within the separations identified in Sections 1-2 through 1-4.
- f. Wastewater discharge and sludge disposal.** The FAA recommends against the discharge of wastewater or sludge on airport property because it may improve soil moisture and quality on unpaved areas and lead to improved turf growth that can be an attractive food source for many species of animals. Also, the turf requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw, both of which can attract hazardous wildlife. In addition, the improved turf may attract grazing wildlife, such as deer and geese. Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

2-4. WETLANDS. Wetlands provide a variety of functions and can be regulated by local, state, and Federal laws. Normally, wetlands are attractive to many types of wildlife, including many which rank high on the list of hazardous wildlife species (Table 1).

NOTE: If questions exist as to whether an area qualifies as a wetland, contact the local division of the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or a wetland consultant qualified to delineate wetlands.

- a. Existing wetlands on or near airport property.** If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports. Where required, a WHMP will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.
- b. New airport development.** Whenever possible, the FAA recommends locating new airports using the separations from wetlands identified in Sections 1-2 through 1-4. Where alternative sites are not practicable, or when airport operators are expanding an existing airport into or near wetlands, a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the state wildlife management agency should evaluate the wildlife hazards and prepare a WHMP that indicates methods of minimizing the hazards.
- c. Mitigation for wetland impacts from airport projects.** Wetland mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects or projects required to correct wildlife hazards from wetlands. Wetland mitigation must be designed so it does not create a wildlife hazard. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4.
 - (1) Onsite mitigation of wetland functions.** The FAA may consider exceptions to locating mitigation activities outside the separations identified in Sections 1-2 through 1-4 if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge, which cannot be replicated when moved to a different location. Using existing airport property is sometimes the only feasible way to achieve the mitigation ratios mandated in regulatory orders and/or settlement agreements with the resource agencies. Conservation easements are an additional means of providing mitigation for project impacts. Typically the airport operator continues to own the property, and an easement is created stipulating that the property will be maintained as habitat for state or Federally listed species.

Mitigation must not inhibit the airport operator's ability to effectively control hazardous wildlife on or near the mitigation site or effectively maintain other aspects of safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife must be avoided. The FAA will review any onsite mitigation proposals to determine compatibility with safe airport operations. A wildlife damage management biologist should evaluate any wetland mitigation projects that are needed to protect unique wetland functions and that must be located in the separation criteria in Sections 1-2 through 1-4 before the mitigation is implemented. A WHMP should be developed to reduce the wildlife hazards.

(2) Offsite mitigation of wetland functions. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4 unless they provide unique functions that must remain onsite (see 2-4c(1)). Agencies that regulate impacts to or around wetlands recognize that it may be necessary to split wetland functions in mitigation schemes. Therefore, regulatory agencies may, under certain circumstances, allow portions of mitigation to take place in different locations.

(3) Mitigation banking. Wetland mitigation banking is the creation or restoration of wetlands in order to provide mitigation credits that can be used to offset permitted wetland losses. Mitigation banking benefits wetland resources by providing advance replacement for permitted wetland losses; consolidating small projects into larger, better-designed and managed units; and encouraging integration of wetland mitigation projects with watershed planning. This last benefit is most helpful for airport projects, as wetland impacts mitigated outside of the separations identified in Sections 1-2 through 1-4 can still be located within the same watershed. Wetland mitigation banks meeting the separation criteria offer an ecologically sound approach to mitigation in these situations. Airport operators should work with local watershed management agencies or organizations to develop mitigation banking for wetland impacts on airport property.

2-5. DREDGE SPOIL CONTAINMENT AREAS. The FAA recommends against locating dredge spoil containment areas (also known as Confined Disposal Facilities) within the separations identified in Sections 1-2 through 1-4 if the containment area or the spoils contain material that would attract hazardous wildlife.

2-6. AGRICULTURAL ACTIVITIES. Because most, if not all, agricultural crops can attract hazardous wildlife during some phase of production, the FAA recommends against the use of airport property for agricultural production, including hay crops, within the separations identified in Sections 1-2 through 1-4. If the airport has no financial alternative to agricultural crops to produce income necessary to maintain the viability of the airport, then the airport shall follow the crop distance guidelines listed in the table titled "Minimum Distances between Certain Airport Features and Any On-Airport Agricultural Crops" found in AC 150/5300-13, *Airport Design*, Appendix 17. The cost of wildlife control and potential accidents should be weighed against the income produced by the on-airport crops when deciding whether to allow crops on the airport.

- a. Livestock production.** Confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg laying operations) often attract flocking birds, such as starlings, that pose a hazard to aviation. Therefore, The FAA recommends against such facilities within the separations identified in Sections 1-2 through 1-4. Any livestock operation within these separations should have a program developed to reduce the attractiveness of the site to species that are hazardous to aviation safety. Free-ranging livestock must not be grazed on airport property because the animals may wander onto the AOA. Furthermore, livestock feed, water, and manure may attract birds.
- b. Aquaculture.** Aquaculture activities (i.e. catfish or trout production) conducted outside of fully enclosed buildings are inherently attractive to a wide variety of birds. Existing aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4 must have a program developed to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should also oppose the establishment of new aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4.
- c. Alternative uses of agricultural land.** Some airports are surrounded by vast areas of farmed land within the distances specified in Sections 1-2 through 1-4. Seasonal uses of agricultural land for activities such as hunting can create a hazardous wildlife situation. In some areas, farmers will rent their land for hunting purposes. Rice farmers, for example, flood their land during waterfowl hunting season and obtain additional revenue by renting out duck blinds. The duck hunters then use decoys and call in hundreds, if not thousands, of birds, creating a tremendous threat to aircraft safety. A wildlife damage management biologist should review, in coordination with local farmers and producers, these types of seasonal land uses and incorporate them into the WHMP.

2-7. GOLF COURSES, LANDSCAPING AND OTHER LAND-USE CONSIDERATIONS.

- a. Golf courses.** The large grassy areas and open water found on most golf courses are attractive to hazardous wildlife, particularly Canada geese and some species of gulls. These species can pose a threat to aviation safety. The FAA recommends against construction of new golf courses within the separations identified in Sections 1-2 through 1-4. Existing golf courses located within these separations must develop a program to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should ensure these golf courses are monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.
- b. Landscaping and landscape maintenance.** Depending on its geographic location, landscaping can attract hazardous wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. A wildlife damage management biologist should review all landscaping plans. Airport operators should also monitor all landscaped areas on a continuing basis for the presence of hazardous wildlife. If

hazardous wildlife is detected, corrective actions should be immediately implemented.

Turf grass areas can be highly attractive to a variety of hazardous wildlife species. Research conducted by the USDA Wildlife Services' National Wildlife Research Center has shown that no one grass management regime will deter all species of hazardous wildlife in all situations. In cooperation with wildlife damage management biologist, airport operators should develop airport turf grass management plans on a prescription basis, depending on the airport's geographic locations and the type of hazardous wildlife likely to frequent the airport

Airport operators should ensure that plant varieties attractive to hazardous wildlife are not used on the airport. Disturbed areas or areas in need of re-vegetating should not be planted with seed mixtures containing millet or any other large-seed producing grass. For airport property already planted with seed mixtures containing millet, rye grass, or other large-seed producing grasses, the FAA recommends disking, plowing, or another suitable agricultural practice to prevent plant maturation and seed head production. Plantings should follow the specific recommendations for grass management and seed and plant selection made by the State University Cooperative Extension Service, the local office of Wildlife Services, or a qualified wildlife damage management biologist. Airport operators should also consider developing and implementing a preferred/prohibited plant species list, reviewed by a wildlife damage management biologist, which has been designed for the geographic location to reduce the attractiveness to hazardous wildlife for landscaping airport property.

- c. **Airports surrounded by wildlife habitat.** The FAA recommends that operators of airports surrounded by woodlands, water, or wetlands refer to Section 2.4 of this AC. Operators of such airports should provide for a Wildlife Hazard Assessment (WHA) conducted by a wildlife damage management biologist. This WHA is the first step in preparing a WHMP, where required.
- d. **Other hazardous wildlife attractants.** Other specific land uses or activities (e.g., sport or commercial fishing, shellfish harvesting, etc.), perhaps unique to certain regions of the country, have the potential to attract hazardous wildlife. Regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, airport operators must take prompt remedial action(s) to protect aviation safety.

2-8. SYNERGISTIC EFFECTS OF SURROUNDING LAND USES. There may be circumstances where two (or more) different land uses that would not, by themselves, be considered hazardous wildlife attractants or that are located outside of the separations identified in Sections 1-2 through 1-4 that are in such an alignment with the airport as to create a wildlife corridor directly through the airport and/or surrounding airspace. An example of this situation may involve a lake located outside of the separation criteria on the east side of an airport and a large hayfield on the west side of an airport, land uses that together could create a flyway for Canada geese directly across the airspace of the airport. There are numerous examples of such situations;

therefore, airport operators and the wildlife damage management biologist must consider the entire surrounding landscape and community when developing the WHMP.

SECTION 3.

PROCEDURES FOR WILDLIFE HAZARD MANAGEMENT BY OPERATORS OF PUBLIC-USE AIRPORTS.

3.1. INTRODUCTION. In recognition of the increased risk of serious aircraft damage or the loss of human life that can result from a wildlife strike, the FAA may require the development of a Wildlife Hazard Management Plan (WHMP) when specific triggering events occur on or near the airport. Part 139.337 discusses the specific events that trigger a Wildlife Hazard Assessment (WHA) and the specific issues that a WHMP must address for FAA approval and inclusion in an Airport Certification Manual.

3.2. COORDINATION WITH USDA WILDLIFE SERVICES OR OTHER QUALIFIED WILDLIFE DAMAGE MANAGEMENT BIOLOGISTS. The FAA will use the Wildlife Hazard Assessment (WHA) conducted in accordance with Part 139 to determine if the airport needs a WHMP. Therefore, persons having the education, training, and expertise necessary to assess wildlife hazards must conduct the WHA. The airport operator may look to Wildlife Services or to qualified private consultants to conduct the WHA. When the services of a wildlife damage management biologist are required, the FAA recommends that land-use developers or airport operators contact a consultant specializing in wildlife damage management or the appropriate state director of Wildlife Services.

NOTE: Telephone numbers for the respective USDA Wildlife Services state offices can be obtained by contacting USDA Wildlife Services Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD, 20737-1234, Telephone (301) 734-7921, Fax (301) 734-5157 (<http://www.aphis.usda.gov/ws/>).

3-3. WILDLIFE HAZARD MANAGEMENT AT AIRPORTS: A MANUAL FOR AIRPORT PERSONNEL. This manual, prepared by FAA and USDA Wildlife Services staff, contains a compilation of information to assist airport personnel in the development, implementation, and evaluation of WHMPs at airports. The manual includes specific information on the nature of wildlife strikes, legal authority, regulations, wildlife management techniques, WHAs, WHMPs, and sources of help and information. The manual is available in three languages: English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: <http://wildlife-mitigation.tc.FAA.gov/>. This manual only provides a starting point for addressing wildlife hazard issues at airports. Hazardous wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, qualified wildlife damage management biologists must direct the development of a WHMP and the implementation of management actions by airport personnel.

There are many other resources complementary to this manual for use in developing and implementing WHMPs. Several are listed in the manual's bibliography.

3-4. WILDLIFE HAZARD ASSESSMENTS, TITLE 14, CODE OF FEDERAL REGULATIONS, PART 139. Part 139.337(b) requires airport operators to conduct a Wildlife Hazard Assessment (WHA) when certain events occur on or near the airport.

Part 139.337 (c) provides specific guidance as to what facts must be addressed in a WHA.

3-5. WILDLIFE HAZARD MANAGEMENT PLAN (WHMP). The FAA will consider the results of the WHA, along with the aeronautical activity at the airport and the views of the airport operator and airport users, in determining whether a formal WHMP is needed, in accordance with Part 139.337. If the FAA determines that a WHMP is needed, the airport operator must formulate and implement a WHMP, using the WHA as the basis for the plan.

The goal of an airport's Wildlife Hazard Management Plan is to minimize the risk to aviation safety, airport structures or equipment, or human health posed by populations of hazardous wildlife on and around the airport.

The WHMP must identify hazardous wildlife attractants on or near the airport and the appropriate wildlife damage management techniques to minimize the wildlife hazard. It must also prioritize the management measures.

3-6. LOCAL COORDINATION. The establishment of a Wildlife Hazards Working Group (WHWG) will facilitate the communication, cooperation, and coordination of the airport and its surrounding community necessary to ensure the effectiveness of the WHMP. The cooperation of the airport community is also necessary when new projects are considered. Whether on or off the airport, the input from all involved parties must be considered when a potentially hazardous wildlife attractant is being proposed. Airport operators should also incorporate public education activities with the local coordination efforts because some activities in the vicinity of your airport, while harmless under normal leisure conditions, can attract wildlife and present a danger to aircraft. For example, if public trails are planned near wetlands or in parks adjoining airport property, the public should know that feeding birds and other wildlife in the area may pose a risk to aircraft.

Airport operators should work with local and regional planning and zoning boards so as to be aware of proposed land-use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in Sections 1-2 through 1-4. Pay particular attention to proposed land uses involving creation or expansion of waste water treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas. At the very least, airport operators must ensure they are on the notification list of the local planning board or equivalent review entity for all communities located within 5 miles of the airport, so they will receive notification of any proposed project and have the opportunity to review it for attractiveness to hazardous wildlife.

3-7 COORDINATION/NOTIFICATION OF AIRMEN OF WILDLIFE HAZARDS. If an existing land-use practice creates a wildlife hazard and the land-use practice or wildlife hazard cannot be immediately eliminated, airport operators must issue a Notice to Airmen (NOTAM) and encourage the land-owner or manager to take steps to control the wildlife hazard and minimize further attraction.

SECTION 4.

FAA NOTIFICATION AND REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS

4-1. FAA REVIEW OF PROPOSED LAND-USE PRACTICE CHANGES IN THE VICINITY OF PUBLIC-USE AIRPORTS.

- a. The FAA discourages the development of waste disposal and other facilities, discussed in Section 2, located within the 5,000/10,000-foot criteria specified in Sections 1-2 through 1-4.
- b. For projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport's AOA, the FAA may review development plans, proposed land-use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. The FAA considers sensitive airport areas as those that lie under or next to approach or departure airspace. This brief examination should indicate if further investigation is warranted.
- c. Where a wildlife damage management biologist has conducted a further study to evaluate a site's compatibility with airport operations, the FAA may use the study results to make a determination.

4-2. WASTE MANAGEMENT FACILITIES.

- a. **Notification of new/expanded project proposal.** Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) limits the construction or establishment of new MSWLF within 6 statute miles of certain public-use airports, when both the airport and the landfill meet very specific conditions. See Section 2-2 of this AC and AC 150/5200-34 for a more detailed discussion of these restrictions.

The Environmental Protection Agency (EPA) requires any MSWLF operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, *Criteria for Municipal Solid Waste Landfills*, Section 258.10, *Airport Safety*). The EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. (See 4-2.b below.)

When new or expanded MSWLF are being proposed near airports, MSWLF operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258.

- b. Waste handling facilities within separations identified in Sections 1-2 through 1-4.** To claim successfully that a waste-handling facility sited within the separations identified in Sections 1-2 through 1-4 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 2-2.d. The FAA strongly recommends against any facility other than that as outlined in 2-2.d (enclosed transfer stations). The FAA will use this information to determine if the facility will be a hazard to aviation.
- c. Putrescible-Waste Facilities.** In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, no such facility has been able to demonstrate an ability to reduce and sustain hazardous wildlife to levels that existed before the putrescible-waste landfill began operating. For this reason, demonstrations of experimental wildlife control measures may not be conducted within the separation identified in Sections 1-2 through 1-4.

4-3. OTHER LAND-USE PRACTICE CHANGES. As a matter of policy, the FAA encourages operators of public-use airports who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 statute miles of their airports to promptly notify the FAA. The FAA also encourages proponents of such land use changes to notify the FAA as early in the planning process as possible. Advanced notice affords the FAA an opportunity (1) to evaluate the effect of a particular land-use change on aviation safety and (2) to support efforts by the airport sponsor to restrict the use of land next to or near the airport to uses that are compatible with the airport.

The airport operator, project proponent, or land-use operator may use FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, or other suitable documents similar to FAA Form 7460-1 to notify the appropriate FAA Regional Airports Division Office. Project proponents can contact the appropriate FAA Regional Airports Division Office for assistance with the notification process.

It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land-use operator or project proponent should also forward specific details of the proposed land-use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.

- a. Airports that have received Federal grant-in-aid assistance.** Airports that have received Federal grant-in-aid assistance are required by their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations. The FAA recommends that airport operators to the extent practicable oppose off-airport land-use changes or practices within the separations identified in Sections 1-2 through 1-4 that may attract hazardous wildlife. Failure to do so may lead to noncompliance with applicable grant assurances. The FAA will not approve the placement of airport

development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants without appropriate mitigating measures. Increasing the intensity of wildlife control efforts is not a substitute for eliminating or reducing a proposed wildlife hazard. Airport operators should identify hazardous wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

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APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR.

1. **GENERAL.** This appendix provides definitions of terms used throughout this AC.
1. **Air operations area.** Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.
2. **Airport operator.** The operator (private or public) or sponsor of a public-use airport.
3. **Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.
4. **Bird balls.** High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.
5. **Certificate holder.** The holder of an Airport Operating Certificate issued under Title 14, Code of Federal Regulations, Part 139.
6. **Construct a new MSWLF.** To begin to excavate, grade land, or raise structures to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting agency.
7. **Detention ponds.** Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.
8. **Establish a new MSWLF.** When the first load of putrescible waste is received on-site for placement in a prepared municipal solid waste landfill.
9. **Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.
10. **General aviation aircraft.** Any civil aviation aircraft not operating under 14 CFR Part 119, Certification: Air Carriers and Commercial Operators.
11. **Hazardous wildlife.** Species of wildlife (birds, mammals, reptiles), including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard
12. **Municipal Solid Waste Landfill (MSWLF).** A publicly or privately owned discrete area of land or an excavation that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. An MSWLF may receive

other types wastes, such as commercial solid waste, non-hazardous sludge, small-quantity generator waste, and industrial solid waste, as defined under 40 CFR § 258.2. An MSWLF can consist of either a stand alone unit or several cells that receive household waste.

13. **New MSWLF.** A municipal solid waste landfill that was established or constructed after April 5, 2001.
14. **Piston-powered aircraft.** Fixed-wing aircraft powered by piston engines.
15. **Piston-use airport.** Any airport that does not sell Jet-A fuel for fixed-wing turbine-powered aircraft, and primarily serves fixed-wing, piston-powered aircraft. Incidental use of the airport by turbine-powered, fixed-wing aircraft would not affect this designation. However, such aircraft should not be based at the airport.
16. **Public agency.** A State or political subdivision of a State, a tax-supported organization, or an Indian tribe or pueblo (49 U.S.C. § 47102(19)).
17. **Public airport.** An airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(20)).
18. **Public-use airport.** An airport used or intended to be used for public purposes, and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft may be under the control of a public agency or privately owned and used for public purposes (49 U.S.C. § 47102(21)).
19. **Putrescible waste.** Solid waste that contains organic matter capable of being decomposed by micro-organisms and of such a character and proportion as to be capable of attracting or providing food for birds (40 CFR §257.3-8).
20. **Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.
21. **Retention ponds.** Storm water management ponds that hold water for several months.
22. **Runway protection zone (RPZ).** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the airport design, aircraft, type of operation, and visibility minimum.
23. **Scheduled air carrier operation.** Any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial

operator for which the air carrier, commercial operator, or their representative offers in advance the departure location, departure time, and arrival location. It does not include any operation that is conducted as a supplemental operation under 14 CFR Part 119 or as a public charter operation under 14 CFR Part 380 (14 CFR § 119.3).

24. **Sewage sludge.** Any solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works. (40 CFR 257.2)
25. **Sludge.** Any solid, semi-solid, or liquid waste generated from a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. (40 CFR 257.2)
26. **Solid waste.** Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including, solid liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or by product material as defined by the Atomic Energy Act of 1954, as amended, (68 Stat. 923). (40 CFR 257.2)
27. **Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.
28. **Turbine-use airport.** Any airport that sells Jet-A fuel for fixed-wing turbine-powered aircraft.
29. **Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including Publicly Owned Treatment Works (POTW), as defined by Section 212 of the Federal Water Pollution Control Act (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-576) and the Water Quality Act of 1987 (P.L. 100-4). This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. (See 40 CFR Section 403.3 (q), (r), & (s)).

30. **Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, wildlife includes feral animals and domestic animals out of the control of their owners (14 CFR Part 139, *Certification of Airports*).
31. **Wildlife attractants.** Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's AOA. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.
32. **Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport.
33. **Wildlife strike.** A wildlife strike is deemed to have occurred when:
 - a. A pilot reports striking 1 or more birds or other wildlife;
 - b. Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;
 - c. Personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;
 - d. Bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified;
 - e. The animal's presence on the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal) (*Transport Canada, Airports Group, Wildlife Control Procedures Manual, Technical Publication 11500E, 1994*).

2. RESERVED.

Appendix B



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: CONSTRUCTION OR
ESTABLISHMENT OF LANDFILLS NEAR
PUBLIC AIRPORTS

Date: January 26, 2006
Initiated by: AAS-300

AC No: 150/5200-34A
Change:

1. Purpose.

This advisory circular (AC) contains guidance on complying with Federal statutory requirements regarding the construction or establishment of landfills near public airports.

2. Application.

The guidance contained in the AC is provided by the Federal Aviation Administration (FAA) for use by persons considering the construction or establishment of a new municipal solid waste landfill (MSWLF) near a public airport. Guidance contained herein should be used to comply with MSWLF site limitations contained in 49 U.S.C. § 44718(d), as amended by section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century, Pub. L. No. 106-181 (April 5, 2000), "Structures interfering with air commerce." In accordance with § 44718(d), as amended, these site limitations are not applicable in the State of Alaska.

In addition, this AC provides guidance for a state aviation agency desiring to petition the FAA for an exemption from the requirements of § 44718(d), as amended.

3. Cancellation

This AC cancels AC 150/52300-34, *Construction or Establishment of Landfills Near Public Airports*, dated August 8, 2000.

This revision contains no substantive changes to the original. Changes include revised and new website addresses, revised strike statistics, and regulation titles.

4. Related Reading Materials.

AC - 150/5200-33, *Hazardous Wildlife Attractions On or Near Airports*.

Wildlife Strikes to Civil Aircraft in the United States. FAA Wildlife Aircraft Strike Database Serial Reports.

Report to Congress: Potential Hazards to Aircraft by Locating Waste Disposal Sites in the Vicinity of Airports, April 1996, DOT/FAA/AS/96-1.

Title 14, Code of Federal Regulation, Part 139, Certification of Airports.

Title 40, Code of Federal Regulation, Part 258, Municipal Solid Waste Landfill Criteria.

Some of these documents and additional information on wildlife management, including guidance on landfills, are available on the FAA's Airports web site at <http://www.faa.gov/airports/airtraffic/airports/> or <http://wildlife-mitigation.tc.faa.gov>

5. Definitions.

Definitions for the specific purpose of this AC are found in Appendix 1.

6. Background.

The FAA has the broad authority to regulate and develop civil aviation under the Federal Aviation Act of 1958, 49 U.S.C. § 40101, et. seq., and other Federal law. In section 1220 of the Federal Aviation Reauthorization Act of 1996, Pub. L. No. 104-264 (October 9, 1996), the Congress added a new provision, section (d), to 49 U.S.C. § 44718 to be enforced by the FAA and placing limitations on the construction or establishment of landfills near public airports for the purposes of enhancing aviation safety. Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21), Pub. L. No. 106-181 (April 5, 2000) replaced section 1220 of the 1996 Reauthorization Act, 49 U.S.C. § 44718 (d), with new language. Specifically, the new provision, § 44718(d), as amended, was enacted to further limit the construction or establishment of a municipal solid waste landfill (MSWLF) near certain smaller public airports.

In enacting this legislation, Congress expressed concern that a MSWLF sited near an airport poses a potential hazard to aircraft operations because such a waste facility attracts birds. Statistics support the fact that bird strikes pose a real danger to aircraft. An estimated 87 percent of the collisions between wildlife and civil aircraft occurred on or near airports when aircraft are below 2,000 feet above ground level (AGL). Collisions with wildlife at these altitudes are especially dangerous as aircraft pilots have minimal time to recover from such emergencies.

The FAA National Wildlife Aircraft Strike Database shows that more than 59,000 civil aircraft sustained reported strikes with wildlife from 1990 to 2004. Between 1990-2004, aircraft-wildlife strikes involving U. S. civil aircraft resulted in over \$495 million/year worth of aircraft damage and associated losses and over 631,000 hours/year of aircraft down time.

From 1990 to 2004, waterfowl, gulls and raptors were involved in 77% of the 3,493 reported damaging aircraft-wildlife strikes where the bird was identified. Populations of Canada geese and many species of gulls and raptors have increased markedly over the last several years. Further, gulls and Canada geese have adapted to urban and suburban environments and, along with raptors and turkey vultures, are commonly found feeding or loafing on or near landfills.

In light of increasing bird populations and aircraft operations, the FAA believes locating landfills in proximity to airports increases the risk of collisions between birds and aircraft. To address this concern, the FAA issued AC 150/5200-33, *Hazardous Wildlife Attractions On or Near Airports*, to provide airport operators and aviation planners with guidance on minimizing wildlife attractants. AC 150/5200-33 recommends against locating municipal solid waste landfills within five statute miles of an airport if the landfill may cause hazardous wildlife to move into or through the airport's approach or departure airspace.

7. General.

Using guidance provided in the following sections, persons considering construction or establishment of a landfill should first determine if the proposed facility meets the definition of a new MSWLF (see Appendix 1). Section 44718(d), as amended, applies only to a new MSWLF. It does not apply to the expansion or modification of an existing MSWLF, and does not apply in the State of Alaska. If the proposed landfill meets the definition of a new MSWLF, its proximity to certain public airports (meeting the criteria specified in Paragraph 8 below) should be determined. If it is determined that a new MSWLF would be located within six miles of such a public airport, then either the MSWLF should be planned for an alternate location more than 6 miles from the airport, or the MSWLF proponent should request the appropriate State aviation agency to file a petition for an exemption from the statutory restriction.

In addition to the requirements of § 44718(d), existing landfill restrictions contained in AC 150/5200-33, *Hazardous Wildlife Attractions On or Near Airports* (see Paragraph 5, Background) also may be applicable. Airport operators that have accepted Federal funds have obligations under Federal grant assurances to operate their facilities in safe manner and must comply with standards prescribed in advisory circulars, including landfill site limitations contained in AC 150/5200-33.

8. Landfills Covered by the Statute.

The limitations of § 44718(d), as amended, only apply to a new MSWLF (constructed or established after April 5, 2000). The statutory limitations are not applicable where construction or establishment of a MSWLF began on or before April 5, 2000, or to an existing MSWLF (received putrescible waste on or before April 5, 2000). Further, an existing MSWLF that is expanded or modified after April 5, 2000, would not be held to the limitations of § 44718(d), as amended.

9. Airports Covered by the Statute.

The statutory limitations restricting the location of a new MSWLF near an airport apply to only those airports that are recipients of Federal grants (under the Airport and Airway Improvement Act of 1982, as amended, 49 U.S.C. § 47101, *et seq.*) and primarily serve general aviation aircraft and scheduled air carrier operations using aircraft with less than 60 passenger seats.

While the FAA does not classify airports precisely in this manner, the FAA does categorize airports by the type of aircraft operations served and number of annual passenger enplanements. In particular, the FAA categorizes public airports that serve air carrier operations. These airports are known as commercial service airports, and receive scheduled passenger service and have 2,500 or more enplaned passengers per year.

One sub-category of commercial service airports, nonhub primary airports, closely matches the statute requirement. Nonhub primary airports are defined as commercial service airports that enplane less than 0.05 percent of all commercial passenger enplanements (0.05 percent equated to 352,748 enplanements in 2004) but more than 10,000 annual enplanements. While these enplanements consist of both large and small air carrier operations, most are conducted in aircraft with less than 60 seats. These airports also are heavily used by general aviation aircraft, with an average of 81 based aircraft per nonhub primary airport.

In addition, the FAA categorizes airports that enplane 2,500 to 10,000 passengers annually as non-primary commercial service airports, and those airports that enplane 2,500 or less passengers annually as general aviation airports. Both types of airports are mainly used by general aviation but in some instances, they have annual enplanements that consist of scheduled air carrier operations conducted in aircraft with less than 60 seats. Of the non-primary commercial service airports and general aviation airports, only those that have scheduled air carrier operations conducted in aircraft with less than 60 seats would be covered by the statute. The statute does not apply to those airports that serve only general aviation aircraft operations.

To comply with the intent of the statute, the FAA has identified those airports classified as nonhub primary, non-primary commercial service and general aviation airports that:

1. Are recipients of Federal grant under 49 U.S.C. § 47101, et. seq.;
2. Are under control of a public agency;
3. Serve scheduled air carrier operations conducted in aircraft with less than 60 seats; and
4. Have total annual enplanements consisting of at least 51% of scheduled air carrier enplanements conducted in aircraft with less than 60 passenger seats.

Persons considering construction or establishment of a new MSWLF should contact the FAA to determine if an airport within six statute miles of the new MSWLF meets these criteria (see paragraph 11 below for information on contacting the FAA). If the FAA determines the airport does meet these criteria, then § 44718(d), as amended, is applicable.

An in-depth explanation of how the FAA collects and categorizes airport data is available in the FAA's National Plan of Integrated Airport Systems (NPIAS). This report and a list of airports classified as nonhub primary, non-primary commercial service and general aviation airports (and associated enplanement data) are available on the FAA's Airports web site at http://www.faa.gov/airports_airtraffic/airports/planning_capacity/.

10. Separation distance measurements.

Section 44718(d), as amended, requires a minimum separation distance of six statute miles between a new MSWLF and a public airport. In determining this distance separation, measurements should be made from the closest point of the airport property boundary to the closest point of the MSWLF property boundary. Measurements can be made from a perimeter fence if the fence is co-located, or within close proximity to, property boundaries. It is the responsibility of the new MSWLF proponent to determine the separation distance.

11. Exemption Process.

Under § 44718(d), as amended, the FAA Administrator may approve an exemption from the statute's landfill location limitations. Section 44718(d), as amended, permits the aviation agency of the state in which the airport is located to request such an exemption from the FAA Administrator. Any person desiring such an exemption should contact the aviation agency in the state in which the affected airport is located. A list of state aviation agencies and contact information is available at the National Association of State Aviation Officials (NASAQ) web site at www.nasaq.org or by calling NASAQ at (301) 588-1286.

A state aviation agency that desires to petition the FAA for an exemption should notify the Regional Airports Division Manager, in writing, at least 60 days prior to the construction of a MSWLF. The petition should explain the nature and extent of relief sought, and contain information, documentation, views, or arguments that demonstrate that an exemption from the statute would not have an adverse impact on aviation safety. Information on contacting FAA Regional Airports Division Managers can be found on the FAA's web site at www.faa.gov.

After considering all relevant material presented, the Regional Airports Division Manager will notify the state agency within 30 days whether the request for exemption has been approved or denied. The FAA may approve a request for an exemption if it is determined that such an exemption would have no adverse impact on aviation safety.

12. Information.

For further information, please contact the FAA's Office of Airport Safety and Standards, Airport Safety and Operations Division, at (800) 842-8736, Ext. 7-3085 or via email at WebmasterARP@faa.gov. Any information, documents and reports that are available on the FAA web site also can be obtained by calling the toll-free telephone number listed above.



DAVID L. BENNETT
Director, Office of Airport Safety and Standards

APPENDIX 1. DEFINITIONS.

The following are definitions for the specific purpose of this advisory circular.

Construct a municipal solid waste landfill (MSWLF) means excavate or grade land, or raise structures, to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting authority.

Establish a municipal solid waste landfill (MSWLF) means receive the first load of putrescible waste on site for placement in a prepared municipal solid waste landfill.

Existing municipal solid waste landfill (MSWLF) means a municipal solid waste landfill that received putrescible waste on or before April 5, 2000.

General aviation aircraft means any civil aviation aircraft not operating under 14 CFR Part 119, Certification: Air carriers and commercial operators.

Municipal solid waste landfill (MSWLF) means publicly or privately owned discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. A MSWLF may receive other types of RCRA subtitle D wastes, such as commercial solid waste, nonhazardous sludge, small quantity generator waste and industrial solid waste, as defined under 40 CFR § 258.2. A MSWLF may consist of either a standalone unit or several cells that receive household waste.

New municipal solid waste landfill (MSWLF) means a municipal solid waste landfill that was established or constructed after April 5, 2000.

Person(s) means an individual, firm, partnership, corporation, company, association, joint-stock association, or governmental entity. It includes a trustee, receiver, assignee, or similar representative of any of them (14 CFR Part 1).

Public agency means a State or political subdivision of a State; a tax-supported organization; or an Indian tribe or pueblo (49 U.S.C. § 47102(15)).

Public airport means an airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(16)).

Putrescible waste means solid waste which contains organic matter capable of being decomposed by micro-organisms and of such a character and proportion as to be capable of attracting or providing food for birds (40 CFR § 257.3-8).

Scheduled air carrier operation means any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial operator for which the air carrier, commercial operator, or their representatives offers in advance the departure location, departure time, and arrival location. It does not include any operation that is conducted as a supplemental operation under 14 CFR Part 119, or is conducted as a public charter operation under 14 CFR Part 380 (14 CFR § 119.3).

Solid waste means any garbage, or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permit under 33 U.S.C. § 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) (40 CFR § 258.2).

Appendix C



U.S. Department
of Transportation

**Federal Aviation
Administration**

Advisory Circular

Subject: REPORTING WILDLIFE AIRCRAFT STRIKES **Date:** 12/22/04 **AC No:** 150/5200-32A
Initiated by: AAS-300 **Change:**

1. Purpose:

This Advisory Circular (AC) explains the importance of reporting collisions between aircraft and wildlife, more commonly referred to as wildlife strikes. It also examines recent improvements in the Federal Aviation Administration's (FAA) Bird/Other Wildlife Strike Reporting system; how to report a wildlife strike; what happens to the wildlife strike report data; how to access the FAA National Wildlife Aircraft Strike Database; and the FAA's Feather Identification program.

2. Background:

The FAA has long recognized the threat to aviation safety posed by wildlife strikes. Worldwide, wildlife strikes cost civil aviation an estimated \$1.2 billion annually. Each year in the U.S., wildlife strikes to U.S. civil aircraft cause about \$500 million in damage to aircraft and about 500,000 hours of civil aircraft down time. For the period 1990—2004, over 63,000 wildlife strikes were reported to the FAA. About 97 percent of all wildlife strikes reported to the FAA involve birds, almost 3 percent involve mammals and less than 1 percent involved reptiles. Waterfowl (ducks and geese), gulls, and raptors (mainly hawks and vultures) are the bird species that cause the most damage to civil aircraft in the United States. Vultures and waterfowl cause the most losses to U.S. military aircraft.

The FAA has initiated several programs to address this important safety issue, including the collection, analysis, and dissemination of wildlife strike data. The FAA actively encourages the voluntary reporting of wildlife strikes.

3. How to Report a Wildlife Aircraft strike:

A wildlife strike has occurred when:

1. A pilot reports striking 1 or more birds or other wildlife;
2. Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;
3. Personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;
4. Bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified; and
5. An animal's presence on the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal) (Transport Canada, Airports Group, *Wildlife Control Procedures Manual*, Technical Publication 11500E, 1994).

Pilots, airport operations, aircraft maintenance personnel, or anyone else who has knowledge of a strike is encouraged to report it to the FAA. Wildlife strikes may be reported to the FAA using the paper FAA Form 5200-7 Bird/Other Wildlife Strike Report, or electronically at the *Airport Wildlife Hazard Mitigation* web site: <http://wildlife-mitigation.tc.faa.gov>. The FAA's Bird/Other Wildlife Strike Report Form can be downloaded or printed from the same web site. Paper copies of Form 5200-7 may also be obtained from the appropriate Airports District Offices (ADO), Flight Standards District Offices (FSDO), and Flight Service Stations (FSS). Copies of the Bird/Other Wildlife Strike Report form are also found in the Airman's Information Manual (AIM).

Paper forms are pre-addressed to the FAA. No postage is needed if the form is mailed in the United States. It is important to include as much information as possible on the strike report.

The FAA National Wildlife Strike Database Manager edits all strike reports to insure consistent, error-free data before entering the report into the database. This information is supplemented with non-duplicated strike reports from other sources. About every 6 weeks, an updated version of the database is posted on the web site. Annually, a current version of the database is forwarded to the International Civil Aviation Organization (ICAO) for incorporation into ICAO's Bird Strike Information System Database.

Analyses of data from the FAA National Wildlife Aircraft Strike Database has proved invaluable in determining the nature and severity of the wildlife strike problem. The database provides a scientific basis for identifying risk factors; justifying, implementing and defending corrective actions at airports; and for judging the effectiveness of those corrective actions. The database is invaluable to engine manufacturers and aeronautical engineers as they develop new technologies for the aviation industry. Each wildlife strike report contributes to the accuracy of and effectiveness of the database. Moreover, each report contributes to the common goal of increasing aviation safety.

4. Access to the FAA National Wildlife Aircraft Strike Database:

In order to expedite the dissemination of this important information, the FAA has developed procedures for searching the database on line at: <http://wildlife-mitigation.tc.faa.gov>. The public may access the database without a password and retrieve basic information on the number of strikes by year, by state, and by species of wildlife.

Access for airport operators, airline operators, engine manufactures, air frame manufactures, and certain other governmental agencies requires a password to access the database and allows retrieval of more detailed wildlife strike information for their specific area of concern. An airport operator's access is limited to strike information for incidents occurring on its particular airport. Airlines may only access strike records involving aircraft owned or operated by them. Comparisons among individual airports and airlines are not made.

Airline and airport operators, airframe and engine manufactures, or governmental agencies may gain access to the FAA National Wildlife Aircraft Strike Database by writing the FAA Staff Wildlife Biologist. All written requests should follow the guidelines provided below:

1. On Company Letterhead, request access to the FAA National Wildlife Aircraft Strike Database. Include:
 - a. Your preferred password. (The FAA does not assign passwords. The password should be no more than 8 characters, alphanumeric, and case sensitive.)
 - b. Your contact information. (Title, mailing address, phone number, and e-mail address.)
2. Submit the request to:

FAA Staff Wildlife Biologist, AAS-300
Federal Aviation Administration,
800 Independence Ave. SW.
Washington, DC. 20591.
3. When the FAA receives the request for access to the database, the request and the password will be entered into the system. Upon completion of the process, the requestor will be notified by e-mail.

The database is accessible from the *Airport Wildlife Hazard Mitigation* web page (<http://wildlife-mitigation.tc.faa.gov>):

5. Bird Identification:

Accurate species identification is critical for bird-aircraft strike reduction programs. Wildlife biologists must know what species of animal they are dealing with in order to make proper management decisions. The FAA, the U.S. Air Force, and the U.S. Department of Agriculture – Wildlife Services are working closely with the Feather Identification Lab at the Smithsonian Institution, Museum of Natural History, to improve the understanding and prevention of bird-aircraft strike hazards. Bird strike remains that cannot be identified by airport personnel or by a local biologist can be sent (with FAA Form 5200-7) to the Smithsonian Museum for identification.

Feather identification of birds involved in bird-aircraft strikes will be provided free of charge to all U.S. airport operators, all U.S. aircraft owners/operators (regardless of where the strike happened), or to any foreign air carrier if the strike occurred at a U.S. airport.

Please observe the following guidelines for collecting and submitting feathers or other bird/wildlife remains for species identification. These guidelines help maintain species identification accuracy, reduce turn-around time, and maintain a comprehensive FAA National Wildlife Aircraft Strike Database.

1. Collect and submit remains as soon as possible.
2. Provide complete information regarding the incident
 - a. Fill out FAA Form 5200-7 – Bird/Other Wildlife Strike Report.
 - i. A copy of Form 5200-7 can be downloaded and or printed from: <http://wildlife-mitigation.tc.faa.gov/T>.
 - b. Mail report with feather material (see address below).
 - c. Provide your contact information if you wish to be informed of the species identification.
3. Collect as much material as possible in a clean plastic/ziplock bag. (Please, do not send whole birds).
 - a. Pluck/pick a variety of feathers from the wings, tail and body.
 - b. **Do not** cut off feathers. This removes the downy region needed to aid in identification.
 - c. Include any feathers with distinct colors or patterns.
 - d. Include any downy "fluff".
 - e. Include beaks, feet, and talons if possible.
 - f. Where only a small amount of material is available, such as scrapings from an engine or smears on wings or windshields, send all of it.
 - g. **Do not** use any sticky substance such as tape or post-it notes to attach feathers.
4. Mail the Bird/Other Wildlife Strike Report and collected material to the Smithsonian's Feather Identification Lab. They will forward the report to the FAA Staff Wildlife Biologist at the FAA's Office of Airport Safety and Standards.

For Material Sent via Express Mail Service:	For Material Sent via US Postal Service:
Feather Identification Lab	Feather Identification Lab
Smithsonian Institution	Smithsonian Institution
NHB, E610, MRC 116	PO Box 37012
10 th & Constitution Ave. NW	NHB, E610, MRC 116
Washington, D.C. 20560-0116	Washington, D.C. 20013-7012
(This can be identified as "safety investigation material")	(Not recommended for priority cases.)

The species identification turn around time is usually 24 hours from receipt. Once processed, the reports and species identification information are sent to the database Manager for entry into the FAA National Wildlife Aircraft Strike Database. Persons wishing to be notified of the species identification must include contact information (e-mail, phone, etc.) on the report.

For more information contact The FAA Staff Wildlife Biologist [(202) 267-3389], or the Smithsonian's Feather Identification Lab [(202) 633-0801].



for

David L. Bennett
Director of Airport Safety and Standards

Appendix D

BQK - Species Observed by Group

Group	Species
Gulls	Herring Gulls, Ringed-billed Gulls, and Royal Terns
Passerines	American Robin, Blue Grosbeak, Brown Thrasher, Eastern Kingbird, Eastern Meadowlark, Eastern Towhee, Gray Catbird, House Finch, House Sparrow, Loggerhead Shrike, Unidentified Sparrows, Northern Cardinal, Northern Mockingbird, Pileated Woodpecker, American Goldfinch, Eastern Phoebe
Waterfowl	Pied-billed Grebe, Anhinga, Common Moorhen, Wood Duck, Belted Kingfisher, Double-creasted Cormorant, Unidentified Ducks, Canada Goose, Hooded Merganser
Wading Birds	American Bittern, Black-crowned Night-Heron, Black-necked Stilt, Cattle Egret, Great Blue Heron, Glossy Ibis, Great Egret, Green Heron, Little Blue Heron, Snowy Egret, White Ibis, Wood Stock
Raptors	American Kestrel, Bald Eagle, Barred Owl, Black Vulture, Cooper's Hawk, Great Horned Owl, Mississippi Kite, Northern Harrier, Osprey, Red-shouldered Hawk, Red-tailed Hawk, Turkey Vulture, Unidentified Hawk
Doves/Pigeons	Mourning Dove, Rock Pigeons
Blackbirds	Brown-headed Cowbird, Red-winged Blackbird, Boat-tailed Grackle, European Starling
Shorebirds	Killdeer
Corvids	American Crow, Fish Crow
Aerial Foragers	Chimney Swift, Common Night-Hawk, Tree Swallow
Game Birds	Wild Turkey
Mammals	Armadillo, Beaver, Feral Cat, Coyote, Cottontail Rabbit, Feral Dog, Fox Squirrel, Opossum, Raccoon, Cotton Mouse, Gray Squirrel, Cotton Rat, White-tailed Deer
Herps	American Alligator, Cottonmouth, Gopher Tortoise, Mud Snake, Florida Cooter

Appendix E

Migratory Bird Treaty Act

Citation: 16 U.S.C. 703-712

Summary: This law implements the treaties that the US has signed with a number of countries protecting birds that migrate across our national borders. It makes illegal the taking, possessing or selling of protected species.

Statute in Full:

§ 703 · Taking, killing, or possessing migratory birds unlawful [MBTA § 2]

Unless and except as permitted by regulations made as hereinafter provided in sections 703 to 711 of this title, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof, included in the terms of the conventions between the United States and Great Britain for the protection of migratory birds concluded August 16, 1916 (39 Stat. 1702), the United States and the United Mexican States for the protection of migratory birds and game mammals concluded February 7, 1936, and the United States and the Government of Japan for the protection of migratory birds and birds in danger of extinction, and their environment concluded March 4, 1972[,] and the convention between the United States and the Union of Soviet Socialist Republics for the conservation of migratory birds and their environments concluded November 19, 1976.

§ 704 · Determination as to when and how migratory birds may be taken, killed, or possessed [MBTA § 3]

Subject to the provisions and in order to carry out the purposes of the conventions, referred to in section 703 of this title, the Secretary of the Interior is authorized and directed, from time to time, having due regard to the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the conventions to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President.

§ 705 · Transportation or importation of migratory birds; when unlawful [MBTA § 4]

It shall be unlawful to ship, transport, or carry, by any means whatever, from one State, Territory, or district to or through another State, Territory, or district, or to or through a foreign country, any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried at any time contrary to the laws of the State, Territory, or district in which it was captured, killed, or taken, or from which it was shipped, transported, or carried. It shall be unlawful to import any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried contrary to the laws of any Province of the Dominion of Canada in which the same was captured, killed or taken, or from which it was shipped, transported, or carried.

§ 706 · Arrests; search warrants [MBTA § 5]

Any employee of the Department of Agriculture [Department of Interior] authorized by the Secretary of Agriculture [Secretary of the Interior] to enforce the provisions of this Act shall have power, without warrant, to arrest any person committing a violation of this Act in his presence or view and to take such person immediately for examination or trial before an officer or court of competent jurisdiction; shall have power to execute any warrant or other process issued by an officer or court of competent jurisdiction for the enforcement of the provisions of this Act; and shall have authority, with a search warrant, to search any place. The several judges of the courts established under the laws of the United States, and United States commissioners [United States magistrate judges] may, within their respective jurisdictions, upon proper oath or affirmation showing probable cause, issue warrants in all such cases. All birds, or parts, nests, or eggs thereof, captured, killed, taken, sold or offered for sale, bartered or offered for barter, purchased, shipped, transported, carried, imported, exported, or possessed contrary to the provisions of this Act or of any regulation prescribed there under shall, when found, be seized and, upon conviction of the offender or upon judgment of a court of the United States that the same were captured, killed, taken, sold or offered for sale, bartered or offered for barter, purchased, shipped, transported, carried, imported, exported, or possessed contrary to the provisions of this Act or of any regulation prescribed there under, shall be forfeited to the United States and disposed of by the Secretary of the Interior in such manner as he deems appropriate.

§ 707 · Violations and penalties; forfeitures [MBTA § 6]

(a) Except as otherwise provided in this section, any person, association, partnership, or corporation who shall violate any provisions of said conventions or of this subchapter, or who shall violate or fail to comply with any regulation made pursuant to this subchapter shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not more than \$15,000 or be imprisoned not more than six months, or both.

(b) Whoever, in violation of this subchapter, shall knowingly--

- (1) take by any manner whatsoever any migratory bird with intent to sell, offer to sell, barter or offer to barter such bird, or
- (2) sell, offer for sale, barter or offer to barter, any migratory bird shall be guilty of a felony and shall be fined not more than \$2,000 or imprisoned not more than two years, or both.

(c) Whoever violates section 704(b)(2) of this title shall be fined under Title 18, imprisoned not more than 1 year, or both.

(d) All guns, traps, nets and other equipment, vessels, vehicles, and other means of transportation used by any person when engaged in pursuing, hunting, taking, trapping, ensnaring, capturing, killing, or attempting to take, capture, or kill any migratory bird in violation of this subchapter with the intent to offer for sale, or sell, or offer for barter, or barter such bird in violation of this subchapter shall be forfeited to the United States and may be seized and held pending the prosecution of any person arrested for violating this subchapter and upon conviction for such violation, such forfeiture shall be adjudicated as a penalty in addition to any other provided for violation of this subchapter. Such forfeited property shall be disposed of and accounted for by, and under the authority of, the Secretary of the Interior.

§ 708 · State or Territorial laws or regulations [MBTA § 7]

Nothing in this Act shall be construed to prevent the several States and Territories from making or enforcing laws or regulations not inconsistent with the provisions of said conventions or of this Act, or from making or enforcing laws or regulations which shall give further protection to migratory birds, their nests, and eggs, if such laws or regulations do not extend the open seasons for such birds beyond the dates approved by the President in accordance with section three of this Act [16 USCS @ 704].

§ 709a · Authorization of appropriations [MBTA § 8]

There is authorized to be appropriated, from time to time, out of any money in the Treasury not otherwise appropriated, such amounts as may be necessary to carry out the provisions and to accomplish the purposes of said conventions and this Act and regulations made pursuant thereto, and the Secretary of Agriculture [Secretary of the Interior] is authorized out of such moneys to employ in the city of Washington and elsewhere such persons and means as he may deem necessary for such purpose and may cooperate with local authorities in the protection of migratory birds and make the necessary investigations connected therewith.

§ 710 · Partial invalidity/Short title [MBTA § 9]

If any clause, sentence, paragraph, or part of this subchapter, which shall be known by the short title of the "Migratory Bird Treaty Act", shall, for any reason, be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect, impair, or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, or part thereof directly involved in the controversy in which such judgment shall have been rendered.

§ 711 · Breeding and sale for food supply [MBTA § 10]

Nothing in this Act shall be construed to prevent the breeding of migratory game birds on farms and preserves and the sale of birds so bred under proper regulations for the purpose of increasing the food supply.

§ 712 · Treaty and convention implementing regulations; seasonal taking of migratory birds for essential needs or indigenous Alaskans to preserve and maintain stocks of the birds; protection and conservation of the birds. [MBTA § 11]

(1) In accordance with the various migratory bird treaties and conventions with Canada, Japan, Mexico, and the Union of Soviet Socialist Republics, the Secretary of the Interior is authorized to issue such regulations as may be necessary to assure that the taking of migratory birds and the collection of their eggs, by the indigenous inhabitants of the State of Alaska, shall be permitted for their own nutritional and other essential needs, as determined by the Secretary of the Interior, during seasons established so as to provide for the preservation and maintenance of stocks of migratory birds.

(2) The Secretary of the Interior is authorized to issue such regulations as may be necessary to implement the provisions of the convention between the United States and Great Britain for the protection of migratory birds concluded August 16, 1916, the convention between the United States and the United Mexican States for the protection of migratory birds and game mammals concluded February 7, 1936, the convention between the United States and the Government of Japan for the protection of migratory birds in danger of extinction, and their environment concluded March 4, 1972; and the convention between the United States and the Union of Soviet Socialist Republics for the conservation of migratory birds and their environment concluded November 19, 1976.

Appendix F



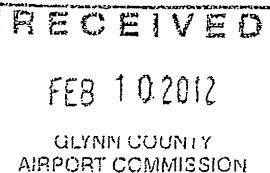
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

FEDERAL FISH AND WILDLIFE PERMIT

2. AUTHORITY-STATUTES
16 USD 703-712

1. PERMITTEE

GLYNN COUNTY AIRPORT COMMISSION
295 AVIATION PARKWAY, SUITE 205
BRUNSWICK, GA 31525



REGULATIONS
50 CFR Part 13
50 CFR 21.41

3. NUMBER
MB673423-0

4. RENEWABLE
 YES
 NO

5. MAY COPY
 YES
 NO

6. EFFECTIVE
04/01/2012

7. EXPIRES
03/31/2013

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*
STEVEN V. BRIAN

EXECUTIVE DIRECTOR

9. TYPE OF PERMIT
DEPREDACTION AT AIRPORTS

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
Airport property

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. You are authorized to take, temporarily possess, and transport the migratory birds specified below to relieve or prevent injurious situations impacting public safety. All take must be done as part of an integrated wildlife damage management program that emphasizes nonlethal management techniques. You may not use this authority for situations in which migratory birds are merely causing a nuisance.

(1) The following may be lethally taken: Minimum numbers and species.

(2) The following may be live-trapped and relocated: Minimum numbers and species.

(3) The following active nests (including eggs) may be destroyed: Canada geese.

E. You are authorized in emergency situations only to take, trap, or relocate any migratory birds, nests and eggs, including species that are not listed in Condition D (except bald eagles, golden eagles, or endangered or threatened species) when the migratory birds, nests, or eggs are posing a direct threat to human safety. A direct threat to human safety is one which involves a threat of serious bodily injury or a risk to human life.

You must report any emergency take activity to your migratory bird permit issuing office 404/679-7070 within 72 hours after the emergency take action. Your report must include the species and number of birds taken, method, and a complete description of the circumstances warranting the emergency action.

F. You are authorized to salvage and temporarily possess migratory birds found dead or taken under this permit for (1) disposal, (2) transfer to the U.S. Department of Agriculture, (3) diagnostic purposes, (4) purposes of training airport personnel, (5) donation to a public scientific or educational institution as defined in 50 CFR 10.12, (6) donation to persons authorized by permit or regulation to possess them, or (7) donation of migratory game birds only to a public charity (those suitable for human consumption). Any dead bald eagles or golden eagles salvaged must be reported within 48 hours to the National Eagle Repository at 303/287-2110 and to the migratory bird permit issuing office at 404/679-7070. The Repository will provide directions for shipment of

ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS

ANNUAL REPORT DUE: 01/31

You must submit a report to your Regional Migratory Bird Permit Office even if you had no activity. Report form is at www.fws.gov/forms/3-202-9.pdf.

JUL 26 2012

PLR

INSPECTOR

01/30/2012

ISSUED BY

Camille P. Johnson

TITLE

CHIEF, MIGRATORY BIRD PERMIT OFFICE - REGION 4

these specimens.

G. You may not salvage and must immediately report to U.S. Fish and Wildlife Service Office of Law Enforcement any dead or injured migratory birds that you encounter that appear to have been poisoned, shot, electrocuted, have collided with industrial power generation equipment, or were otherwise killed or injured as the result of potential criminal activity. See USFWS OLE contact information below.

H. You may use the following methods of take: (1) firearms; (2) nets; (3) registered animal drugs (excluding nicarbazin), pesticides and repellents; (4) falconry abatement; and (5) legal lethal and live traps (excluding pole traps). Birds caught live may be euthanized or transported and relocated to another site approved by the appropriate State wildlife agency, if required. When using firearms, you may use rifles or air rifles to shoot any bird when you determine that the use of a shotgun is inadequate to resolve the injurious situation. You may use paint ball guns to haze birds or deter birds only when other methods of hazing are ineffective.

Anyone who takes migratory birds under the authority of this permit must follow the American Veterinary Medical Association Guidelines on Euthanasia when euthanization of a bird is necessary (http://www.avma.org/issues/animal_welfare/euthanasia.pdf).

I. You may temporarily possess and stabilize sick and injured migratory birds and immediately transport them to a federally licensed rehabilitator for care.

J. The following subpermittees are authorized: any other person who is (1) employed by or under contract to you for the activities specified in this permit, or (2) otherwise designated a subpermittee by you in writing, may exercise the authority of this permit.

K. You and any subpermittee(s) must comply with the attached Standard Conditions for Migratory Bird Depredation Permits. These standard conditions are a continuation of your permit conditions *and must remain with your permit*.

For suspected illegal activity, immediately contact USFWS Law Enforcement at: Atlanta, Georgia 404/763-7959 GA, AL, NC, SC

FEDERAL AVIATION ADMINISTRATION

JUL 26 2012

PLR
INSPECTOR

Appendix G



U.S. Fish & Wildlife Service

ENDANGERED SPECIES ACT OF 1973

As Amended through the
108th Congress

Department of the Interior
U.S. Fish and Wildlife Service
Washington, D.C. 20240

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ENDANGERED SPECIES ACT OF 1973*

FINDINGS, PURPOSES, AND POLICY

SEC. 2. (a) FINDINGS.—The Congress finds and declares that—

(1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation;

(2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction;

(3) these species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people;

(4) the United States has pledged itself as a sovereign state in the international community to conserve to the extent practicable the various species of fish or wildlife and plants facing extinction, pursuant to—

(A) migratory bird treaties with Canada and Mexico;

(B) the Migratory and Endangered Bird Treaty with Japan;

(C) the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere;

(D) the International Convention for the Northwest Atlantic Fisheries;

(E) the International Convention for the High Seas Fisheries of the North Pacific Ocean;

(F) the Convention on International Trade in Endangered Species of Wild Fauna and Flora; and

(G) other international agreements; and

(5) encouraging the States and other interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs which meet national and international standards is a key to meeting the Nation's international commitments and to better safeguarding, for the benefit of all citizens, the Nation's heritage in fish, wildlife, and plants.

(b) PURPOSES.—The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.

(c) POLICY.—(1) It is further declared to be the policy of Congress that all Federal

*As amended by P.L. 94-325, June 30, 1976; P.L. 94-359, July 12, 1976; P.L. 95-212, December 19, 1977; P.L. 95-632, November 10, 1978; P.L. 96-159, December 28, 1979; P.L. 97-304, October 13, 1982; P.L. 98-327, June 25, 1984; and P.L. 100-478, October 7, 1988; P.L. 107-171, May 13, 2002; P.L. 108-136, November 24, 2003.

departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.

(2) It is further declared to be the policy of Congress that Federal agencies shall cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species.

DEFINITIONS

SEC. 3. For the purposes of this Act—

(1) The term "alternative courses of action" means all alternatives and thus is not limited to original project objectives and agency jurisdiction.

(2) The term "commercial activity" means all activities of industry and trade, including, but not limited to, the buying or selling of commodities and activities conducted for the purpose of facilitating such buying and selling: *Provided, however,* That it does not include exhibition of commodities by museums or similar cultural or historical organizations.

(3) The terms "conserve", "conserving", and "conservation" mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

(4) The term "Convention" means the Convention on International Trade in Endangered Species of Wild Fauna and Flora, signed on March 3, 1973, and the appendices thereto.

(5)(A) The term "critical habitat" for a threatened or endangered species means—

(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of this Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species.

(B) Critical habitat may be established for those species now listed as threatened or endangered species for which no critical habitat has heretofore been established as set forth in subparagraph (A) of this paragraph.

(C) Except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.

(6) The term "endangered species" means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.

(7) The term "Federal agency" means any department, agency, or instrumentality of the United States.

(8) The term "fish or wildlife" means any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof.

(9) The term "foreign commerce" includes, among other things, any transaction—

(A) between persons within one foreign country;

(B) between persons in two or more foreign countries;

(C) between a person within the United States and a person in a foreign country; or

(D) between persons within the United States, where the fish and wildlife in question are moving in any country or countries outside the United States.

(10) The term "import" means to land on, bring into, or introduce into, or attempt to land on, bring into, or introduce into, any place subject to the jurisdiction of the United States, whether or not such landing, bringing, or introduction constitutes an importation within the meaning of the customs laws of the United States.

(11) [Repealed]

(12) The term "permit or license applicant" means, when used with respect to an action of a Federal agency for which exemption is sought under section 7, any person whose application to such agency for a permit or license has been denied primarily because of the application of section 7(a) to such agency action.

(13) The term "person" means an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal Government, of any State, municipality, or political subdivision of a State, or of any foreign government; any State, municipality, or political subdivision of a State; or any other entity subject to the jurisdiction of the United States.

(14) The term "plant" means any member of the plant kingdom, including seeds, roots and other parts thereof.

(15) The term "Secretary" means, except as otherwise herein provided, the Secretary of the Interior or the Secretary of Commerce as program responsibilities are vested pursuant to the provisions of Reorganization Plan Numbered 4 of 1970; except that with respect to the enforcement of the provisions of this Act and the Convention which pertain to the importation or exportation of terrestrial plants, the term also means the Secretary of Agriculture.

(16) The term "species" includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.

(17) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, and the Trust Territory of the Pacific Islands.

(18) the term "State agency" means any State agency, department, board, commission, or other governmental entity which is responsible for the management and conservation of fish, plant, or wildlife resources within a State.

(19) The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

(20) The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

(21) The term "United States," when used in a geographical context, includes all States.

DETERMINATION OF ENDANGERED SPECIES AND THREATENED SPECIES

SEC. 4. (a) GENERAL.—(1) The Secretary shall by regulation promulgated in accordance with subsection (b) determine whether any species is an endangered species or a threatened species because of any of the following factors:

- (A) the present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) overutilization for commercial, recreational, scientific, or educational purposes;
- (C) disease or predation;
- (D) the inadequacy of existing regulatory mechanisms; or
- (E) other natural or manmade factors affecting its continued existence.

(2) With respect to any species over which program responsibilities have been vested in the Secretary of Commerce pursuant to Reorganization Plan Numbered 4 of 1970—

(A) in any case in which the Secretary of Commerce determines that such species should—

- (i) be listed as an endangered species or a threatened species, or
- (ii) be changed in status from a threatened species to an endangered species, he shall so inform the Secretary of the Interior, who shall list such species in accordance with this section;

(B) in any case in which the Secretary of Commerce determines that such species should—

- (i) be removed from any list published pursuant to subsection (c) of this section, or

(ii) be changed in status from an endangered species to a threatened species, he shall recommend such action to the Secretary of the Interior; and the Secretary of the Interior, if he concurs in the recommendation, shall implement such action; and (C) the Secretary of the Interior may not list or remove from any list any such species, and may not change the status of any such species which are listed, without a prior favorable determination made pursuant to this section by the Secretary of Commerce.

(3)(A) The Secretary, by regulation promulgated in accordance with subsection (b) and to the maximum extent prudent and determinable—

(i) shall, concurrently with making a determination under paragraph (1) that a species is an endangered species or a threatened species, designate any habitat of such species which is then considered to be critical habitat; and

(ii) may, from time-to-time thereafter as appropriate, revise such designation.

(B)(i) The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines

in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.

(ii) Nothing in this paragraph affects the requirement to consult under section 7(a)(2) with respect to an agency action (as that term is defined in that section).

(iii) Nothing in this paragraph affects the obligation of the Department of Defense to comply with section 9, including the prohibition preventing extinction and taking of endangered species and threatened species.

(b) BASIS FOR DETERMINATIONS.—(1)(A) The Secretary shall make determinations required by subsection (a)(1) solely on the basis of the best scientific and commercial data available to him after conducting a review of the status of the species and after taking into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under its jurisdiction, or on the high seas.

(B) In carrying out this section, the Secretary shall give consideration to species which have been—

(i) designated as requiring protection from unrestricted commerce by any foreign nation, or pursuant to any international agreement; or

(ii) identified as in danger of extinction, or likely to become so within the foreseeable future, by any State agency or by any agency of a foreign nation that is responsible for the conservation of fish or wildlife or plants.

(2) The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.

(3)(A) To the maximum extent practicable, within 90 days after receiving the petition of an interested person under section 553(e) of title 5, United States Code, to add a species to, or to remove a species from, either of the lists published under subsection (c), the Secretary shall make a finding as to whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted. If such a petition is found to present such information, the Secretary shall promptly commence a review of the status of the species concerned. The Secretary shall promptly publish each finding made under this subparagraph in the Federal Register.

(B) Within 12 months after receiving a petition that is found under subparagraph (A) to present substantial information indicating that the petitioned action may be warranted, the Secretary shall make one of the following findings:

(i) The petitioned action is not warranted, in which case the Secretary shall promptly publish such finding in the Federal Register.

(ii) The petitioned action is warranted, in which case the Secretary shall promptly publish in the Federal Register a general notice and the complete text of a proposed regulation to implement such action in accordance with paragraph (5).

(iii) The petitioned action is warranted, but that—

(I) the immediate proposal and timely promulgation of a final regulation implementing the petitioned action in accordance with paragraphs (5) and (6) is precluded by pending proposals to determine whether any species is an endangered species or a threatened species, and

(II) expeditious progress is being made to add qualified species to either of the lists published under subsection (c) and to remove from such lists species for which the protections of the Act are no longer necessary, in which case the Secretary shall promptly publish such finding in the Federal Register, together with a description and evaluation of the reasons and data on which the finding is based.

(C)(i) A petition with respect to which a finding is made under subparagraph (B)(iii) shall be treated as a petition that is resubmitted to the Secretary under subparagraph (A) on the date of such finding and that presents substantial scientific or commercial information that the petitioned action may be warranted.

(ii) Any negative finding described in subparagraph (A) and any finding described in subparagraph (B)(i) or (iii) shall be subject to judicial review.

(iii) The Secretary shall implement a system to monitor effectively the status of all species with respect to which a finding is made under subparagraph (B)(iii) and shall make prompt use of the authority under paragraph 7 to prevent a significant risk to the well being of any such species.

(D)(i) To the maximum extent practicable, within 90 days after receiving the petition of an interested person under section 553(e) of title 5, United States Code, to revise a critical habitat designation, the Secretary shall make a finding as to whether the petition presents substantial scientific information indicating that the revision may be warranted. The Secretary shall promptly publish such finding in the Federal Register.

(ii) Within 12 months after receiving a petition that is found under clause (i) to present substantial information indicating that the requested revision may be warranted, the Secretary shall determine how he intends to proceed with the requested revision, and shall promptly publish notice of such intention in the Federal Register.

(4) Except as provided in paragraphs (5) and (6) of this subsection, the provisions of section 553 of title 5, United States Code (relating to rulemaking procedures), shall apply to any regulation promulgated to carry out the purposes of this Act.

(5) With respect to any regulation proposed by the Secretary to implement a determination, designation, or revision referred to in subsection (a)(1) or (3), the Secretary shall—

(A) not less than 90 days before the effective date of the regulation—

(i) publish a general notice and the complete text of the proposed regulation in the Federal Register; and

(ii) give actual notice of the proposed regulation (including the complete text of the regulation) to the State agency in each State in which the species is believed to occur, and to each county or equivalent jurisdiction in which the species is believed to occur; and invite the comment of such agency, and each such jurisdiction, thereon;

(B) insofar as practical, and in cooperation with the Secretary of State, give notice of the proposed regulation to each foreign nation in which the species is believed to occur or whose citizens harvest the species on the high seas, and invite the comment of such nation thereon;

(C) give notice of the proposed regulation to such professional scientific organizations as he deems appropriate;

(D) publish a summary of the proposed regulation in a newspaper of general circulation in each area of the United States in which the species is believed to occur; and

(E) promptly hold one public hearing on the proposed regulation if any person files a request for such a hearing within 45 days after the date of publication of general notice.

(6)(A) Within the one-year period beginning on the date on which general notice is published in accordance with paragraph (5)(A)(i) regarding a proposed regulation, the Secretary shall publish in the Federal Register—

(i) if a determination as to whether a species is an endangered species or a threatened species, or a revision of critical habitat, is involved, either—

(I) a final regulation to implement such determination,

(II) a final regulation to implement such revision or a finding that such revision should not be made,

(III) notice that such one-year period is being extended under subparagraph (B)(i), or

(IV) notice that the proposed regulation is being withdrawn under subparagraph (B)(ii), together with the finding on which such withdrawal is based; or

(ii) subject to subparagraph (C), if a designation of critical habitat is involved, either—

(I) a final regulation to implement such designation, or

(II) notice that such one-year period is being extended under such subparagraph.

(B)(i) If the Secretary finds with respect to a proposed regulation referred to in subparagraph (A)(i) that there is substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the determination or revision concerned, the Secretary may extend the one-year period specified in subparagraph (A) for not more than six months for purposes of soliciting additional data.

(ii) If a proposed regulation referred to in subparagraph (A)(i) is not promulgated as a final regulation within such one-year period (or longer period if extension under clause (i) applies) because the Secretary finds that there is not sufficient evidence to justify the action proposed by the regulation, the Secretary shall immediately withdraw the regulation. The finding on which a withdrawal is based shall be subject to judicial review. The Secretary may not propose a regulation that has previously been withdrawn under this clause unless he determines that sufficient new information is available to warrant such proposal.

(iii) If the one-year period specified in subparagraph (A) is extended under clause (i) with respect to a proposed regulation, then before the close of such extended period the Secretary shall publish in the Federal Register either a final regulation to implement the determination or revision concerned, a finding that the revision should not be made, or a notice of withdrawal of the regulation under clause (ii), together with the finding on which the withdrawal is based.

(C) A final regulation designating critical habitat of an endangered species or a threatened species shall be published concurrently with the final regulation implementing the determination that such species is endangered or threatened, unless the Secretary deems that—

- (i) it is essential to the conservation of such species that the regulation implementing such determination be promptly published; or
- (ii) critical habitat of such species is not then determinable, in which case the Secretary, with respect to the proposed regulation to designate such habitat, may extend the one-year period specified in subparagraph (A) by not more than one additional year, but not later than the close of such additional year the Secretary must publish a final regulation, based on such data as may be available at that time, designating, to the maximum extent prudent, such habitat.

(7) Neither paragraph (4), (5), or (6) of this subsection nor section 553 of title 5, United States Code, shall apply to any regulation issued by the Secretary in regard to any emergency posing a significant risk to the well-being of any species of fish or wildlife or plants, but only if—

- (A) at the time of publication of the regulation in the Federal Register the Secretary publishes therein detailed reasons why such regulation is necessary; and
- (B) in the case such regulation applies to resident species of fish or wildlife, or plants, the Secretary gives actual notice of such regulation to the State agency in each State in which such species is believed to occur.

Such regulation shall, at the discretion of the Secretary, take effect immediately upon the publication of the regulation in the Federal Register. Any regulation promulgated under the authority of this paragraph shall cease to have force and effect at the close of the 240-day period following the date of publication unless, during such 240-day period, the rulemaking procedures which would apply to such regulation without regard to this paragraph are complied with. If at any time after issuing an emergency regulation the Secretary determines, on the basis of the best appropriate data available to him, that substantial evidence does not exist to warrant such regulation, he shall withdraw it.

(8) The publication in the Federal Register of any proposed or final regulation which is necessary or appropriate to carry out the purposes of this Act shall include a summary by the Secretary of the data on which such regulation is based and shall show the relationship of such data to such regulation; and if such regulation designates or revises critical habitat, such summary shall, to the maximum extent practicable, also include a brief description and evaluation of those activities (whether public or private) which, in the opinion of the Secretary, if undertaken may adversely modify such habitat, or may be affected by such designation.

(c) **LISTS.**—(1) The Secretary of the Interior shall publish in the Federal Register a list of all species determined by him or the Secretary of Commerce to be endangered species and a list of all species determined by him or the Secretary of Commerce to be threatened species. Each list shall refer to the species contained therein by scientific and common name or names, if any, specify with respect to each such species over what portion of its range it is endangered or threatened, and specify any critical habitat within such range. The Secretary shall from time to time revise each list published under the authority of this subsection to reflect recent determinations, designations, and revisions made in accordance with subsections (a) and (b).

(2) The Secretary shall—

- (A) conduct, at least once every five years, a review of all species included in

a list which is published pursuant to paragraph (1) and which is in effect at the time of such review; and

- (B) determine on the basis of such review whether any such species should—
 - (i) be removed from such list;
 - (ii) be changed in status from an endangered species to a threatened species; or
 - (iii) be changed in status from a threatened species to an endangered species.

Each determination under subparagraph (B) shall be made in accordance with the provisions of subsections (a) and (b).

(d) PROTECTIVE REGULATIONS.—Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants, with respect to endangered species; except that with respect to the taking of resident species of fish or wildlife, such regulations shall apply in any State which has entered into a cooperative agreement pursuant to section 6(c) of this Act only to the extent that such regulations have also been adopted by such State.

(e) SIMILARITY OF APPEARANCE CASES.—The Secretary may, by regulation of commerce or taking, and to the extent he deems advisable, treat any species as an endangered species or threatened species even though it is not listed pursuant to section 4 of this Act if he finds that—

(A) such species so closely resembles in appearance, at the point in question, a species which has been listed pursuant to such section that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species;

(B) the effect of this substantial difficulty is an additional threat to an endangered or threatened species; and

(C) such treatment of an unlisted species will substantially facilitate the enforcement and further the policy of this Act.

(f)(1) RECOVERY PLANS.—The Secretary shall develop and implement plans (hereinafter in this subsection referred to as "recovery plans") for the conservation and survival of endangered species and threatened species listed pursuant to this section, unless he finds that such a plan will not promote the conservation of the species. The Secretary, in developing and implementing recovery plans, shall, to the maximum extent practicable—

(A) give priority to those endangered species or threatened species, without regard to taxonomic classification, that are most likely to benefit from such plans, particularly those species that are, or may be, in conflict with construction or other development projects or other forms of economic activity;

(B) incorporate in each plan—

(i) a description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species;

(ii) objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and

(iii) estimates of the time required and the cost to carry out those measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal.

(2) The Secretary, in developing and implementing recovery plans, may procure the services of appropriate public and private agencies and institutions, and other qualified persons. Recovery teams appointed pursuant to this subsection shall not be subject to the Federal Advisory Committee Act.

(3) The Secretary shall report every two years to the Committee on Environment and Public Works of the Senate and the Committee on Merchant Marine and Fisheries of the House of Representatives on the status of efforts to develop and implement recovery plans for all species listed pursuant to this section and on the status of all species for which such plans have been developed.

(4) The Secretary shall, prior to final approval of a new or revised recovery plan, provide public notice and an opportunity for public review and comment on such plan. The Secretary shall consider all information presented during the public comment period prior to approval of the plan.

(5) Each Federal agency shall, prior to implementation of a new or revised recovery plan, consider all information presented during the public comment period under paragraph (4).

(g) MONITORING.—(1) The Secretary shall implement a system in cooperation with the States to monitor effectively for not less than five years the status of all species which have recovered to the point at which the measures provided pursuant to this Act are no longer necessary and which, in accordance with the provisions of this section, have been removed from either of the lists published under subsection (c).

(2) The Secretary shall make prompt use of the authority under paragraph 7 of subsection (b) of this section to prevent a significant risk to the well being of any such recovered species.

(h) AGENCY GUIDELINES.—The Secretary shall establish, and publish in the Federal Register, agency guidelines to insure that the purposes of this section are achieved efficiently and effectively. Such guidelines shall include, but are not limited to—

(1) procedures for recording the receipt and the disposition of petitions submitted under subsection (b)(3) of this section;

(2) criteria for making the findings required under such subsection with respect to petitions;

(3) a ranking system to assist in the identification of species that should receive priority review under subsection (a)(1) of this section; and

(4) a system for developing and implementing, on a priority basis, recovery plans under subsection (f) of this section. The Secretary shall provide to the public notice of, and opportunity to submit written comments on, any guideline (including any amendment thereto) proposed to be established under this subsection.

(i) If, in the case of any regulation proposed by the Secretary under the authority of this section, a State agency to which notice thereof was given in accordance with subsection (b)(5)(A)(ii) files comments disagreeing with all or part of the proposed regulation, and the Secretary issues a final regulation which is in conflict with such comments, or if the Secretary fails to adopt a regulation pursuant to an action petitioned by a State agency under subsection (b)(3), the Secretary shall submit to the State agency a written justification for his failure to adopt regulations consistent with the agency's comments or petition.

LAND ACQUISITION

SEC. 5. (a) PROGRAM.—The Secretary, and the Secretary of Agriculture with respect to the National Forest System, shall establish and implement a program to conserve fish, wildlife, and plants, including those which are listed as endangered species or threatened species pursuant to section 4 of this Act. To carry out such a program, the appropriate Secretary—

(1) shall utilize the land acquisition and other authority under the Fish and Wildlife Act of 1956, as amended, the Fish and Wildlife Coordination Act, as amended, and the Migratory Bird Conservation Act, as appropriate; and

(2) is authorized to acquire by purchase, donation, or otherwise, lands, waters, or interests therein, and such authority shall be in addition to any other land acquisition authority vested in him.

(b) ACQUISITIONS.—Funds made available pursuant to the Land and Water Conservation Fund Act of 1965, as amended, may be used for the purpose of acquiring lands, waters, or interest therein under subsection (a) of this section.

COOPERATION WITH THE STATES

SEC. 6. (a) GENERAL.—In carrying out the program authorized by this Act, the Secretary shall cooperate to the maximum extent practicable with the States. Such cooperation shall include consultation with the States concerned before acquiring any land or water, or interest therein, for the purpose of conserving any endangered species or threatened species.

(b) MANAGEMENT AGREEMENTS.—The Secretary may enter into agreements with any State for the administration and management of any area established for the conservation of endangered species or threatened species. Any revenues derived from the administration of such areas under these agreements shall be subject to the provisions of section 401 of the Act of June 15, 1935 (49 Stat. 383; 16 U.S.C. 715s).

(c) COOPERATIVE AGREEMENTS.—(1) In furtherance of the purposes of this Act, the Secretary is authorized to enter into a cooperative agreement in accordance with this section with any State which establishes and maintains an adequate and active program for the conservation of endangered species and threatened species. Within one hundred and twenty days after the Secretary receives a certified copy of such a proposed State program, he shall make a determination whether such program is in accordance with this Act. Unless he determines, pursuant to this paragraph that the State program is not in accordance with this Act, he shall enter into a cooperative agreement with the State for the purpose of assisting in implementation of the State program. In order for a State program to be deemed an adequate and active program for the conservation of endangered species and threatened species, the Secretary must find, and annually thereafter reconfirm such finding, that under the State program —

(A) authority resides in the State agency to conserve resident species of fish or wildlife determined by the State agency or the Secretary to be endangered or threatened;

(B) the State agency has established acceptable conservation programs, consistent with the purposes and policies of this Act, for all resident species of fish or

wildlife in the State which are deemed by the Secretary to be endangered or threatened, and has furnished a copy of such plan and program together with all pertinent details, information, and data requested to the Secretary;

(C) the State agency is authorized to conduct investigations to determine the status and requirements for survival of resident species of fish and wildlife;

(D) the State agency is authorized to establish programs, including the acquisition of land or aquatic habitat or interests therein, for the conservation of resident endangered or threatened species of fish or wildlife; and

(E) provision is made for public participation in designating resident species of fish or wildlife as endangered or threatened; or that under the State program—

(i) the requirements set forth in subparagraphs (C), (D), and (E) of this paragraph are complied with, and

(ii) plans are included under which immediate attention will be given to those resident species of fish and wildlife which are determined by the Secretary or the State agency to be endangered or threatened and which the Secretary and the State agency agree are most urgently in need of conservation programs; except that a cooperative agreement entered into with a State whose program is deemed adequate and active pursuant to clause (i) and this clause shall not affect the applicability of prohibitions set forth in or authorized pursuant to section 4(d) or section 9(a)(1) with respect to the taking of any resident endangered or threatened species.

(2) In furtherance of the purposes of this Act, the Secretary is authorized to enter into a cooperative agreement in accordance with this section with any State which establishes and maintains an adequate and active program for the conservation of endangered species and threatened species of plants. Within one hundred and twenty days after the Secretary receives a certified copy of such a proposed State program, he shall make a determination whether such program is in accordance with this Act. Unless he determines, pursuant to this paragraph, that the State program is not in accordance with this Act, he shall enter into a cooperative agreement with the State for the purpose of assisting in implementation of the State program. In order for a State program to be deemed an adequate and active program for the conservation of endangered species of plants and threatened species of plants, the Secretary must find, and annually thereafter reconfirm such finding, that under the State program—

(A) authority resides in the State agency to conserve resident species of plants determined by the State agency or the Secretary to be endangered or threatened;

(B) the State agency has established acceptable conservation programs, consistent with the purposes and policies of this Act, for all resident species of plants in the State which are deemed by the Secretary to be endangered or threatened, and has furnished a copy of such plan and program together with all pertinent details, information, and data requested to the Secretary;

(C) the State agency is authorized to conduct investigations to determine the status and requirements for survival of resident species of plants; and

(D) provision is made for public participation in designating resident species of plants as endangered or threatened; or that under the State program—

(i) the requirements set forth in subparagraphs (C) and (D) of this paragraph are complied with, and

(ii) plans are included under which immediate attention will be given to

those resident species of plants which are determined by the Secretary or the State agency to be endangered or threatened and which the Secretary and the State agency agree are most urgently in need of conservation programs; except that a cooperative agreement entered into with a State whose program is deemed adequate and active pursuant to clause (i) and this clause shall not affect the applicability of prohibitions set forth in or authorized pursuant to section 4(d) or section 9(a)(1) [16 USCS §§ 1533(d), 1538(a)(1)] with respect to the taking of any resident endangered or threatened species.

(d) ALLOCATION OF FUNDS.—(1) The Secretary is authorized to provide financial assistance to any State, through its respective State agency, which has entered into a cooperative agreement pursuant to subsection (c) of this section to assist in development of programs for the conservation of endangered and threatened species or to assist in monitoring the status of candidate species pursuant to subparagraph (C) of section 4(b)(3) and recovered species pursuant to section 4(g). The Secretary shall allocate each annual appropriation made in accordance with the provisions of subsection (i) of this section to such States based on consideration of—

- (A) the international commitments of the United States to protect endangered species or threatened species;
- (B) the readiness of a State to proceed with a conservation program consistent with the objectives and purposes of this Act;
- (C) the number of endangered species and threatened species within a State;
- (D) the potential for restoring endangered species and threatened species within a State;
- (E) the relative urgency to initiate a program to restore and protect an endangered species or threatened species in terms of survival of the species;
- (F) the importance of monitoring the status of candidate species within a State to prevent a significant risk to the well being of any such species; and
- (G) the importance of monitoring the status of recovered species within a State to assure that such species do not return to the point at which the measures provided pursuant to this Act are again necessary.

So much of the annual appropriation made in accordance with provisions of subsection (i) of this section allocated for obligation to any State for any fiscal year as remains unobligated at the close thereof is authorized to be made available to that State until the close of the succeeding fiscal year. Any amount allocated to any State which is unobligated at the end of the period during which it is available for expenditure is authorized to be made available for expenditure by the Secretary in conducting programs under this section.

(2) Such cooperative agreements shall provide for (A) the actions to be taken by the Secretary and the States; (B) the benefits that are expected to be derived in connection with the conservation of endangered or threatened species; (C) the estimated cost of these actions; and (D) the share of such costs to be borne by the Federal Government and by the States; except that—

- (i) the Federal share of such program costs shall not exceed 75 percent of the estimated program cost stated in the agreement; and
- (ii) the Federal share may be increased to 90 percent whenever two or more States having a common interest in one or more endangered or threatened species, the conservation of which may be enhanced by cooperation of such States, enter jointly into an agreement with the Secretary.

The Secretary may, in his discretion, and under such rules and regulations as he may prescribe, advance funds to the State for financing the United States pro rata share agreed upon in the cooperative agreement. For the purposes of this section, the non-Federal share may, in the discretion of the Secretary, be in the form of money or real property, the value of which will be determined by the Secretary, whose decision shall be final.

(e) **REVIEW OF STATE PROGRAMS.**—Any action taken by the Secretary under this section shall be subject to his periodic review at no greater than annual intervals.

(f) **CONFLICTS BETWEEN FEDERAL AND STATE LAWS.**—Any State law or regulation which applies with respect to the importation or exportation of, or interstate or foreign commerce in, endangered species or threatened species is void to the extent that it may effectively (1) permit what is prohibited by this Act or by any regulation which implements this Act, or (2) prohibit what is authorized pursuant to an exemption or permit provided for in this Act or in any regulation which implements this Act. This Act shall not otherwise be construed to void any State law or regulation which is intended to conserve migratory, resident, or introduced fish or wildlife, or to permit or prohibit sale of such fish or wildlife. Any State law or regulation respecting the taking of an endangered species or threatened species may be more restrictive than the exemptions or permits provided for in this Act or in any regulation which implements this Act but not less restrictive than the prohibitions so defined.

(g) **TRANSITION.**—(1) For purposes of this subsection, the term “establishment period” means, with respect to any State, the period beginning on the date of enactment of this Act and ending on whichever of the following dates first occurs: (A) the date of the close of the 120-day period following the adjournment of the first regular session of the legislature of such State which commences after such date of enactment, or (B) the date of the close of the 15-month period following such date of enactment.

(2) The prohibitions set forth in or authorized pursuant to sections 4(d) and 9(a)(1)(B) of this Act shall not apply with respect to the taking of any resident endangered species or threatened species (other than species listed in Appendix I to the Convention or otherwise specifically covered by any other treaty or Federal law) within any state—

(A) which is then a party to a cooperative agreement with the Secretary pursuant to section 6(c) of this Act (except to the extent that the taking of any such species is contrary to the law of such State); or

(B) except for any time within the establishment period when—

(i) the Secretary applies such prohibition to such species at the request of the State, or

(ii) the Secretary applies such prohibition after he finds, and publishes his finding, that an emergency exists posing a significant risk to the well-being of such species and that the prohibition must be applied to protect such species. The Secretary's finding and publication may be made without regard to the public hearing or comment provisions of section 553 of title 5, United States Code, or any other provision of this Act; but such prohibition shall expire 90 days after the date of its imposition unless the Secretary further extends such prohibition by publishing notice and a statement of justification of such extension.

(h) REGULATIONS.—The Secretary is authorized to promulgate such regulations as may be appropriate to carry out the provisions of this section relating to financial assistance to States.

(i) APPROPRIATIONS.—(1) To carry out the provisions of this section for fiscal years after September 30, 1988, there shall be deposited into a special fund known as the cooperative endangered species conservation fund, to be administered by the Secretary, an amount equal to 5 percent of the combined amounts covered each fiscal year into the Federal aid to wildlife restoration fund under section 3 of the Act of September 2, 1937, and paid, transferred, or otherwise credited each fiscal year to the Sport Fishing Restoration Account established under 1016 of the Act of July 18, 1984.

(2) Amounts deposited into the special fund are authorized to be appropriated annually and allocated in accordance with subsection (d) of this section.

INTERAGENCY COOPERATION

SEC. 7. (a) FEDERAL AGENCY ACTIONS AND CONSULTATIONS.—(1) The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.

(2) Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an "agency action") is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section. In fulfilling the requirements of this paragraph each agency shall use the best scientific and commercial data available.

(3) Subject to such guidelines as the Secretary may establish, a Federal agency shall consult with the Secretary on any prospective agency action at the request of, and in cooperation with, the prospective permit or license applicant if the applicant has reason to believe that an endangered species or a threatened species may be present in the area affected by his project and that implementation of such action will likely affect such species.

(4) Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under section 4 or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. This paragraph does not require a limitation on the commitment of resources as described in subsection (d).

(b) OPINION OF SECRETARY.—(1)(A) Consultation under subsection (a)(2) with respect to any agency action shall be concluded within the 90-day period beginning on the date on which initiated or, subject to subparagraph (B), within such other period of time as is mutually agreeable to the Secretary and the Federal agency.

(B) In the case of an agency action involving a permit or license applicant, the Secretary and the Federal agency may not mutually agree to conclude consultation within

a period exceeding 90 days unless the Secretary, before the close of the 90th day referred to in subparagraph (A)—

(i) if the consultation period proposed to be agreed to will end before the 150th day after the date on which consultation was initiated, submits to the applicant a written statement setting forth—

(I) the reasons why a longer period is required,

(II) the information that is required to complete the consultation, and

(III) the estimated date on which consultation will be completed; or

(ii) if the consultation period proposed to be agreed to will end 150 or more days after the date on which consultation was initiated, obtains the consent of the applicant to such period.

The Secretary and the Federal agency may mutually agree to extend a consultation period established under the preceding sentence if the Secretary, before the close of such period, obtains the consent of the applicant to the extension.

(2) Consultation under subsection (a)(3) shall be concluded within such period as is agreeable to the Secretary, the Federal agency, and the applicant concerned.

(3)(A) Promptly after conclusion of consultation under paragraph (2) or (3) of subsection (a), the Secretary shall provide to the Federal agency and the applicant, if any, a written statement setting forth the Secretary's opinion, and a summary of the information on which the opinion is based, detailing how the agency action affects the species or its critical habitat. If jeopardy or adverse modification is found, the Secretary shall suggest those reasonable and prudent alternatives which he believes would not violate subsection (a)(2) and can be taken by the Federal agency or applicant in implementing the agency action.

(B) Consultation under subsection (a)(3), and an opinion issued by the Secretary incident to such consultation, regarding an agency action shall be treated respectively as a consultation under subsection (a)(2), and as an opinion issued after consultation under such subsection, regarding that action if the Secretary reviews the action before it is commenced by the Federal agency and finds, and notifies such agency, that no significant changes have been made with respect to the action and that no significant change has occurred regarding the information used during the initial consultation.

(4) If after consultation under subsection (a)(2), the Secretary concludes that—

(A) the agency action will not violate such subsection, or offers reasonable and prudent alternatives which the Secretary believes would not violate such subsection;

(B) the taking of an endangered species or a threatened species incidental to the agency action will not violate such subsection; and

(C) if an endangered species or threatened species of a marine mammal is involved, the taking is authorized pursuant to section 101(a)(5) of the Marine Mammal Protection Act of 1972;

the Secretary shall provide the Federal agency and the applicant concerned, if any, with a written statement that—

(i) specifies the impact of such incidental taking on the species,

(ii) specifies those reasonable and prudent measures that the Secretary considers necessary or appropriate to minimize such impact,

(iii) in the case of marine mammals, specifies those measures that are necessary to comply with section 101(a)(5) of the Marine Mammal Protection Act of 1972 with regard to such taking, and

(iv) sets forth the terms and conditions (including, but not limited to, reporting requirements) that must be complied with by the Federal agency or applicant (if any), or both, to implement the measures specified under clauses (ii) and (iii).

(c) **BIOLOGICAL ASSESSMENT.**—(1) To facilitate compliance with the requirements of subsection (a)(2), each Federal agency shall, with respect to any agency action of such agency for which no contract for construction has been entered into and for which no construction has begun on the date of enactment of the Endangered Species Act Amendments of 1978, request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action. If the Secretary advises, based on the best scientific and commercial data available, that such species may be present, such agency shall conduct a biological assessment for the purpose of identifying any endangered species or threatened species which is likely to be affected by such action. Such assessment shall be completed within 180 days after the date on which initiated (or within such other period as is mutually agreed to by the Secretary and such agency, except that if a permit or license applicant is involved, the 180-day period may not be extended unless such agency provides the applicant, before the close of such period, with a written statement setting forth the estimated length of the proposed extension and the reasons therefor) and, before any contract for construction is entered into and before construction is begun with respect to such action. Such assessment may be undertaken as part of a Federal agency's compliance with the requirements of section 102 of the National Environmental Policy Act of 1969 (42 U.S.C. 4332).

(2) Any person who may wish to apply for an exemption under subsection (g) of this section for that action may conduct a biological assessment to identify any endangered species or threatened species which is likely to be affected by such action. Any such biological assessment must, however, be conducted in cooperation with the Secretary and under the supervision of the appropriate Federal agency.

(d) **LIMITATION ON COMMITMENT OF RESOURCES.**—After initiation of consultation required under subsection (a)(2), the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2).

(e)(1) **ESTABLISHMENT OF COMMITTEE.**—There is established a committee to be known as the Endangered Species Committee (hereinafter in this section referred to as the "Committee").

(2) The Committee shall review any application submitted to it pursuant to this section and determine in accordance with subsection (h) of this section whether or not to grant an exemption from the requirements of subsection (a)(2) of this section for the action set forth in such application.

(3) The Committee shall be composed of seven members as follows:

- (A) The Secretary of Agriculture.
- (B) The Secretary of the Army.
- (C) The Chairman of the Council of Economic Advisors.
- (D) The Administrator of the Environmental Protection Agency.
- (E) The Secretary of the Interior.
- (F) The Administrator of the National Oceanic and Atmospheric Administration.
- (G) The President, after consideration of any recommendations received pur-

suant to subsection (g)(2)(B) shall appoint one individual from each affected State, as determined by the Secretary, to be a member of the Committee for the consideration of the application for exemption for an agency action with respect to which such recommendations are made, not later than 30 days after an application is submitted pursuant to this section.

(4)(A) Members of the Committee shall receive no additional pay on account of their service on the Committee.

(B) While away from their homes or regular places of business in the performance of services for the Committee, members of the Committee shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5 of the United States Code.

(5)(A) Five members of the Committee or their representatives shall constitute a quorum for the transaction of any function of the Committee, except that, in no case shall any representative be considered in determining the existence of a quorum for the transaction of any function of the Committee if that function involves a vote by the Committee on any matter before the Committee.

(B) The Secretary of the Interior shall be the Chairman of the Committee.

(C) The Committee shall meet at the call of the Chairman or five of its members.

(D) All meetings and records of the Committee shall be open to the public.

(6) Upon request of the Committee, the head of any Federal agency is authorized to detail, on a nonreimbursable basis, any of the personnel of such agency to the Committee to assist it in carrying out its duties under this section.

(7)(A) The Committee may for the purpose of carrying out its duties under this section hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence, as the Committee deems advisable.

(B) When so authorized by the Committee, any member or agent of the Committee may take any action which the Committee is authorized to take by this paragraph.

(C) Subject to the Privacy Act, the Committee may secure directly from any Federal agency information necessary to enable it to carry out its duties under this section. Upon request of the Chairman of the Committee, the head of such Federal agency shall furnish such information to the Committee.

(D) The Committee may use the United States mails in the same manner and upon the same conditions as a Federal agency.

(E) The Administrator of General Services shall provide to the Committee on a reimbursable basis such administrative support services as the Committee may request.

(8) In carrying out its duties under this section, the Committee may promulgate and amend such rules, regulations, and procedures, and issue and amend such orders as it deems necessary.

(9) For the purpose of obtaining information necessary for the consideration of an application for an exemption under this section the Committee may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents.

(10) In no case shall any representative, including a representative of a member designated pursuant to paragraph (3)(G) of this subsection, be eligible to cast a vote on behalf of any member.

(f) REGULATIONS.—Not later than 90 days after the date of enactment of the En-

dangered Species Act Amendments of 1978, the Secretary shall promulgate regulations which set forth the form and manner in which applications for exemption shall be submitted to the Secretary and the information to be contained in such applications. Such regulations shall require that information submitted in an application by the head of any Federal agency with respect to any agency action include, but not be limited to —

(1) a description of the consultation process carried out pursuant to subsection (a)(2) of this section between the head of the Federal agency and the Secretary; and

(2) a statement describing why such action cannot be altered or modified to conform with the requirements of subsection (a)(2) of this section.

(g) APPLICATION FOR EXEMPTION AND REPORT TO THE COMMITTEE.—(1) A Federal agency, the Governor of the State in which an agency action will occur, if any, or a permit or license applicant may apply to the Secretary for an exemption for an agency action of such agency if, after consultation under subsection (a)(2), the Secretary's opinion under subsection (b) indicates that the agency action would violate subsection (a)(2). An application for an exemption shall be considered initially by the Secretary in the manner provided for in this subsection, and shall be considered by the Committee for a final determination under subsection (h) after a report is made pursuant to paragraph (5). The applicant for an exemption shall be referred to as the "exemption applicant" in this section.

(2)(A) An exemption applicant shall submit a written application to the Secretary, in a form prescribed under subsection (f), not later than 90 days after the completion of the consultation process; except that, in the case of any agency action involving a permit or license applicant, such application shall be submitted not later than 90 days after the date on which the Federal agency concerned takes final agency action with respect to the issuance of the permit or license. For purposes of the preceding sentence, the term "final agency action" means (i) a disposition by an agency with respect to the issuance of a permit or license that is subject to administrative review, whether or not such disposition is subject to judicial review; or (ii) if administrative review is sought with respect to such disposition, the decision resulting after such review. Such application shall set forth the reasons why the exemption applicant considers that the agency action meets the requirements for an exemption under this subsection.

(B) Upon receipt of an application for exemption for an agency action under paragraph (1), the Secretary shall promptly (i) notify the Governor of each affected State, if any, as determined by the Secretary, and request the Governors so notified to recommend individuals to be appointed to the Endangered Species Committee for consideration of such application; and (ii) publish notice of receipt of the application in the Federal Register, including a summary of the information contained in the application and a description of the agency action with respect to which the application for exemption has been filed.

(3) The Secretary shall within 20 days after the receipt of an application for exemption, or within such other period of time as is mutually agreeable to the exemption applicant and the Secretary—

(A) determine that the Federal agency concerned and the exemption applicant have—

(i) carried out the consultation responsibilities described in subsection (a) in good faith and made a reasonable and responsible effort to develop and

fairly consider modifications or reasonable and prudent alternatives to the proposed agency action which would not violate subsection (a)(2);

(ii) conducted any biological assessment required by subsection (c); and

(iii) to the extent determinable within the time provided herein, refrained from making any irreversible or irretrievable commitment of resources prohibited by subsection (d); or

(B) deny the application for exemption because the Federal agency concerned or the exemption applicant have not met the requirements set forth in subparagraph (A)(i), (ii), and (iii).

The denial of an application under subparagraph (B) shall be considered final agency action for purposes of chapter 7 of title 5, United States Code.

(4) If the Secretary determines that the Federal agency concerned and the exemption applicant have met the requirements set forth in paragraph (3)(A)(i), (ii), and (iii) he shall, in consultation with the Members of the Committee, hold a hearing on the application for exemption in accordance with sections 554, 555, and 556 (other than subsection (b)(1) and (2) thereof) of title 5, United States Code, and prepare the report to be submitted pursuant to paragraph (5).

(5) Within 140 days after making the determinations under paragraph (3) or within such other period of time as is mutually agreeable to the exemption applicant and the Secretary, the Secretary shall submit to the Committee a report discussing—

(A) the availability of reasonable and prudent alternatives to the agency action, and the nature and extent of the benefits of the agency action and of alternative courses of action consistent with conserving the species or the critical habitat;

(B) a summary of the evidence concerning whether or not the agency action is in the public interest and is of national or regional significance;

(C) appropriate reasonable mitigation and enhancement measures which should be considered by the Committee; and

(D) whether the Federal agency concerned and the exemption applicant refrained from making any irreversible or irretrievable commitment of resources prohibited by subsection (d).

(6) To the extent practicable within the time required for action under subsection (g) of this section, and except to the extent inconsistent with the requirements of this section, the consideration of any application for an exemption under this section and the conduct of any hearing under this subsection shall be in accordance with sections 554, 555, and 556 (other than subsection (b)(3) of section 556) of title 5, United States Code.

(7) Upon request of the Secretary, the head of any Federal agency is authorized to detail, on a nonreimbursable basis, any of the personnel of such agency to the Secretary to assist him in carrying out his duties under this section.

(8) All meetings and records resulting from activities pursuant to this subsection shall be open to the public.

(h) EXEMPTION.—(1) The Committee shall make a final determination whether or not to grant an exemption within 30 days after receiving the report of the Secretary pursuant to subsection (g)(5). The Committee shall grant an exemption from the requirements of subsection (a)(2) for an agency action if, by a vote of not less than five of its members voting in person—

(A) it determines on the record, based on the report of the Secretary, the

record of the hearing held under subsection (g)(4) and on such other testimony or evidence as it may receive, that—

- (i) there are no reasonable and prudent alternatives to the agency action;
- (ii) the benefits of such action clearly outweigh the benefits of alternative courses of action consistent with conserving the species or its critical habitat, and such action is in the public interest;
- (iii) the action is of regional or national significance; and
- (iv) neither the Federal agency concerned nor the exemption applicant made any irreversible or irretrievable commitment of resources prohibited by subsection (d); and

(B) it establishes such reasonable mitigation and enhancement measures, including, but not limited to, live propagation, transplantation, and habitat acquisition and improvement, as are necessary and appropriate to minimize the adverse effects of the agency action upon the endangered species, threatened species, or critical habitat concerned.

Any final determination by the Committee under this subsection shall be considered final agency action for purposes of chapter 7 of title 5 of the United States Code.

(2)(A) Except as provided in subparagraph (B), an exemption for an agency action granted under paragraph (1) shall constitute a permanent exemption with respect to all endangered or threatened species for the purposes of completing such agency action—

- (i) regardless whether the species was identified in the biological assessment; and
- (ii) only if a biological assessment has been conducted under subsection (c) with respect to such agency action.

(B) An exemption shall be permanent under subparagraph (A) unless—

- (i) the Secretary finds, based on the best scientific and commercial data available, that such exemption would result in the extinction of a species that was not the subject of consultation under subsection (a)(2) or was not identified in any biological assessment conducted under subsection (c), and

- (ii) the Committee determines within 60 days after the date of the Secretary's finding that the exemption should not be permanent.

If the Secretary makes a finding described in clause (i), the Committee shall meet with respect to the matter within 30 days after the date of the finding.

(i) **REVIEW BY SECRETARY OF STATE.**—Notwithstanding any other provision of this Act, the Committee shall be prohibited from considering for exemption any application made to it, if the Secretary of State, after a review of the proposed agency action and its potential implications, and after hearing, certifies, in writing, to the Committee within 60 days of any application made under this section that the granting of any such exemption and the carrying out of such action would be in violation of an international treaty obligation or other international obligation of the United States. The Secretary of State shall, at the time of such certification, publish a copy thereof in the Federal Register.

(j) Notwithstanding any other provision of this Act, the Committee shall grant an exemption for any agency action if the Secretary of Defense finds that such exemption is necessary for reasons of national security.

(k) **SPECIAL PROVISIONS.**—An exemption decision by the Committee under this section shall not be a major Federal action for purposes of the National Environ-

mental Policy Act of 1969 (42 U.S.C. 4321 et seq.): *Provided*, That an environmental impact statement which discusses the impacts upon endangered species or threatened species or their critical habitats shall have been previously prepared with respect to any agency action exempted by such order.

(l) COMMITTEE ORDERS.—(1) If the Committee determines under subsection (h) that an exemption should be granted with respect to any agency action, the Committee shall issue an order granting the exemption and specifying the mitigation and enhancement measures established pursuant to subsection (h) which shall be carried out and paid for by the exemption applicant in implementing the agency action. All necessary mitigation and enhancement measures shall be authorized prior to the implementing of the agency action and funded concurrently with all other project features.

(2) The applicant receiving such exemption shall include the costs of such mitigation and enhancement measures within the overall costs of continuing the proposed action. Notwithstanding the preceding sentence the costs of such measures shall not be treated as project costs for the purpose of computing benefit-cost or other ratios for the proposed action. Any applicant may request the Secretary to carry out such mitigation and enhancement measures. The costs incurred by the Secretary in carrying out any such measures shall be paid by the applicant receiving the exemption. No later than one year after the granting of an exemption, the exemption applicant shall submit to the Council on Environmental Quality a report describing its compliance with the mitigation and enhancement measures prescribed by this section. Such a report shall be submitted annually until all such mitigation and enhancement measures have been completed. Notice of the public availability of such reports shall be published in the Federal Register by the Council on Environmental Quality.

(m) NOTICE.—The 60-day notice requirement of section 11(g) of this Act shall not apply with respect to review of any final determination of the Committee under subsection (h) of this section granting an exemption from the requirements of subsection (a)(2) of this section.

(n) JUDICIAL REVIEW.—Any person, as defined by section 3(13) of this Act, may obtain judicial review, under chapter 7 of title 5 of the United States Code, of any decision of the Endangered Species Committee under subsection (h) in the United States Court of Appeals for (1) any circuit wherein the agency action concerned will be, or is being, carried out, or (2) in any case in which the agency action will be, or is being, carried out outside of any circuit, the District of Columbia, by filing in such court within 90 days after the date of issuance of the decision, a written petition for review. A copy of such petition shall be transmitted by the clerk of the court to the Committee and the Committee shall file in the court the record in the proceeding, as provided in section 2112, of title 28, United States Code. Attorneys designated by the Endangered Species Committee may appear for, and represent the Committee in any action for review under this subsection.

(o) Notwithstanding sections 4(d) and 9(a)(1)(B) and (C), sections 101 and 102 of the Marine Mammal Protection Act of 1972, or any regulation promulgated to implement any such section—

(1) any action for which an exemption is granted under subsection (h) shall not be considered to be a taking of any endangered species or threatened species with respect to any activity which is necessary to carry out such action; and

(2) any taking that is in compliance with the terms and conditions specified in

a written statement provided under subsection (b)(4)(iv) shall not be considered to be a prohibited taking of the species concerned.

(p) EXEMPTIONS IN PRESIDENTIALLY DECLARED DISASTER AREAS.—In any area which has been declared by the President to be a major disaster area under the Disaster Relief and Emergency Assistance Act, the President is authorized to make the determinations required by subsections (g) and (h) of this section for any project for the repair or replacement of a public facility substantially as it existed prior to the disaster under section 405 or 406 of the Disaster Relief and Emergency Assistance Act, and which the President determines (1) is necessary to prevent the recurrence of such a natural disaster and to reduce the potential loss of human life, and (2) to involve an emergency situation which does not allow the ordinary procedures of this section to be followed. Notwithstanding any other provision of this section, the Committee shall accept the determinations of the President under this subsection.

INTERNATIONAL COOPERATION

SEC. 8. (a) FINANCIAL ASSISTANCE.—As a demonstration of the commitment of the United States to the worldwide protection of endangered species and threatened species, the President may, subject to the provisions of section 1415 of the Supplemental Appropriation Act, 1953 (31 U.S.C. 724), use foreign currencies accruing to the United States Government under the Agricultural Trade Development and Assistance Act of 1954 or any other law to provide to any foreign country (with its consent) assistance in the development and management of programs in that country which the Secretary determines to be necessary or useful for the conservation of any endangered species or threatened species listed by the Secretary pursuant to section 4 of this Act. The President shall provide assistance (which includes, but is not limited to, the acquisition, by lease or otherwise, of lands, waters, or interests therein) to foreign countries under this section under such terms and conditions as he deems appropriate. Whenever foreign currencies are available for the provision of assistance under this section, such currencies shall be used in preference to funds appropriated under the authority of section 15 of this Act.

(b) ENCOURAGEMENT OF FOREIGN PROGRAMS.—In order to carry out further the provisions of this Act, the Secretary, through the Secretary of State, shall encourage—

(1) foreign countries to provide for the conservation of fish or wildlife and plants including endangered species and threatened species listed pursuant to section 4 of this Act;

(2) the entering into of bilateral or multilateral agreements with foreign countries to provide for such conservation; and

(3) foreign persons who directly or indirectly take fish or wildlife or plants in foreign countries or on the high seas for importation into the United States for commercial or other purposes to develop and carry out with such assistance as he may provide, conservation practices designed to enhance such fish or wildlife or plants and their habitat.

(c) PERSONNEL.—After consultation with the Secretary of State, the Secretary may—

(1) assign or otherwise make available any officer or employee of his department for the purpose of cooperating with foreign countries and international organizations in developing personnel resources and programs which promote the conservation of fish or wildlife or plants; and

(2) conduct or provide financial assistance for the educational training of foreign personnel, in this country or abroad, in fish, wildlife, or plant management, research and law enforcement and to render professional assistance abroad in such matters.

(d) INVESTIGATIONS.—After consultation with the Secretary of State and the Secretary of the Treasury, as appropriate, the Secretary may conduct or cause to be conducted such law enforcement investigations and research abroad as he deems necessary to carry out the purposes of this Act.

CONVENTION IMPLEMENTATION

SEC. 8A. (a) MANAGEMENT AUTHORITY AND SCIENTIFIC AUTHORITY.—The Secretary of the Interior (hereinafter in this section referred to as the "Secretary") is designated as the Management Authority and the Scientific Authority for purposes of the Convention and the respective functions of each such Authority shall be carried out through the United States Fish and Wildlife Service.

(b) MANAGEMENT AUTHORITY FUNCTIONS.—The Secretary shall do all things necessary and appropriate to carry out the functions of the Management Authority under the Convention.

(c) SCIENTIFIC AUTHORITY FUNCTIONS.—(1) The Secretary shall do all things necessary and appropriate to carry out the functions of the Scientific Authority under the Convention.

(2) The Secretary shall base the determinations and advice given by him under Article IV of the Convention with respect to wildlife upon the best available biological information derived from professionally accepted wildlife management practices; but is not required to make, or require any State to make, estimates of population size in making such determinations or giving such advice.

(d) RESERVATIONS BY THE UNITED STATES UNDER CONVENTION.—If the United States votes against including any species in Appendix I or II of the Convention and does not enter a reservation pursuant to paragraph (3) of Article XV of the Convention with respect to that species, the Secretary of State, before the 90th day after the last day on which such a reservation could be entered, shall submit to the Committee on Merchant Marine and Fisheries of the House of Representatives, and to the Committee on the Environment and Public Works of the Senate, a written report setting forth the reasons why such a reservation was not entered.

(e) WILDLIFE PRESERVATION IN WESTERN HEMISPHERE.—(1) The Secretary of the Interior (hereinafter in this subsection referred to as the "Secretary"), in cooperation with the Secretary of State, shall act on behalf of, and represent, the United States in all regards as required by the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (56 Stat. 1354, T.S. 982, hereinafter in this subsection referred to as the "Western Convention"). In the discharge of these responsibilities, the Secretary and the Secretary of State shall consult with the Secretary of Agriculture, the Secretary of Commerce, and the heads of other agencies with respect to matters relating to or affecting their areas of responsibility.

(2) The Secretary and the Secretary of State shall, in cooperation with the contracting parties to the Western Convention and, to the extent feasible and appropriate, with the participation of State agencies, take such steps as are necessary to implement the Western Convention. Such steps shall include, but not be limited to—

(A) cooperation with contracting parties and international organizations for

the purpose of developing personnel resources and programs that will facilitate implementation of the Western Convention.

(B) identification of those species of birds that migrate between the United States and other contracting parties, and the habitats upon which those species depend, and the implementation of cooperative measures to ensure that such species will not become endangered or threatened; and

(C) identification of measures that are necessary and appropriate to implement those provisions of the Western Convention which address the protection of wild plants.

(3) No later than September 30, 1985, the Secretary and the Secretary of State shall submit a report to Congress describing those steps taken in accordance with the requirements of this subsection and identifying the principal remaining actions yet necessary for comprehensive and effective implementation of the Western Convention.

(4) The provisions of this subsection shall not be construed as affecting the authority, jurisdiction, or responsibility of the several States to manage, control, or regulate resident fish or wildlife under State law or regulations.

PROHIBITED ACTS

SEC. 9. (a) GENERAL.—(1) Except as provided in sections 6(g)(2) and 10 of this Act, with respect to any endangered species of fish or wildlife listed pursuant to section 4 of this Act it is unlawful for any person subject to the jurisdiction of the United States to—

(A) import any such species into, or export any such species from the United States;

(B) take any such species within the United States or the territorial sea of the United States;

(C) take any such species upon the high seas;

(D) possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any such species taken in violation of subparagraphs (B) and (C);

(E) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of a commercial activity, any such species;

(F) sell or offer for sale in interstate or foreign commerce any such species; or

(G) violate any regulation pertaining to such species or to any threatened species of fish or wildlife listed pursuant to section 4 of this Act and promulgated by the Secretary pursuant to authority provided by this Act.

(2) Except as provided in sections 6(g)(2) and 10 of this Act, with respect to any endangered species of plants listed pursuant to section 4 of this Act, it is unlawful for any person subject to the jurisdiction of the United States to—

(A) import any such species into, or export any such species from, the United States;

(B) remove and reduce to possession any such species from areas under Federal jurisdiction; maliciously damage or destroy any such species on any such area; or remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law;

(C) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of a commercial activity, any such species;

(D) sell or offer for sale in interstate or foreign commerce any such species; or

(E) violate any regulation pertaining to such species or to any threatened species of plants listed pursuant to section 4 of this Act and promulgated by the Secretary pursuant to authority provided by this Act.

(b)(1) **SPECIES HELD IN CAPTIVITY OR CONTROLLED ENVIRONMENT.**—The provisions of subsections (a)(1)(A) and (a)(1)(G) of this section shall not apply to any fish or wildlife which was held in captivity or in a controlled environment on (A) December 28, 1973, or (B) the date of the publication in the Federal Register of a final regulation adding such fish or wildlife species to any list published pursuant to subsection (c) of section 4 of this Act: *Provided*, That such holding and any subsequent holding or use of the fish or wildlife was not in the course of a commercial activity. With respect to any act prohibited by subsections (a)(1)(A) and (a)(1)(G) of this section which occurs after a period of 180 days from (i) December 28, 1973, or (ii) the date of publication in the Federal Register of a final regulation adding such fish or wildlife species to any list published pursuant to subsection (c) of section 4 of this Act, there shall be a rebuttable presumption that the fish or wildlife involved in such act is not entitled to the exemption contained in this subsection.

(2)(A) The provisions of subsection (a)(1) shall not apply to—

(i) any raptor legally held in captivity or in a controlled environment on the effective date of the Endangered Species Act Amendments of 1978; or

(ii) any progeny of any raptor described in clause (i); until such time as any such raptor or progeny is intentionally returned to a wild state.

(B) Any person holding any raptor or progeny described in subparagraph (A) must be able to demonstrate that the raptor or progeny does, in fact, qualify under the provisions of this paragraph, and shall maintain and submit to the Secretary, on request, such inventories, documentation, and records as the Secretary may by regulation require as being reasonably appropriate to carry out the purposes of this paragraph. Such requirements shall not unnecessarily duplicate the requirements of other rules and regulations promulgated by the Secretary.

(c) **VIOLATION OF CONVENTION.**—(1) It is unlawful for any person subject to the jurisdiction of the United States to engage in any trade in any specimens contrary to the provisions of the Convention, or to possess any specimens traded contrary to the provisions of the Convention, including the definitions of terms in article I thereof.

(2) Any importation into the United States of fish or wildlife shall, if —

(A) such fish or wildlife is not an endangered species listed pursuant to section 4 of this Act but is listed in Appendix II to the Convention,

(B) the taking and exportation of such fish or wildlife is not contrary to the provisions of the Convention and all other applicable requirements of the Convention have been satisfied,

(C) the applicable requirements of subsections (d), (e), and (f) of this section have been satisfied, and

(D) such importation is not made in the course of a commercial activity, be presumed to be an importation not in violation of any provision of this Act or any regulation issued pursuant to this Act.

(d) **IMPORTS AND EXPORTS.**—

(1) IN GENERAL.—It is unlawful for any person, without first having obtained permission from the Secretary, to engage in business—

(A) as an importer or exporter of fish or wildlife (other than shellfish and fishery products which (i) are not listed pursuant to section 4 of this Act as endangered species or threatened species, and (ii) are imported for purposes of human or animal consumption or taken in waters under the jurisdiction of the United States or on the high seas for recreational purposes) or plants; or

(B) as an importer or exporter of any amount of raw or worked African elephant ivory.

(2) REQUIREMENTS.—Any person required to obtain permission under paragraph (1) of this subsection shall—

(A) keep such records as will fully and correctly disclose each importation or exportation of fish, wildlife, plants, or African elephant ivory made by him and the subsequent disposition made by him with respect to such fish, wildlife, plants, or ivory;

(B) at all reasonable times upon notice by a duly authorized representative of the Secretary, afford such representative access to his place of business, an opportunity to examine his inventory of imported fish, wildlife, plants, or African elephant ivory and the records required to be kept under subparagraph (A) of this paragraph, and to copy such records; and

(C) file such reports as the Secretary may require.

(3) REGULATIONS.—The Secretary shall prescribe such regulations as are necessary and appropriate to carry out the purposes of this subsection.

(4) RESTRICTION ON CONSIDERATION OF VALUE OR AMOUNT OF AFRICAN ELEPHANT IVORY IMPORTED OR EXPORTED.—In granting permission under this subsection for importation or exportation of African elephant ivory, the Secretary shall not vary the requirements for obtaining such permission on the basis of the value or amount of ivory imported or exported under such permission.

(e) REPORTS.—It is unlawful for any person importing or exporting fish or wildlife (other than shellfish and fishery products which (1) are not listed pursuant to section 4 of this Act as endangered or threatened species, and (2) are imported for purposes of human or animal consumption or taken in waters under the jurisdiction of the United States or on the high seas for recreational purposes) or plants to fail to file any declaration or report as the Secretary deems necessary to facilitate enforcement of this Act or to meet the obligations of the Convention.

(f) DESIGNATION OF PORTS.—(1) It is unlawful for any person subject to the jurisdiction of the United States to import into or export from the United States any fish or wildlife (other than shellfish and fishery products which (A) are not listed pursuant to section 4 of this Act as endangered species or threatened species, and (B) are imported for purposes of human or animal consumption or taken in waters under the jurisdiction of the United States or on the high seas for recreational purposes) or plants, except at a port or ports designated by the Secretary of the Interior. For the purpose of facilitating enforcement of this Act and reducing the costs thereof, the Secretary of the Interior, with approval of the Secretary of the Treasury and after notice and opportunity for public hearing, may, by regulation, designate ports and change such designations. The Secretary of the Interior, under such terms and conditions as he may prescribe, may permit the importation or exportation at nondesignated ports in the interest of the health or safety of the fish or wildlife or plants, or for other

reasons if, in his discretion, he deems it appropriate and consistent with the purpose of this subsection.

(2) Any port designated by the Secretary of the Interior under the authority of section 4(d) of the Act of December 5, 1969 (16 U.S.C. 666cc-4(d)), shall, if such designation is in effect on the day before the date of the enactment of this Act, be deemed to be a port designated by the Secretary under paragraph (1) of this subsection until such time as the Secretary otherwise provides.

(g) VIOLATIONS.—It is unlawful for any person subject to the jurisdiction of the United States to attempt to commit, solicit another to commit, or cause to be committed, any offense defined in this section.

EXCEPTIONS

SEC. 10. (a) PERMITS.—(1) The Secretary may permit, under such terms and conditions as he shall prescribe—

(A) any act otherwise prohibited by section 9 for scientific purposes or to enhance the propagation or survival of the affected species, including, but not limited to, acts necessary for the establishment and maintenance of experimental populations pursuant to subsection (j); or

(B) any taking otherwise prohibited by section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

(2)(A) No permit may be issued by the Secretary authorizing any taking referred to in paragraph (1)(B) unless the applicant therefor submits to the Secretary a conservation plan that specifies—

(i) the impact which will likely result from such taking;

(ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps;

(iii) what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and

(iv) such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan.

(B) If the Secretary finds, after opportunity for public comment, with respect to a permit application and the related conservation plan that—

(i) the taking will be incidental;

(ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;

(iii) the applicant will ensure that adequate funding for the plan will be provided;

(iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and

(v) the measures, if any, required under subparagraph (A)(iv) will be met; and he has received such other assurances as he may require that the plan will be implemented, the Secretary shall issue the permit. The permit shall contain such terms and conditions as the Secretary deems necessary or appropriate to carry out the purposes of this paragraph, including, but not limited to, such reporting requirements as the Secretary deems necessary for determining whether such terms and conditions are being complied with.

(C) The Secretary shall revoke a permit issued under this paragraph if he finds that the permittee is not complying with the terms and conditions of the permit.

(b) **HARDSHIP EXEMPTIONS.**—(1) If any person enters into a contract with respect to a species of fish or wildlife or plant before the date of the publication in the Federal Register of notice of consideration of that species as an endangered species and the subsequent listing of that species as an endangered species pursuant to section 4 of this Act will cause undue economic hardship to such person under the contract, the Secretary, in order to minimize such hardship, may exempt such person from the application of section 9(a) of this Act to the extent the Secretary deems appropriate if such person applies to him for such exemption and includes with such application such information as the Secretary may require to prove such hardship; except that (A) no such exemption shall be for a duration of more than one year from the date of publication in the Federal Register of notice of consideration of the species concerned, or shall apply to a quantity of fish or wildlife or plants in excess of that specified by the Secretary; (B) the one-year period for those species of fish or wildlife listed by the Secretary as endangered prior to the effective date of this Act shall expire in accordance with the terms of section 3 of the Act of December 5, 1969 (83 Stat. 275); and (C) no such exemption may be granted for the importation or exportation of a specimen listed in Appendix I of the Convention which is to be used in a commercial activity.

(2) As used in this subsection, the term "undue economic hardship" shall include, but not be limited to:

(A) substantial economic loss resulting from inability caused by this Act to perform contracts with respect to species of fish and wildlife entered into prior to the date of publication in the Federal Register of a notice of consideration of such species as an endangered species;

(B) substantial economic loss to persons who, for the year prior to the notice of consideration of such species as an endangered species, derived a substantial portion of their income from the lawful taking of any listed species, which taking would be made unlawful under this Act; or

(C) curtailment of subsistence taking made unlawful under this Act by persons (i) not reasonably able to secure other sources of subsistence; and (ii) dependent to a substantial extent upon hunting and fishing for subsistence; and (iii) who must engage in such curtailed taking for subsistence purposes.

(3) The Secretary may make further requirements for a showing of undue economic hardship as he deems fit. Exceptions granted under this section may be limited by the Secretary in his discretion as to time, area, or other factor of applicability.

(c) **NOTICE AND REVIEW.**—The Secretary shall publish notice in the Federal Register of each application for an exemption or permit which is made under this section. Each notice shall invite the submission from interested parties, within thirty days after the date of the notice, of written data, views, or arguments with respect to the application; except that such thirty-day period may be waived by the Secretary in an emergency situation where the health or life of an endangered animal is threatened and no reasonable alternative is available to the applicant, but notice of any such waiver shall be published by the Secretary in the Federal Register within ten days following the issuance of the exemption or permit. Information received by the Secretary as a part of any application shall be available to the public as a matter of public record at every stage of the proceeding.

(d) PERMIT AND EXEMPTION POLICY.—The Secretary may grant exceptions under subsections (a)(1)(A) and (b) of this section only if he finds and publishes his finding in the Federal Register that (1) such exceptions were applied for in good faith, (2) if granted and exercised will not operate to the disadvantage of such endangered species, and (3) will be consistent with the purposes and policy set forth in section 2 of this Act.

(e) ALASKA NATIVES.—(1) Except as provided in paragraph (4) of this subsection the provisions of this Act shall not apply with respect to the taking of any endangered species or threatened species, or the importation of any such species taken pursuant to this section, by—

(A) any Indian, Aleut, or Eskimo who is an Alaskan Native who resides in Alaska; or

(B) any non-native permanent resident of an Alaskan native village; if such taking is primarily for subsistence purposes. Non-edible byproducts of species taken pursuant to this section may be sold in interstate commerce when made into authentic native articles of handicrafts and clothing; except that the provisions of this subsection shall not apply to any non-native resident of an Alaskan native village found by the Secretary to be not primarily dependent upon the taking of fish and wildlife for consumption or for the creation and sale of authentic native articles of handicrafts and clothing.

(2) Any taking under this subsection may not be accomplished in a wasteful manner.

(3) As used in this subsection—

(i) The term “subsistence” includes selling any edible portion of fish or wildlife in native villages and towns in Alaska for native consumption within native villages or towns; and

(ii) The term “authentic native articles of handicrafts and clothing” means items composed wholly or in some significant respect of natural materials, and which are produced, decorated, or fashioned in the exercise of traditional native handicrafts without the use of pantographs, multiple carvers, or other mass copying devices. Traditional native handicrafts include, but are not limited to, weaving, carving, stitching, sewing, lacing, beading, drawing, and painting.

(4) Notwithstanding the provisions of paragraph (1) of this subsection, whenever the Secretary determines that any species of fish or wildlife which is subject to taking under the provisions of this subsection is an endangered species or threatened species, and that such taking materially and negatively affects the threatened or endangered species, he may prescribe regulations upon the taking of such species by any such Indian, Aleut, Eskimo, or non-Native Alaskan resident of an Alaskan native village. Such regulations may be established with reference to species, geographical description of the area included, the season for taking, or any other factors related to the reason for establishing such regulations and consistent with the policy of this Act. Such regulations shall be prescribed after a notice and hearings in the affected judicial districts of Alaska and as otherwise required by section 103 of the Marine Mammal Protection Act of 1972, and shall be removed as soon as the Secretary determines that the need for their impositions has disappeared.

(f)(1) As used in this subsection—

(A) The term “pre-Act endangered species part” means—

(i) any sperm whale oil, including derivatives thereof, which was lawfully

held within the United States on December 28, 1973, in the course of a commercial activity; or

(ii) any finished scrimshaw product, if such product or the raw material for such product was lawfully held within the United States on December 28, 1973, in the course of a commercial activity.

(B) The term "scrimshaw product" means any art form which involves the substantial etching or engraving of designs upon, or the substantial carving of figures, patterns, or designs from, any bone or tooth of any marine mammal of the order Cetacea. For purposes of this subsection, polishing or the adding of minor superficial markings does not constitute substantial etching, engraving, or carving.

(2) The Secretary, pursuant to the provisions of this subsection, may exempt, if such exemption is not in violation of the Convention, any pre-Act endangered species part from one or more of the following prohibitions:

(A) The prohibition on exportation from the United States set forth in section 9(a)(1)(A) of this Act.

(B) Any prohibition set forth in section 9(a)(1)(E) or (F) of this Act.

(3) Any person seeking an exemption described in paragraph (2) of this subsection shall make application therefor to the Secretary in such form and manner as he shall prescribe, but no such application may be considered by the Secretary unless the application—

(A) is received by the Secretary before the close of the one-year period beginning on the date on which regulations promulgated by the Secretary to carry out this subsection first take effect;

(B) contains a complete and detailed inventory of all pre-Act endangered species parts for which the applicant seeks exemption;

(C) is accompanied by such documentation as the Secretary may require to prove that any endangered species part or product claimed by the applicant to be a pre-Act endangered species part is in fact such a part; and

(D) contains such other information as the Secretary deems necessary and appropriate to carry out the purposes of this subsection.

(4) If the Secretary approves any application for exemption made under this subsection, he shall issue to the applicant a certificate of exemption which shall specify—

(A) any prohibition in section 9(a) of this Act which is exempted;

(B) the pre-Act endangered species parts to which the exemption applies;

(C) the period of time during which the exemption is in effect, but no exemption made under this subsection shall have force and effect after the close of the three-year period beginning on the date of issuance of the certificate unless such exemption is renewed under paragraph (8); and

(D) any term or condition prescribed pursuant to paragraph (5)(A) or (B), or both, which the Secretary deems necessary or appropriate.

(5) The Secretary shall prescribe such regulations as he deems necessary and appropriate to carry out the purposes of this subsection. Such regulations may set forth—

(A) terms and conditions which may be imposed on applicants for exemptions under this subsection (including, but not limited to, requirements that applicants register inventories, keep complete sales records, permit duly authorized agents of the Secretary to inspect such inventories and records, and periodically file appropriate reports with the Secretary); and

(B) terms and conditions which may be imposed on any subsequent purchaser of any pre-Act endangered species part covered by an exemption granted under this subsection;

to insure that any such part so exempted is adequately accounted for and not disposed of contrary to the provisions of this Act. No regulation prescribed by the Secretary to carry out the purposes of this subsection shall be subject to section 4(f)(2)(A)(i) of this Act.

(6)(A) Any contract for the sale of pre-Act endangered species parts which is entered into by the Administrator of General Services prior to the effective date of this subsection and pursuant to the notice published in the Federal Register on January 9, 1973, shall not be rendered invalid by virtue of the fact that fulfillment of such contract may be prohibited under section 9(a)(1)(F).

(B) In the event that this paragraph is held invalid, the validity of the remainder of the Act, including the remainder of this subsection, shall not be affected.

(7) Nothing in this subsection shall be construed to—

(A) exonerate any person from any act committed in violation of paragraphs (1)(A), (1)(E), or (1)(F) of section 9(a) prior to the date of enactment of this subsection; or

(B) immunize any person from prosecution for any such act.

(8)(A)(i) Any valid certificate of exemption which was renewed after October 13, 1982, and was in effect on March 31, 1988, shall be deemed to be renewed for a six-month period beginning on the date of enactment of the Endangered Species Act Amendments of 1988. Any person holding such a certificate may apply to the Secretary for one additional renewal of such certificate for a period not to exceed 5 years beginning on the date of such enactment.

(B) If the Secretary approves any application for renewal of an exemption under this paragraph, he shall issue to the applicant a certificate of renewal of such exemption which shall provide that all terms, conditions, prohibitions, and other regulations made applicable by the previous certificate shall remain in effect during the period of the renewal.

(C) No exemption or renewal of such exemption made under this subsection shall have force and effect after the expiration date of the certificate of renewal of such exemption issued under this paragraph.

(D) No person may, after January 31, 1984, sell or offer for sale in interstate or foreign commerce, any pre-Act finished scrimshaw product unless such person holds a valid certificate of exemption issued by the Secretary under this subsection, and unless such product or the raw material for such product was held by such person on October 13, 1982.

(g) In connection with any action alleging a violation of section 9, any person claiming the benefit of any exemption or permit under this Act shall have the burden of proving that the exemption or permit is applicable, has been granted, and was valid and in force at the time of the alleged violation.

(h) CERTAIN ANTIQUE ARTICLES.—(1) Sections 4(d), 9(a), and 9(c) do not apply to any article which—

(A) is not less than 100 years of age;

(B) is composed in whole or in part of any endangered species or threatened species listed under section 4;

(C) has not been repaired or modified with any part of any such species on or after the date of the enactment of this Act; and

(D) is entered at a port designated under paragraph (3).

(2) Any person who wishes to import an article under the exception provided by this subsection shall submit to the customs officer concerned at the time of entry of the article such documentation as the Secretary of the Treasury, after consultation with the Secretary of the Interior, shall by regulation require as being necessary to establish that the article meets the requirements set forth in paragraph (1)(A), (B), and (C).

(3) The Secretary of the Treasury, after consultation with the Secretary of the Interior, shall designate one port within each customs region at which articles described in paragraph (1)(A), (B), and (C) must be entered into the customs territory of the United States.

(4) Any person who imported, after December 27, 1973, and on or before the date of the enactment of the Endangered Species Act Amendments of 1978, any article described in paragraph (1) which—

(A) was not repaired or modified after the date of importation with any part of any endangered species or threatened species listed under section 4;

(B) was forfeited to the United States before such date of the enactment, or is subject to forfeiture to the United States on such date of enactment, pursuant to the assessment of a civil penalty under section 11; and

(C) is in the custody of the United States on such date of enactment; may, before the close of the one-year period beginning on such date of enactment, make application to the Secretary for return of the article. Application shall be made in such form and manner, and contain such documentation, as the Secretary prescribes. If on the basis of any such application which is timely filed, the Secretary is satisfied that the requirements of this paragraph are met with respect to the article concerned, the Secretary shall return the article to the applicant and the importation of such article shall, on and after the date of return, be deemed to be a lawful importation under this Act.

(i) NONCOMMERCIAL TRANSSHIPMENTS.—Any importation into the United States of fish or wildlife shall, if—

(1) such fish or wildlife was lawfully taken and exported from the country of origin and country of reexport, if any;

(2) such fish or wildlife is in transit or transshipment through any place subject to the jurisdiction of the United States en route to a country where such fish or wildlife may be lawfully imported and received;

(3) the exporter or owner of such fish or wildlife gave explicit instructions not to ship such fish or wildlife through any place subject to the jurisdiction of the United States, or did all that could have reasonably been done to prevent transshipment, and the circumstances leading to the transshipment were beyond the exporter's or owner's control;

(4) the applicable requirements of the Convention have been satisfied; and

(5) such importation is not made in the course of a commercial activity, be an importation not in violation of any provision of this Act or any regulation issued pursuant to this Act while such fish or wildlife remains in the control of the United States Customs Service.

(j) EXPERIMENTAL POPULATIONS.—(1) For purposes of this subsection, the term "experimental population" means any population (including any offspring arising solely therefrom) authorized by the Secretary for release under paragraph (2), but only when,

and at such times as, the population is wholly separate geographically from nonexperimental populations of the same species.

(2)(A) The Secretary may authorize the release (and the related transportation) of any population (including eggs, propagules, or individuals) of an endangered species or a threatened species outside the current range of such species if the Secretary determines that such release will further the conservation of such species.

(B) Before authorizing the release of any population under subparagraph (A), the Secretary shall by regulation identify the population and determine, on the basis of the best available information, whether or not such population is essential to the continued existence of an endangered species or a threatened species.

(C) For the purposes of this Act, each member of an experimental population shall be treated as a threatened species; except that—

(i) solely for purposes of section 7 (other than subsection (a)(1) thereof), an experimental population determined under subparagraph (B) to be not essential to the continued existence of a species shall be treated, except when it occurs in an area within the National Wildlife Refuge System or the National Park System, as a species proposed to be listed under section 4; and

(ii) critical habitat shall not be designated under this Act for any experimental population determined under subparagraph (B) to be not essential to the continued existence of a species.

(3) The Secretary, with respect to populations of endangered species or threatened species that the Secretary authorized, before the date of the enactment of this subsection, for release in geographical areas separate from the other populations of such species, shall determine by regulation which of such populations are an experimental population for the purposes of this subsection and whether or not each is essential to the continued existence of an endangered species or a threatened species.

PENALTIES AND ENFORCEMENT

SEC. 11. (a) CIVIL PENALTIES.— (1) Any person who knowingly violates, and any person engaged in business as an importer or exporter of fish, wildlife, or plants who violates, any provision of this Act, or any provision of any permit or certificate issued hereunder, or of any regulation issued in order to implement subsection (a)(1)(A), (B), (C), (D), (E), or (F), (a)(2)(A), (B), (C), or (D), (c), (d) (other than regulation relating to recordkeeping or filing of reports), (f) or (g) of section 9 of this Act, may be assessed a civil penalty by the Secretary of not more than \$ 25,000 for each violation. Any person who knowingly violates, and any person engaged in business as an importer or exporter of fish, wildlife, or plants who violates, any provision of any other regulation issued under this Act may be assessed a civil penalty by the Secretary of not more than \$ 12,000 for each such violation. Any person who otherwise violates any provision of this Act, or any regulation, permit, or certificate issued hereunder, may be assessed a civil penalty by the Secretary of not more than \$ 500 for each such violation. No penalty may be assessed under this subsection unless such person is given notice and opportunity for a hearing with respect to such violation. Each violation shall be a separate offense. Any such civil penalty may be remitted or mitigated by the Secretary. Upon any failure to pay a penalty assessed under this subsection, the Secretary may request the Attorney General to institute a civil action in a district court of the United States for any district in which such person is

found, resides, or transacts business to collect the penalty and such court shall have jurisdiction to hear and decide any such action. The court shall hear such action on the record made before the Secretary and shall sustain his action if it is supported by substantial evidence on the record considered as a whole.

(2) Hearings held during proceedings for the assessment of civil penalties authorized by paragraph (1) of this subsection shall be conducted in accordance with section 554 of title 5, United States Code. The Secretary may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and administer oaths. Witnesses summoned shall be paid the same fees and mileage that are paid to witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpoena served upon any person pursuant to this paragraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Secretary or to appear and produce documents before the Secretary, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(3) Notwithstanding any other provision of this Act, no civil penalty shall be imposed if it can be shown by a preponderance of the evidence that the defendant committed an act based on a good faith belief that he was acting to protect himself or herself, a member of his or her family, or any other individual from bodily harm, from any endangered or threatened species.

(b) CRIMINAL VIOLATIONS.—(1) Any person who knowingly violates any provision of this Act, of any permit or certificate issued hereunder, or of any regulation issued in order to implement subsection (a)(1)(A), (B), (C), (D), (E), or (F); (a)(2)(A), (B), (C), or (D), (c), (d) (other than a regulation relating to recordkeeping, or filing of reports), (f), or (g) of section 9 of this Act shall, upon conviction, be fined not more than \$ 50,000 or imprisoned for not more than one year, or both. Any person who knowingly violates any provision of any other regulation issued under this Act shall, upon conviction, be fined not more than \$ 25,000 or imprisoned for not more than six months, or both.

(2) The head of any Federal agency which has issued a lease, license, permit, or other agreement authorizing a person to import or export fish, wildlife, or plants, or to operate a quarantine station for imported wildlife, or authorizing the use of Federal lands, including grazing of domestic livestock, to any person who is convicted of a criminal violation of this Act or any regulation, permit, or certificate issued hereunder may immediately modify, suspend, or revoke each lease, license, permit, or other agreement. The Secretary shall also suspend for a period of up to one year, or cancel, any Federal hunting or fishing permits or stamps issued to any person who is convicted of a criminal violation of any provision of this Act or any regulation, permit, or certificate issued hereunder. The United States shall not be liable for the payments of any compensation, reimbursement, or damages in connection with the modification, suspension, or revocation of any leases, licenses, permits, stamps, or other agreements pursuant to this section.

(3) Notwithstanding any other provision of this Act, it shall be a defense to prosecution under this subsection if the defendant committed the offense based on a good faith belief that he was acting to protect himself or herself, a member of his or her family, or any other individual, from bodily harm from any endangered or threatened species.

(c) DISTRICT COURT JURISDICTION.—The several district courts of the United States, including the courts enumerated in section 460 of title 28, United States Code, shall have jurisdiction over any actions arising under this Act. For the purpose of this Act, American Samoa shall be included within the judicial district of the District Court of the United States for the District of Hawaii.

(d) REWARDS AND CERTAIN INCIDENTAL EXPENSES.—The Secretary or the Secretary of the Treasury shall pay, from sums received as penalties, fines, or forfeitures of property for any violation of this Act or any regulation issued hereunder (1) a reward to any person who furnishes information which leads to an arrest, a criminal conviction, civil penalty assessment, or forfeiture of property for any violation of this Act or any regulation issued hereunder, and (2) the reasonable and necessary costs incurred by any person in providing temporary care for any fish, wildlife, or plant pending the disposition of any civil or criminal proceeding alleging a violation of this Act with respect to that fish, wildlife, or plant. The amount of the reward, if any, is to be designated by the Secretary or the Secretary of the Treasury, as appropriate. Any officer or employee of the United States or any State or local government who furnishes information or renders service in the performance of his official duties is ineligible for payment under this subsection. Whenever the balance of sums received under this section and section 6(d) of the Act of November 16, 1981 (16 U.S.C. 3375(d)), as penalties or fines, or from forfeitures of property, exceed \$ 500,000, the Secretary of the Treasury shall deposit an amount equal to such excess balance in the cooperative endangered species conservation fund established under section 6(i) of this Act.

(e) ENFORCEMENT.—(1) The provisions of this Act and any regulations or permits issued pursuant thereto shall be enforced by the Secretary, the Secretary of the Treasury, or the Secretary of the Department in which the Coast Guard is operating, or all such Secretaries. Each such Secretary may utilize by agreement, with or without reimbursement, the personnel, services, and facilities of any other Federal agency or any State agency for purposes of enforcing this Act.

(2) The judges of the district courts of the United States and the United States magistrates may, within their respective jurisdictions, upon proper oath or affirmation showing probable cause, issue such warrants or other process as may be required for enforcement of this Act and any regulation issued thereunder.

(3) Any person authorized by the Secretary, the Secretary of the Treasury, or the Secretary of the Department in which the Coast Guard is operating, to enforce this Act may detain for inspection and inspect any package, crate, or other container, including its contents, and all accompanying documents, upon importation or exportation. Such person may make arrests without a warrant for any violation of this Act if he has reasonable grounds to believe that the person to be arrested is committing the violation in his presence or view, and may execute and serve any arrest warrant, search warrant, or other warrant or civil or criminal process issued by any officer or court of competent jurisdiction for enforcement of this Act. Such person so authorized may search and seize, with or without a warrant, as authorized by law. Any fish, wildlife, property, or item so seized shall be held by any person authorized by the Secretary, the Secretary of the Treasury, or the Secretary of the Department in which the Coast Guard is operating pending disposition of civil or criminal proceedings, or the institution of an action in rem for forfeiture of such fish, wildlife, property, or item pursuant to paragraph (4) of this subsection; except that the Secretary may, in lieu of holding such fish, wildlife, property, or item, permit the owner or con-

signee to post a bond or other surety satisfactory to the Secretary, but upon forfeiture of any such property to the United States, or the abandonment or waiver of any claim to any such property, it shall be disposed of (other than by sale to the general public) by the Secretary in such a manner, consistent with the purposes of this Act, as the Secretary shall by regulation prescribe.

(4)(A) All fish or wildlife or plants taken, possessed, sold, purchased, offered for sale or purchase, transported, delivered, received, carried, shipped, exported, or imported contrary to the provisions of this Act, any regulation made pursuant thereto, or any permit or certificate issued hereunder shall be subject to forfeiture to the United States.

(B) All guns, traps, nets, and other equipment, vessels, vehicles, aircraft, and other means of transportation used to aid the taking, possessing, selling, purchasing, offering for sale or purchase, transporting, delivering, receiving, carrying, shipping, exporting, or importing of any fish or wildlife or plants in violation of this Act, any regulation made pursuant thereto, or any permit or certificate issued thereunder shall be subject to forfeiture to the United States upon conviction of a criminal violation pursuant to section 11(b)(1) of this Act.

(5) All provisions of law relating to the seizure, forfeiture, and condemnation of a vessel for violation of the customs laws, the disposition of such vessel or the proceeds from the sale thereof, and the remission or mitigation of such forfeiture, shall apply to the seizures and forfeitures incurred, or alleged to have been incurred, under the provisions of this Act, insofar as such provisions of law are applicable and not inconsistent with the provisions of this Act; except that all powers, rights, and duties conferred or imposed by the customs laws upon any officer or employee of the Treasury Department shall, for the purposes of this Act, be exercised or performed by the Secretary or by such persons as he may designate.

(6) The Attorney General of the United States may seek to enjoin any person who is alleged to be in violation of any provision of this Act or regulation issued under authority thereof.

(f) REGULATIONS.—The Secretary, the Secretary of the Treasury, and the Secretary of the Department in which the Coast Guard is operating, are authorized to promulgate such regulations as may be appropriate to enforce this Act, and charge reasonable fees for expenses to the Government connected with permits or certificates authorized by this Act including processing applications and reasonable inspections, and with the transfer, board, handling, or storage of fish or wildlife or plants and evidentiary items seized and forfeited under this Act. All such fees collected pursuant to this subsection shall be deposited in the Treasury to the credit of the appropriation which is current and chargeable for the cost of furnishing the services. Appropriated funds may be expended pending reimbursement from parties in interest.

(g) CITIZEN SUITS.—(1) Except as provided in paragraph (2) of this subsection any person may commence a civil suit on his own behalf—

(A) to enjoin any person, including the United States and any other governmental instrumentality or agency (to the extent permitted by the eleventh amendment to the Constitution), who is alleged to be in violation of any provision of this Act or regulation issued under the authority thereof; or

(B) to compel the Secretary to apply, pursuant to section 6(g)(2)(B)(ii) of this Act, the prohibitions set forth in or authorized pursuant to section 4(d) or section

9(a)(1)(B) of this Act with respect to the taking of any resident endangered species or threatened species within any State; or

(C) against the Secretary where there is alleged a failure of the Secretary to perform any act or duty under section 4 which is not discretionary with the Secretary.

The district courts shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce any such provision or regulation, or to order the Secretary to perform such act or duty, as the case may be. In any civil suit commenced under subparagraph (B) the district court shall compel the Secretary to apply the prohibition sought if the court finds that the allegation that an emergency exists is supported by substantial evidence.

(2)(A) No action may be commenced under subparagraph (1)(A) of this section—

(i) prior to sixty days after written notice of the violation has been given to the Secretary, and to any alleged violator of any such provision or regulation;

(ii) if the Secretary has commenced action to impose a penalty pursuant to subsection (a) of this section; or

(iii) if the United States has commenced and is diligently prosecuting a criminal action in a court of the United States or a State to redress a violation of any such provision or regulation.

(B) No action may be commenced under subparagraph (1)(B) of this section—

(i) prior to sixty days after written notice has been given to the Secretary setting forth the reasons why an emergency is thought to exist with respect to an endangered species or a threatened species in the State concerned; or

(ii) if the Secretary has commenced and is diligently prosecuting action under section 6(g)(2)(B)(ii) of this Act to determine whether any such emergency exists.

(C) No action may be commenced under subparagraph (1)(C) of this section prior to sixty days after written notice has been given to the Secretary; except that such action may be brought immediately after such notification in the case of an action under this section respecting an emergency posing a significant risk to the well-being of any species of fish or wildlife or plants.

(3)(A) Any suit under this subsection may be brought in the judicial district in which the violation occurs.

(B) In any such suit under this subsection in which the United States is not a party, the Attorney General, at the request of the Secretary, may intervene on behalf of the United States as a matter of right.

(4) The court, in issuing any final order in any suit brought pursuant to paragraph (1) of this subsection, may award costs of litigation (including reasonable attorney and expert witness fees) to any party, whenever the court determines such award is appropriate.

(5) The injunctive relief provided by this subsection shall not restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any standard or limitation or to seek any other relief (including relief against the Secretary or a State agency).

(h) COORDINATION WITH OTHER LAWS.—The Secretary of Agriculture and the Secretary shall provide for appropriate coordination of the administration of this Act with the administration of the animal quarantine laws (as defined in section 2509(f) of the Food, Agriculture, Conservation, and Trade Act of 1990 (21 U.S.C. 136a(f)) and

section 306 of the Tariff Act of 1930 (19 U.S.C. 1306). Nothing in this Act or any amendment made by this Act shall be construed as superseding or limiting in any manner the functions of the Secretary of Agriculture under any other law relating to prohibited or restricted importations or possession of animals and other articles and no proceeding or determination under this Act shall preclude any proceeding or be considered determinative of any issue of fact or law in any proceeding under any Act administered by the Secretary of Agriculture. Nothing in this Act shall be construed as superseding or limiting in any manner the functions and responsibilities of the Secretary of the Treasury under the Tariff Act of 1930, including, without limitation, section 527 of that Act (19 U.S.C. 1527), relating to the importation of wildlife taken, killed, possessed, or exported to the United States in violation of the laws or regulations of a foreign country.

ENDANGERED PLANTS

SEC. 12. The Secretary of the Smithsonian Institution, in conjunction with other affected agencies, is authorized and directed to review (1) species of plants which are now or may become endangered or threatened and (2) methods of adequately conserving such species, and to report to Congress, within one year after the date of the enactment of this Act, the results of such review including recommendations for new legislation or the amendment of existing legislation.

CONFORMING AMENDMENTS

SEC. 13. (a) Subsection 4(c) of the Act of October 15, 1966 (80 Stat. 928, 16 U.S.C. 668dd(c)), is further amended by revising the second sentence thereof to read as follows: "With the exception of endangered species and threatened species listed by the Secretary pursuant to section 4 of the Endangered Species Act of 1973 in States wherein a cooperative agreement does not exist pursuant to section 6(c) of that Act, nothing in this Act shall be construed to authorize the Secretary to control or regulate hunting or fishing of resident fish and wildlife on lands not within the system."

(b) Subsection 10(a) of the Migratory Bird Conservation Act (45 Stat. 1224, 16 U.S.C. 715i(a)), and subsection 401(a) of the Act of June 15, 1935 (49 Stat. 383, 16 U.S.C. 715s(a)), are each amended by striking out "threatened with extinction," and inserting in lieu thereof the following: "listed pursuant to section 4 of the Endangered Species Act of 1973 as endangered species or threatened species".

(c) Section 7(a)(1) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-9(a)(1)) is amended by striking out:

"THREATENED SPECIES.—For any national area which may be authorized for the preservation of species of fish or wildlife that are threatened with extinction." and inserting in lieu thereof the following:

"ENDANGERED SPECIES AND THREATENED SPECIES.—For lands, waters, or interests therein, the acquisition of which is authorized under section 5(a) of the Endangered Species Act of 1973, needed for the purpose of conserving endangered or threatened species of fish or wildlife or plants."

(d) The first sentence of section 2 of the Act of September 28, 1962, as amended (76 Stat. 653, 16 U.S.C. 460k-1), is amended to read as follows:

"The Secretary is authorized to acquire areas of land, or interests therein, which are suitable for—

- "(1) incidental fish and wildlife-oriented recreational development,
- "(2) the protection of natural resources,
- "(3) the conservation of endangered species or threatened species listed by the Secretary pursuant to section 4 of the Endangered Species Act of 1973, or
- "(4) carrying out two or more of the purposes set forth in paragraphs (1) through (3) of this section, and are adjacent to, or within, the said conservation areas, except that the acquisition of any land or interest therein pursuant to this section shall be accomplished only with such funds as may be appropriated therefor by the Congress or donated for such purposes, but such property shall not be acquired with funds obtained from the sale of Federal migratory bird hunting stamps."

(e) The Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 - 1407) is amended—

- (1) by striking out "Endangered Species Conservation Act of 1969" in section 3(l)(B) thereof and inserting in lieu thereof the following: "Endangered Species Act of 1973";
- (2) by striking out "pursuant to the Endangered Species Conservation Act of 1969" in section 101(a)(3)(B) thereof and inserting in lieu thereof the following: "or threatened species pursuant to the Endangered Species Act of 1973";
- (3) by striking out "endangered under the Endangered Species Conservation Act of 1969" in section 102(b)(3) thereof and inserting in lieu thereof the following: "an endangered species or threatened species pursuant to the Endangered Species Act of 1973"; and
- (4) by striking out "of the Interior such revisions of the Endangered Species List, authorized by the Endangered Species Conservation Act of 1969," in section 202(a)(6) thereof and inserting in lieu thereof the following: "such revisions of the endangered species list and threatened species list published pursuant to section 4(c)(1) of the Endangered Species Act of 1973".

(f) Section 2(1) of the Federal Environmental Pesticide Control Act of 1972 (Public Law 92-516) is amended by striking out the words "by the Secretary of the Interior under Public Law 91-135" and inserting in lieu thereof the words "or threatened by the Secretary pursuant to the Endangered Species Act of 1973".

REPEALER

SEC. 14. The Endangered Species Conservation Act of 1969 (sections 1 through 3 of the Act of October 15, 1966, and sections 1 through 6 of the Act of December 5, 1969; 16 U.S.C. 668aa—668cc-6), is repealed.

AUTHORIZATION OF APPROPRIATIONS

SEC. 15. (a) IN GENERAL.—Except as provided in subsections (b), (c), and (d), there are authorized to be appropriated—

- (1) not to exceed \$ 35,000,000 for fiscal year 1988, \$ 36,500,000 for fiscal year 1989, \$38,000,000 for fiscal year 1990, \$ 39,500,000 for fiscal year 1991, and \$ 41,500,000 for fiscal year 1992 to enable the Department of the Interior to carry out such functions and responsibilities as it may have been given under this Act;
- (2) not to exceed \$ 5,750,000 for fiscal year 1988, \$ 6,250,000 for each of fiscal years 1989 and 1990, and \$ 6,750,000 for each of fiscal years 1991 and 1992 to en-

able the Department of Commerce to carry out such functions and responsibilities as it may have been given under this Act; and

(3) not to exceed \$ 2,200,000 for fiscal year 1988, \$ 2,400,000 for each of fiscal years 1989 and 1990, and \$ 2,600,000 for each of fiscal years 1991 and 1992, to enable the Department of Agriculture to carry out its functions and responsibilities with respect to the enforcement of this Act and the Convention which pertain to the importation or exportation of plants.

(b) EXEMPTIONS FROM ACT.—There are authorized to be appropriated to the Secretary to assist him and the Endangered Species Committee in carrying out their functions under sections 7(e), (g), and (h) not to exceed \$ 600,000 for each of fiscal years 1988, 1989, 1990, 1991, and 1992.

(c) CONVENTION IMPLEMENTATION.—There are authorized to be appropriated to the Department of the Interior for purposes of carrying out section 8A(e) not to exceed \$ 400,000 for each of fiscal years 1988, 1989, and 1990, and \$ 500,000 for each of fiscal years 1991 and 1992, and such sums shall remain available until expended.

EFFECTIVE DATE

SEC. 16. This Act shall take effect on the date of its enactment.

MARINE MAMMAL PROTECTION ACT OF 1972

SEC. 17. Except as otherwise provided in this Act, no provision of this Act shall take precedence over any more restrictive conflicting provision of the Marine Mammal Protection Act of 1972.

ANNUAL COST ANALYSIS BY THE FISH AND WILDLIFE SERVICE

SEC. 18. Notwithstanding section 3003 of Public Law 104-66 (31 U.S.C. 1113 note; 109 Stat. 734), on or before January 15, 1990, and each January 15 thereafter, the Secretary of the Interior, acting through the Fish and Wildlife Service, shall submit to the Congress an annual report covering the preceding fiscal year which shall contain—

(1) an accounting on a species by species basis of all reasonably identifiable Federal expenditures made primarily for the conservation of endangered or threatened species pursuant to this Act; and

(2) an accounting on a species by species basis of all reasonably identifiable expenditures made primarily for the conservation of endangered or threatened species pursuant to this Act by States receiving grants under section 6.

Appendix H

**Memorandum of Agreement Between
the Federal Aviation Administration,
the U.S. Air Force,
the U.S. Army,
the U.S. Environmental Protection Agency,
the U.S. Fish and Wildlife Service, and
the U.S. Department of Agriculture
to Address Aircraft-Wildlife Strikes**

PURPOSE

The signatory agencies know the risks that aircraft-wildlife strikes pose to safe aviation.

This Memorandum of Agreement (MOA) acknowledges each signatory agency's respective missions. Through this MOA, the agencies establish procedures necessary to coordinate their missions to more effectively address existing and future environmental conditions contributing to aircraft-wildlife strikes throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety, while protecting the Nation's valuable environmental resources.

BACKGROUND

Aircraft-wildlife strikes are the second leading causes of aviation-related fatalities. Globally, these strikes have killed over 400 people and destroyed more than 420 aircraft. While these extreme events are rare when compared to the millions of annual aircraft operations, the potential for catastrophic loss of human life resulting from one incident is substantial. The most recent accident demonstrating the grievous nature of these strikes occurred in September 1995, when a U.S. Air Force reconnaissance jet struck a flock of Canada geese during takeoff, killing all 24 people aboard.

The Federal Aviation Administration (FAA) and the United States Air Force (USAF) databases contain information on more than 54,000 United States civilian and military aircraft-wildlife strikes reported to them between 1990 and 1999¹. During that decade, the FAA received reports indicating that aircraft-wildlife strikes, damaged 4,500 civilian U.S. aircraft (1,500 substantially), destroyed 19 aircraft, injured 91 people, and killed 6 people. Additionally, there were 216 incidents where birds struck two or more engines on civilian aircraft, with damage occurring to 26 percent of the 449 engines involved in these incidents. The FAA estimates that during the same decade, civilian U.S. aircraft sustained \$4 billion worth of damages and associated losses and 4.7 million hours of aircraft downtime due to aircraft-wildlife strikes. For the same period,

¹ FAA estimates that the 28,150 aircraft-wildlife strike reports it received represent less than 20% of the actual number of strikes that occurred during the decade.

USAF planes colliding with wildlife resulted in 10 Class A Mishaps², 26 airmen deaths, and over \$217 million in damages.

Approximately 97 percent of the reported civilian aircraft-wildlife strikes involved common, large-bodied birds or large flocks of small birds. Almost 70 percent of these events involved gulls, waterfowl, and raptors (Table 1).

About 90 percent of aircraft-wildlife strikes occur on or near airports, when aircraft are below altitudes of 2,000 feet. Aircraft-wildlife strikes at these elevations are especially dangerous because aircraft are moving at high speeds and are close to or on the ground. Aircrews are intently focused on complex take-off or landing procedures and monitoring the movements of other aircraft in the airport vicinity. Aircrew attention to these activities while at low altitudes often compromises their ability to successfully recover from unexpected collisions with wildlife and to deal with rapidly changing flight procedures. As a result, crews have minimal time and space to recover from aircraft-wildlife strikes.

Increasing bird and wildlife populations in urban and suburban areas near airports contribute to escalating aircraft-wildlife strike rates. FAA, USAF, and Wildlife Services (WS) experts expect the risks, frequencies, and potential severities of aircraft-wildlife strikes to increase during the next decade as the numbers of civilian and military aircraft operations grow to meet expanding transportation and military demands.

SECTION I.

SCOPE OF COOPERATION AND COORDINATION

Based on the preceding information and to achieve this MOA's purpose, the signatory agencies:

- A. Agree to strongly encourage their respective regional and local offices, as appropriate, to develop interagency coordination procedures necessary to effectively and efficiently implement this MOA. Local procedures should clarify time frames and other general coordination guidelines.
- B. Agree that the term "airport" applies only to those facilities as defined in the attached glossary.
- C. Agree that the three major activities of most concern include, but are not limited to:
 1. airport siting and expansion;

² See glossary for the definition of a Class A Mishap and similar terms.

2. development of conservation/mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas; and
3. responses to known wildlife hazards or aircraft-wildlife strikes.

D. Agree that "hazardous wildlife" are those animals, identified to species and listed in FAA and USAF databases, that are most often involved in aircraft-wildlife strikes. Many of the species frequently inhabit areas on or near airports, cause structural damage to airport facilities, or attract other wildlife that pose an aircraft-wildlife strike hazard. Table 1 lists many of these species. It is included solely to provide information on identified wildlife species that have been involved in aircraft-wildlife strikes. It is not intended to represent the universe of species concerning the signatory agencies, since more than 50 percent of the aircraft-wildlife strikes reported to FAA or the USAF did not identify the species involved.

E. Agree to focus on habitats attractive to the species noted in Table 1, but the signatory agencies realize that it is imperative to recognize that wildlife hazard determinations discussed in Paragraph L of this section may involve other animals.

F. Agree that not all habitat types attract hazardous wildlife. The signatory agencies, during their consultative or decisionmaking activities, will inform regional and local land use authorities of this MOA's purpose. The signatory agencies will consider regional, local, and site-specific factors (e.g., geographic setting and/or ecological concerns) when conducting these activities and will work cooperatively with the authorities as they develop and implement local land use programs under their respective jurisdictions. The signatory agencies will encourage these stakeholders to develop land uses within the siting criteria noted in Section 1-3 of FAA Advisory Circular (AC) 150.5200-33 (Attachment A) that do not attract hazardous wildlife. Conversely, the agencies will promote the establishment of land uses attractive to hazardous wildlife outside those siting criteria. Exceptions to the above siting criteria, as described in Section 2.4.b of the AC, will be considered because they typically involve habitats that provide unique ecological functions or values (e.g., critical habitat for federally-listed endangered or threatened species, ground water recharge).

G. Agree that wetlands provide many important ecological functions and values, including fish and wildlife habitats; flood protection; shoreline erosion control; water quality improvement; and recreational, educational, and research opportunities. To protect jurisdictional wetlands, Section 404 of the Clean Water Act (CWA) establishes a program to regulate dredge and/or fill activities in these wetlands and navigable waters. In recognizing Section 404 requirements and the Clean Water Action Plan's goal to annually increase the Nation's net wetland acreage by 100,000 acres through 2005, the signatory agencies agree to resolve aircraft-wildlife conflicts. They will do so by

avoiding and minimizing wetland impacts to the maximum extent practicable, and will work to compensate for all associated unavoidable wetland impacts. The agencies agree to work with landowners and communities to encourage and support wetland restoration or enhancement efforts that do not increase aircraft-wildlife strike potentials.

- H. Agree that the: U.S. Army Corps of Engineers (ACOE) has expertise in protecting and managing jurisdictional wetlands and their associated wildlife; U.S. Environmental Protection Agency (EPA) has expertise in protecting environmental resources; and the U.S. Fish and Wildlife Service (USFWS) has expertise in protecting and managing wildlife and their habitats, including migratory birds and wetlands. Appropriate signatory agencies will cooperatively review proposals to develop or expand wetland mitigation sites, or wildlife refuges that may attract hazardous wildlife. When planning these sites or refuges, the signatory agencies will diligently consider the siting criteria and land use practice recommendations stated in FAA AC 150/5200-33. The agencies will make every effort to undertake actions that are consistent with those criteria and recommendations, but recognize that exceptions to the siting criteria may be appropriate (see Paragraph F of this section).
- I. Agree to consult with airport proponents during initial airport planning efforts. As appropriate, the FAA or USAF will initiate signatory agency participation in these efforts. When evaluating proposals to build new civilian or military aviation facilities or to expand existing ones, the FAA or the USAF, will work with appropriate signatory agencies to diligently evaluate alternatives that may avoid adverse effects on wetlands, other aquatic resources, and Federal wildlife refuges. If these or other habitats support hazardous wildlife, and there is no practicable alternative location for the proposed aviation project, the appropriate signatory agencies, consistent with applicable laws, regulations, and policies, will develop mutually acceptable measures, to protect aviation safety and mitigate any unavoidable wildlife impacts.
- J. Agree that a variety of other land uses (e.g., storm water management facilities, wastewater treatment systems, landfills, golf courses, parks, agricultural or aquacultural facilities, and landscapes) attract hazardous wildlife and are, therefore, normally incompatible with airports. Accordingly, new, federally-funded airport construction or airport expansion projects near habitats or other land uses that may attract hazardous wildlife must conform to the siting criteria established in the FAA Advisory Circular (AC) 150/5200-33, Section 1-3.
- K. Agree to encourage and advise owners and/or operators of non-airport facilities that are known hazardous wildlife attractants (See Paragraph J) to follow the siting criteria in Section 1-3 of AC 150/5200-33. As appropriate, each signatory agency will inform proponents of these or other land uses about the land use's potential to attract hazardous species to airport areas.

The signatory agencies will urge facility owners and/or operators about the critical need to consider the land uses' effects on aviation safety.

- L. Agree that FAA, USAF, and WS personnel have the expertise necessary to determine the aircraft-wildlife strike potentials of various land uses. When there is disagreement among signatory agencies about a particular land use and its potential to attract hazardous wildlife, the FAA, USAF, or WS will prepare a wildlife hazard assessment. Then, the appropriate signatory agencies will meet at the local level to review the assessment. At a minimum, that assessment will:
 1. identify each species causing the aviation hazard, its seasonal and daily populations, and the population's local movements;
 2. discuss locations and features on and near the airport or land use attractive to hazardous wildlife; and
 3. evaluate the extent of the wildlife hazard to aviation.
- M. Agree to cooperate with the airport operator to develop a specific, wildlife hazard management plan for a given location, when a potential wildlife hazard is identified. The plan will meet applicable FAA, USAF, and other relevant requirements. In developing the plan, the appropriate agencies will use their expertise and attempt to integrate their respective programmatic responsibilities, while complying with existing laws, regulations, and policies. The plan should avoid adverse impacts to wildlife populations, wetlands, or other sensitive habitats to the maximum extent practical. Unavoidable impacts resulting from implementing the plan will be fully compensated pursuant to all applicable Federal laws, regulations, and policies.
- N. Agree that whenever a significant aircraft-wildlife strike occurs or a potential for one is identified, any signatory agency may initiate actions with other appropriate signatory agencies to evaluate the situation and develop mutually acceptable solutions to reduce the identified strike probability. The agencies will work cooperatively, preferably at the local level, to determine the causes of the strike and what can and should be done at the airport or in its vicinity to reduce potential strikes involving that species.
- O. Agree that information and analyses relating to mitigation that could cause or contribute to aircraft-wildlife strikes should, whenever possible, be included in documents prepared to satisfy the National Environmental Policy Act (NEPA). This should be done in coordination with appropriate signatory agencies to inform the public and Federal decision makers about important ecological factors that may affect aviation. This concurrent review of environmental issues will promote the streamlining of the NEPA review process.
- P. Agree to cooperatively develop mutually acceptable and consistent guidance, manuals, or procedures addressing the management of habitats attractive to

hazardous wildlife, when those habitats are or will be within the siting criteria noted in Section 1-3 of FAA AC 5200-33. As appropriate, the signatory agencies will also consult each other when they propose revisions to any regulations or guidance relevant to the purpose of this MOA, and agree to modify this MOA accordingly.

SECTION II. **GENERAL RULES AND INFORMATION**

- A. Development of this MOA fulfills the National Transportation Safety Board's recommendation of November 19, 1999, to form an inter-departmental task force to address aircraft-wildlife strike issues.
- B. This MOA does not nullify any obligations of the signatory agencies to enter into separate MOAs with the USFWS addressing the conservation of migratory birds, as outlined in Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, dated January 10, 2001 (66 *Federal Register*, No. 11, pg. 3853).
- C. This MOA in no way restricts a signatory agency's participation in similar activities or arrangements with other public or private agencies, organizations, or individuals.
- D. This MOA does not alter or modify compliance with any Federal law, regulation or guidance (e.g., Clean Water Act; Endangered Species Act; Migratory Bird Treaty Act; National Environmental Policy Act; North American Wetlands Conservation Act; Safe Drinking Water Act; or the "no-net loss" policy for wetland protection). The signatory agencies will employ this MOA in concert with the Federal guidance addressing wetland mitigation banking dated March 6, 1995 (60 *Federal Register*, No. 43, pg. 12286).
- E. The statutory provisions and regulations mentioned above contain legally binding requirements. However, this MOA does not substitute for those provisions or regulations, nor is it a regulation itself. This MOA does not impose legally binding requirements on the signatory agencies or any other party, and may not apply to a particular situation in certain circumstances. The signatory agencies retain the discretion to adopt approaches on a case-by-case basis that differ from this MOA when they determine it is appropriate to do so. Such decisions will be based on the facts of a particular case and applicable legal requirements. Therefore, interested parties are free to raise questions and objections about the substance of this MOA and the appropriateness of its application to a particular situation.
- F. This MOA is based on evolving information and may be revised periodically without public notice. The signatory agencies welcome public comments on this MOA at any time and will consider those comments in any future revision of this MOA.

- G. This MOA is intended to improve the internal management of the Executive Branch to address conflicts between aviation safety and wildlife. This MOA does not create any right, benefit, or trust responsibility, either substantively or procedurally. No party, by law or equity, may enforce this MOA against the United States, its agencies, its officers, or any person.
- H. This MOA does not obligate any signatory agency to allocate or spend appropriations or enter into any contract or other obligations.
- I. This MOA does not reduce or affect the authority of Federal, State, or local agencies regarding land uses under their respective purviews. When requested, the signatory agencies will provide technical expertise to agencies making decisions regarding land uses within the siting criteria in Section 1-3 of FAA AC 150/5200-33 to minimize or prevent attracting hazardous wildlife to airport areas.
- J. Any signatory agency may request changes to this MOA by submitting a written request to any other signatory agency and subsequently obtaining the written concurrence of all signatory agencies.
- K. Any signatory agency may terminate its participation in this MOA within 60 days of providing written notice to the other agencies. This MOA will remain in effect until all signatory agencies terminate their participation in it.

SECTION III. PRINCIPAL SIGNATORY AGENCY CONTACTS

The following list identifies contact offices for each signatory agency.

Federal Aviation Administration
Office Airport Safety and Standards
Airport Safety and
Compliance Branch (AAS-310)
800 Independence Ave., S.W.
Washington, D.C. 20591
V: 202-267-1799
F: 202-267-7546

U.S. Army
Directorate of Civil Works
Regulatory Branch (CECW-OR)
441 G St., N.W.
Washington, D.C. 20314
V: 202-761-4750
F: 202-761-4150

U.S. Air Force
HQ AFSC/SEFW
9700 Ave., G. SE, Bldg. 24499
Kirtland AFB, NM 87117
V: 505-846-5679
F: 505-846-0684

U.S. Environmental Protection Agy.
Office of Water
Wetlands Division
Ariel Rios Building, MC 4502F
1200 Pennsylvania Ave., SW
Washington, D.C. 20460
V: 202-260-1799
F: 202-260-7546

U.S. Fish and Wildlife Service
Division of Migratory Bird Management
4401 North Fairfax Drive, Room 634
Arlington, VA 22203
V: 703-358-1714
F: 703-358-2272

U.S. Department of Agriculture
Animal and Plant Inspection Service
Wildlife Services
Operational Support Staff
4700 River Road, Unit 87
Riverdale, MD 20737
V: 301-734-7921
F: 301-734-5157

Signature Page

Worden L. Gordan
Associate Administrator for Airports,
Federal Aviation Administration

12/17/02
Date

Kenneth W. Her

Chief of Safety,
U. S. Air Force

27 May 2003
Date

R. L. Brownlie

Acting Assistant Secretary of the Army
(Civil Works)
Department of the Army

December 9, 2002
Date

M. T. May, Jr.

Assistant Administrator, Office of Water,
U.S. Environmental Protection Agency

1/17/03

Paul R. Schmidt

Assistant Director, Migratory Birds
and State Programs,
U.S. Fish and Wildlife Service

7/29/03

Date

Acting Richard D. Currow
Deputy Administrator, Wildlife Services
U.S. Department of Agriculture

09 January 2003
Date

GLOSSARY

This glossary defines terms used in this MOA.

Airport. All USAF airfields or all public use airports in the FAA's National Plan of Integrated Airport Systems (NPIAS). Note: There are over 18,000 civil-use airports in the U.S., but only 3,344 of them are in the NPIAS and, therefore, under FAA's jurisdiction.

Aircraft-wildlife strike. An aircraft-wildlife strike is deemed to have occurred when:

1. a pilot reports that an aircraft struck 1 or more birds or other wildlife;
2. aircraft maintenance personnel identify aircraft damage as having been caused by an aircraft-wildlife strike;
3. personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;
4. bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified; or
5. the animal's presence on the airport had a significant, negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal)

(Source: *Wildlife Control Procedures Manual*, Technical Publication 11500E, 1994).

Aircraft-wildlife strike hazard. A potential for a damaging aircraft collision with wildlife on or near an airport (14 CFR 139.3).

Bird Sizes. Title 40, Code of Federal Regulations, Part 33.76 classifies birds according to weight:

- small birds weigh less than 3 ounces (oz).
- medium birds weigh more than 3 oz and less than 2.5 lbs.
- large birds weigh greater than 2.5 lbs.

Civil aircraft damage classifications. The following damage descriptions are based on the *Manual on the International Civil Aviation Organization Bird Strike Information System*:

Minor: The aircraft is deemed airworthy upon completing simple repairs or replacing minor parts and an extensive inspection is not necessary.

Substantial: Damage or structural failure adversely affects an aircraft's structural integrity, performance, or flight characteristics. The damage normally requires major repairs or the replacement of the entire affected component. Bent fairings or cowlings; small dents; skin punctures; damage to wing tips, antenna, tires or brakes, or engine blade damage not requiring blade replacement are specifically excluded.

Destroyed: The damage sustained makes it inadvisable to restore the aircraft to an airworthy condition.

Significant Aircraft-Wildlife Strikes. A significant aircraft-wildlife strike is deemed to have occurred when any of the following applies:

1. a civilian, U.S. air carrier aircraft experiences a multiple aircraft-bird strike or engine ingestion;
2. a civilian, U.S. air carrier aircraft experiences a damaging collision with wildlife other than birds; or
3. a USAF aircraft experiences a Class A, B, or C mishap as described below:
 - A. **Class A Mishap:** Occurs when at least one of the following applies:
 1. total mishap cost is \$1,000,000 or more;
 2. a fatality or permanent total disability occurs; and/or
 3. an Air Force aircraft is destroyed.
 - B. **Class B Mishap:** Occurs when at least one of the following applies:
 1. total mishap cost is \$200,000 or more and less than \$1,000,000; and/or
 2. a permanent partial disability occurs and/or 3 or more people are hospitalized;
 - C. **Class C Mishap:** Occurs when at least one of the following applies:
 1. cost of reported damage is between \$20,000 and \$200,000;
 2. an injury causes a lost workday (i.e., duration of absence is at least 8 hours beyond the day or shift during which mishap occurred); and/or
 3. an occupational illness causing absence from work at any time.

Wetlands. An ecosystem requiring constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or

near the surface and the presence of physical, chemical, and biological features indicating recurrent, sustained inundation, or saturation. Common diagnostic wetland features are hydric soils and hydrophytic vegetation. These features will be present, except where specific physiochemical, biotic, or anthropogenic factors have removed them or prevented their development.

(Source the 1987 Delineation Manual; 40 CFR 230.3(t)).

Wildlife. Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this MOA, "wildlife" includes feral animals and domestic animals while out of their owner's control (14 CFR 139.3, *Certification and Operations: Land Airports Serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters)*)

Table 1. Identified wildlife species, or groups, that were involved in two or more aircraft-wildlife strikes, that caused damage to one or more aircraft components, or that had an adverse effect on an aircraft's flight. Data are for 1990-1999 and involve only civilian, U.S. aircraft.

Birds	No. reported strikes
Gulls (all spp.)	874
Geese (primarily, Canada geese)	458
Hawks (primarily, Red-tailed hawks)	182
Ducks (primarily Mallards.)	166
Vultures (primarily, Turkey vulture)	142
Rock doves	122
Doves (primarily, mourning doves)	109
Blackbirds	81
European starlings	55
Sparrows	52
Egrets	41
Shore birds (primarily, Killdeer & Sandpipers)	40
Crows	31
Owls	24
Sandhill cranes	22
American kestrels	15
Great blue herons	15
Pelicans	14
Swallows	14
Eagles (Bald and Golden)	14
Ospreys	13
Ring-necked pheasants	11
Herons	11
Barn-owls	9
American robins	8
Meadowlarks	8
Buntings (snow)	7
Cormorants	6
Snow buntings	6
Brants	5
Terns (all spp.)	5
Great horned owls	5
Horned larks	4
Turkeys	4
Swans	3
Mockingbirds	3
Quails	3
Homing pigeons	3
Snowy owls	3
Anhingas	2

Ravens	2
Kites	2
Falcons	2
Peregrine falcons	2
Merlins	2
Grouse	2
Hungarian partridges	2
Spotted doves	2
Thrushes	2
Mynas	2
Finches	2
Total known birds	2,612

Mammals	No. reported strikes
Deer (primarily, White-tailed deer)	285
Coyotes	16
Dogs	10
Elk	6
Cattle	5
Bats	4
Horses	3
Pronghorn antelopes	3
Foxes	2
Raccoons	2
Rabbits	2
Moose	2
Total known mammals	340

Ring-billed gulls were the most commonly struck gulls. The U.S. ring-billed gull population increased steadily at about 6% annually from 1966-1988. Canada geese were involved in about 90% of the aircraft-goose strikes involving civilian, U.S. aircraft from 1990-1998. Resident (non-migratory) Canada goose populations increased annually at 13% from 1966-1998. Red-tailed hawks accounted for 90% of the identified aircraft-hawk strikes for the 10-year period. Red-tailed hawk populations increased annually at 3% from 1966 to 1998. Turkey vultures were involved in 93% of the identified aircraft-vulture strikes. The U.S. Turkey vulture populations increased at annually at 1% between 1966 and 1998. Deer, primarily white-tailed deer, have also adapted to urban and airport areas and their populations have increased dramatically. In the early 1900's, there were about 100,000 white-tailed deer in the U.S. Current estimates are that the U.S. population is about 24 million.

Appendix I

16 USC 668-668d
Bald and Golden Eagle Protection Act

SUBCHAPTER II—PROTECTION OF BALD AND GOLDEN EAGLES

Release date: 2004-04-30

- § 668. Bald and golden eagles
- § 668a. Taking and using of the bald and golden eagle for scientific, exhibition, and religious purposes
- § 668b. Enforcement provisions
- § 668c. Definitions
- § 668d. Availability of appropriations for Migratory Bird Treaty Act

§ 668. Bald and golden eagles

(a) Prohibited acts; criminal penalties

Whoever, within the United States or any place subject to the jurisdiction thereof, without being permitted to do so as provided in this subchapter, shall knowingly, or with wanton disregard for the consequences of his act take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner any bald eagle commonly known as the American eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof of the foregoing eagles, or whoever violates any permit or regulation issued pursuant to this subchapter, shall be fined not more than \$5,000 or imprisoned not more than one year or both: Provided, That in the case of a second or subsequent conviction for a violation of this section committed after October 23, 1972, such person shall be fined not more than \$10,000 or imprisoned not more than two years, or both: Provided further, That the commission of each taking or other act prohibited by this section with respect to a bald or golden eagle shall constitute a separate violation of this section: Provided further, That one-half of any such fine, but not to exceed \$2,500, shall be paid to the person or persons giving information which leads to conviction: Provided further, That nothing herein shall be construed to prohibit possession or transportation of any bald eagle, alive or dead, or any part, nest, or egg thereof, lawfully taken prior to June 8, 1940, and that nothing herein shall be construed to prohibit possession or transportation of any golden eagle, alive or dead, or any part, nest, or egg thereof, lawfully taken prior to the addition to this subchapter of the provisions relating to preservation of the golden eagle.

(b) Civil penalties

Whoever, within the United States or any place subject to the jurisdiction thereof, without being permitted to do so as provided in this subchapter, shall take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner, any bald eagle, commonly known as the American eagle, or any golden eagle, alive or dead, or any part, nest, or egg thereof of the foregoing eagles, or whoever violates any permit or regulation issued pursuant to this subchapter, may be assessed a civil penalty by the Secretary of not more than \$5,000 for each such violation. Each violation shall be a separate offense. No penalty shall be assessed unless such person is given notice and opportunity for a hearing with respect to such violation. In determining the amount of the penalty, the gravity of the violation, and the demonstrated good faith of the person charged shall be considered by the Secretary. For good cause shown, the Secretary may remit or mitigate any such penalty. Upon any failure to pay the penalty assessed under this section, the Secretary may request the Attorney General to institute a civil action in a district court of the United States for any district in which such person is found or resides or transacts business to collect the penalty and such court shall have jurisdiction to hear and decide any such action. In hearing any such action, the court must sustain the Secretary's action if supported by substantial evidence.

(c) Cancellation of grazing agreements

The head of any Federal agency who has issued a lease, license, permit, or other agreement authorizing the grazing of domestic livestock on Federal lands to any person who is convicted of a violation of this subchapter or of any permit or regulation issued hereunder may immediately cancel each such lease, license, permit, or other agreement. The United States shall not be liable for the payment of any compensation, reimbursement, or damages in connection with the cancellation of any lease, license, permit, or other agreement pursuant to

**16 USC 668-668d
Bald and Golden Eagle Protection Act**

this section.

§ 668a. Taking and using of the bald and golden eagle for scientific, exhibition, and religious purposes

Whenever, after investigation, the Secretary of the Interior shall determine that it is compatible with the preservation of the bald eagle or the golden eagle to permit the taking, possession, and transportation of specimens thereof for the scientific or exhibition purposes of public museums, scientific societies, and zoological parks, or for the religious purposes of Indian tribes, or that it is necessary to permit the taking of such eagles for the protection of wildlife or of agricultural or other interests in any particular locality, he may authorize the taking of such eagles pursuant to regulations which he is hereby authorized to prescribe: Provided, That on request of the Governor of any State, the Secretary of the Interior shall authorize the taking of golden eagles for the purpose of seasonally protecting domesticated flocks and herds in such State, in accordance with regulations established under the provisions of this section, in such part or parts of such State and for such periods as the Secretary determines to be necessary to protect such interests: Provided further, That bald eagles may not be taken for any purpose unless, prior to such taking, a permit to do so is procured from the Secretary of the Interior: Provided further, That the Secretary of the Interior, pursuant to such regulations as he may prescribe, may permit the taking, possession, and transportation of golden eagles for the purposes of falconry, except that only golden eagles which would be taken because of depredations on livestock or wildlife may be taken for purposes of falconry: Provided further, That the Secretary of the Interior, pursuant to such regulations as he may prescribe, may permit the taking of golden eagle nests which interfere with resource development or recovery operations.

§ 668b. Enforcement provisions**(a) Arrest; search; issuance and execution of warrants and process**

Any employee of the Department of the Interior authorized by the Secretary of the Interior to enforce the provisions of this subchapter may, without warrant, arrest any person committing in his presence or view a violation of this subchapter or of any permit or regulations issued hereunder and take such person immediately for examination or trial before an officer or court of competent jurisdiction; may execute any warrant or other process issued by an officer or court of competent jurisdiction for the enforcement of the provisions of this subchapter; and may, with or without a warrant, as authorized by law, search any place. The Secretary of the Interior is authorized to enter into cooperative agreements with State fish and wildlife agencies or other appropriate State authorities to facilitate enforcement of this subchapter, and by said agreements to delegate such enforcement authority to State law enforcement personnel as he deems appropriate for effective enforcement of this subchapter. Any judge of any court established under the laws of the United States, and any United States magistrate judge may, within his respective jurisdiction, upon proper oath or affirmation showing probable cause, issue warrants in all such cases.

(b) Forfeiture

All bald or golden eagles, or parts, nests, or eggs thereof, taken, possessed, sold, purchased, bartered, offered for sale, purchase, or barter, transported, exported, or imported contrary to the provisions of this subchapter, or of any permit or regulation issued hereunder, and all guns, traps, nets, and other equipment, vessels, vehicles, aircraft, and other means of transportation used to aid in the taking, possessing, selling, purchasing, bartering, offering for sale, purchase, or barter, transporting, exporting, or importing of any bird, or part, nest, or egg thereof, in violation of this subchapter or of any permit or regulation issued hereunder shall be subject to forfeiture to the United States.

(c) Customs laws applied

All provisions of law relating to the seizure, forfeiture, and condemnation of a vessel for violation of the customs laws, the disposition of such vessel or the proceeds from the sale thereof, and the remission or mitigation of such forfeitures, shall apply to the seizures and forfeitures incurred, or alleged to have been incurred, under the provisions of this subchapter, insofar as such provisions of law are applicable and not

16 USC 668-668d
Bald and Golden Eagle Protection Act

inconsistent with the provisions of this subchapter: Provided, That all powers, rights, and duties conferred or imposed by the customs laws upon any officer or employee of the Treasury Department shall, for the purposes of this subchapter, be exercised or performed by the Secretary of the Interior or by such persons as he may designate.

§ 668c. Definitions

As used in this subchapter "whoever" includes also associations, partnerships, and corporations; "take" includes also pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb; "transport" includes also ship, convey, carry, or transport by any means whatever, and deliver or receive or cause to be delivered or received for such shipment, conveyance, carriage, or transportation.

§ 668d. Availability of appropriations for Migratory Bird Treaty Act

Moneys now or hereafter available to the Secretary of the Interior for the administration and enforcement of the Migratory Bird Treaty Act of July 3, 1918 [16 U.S.C. 703 et seq.], shall be equally available for the administration and enforcement of this subchapter.

Appendix J

Georgia Department of Natural Resources
Wildlife Resources Division

Game Management Region VII
One Conservation Way, Brunswick, GA 31520
(912) 262-3173

December 14, 2011

Brunswick Golden Isles Airport
Glynn County Airport Commission
c/o Colette Edmisten
295 Aviation Parkway, Suite 205
Brunswick, GA 31525

Dear Mrs. Edmisten,

Pursuant to O.C.G.A. § 27-2-31(2), you and your agents, as listed below, are hereby authorized to remove by lethal methods white-tailed deer from Brunswick Golden Isles Airport in Brunswick, Georgia, as necessary for the purposes of public safety. All removals must be accomplished in accordance with the attached standard conditions (see reverse side). This letter of authorization will serve as your permit to control white-tailed deer on said property, and does not authorize taking of any other species. This permit must be in possession of you or your agents when conducting removal operations and expires on December 31, 2012.

If you have any questions, please contact the Special Permit office at 770-761-3044 or your regional office at 912-262-3173.

Sincerely,

Will Ricks
Region VII GM Assistant Region Supervisor

Attachments

WR/wr

Cc: David Mixon, Region VII GM Supervisor
Doug Lewis, Region VII LE Captain
Brooke Smith, Special Permit Unit
File

List of approved agents

1. Vernon Bessing
2. Horace Chatham
3. George Miller
4. Ray Potter

Appendix K

Published on *Georgia DNR - Wildlife Resources Division*
 (<http://georgiawildlife.com>)

Protected Birds of Georgia

21 birds on this list

Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Aimophila aestivalis</i>	Bachman's Sparrow	R	None
<i>Ammodramus henslowii</i>	Henslow's Sparrow	R	None
<i>Calidris canutus</i>	Red Knot	R	None
<i>Campephilus principalis</i>	Ivory-billed Woodpecker	E	LE
<i>Charadrius melanotos</i>	Piping Plover	T	LT
<i>Charadrius wilsonia</i>	Wilson's Plover	T	None
<i>Corvus corax</i>	Common Raven	R	None
<i>Dendroica cerulea</i>	Cerulean Warbler	R	None
<i>Dendroica kirtlandii</i>	Kirtland's Warbler	E	LE
<i>Elanoides forficatus</i>	Swallow-tailed Kite	R	None
<i>Falco peregrinus</i>	Peregrine Falcon	R	None
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	E	None
<i>Falco sparverius paulus</i>	Southeastern American Kestrel	R	None
<i>Haematopus palliatus</i>	American Oystercatcher	R	None
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	None
<i>Mycteria americana</i>	Wood Stork	E	LE
<i>Picoides borealis</i>	Red-cockaded Woodpecker	E	LE
<i>Rynchops niger</i>	Black Skimmer	R	None
<i>Sterna antillarum</i>	Least Tern	R	None
<i>Sterna nilotica</i>	Gull-billed Tern	T	None
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	E	None

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
 2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on **Georgia DNR - Wildlife Resources Division**
(<http://georgiawildlife.com>)

Protected Mammals of Georgia

10 mammals on this list

Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	R	None
<i>Eubalaena glacialis</i>	Northern Atlantic Right Whale	E	LE
<i>Geomys pinetis</i>	Southeastern Pocket Gopher	T	None
<i>Megaptera novaeangliae</i>	Humpback Whale	E	LE
<i>Myotis griseescens</i>	Gray Myotis	E	LE
<i>Myotis sodalis</i>	Indiana Myotis	E	LE
<i>Neofiber alleni</i>	Round-tailed Muskrat	T	None
<i>Puma concolor coryi</i>	Florida Panther	E	LE
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	R	None
<i>Trichechus manatus</i>	Manatee	E	LE

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on **Georgia DNR - Wildlife Resources Division**
<http://georgiawildlife.com>

Protected Reptiles of Georgia

18 reptiles on this list

Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Caretta caretta</i>	Loggerhead Sea Turtle	E	LT
<i>Chelonia mydas</i>	Green Sea Turtle	T	LT
<i>Clemmys guttata</i>	Spotted Turtle	U	None
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	E	LE
<i>Drymarchon couperi</i>	Eastern Indigo Snake	T	LT
<i>Eretmochelys imbricata</i>	Hawksbill Sea Turtle	E	LE
<i>Eretmochelys imbricata imbricata</i>	Atlantic Hawksbill Sea Turtle	E	None
<i>Glyptemys muhlenbergii</i>	Bog Turtle	E	LT
<i>Gopherus polyphemus</i>	Gopher Tortoise	T	None
<i>Graptemys barbouri</i>	Barbour's Map Turtle	T	None
<i>Graptemys geographica</i>	Map Turtle	R	None
<i>Graptemys pulchra</i>	Alabama Map Turtle	R	None
<i>Heterodon simus</i>	Southern Hognose Snake	T	None
<i>Lepidochelys kempii</i>	Kemp's or Atlantic Ridley	E	LE
<i>Macrochelys temminckii</i>	Alligator Snapping Turtle	T	None
<i>Malaclemys terrapin</i>	Diamondback Terrapin	U	None
<i>Malaclemys terrapin centrata</i>	Carolina diamond-backed Terrapin	U	None
<i>Ophisaurus mimicus</i>	Mimic Glass Lizard	R	None

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on **Georgia DNR - Wildlife Resources Division**
(<http://georgiawildlife.com>)

Protected Reptiles of Georgia

18 reptiles on this list

Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Caretta caretta</i>	Loggerhead Sea Turtle	E	LT
<i>Chelonia mydas</i>	Green Sea Turtle	T	LT
<i>Clemmys guttata</i>	Spotted Turtle	U	None
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	E	LE
<i>Drymarchon couperi</i>	Eastern Indigo Snake	T	LT
<i>Eretmochelys imbricata</i>	Hawksbill Sea Turtle	E	LE
<i>Eretmochelys imbricata imbricata</i>	Atlantic Hawksbill Sea Turtle	E	None
<i>Glyptemys muhlenbergii</i>	Bog Turtle	E	LT
<i>Gopherus polyphemus</i>	Gopher Tortoise	T	None
<i>Graptemys barbouri</i>	Barbour's Map Turtle	T	None
<i>Graptemys geographica</i>	Map Turtle	R	None
<i>Graptemys pulchra</i>	Alabama Map Turtle	R	None
<i>Heterodon simus</i>	Southern Hognose Snake	T	None
<i>Lepidochelys kempii</i>	Kemp's or Atlantic Ridley	E	LE
<i>Macrochelys temminckii</i>	Alligator Snapping Turtle	T	None
<i>Malaclemys terrapin</i>	Diamondback Terrapin	U	None
<i>Malaclemys terrapin centrata</i>	Carolina diamond-backed Terrapin	U	None
<i>Ophisaurus mimicus</i>	Mimic Glass Lizard	R	None

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on **Georgia DNR - Wildlife Resources Division**
 (<http://georgiawildlife.com>)

Protected Plants of Georgia

161 plants on this list

Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Allium speculae</i>	Flatrock Onion	T	None
<i>Alnus maritima</i> ssp. <i>georgiensis</i>	Georgia Alder	T	None
<i>Amorpha georgiana</i>	Georgia Indigo Bush	E	None
<i>Amphianthus pusillus</i>	Pool Sprite	T	LT
<i>Arabis georgiana</i>	Georgia Rockcress	T	C
<i>Arnoglossum diversifolium</i>	Variable-leaf Indian-plantain	T	None
<i>Asclepias purpurascens</i>	Purple Milkweed	R	None
<i>Asplenium heteroresiliens</i>	Marl Spleenwort	T	None
<i>Astragalus michauxii</i>	Sandhill Milk-vetch	T	None
<i>Aureolaria patula</i>	Spreading Yellow Foxglove	T	None
<i>Balduina atropurpurea</i>	Purple Honeycomb Head	R	None
<i>Baptisia arachnifera</i>	Hairy Rattleweed	E	LE
<i>Berberis canadensis</i>	American Barberry	E	None
<i>Brickellia cordifolia</i>	Heartleaf Brickellia	T	None
<i>Calamagrostis porteri</i>	Porter's Reed-grass	R	None
<i>Calamintha ashei</i>	Ohoopee Wild Basil	T	None
<i>Carex baltzellii</i>	Baltzell's Sedge	E	None
<i>Carex biltmoreana</i>	Granite Dome Sedge	T	None
<i>Carex dasycarpa</i>	Velvet Sedge	R	None
<i>Carex misera</i>	Wretched Sedge	T	None
<i>Carex radfordii</i>	Radford's Sedge	T	None
<i>Carya myristiciformis</i>	Nutmeg Hickory	R	None
<i>Ceratiola ericoides</i>	Sandhill Rosemary	T	None
<i>Chamaecyparis thyoides</i>	Atlantic White-cedar	R	None
<i>Chelone cuthbertii</i>	Cuthbert's Turtlehead	T	None
<i>Clematis fremontii</i>	Fremont's Leatherflower	E	None

<i>Clematis socialis</i>	Alabama Leatherflower	E	LE
<i>Convallaria majuscula</i>	American Lily-of-the-valley	R	None
<i>Coreopsis integrifolia</i>	Floodplain Tickseed	T	None
<i>Coreopsis latifolia</i>	Broadleaf Tickseed	R	None
<i>Crataegus triflora</i>	Three-flowered Hawthorn	T	None
<i>Croomia pauciflora</i>	Croomia	T	None
<i>Cuscuta harperi</i>	Harper's Dodder	E	None
<i>Cymophyllum fraserianus</i>	Fraser's Sedge	T	None
<i>Cypripedium acaule</i>	Pink Ladyslipper	U	None
<i>Cypripedium kentuckiense</i>	Kentucky Ladyslipper	E	None
<i>Cypripedium parviflorum</i>	Yellow Ladyslipper	R	None
<i>Desmodium ochroleucum</i>	Cream-flowered Tick-trefoil	T	None
<i>Dicerandra radfordiana</i>	Radford's Mint	E	None
<i>Dichanthelium hirstii</i>	Hirst's Witch Grass	E	C
<i>Draba aprica</i>	Sun-loving Draba	E	None
<i>Echinacea laevigata</i>	Smooth Purple Coneflower	E	LE
<i>Elliottia racemosa</i>	Georgia Plume	T	None
<i>Epidendrum magnoliae</i>	Greenfly Orchid	U	None
<i>Eriocaulon koernickianum</i>	Dwarf Hatpins	E	None
<i>Evolvulus sericeus</i>	Silky Morning-glory	E	None
<i>Fimbristylis perpusilla</i>	Harper's Fimbray	E	None
<i>Forestiera godfreyi</i>	Godfrey's Wild Privet	E	None
<i>Forestiera segregata</i>	Florida Wild Privet	R	None
<i>Fothergilla gardenii</i>	Dwarf Witch-alder	T	None
<i>Fothergilla major</i>	Mountain Witch-alder	T	None
<i>Gentianopsis crinita</i>	Fringed Gentian	T	None
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	E	LE
<i>Habenaria quinqueseta</i>	Michaux's Spider Orchid	T	None
<i>Hartwrightia floridana</i>	Hartwrightia	T	None
<i>Helianthus verticillatus</i>	Whorled Sunflower	E	C
<i>Helonias bullata</i>	Swamp Pink	T	LT
<i>Hydrastis canadensis</i>	Goldenseal	E	None
<i>Hymenocallis coronaria</i>	Shoals Spiderlily	T	None
<i>Illicium floridanum</i>	Florida Anise	E	None
<i>Isoetes melanospora</i>	Black-spored Quillwort	E	LE

<i>Isoetes tegetiformans</i>	Mat-forming Quillwort	E	LE
<i>Isotria medeoloides</i>	Small Whorled Pogonia	T	LT
<i>Jamesianthus alabamensis</i>	Alabama Warbonnet	E	None
<i>Jeffersonia diphylla</i>	Twinleaf	R	None
<i>Kalmia carolina</i>	Carolina Bog Laurel	T	None
<i>Leavenworthia exigua var. exigua</i>	Least Glade-cress	T	None
<i>Leiophyllum buxifolium</i>	Sand-Myrtle	T	None
<i>Leitneria floridana</i>	Corkwood	T	None
<i>Lilium michiganense</i>	Michigan Lily	R	None
<i>Lilium philadelphicum</i>	Wood Lily	E	None
<i>Lindera melissifolia</i>	Pond Spicebush	E	LE
<i>Litsea aestivalis</i>	Pond Spice	R	None
<i>Lotus helleri</i>	Carolina Trefoil	E	None
<i>Lysimachia fraseri</i>	Fraser's Loosestrife	R	None
<i>Lythrum curtissii</i>	Curtiss' Loosestrife	T	None
<i>Macbridea caroliniana</i>	Carolina Boggart-mint	R	None
<i>Macranthera flammula</i>	Hummingbird Flower	T	None
<i>Marshallia mohrii</i>	Coosa Barbara Buttons	T	LT
<i>Marshallia ramosa</i>	Pineland Barbara Buttons	R	None
<i>Matelea alabamensis</i>	Alabama Milk-vine	T	None
<i>Matelea pubiflora</i>	Trailing Milk-vine	R	None
<i>Megaceros aenigmaticus</i>	Bighorn Hornwort	T	None
<i>Monotropis odorata</i>	Sweet Pinesap	T	None
<i>Morella inodora</i>	Odorless Bayberry	T	None
<i>Myriophyllum laxum</i>	Lax Water-milfoil	R	None
<i>Najas filifolia</i>	Narrowleaf Naiad	E	None
<i>Nestronia umbellula</i>	Indian Olive	R	None
<i>Neviusia alabamensis</i>	Alabama Snow-wreath	T	None
<i>Oxypolis canbyi</i>	Canby Dropwort	E	LE
<i>Pachysandra procumbens</i>	Allegheny-spurge	R	None
<i>Packera millefolia</i>	Blue Ridge Golden Ragwort	T	None
<i>Paronychia virginica</i>	Yellow Nailwort	E	None
<i>Pedicularis lanceolata</i>	Swamp Lousewort	E	None
<i>Pediomelum piedmontanum</i>	Dixie Mountain Breadroot	E	None
<i>Penstemon dissectus</i>	Cutleaf Beardtongue	R	None

<i>Pinguicula primuliflora</i>	Clearwater Butterwort	T	None
<i>Pityopsis pinifolia</i>	Sandhill Golden-aster	R	None
<i>Platanthera integrilabia</i>	Monkeyface Orchid	T	C
<i>Prenanthes barbata</i>	Barbed Rattlesnake Root	R	None
<i>Pteroglossaspis ecristata</i>	Crestless Plume Orchid	T	None
<i>Ptilimnium nodosum</i>	Harperella	E	LE
<i>Quercus oglethorpeana</i>	Oglethorpe Oak	T	None
<i>Rhododendron prunifolium</i>	Plumleaf Azalea	T	None
<i>Rhus michauxii</i>	Dwarf Sumac	E	LE
<i>Rhynchospora solitaria</i>	Solitary Beakrush	E	None
<i>Rudbeckia auriculata</i>	Swamp Black-eyed Susan	E	None
<i>Rudbeckia heliopsis</i>	Little River Black-eyed Susan	T	None
<i>Sabatia capitata</i>	Cumberland Rose Gentian	R	None
<i>Sageretia minutiflora</i>	Climbing Buckthorn	T	None
<i>Sagittaria secundifolia</i>	Kral's Water-plantain	T	LT
<i>Salix floridana</i>	Florida Willow	E	None
<i>Sanguisorba canadensis</i>	Canada Burnet	T	None
<i>Sapindus marginatus</i>	Soapberry	R	None
<i>Sarracenia flava</i>	Yellow Flytrap	U	None
<i>Sarracenia leucophylla</i>	Whitetop Pitcherplant	E	None
<i>Sarracenia minor</i>	Hooded Pitcherplant	U	None
<i>Sarracenia minor</i> var. <i>minor</i>	Hooded Pitcherplant	U	None
<i>Sarracenia minor</i> var. <i>okefenokeense</i>	Okefenokee Giant	U	None
<i>Sarracenia oreophila</i>	Green Pitcherplant	E	LE
<i>Sarracenia psittacina</i>	Parrot Pitcherplant	T	None
<i>Sarracenia purpurea</i>	Purple Pitcherplant	E	None
<i>Sarracenia purpurea</i> ssp. <i>purpurea</i>	Northern Purple Pitcherplant	E	None
<i>Sarracenia purpurea</i> ssp. <i>venosa</i>	Southern Purple Pitcherplant	E	None
<i>Sarracenia purpurea</i> ssp. <i>venosa</i>	Southern Purple Pitcherplant	E	None
<i>Sarracenia rubra</i>	Sweet Pitcherplant	T	None
<i>Sarracenia rubra</i> ssp. <i>rubra</i>	Red-flower Sweet Pitcherplant	E	None
<i>Schisandra glabra</i>	Bay Star-vine	T	None
<i>Schwalbea americana</i>	Chaffseed	E	LE
<i>Scutellaria montana</i>	Large-flowered Skullcap	T	LT
<i>Scutellaria ocmulgee</i>	Ocmulgee Skullcap	T	None

<i>Sedum nevii</i>	Nevius Stonecrop	T	None
<i>Sedum pusillum</i>	Granite Stonecrop	T	None
<i>Shortia galacifolia</i>	Oconee Bells	E	None
<i>Sibbaldiopsis tridentata</i>	Mountain Cinquefoil	E	None
<i>Sideroxylon macrocarpum</i>	Ohoopee Bumelia	R	None
<i>Sideroxylon thornei</i>	Swamp Buckthorn	R	None
<i>Silene ovata</i>	Ovate Catchfly	R	None
<i>Silene polypetala</i>	Fringed Campion	E	LE
<i>Silene regia</i>	Royal Catchfly	E	None
<i>Solidago simulans</i>	Cliffside Goldenrod	E	None
<i>Spiraea virginiana</i>	Virginia Spirea	T	LT
<i>Spiranthes magnicamporum</i>	Great Plains Ladies-tresses	E	None
<i>Stewartia malacodendron</i>	Silky Camellia	R	None
<i>Streptopus lanceolatus</i> var. <i>lanceolatus</i>	Rosy Twisted Stalk	T	None
<i>Stylosma pickeringii</i> var. <i>pickeringii</i>	Pickering's Morning-glory	T	None
<i>Symphyotrichum georgianum</i>	Georgia Aster	T	C
<i>Thalictrum cooleyi</i>	Cooley Meadowrue	E	LE
<i>Thalictrum debile</i>	Trailing Meadowrue	T	None
<i>Thaspium pinnatifidum</i>	Glade Meadowparsnip	E	None
<i>Torreya taxifolia</i>	Florida Torreya	E	LE
<i>Trientalis borealis</i>	Starflower	E	None
<i>Trillium persistens</i>	Persistent Trillium	E	LE
<i>Trillium pusillum</i>	Dwarf Trillium	E	None
<i>Trillium reliquum</i>	Relict Trillium	E	LE
<i>Tsuga caroliniana</i>	Carolina Hemlock	E	None
<i>Veratrum woodii</i>	Ozark Bunchflower	R	None
<i>Viburnum bracteatum</i>	Limerock Arrow-wood	E	None
<i>Waldsteinia lobata</i>	Barren Strawberry	R	None
<i>Xerophyllum asphodeloides</i>	Eastern Turkeybeard	R	None
<i>Xyris tennesseensis</i>	Tennessee Yellow-eyed Grass	E	LE

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on **Georgia DNR - Wildlife Resources Division**
 (<http://georgiawildlife.com>)

Protected Invertebrates of Georgia

51 invertebrates on this list
 Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Alasmidonta arcula</i>	Altamaha Arcmussel	T	None
<i>Alasmidonta triangulata</i>	Southern Elktoe	E	None
<i>Amblema neislerii</i>	Fat Threeridge	E	LE
<i>Anodonta heardi</i>	Apalachicola Floater	R	None
<i>Anodontoides radiatus</i>	Rayed Creekshell	T	None
<i>Cambarus coosawattae</i>	Coosawattee Crayfish	E	None
<i>Cambarus cryptodytes</i>	Dougherty Plain Cave Crayfish	T	None
<i>Cambarus cymatilis</i>	Conasauga Blue Burrower	E	None
<i>Cambarus doughertyensis</i>	Dougherty Burrowing Crayfish	E	None
<i>Cambarus englishi</i>	Tallapoosa Crayfish	R	None
<i>Cambarus extraneus</i>	Chickamauga Crayfish	T	None
<i>Cambarus fasciatus</i>	Etowah Crayfish	T	None
<i>Cambarus georgiae</i>	Little Tennessee Crayfish	E	None
<i>Cambarus harti</i>	Piedmont Blue Burrower	E	None
<i>Cambarus howardi</i>	Chattahoochee Crayfish	T	None
<i>Cambarus parrishi</i>	Hiwassee Headwaters Crayfish	E	None
<i>Cambarus scotti</i>	Chattooga River Crayfish	T	None
<i>Cambarus speciosus</i>	Beautiful Crayfish	E	None
<i>Cambarus strigosus</i>	Lean Crayfish	T	None
<i>Cambarus truncatus</i>	Oconee Burrowing Crayfish	T	None
<i>Cambarus unestami</i>	Blackbarred Crayfish	T	None
<i>Cordulegaster sayi</i>	Say's Spiketail	T	None
<i>Distocambarus devexus</i>	Broad River Burrowing Crayfish	T	None
<i>Elliptio arca</i>	Alabama Spike	E	None
<i>Elliptio arctata</i>	Delicate Spike	E	None
<i>Elliptio purpurella</i>	Inflated Spike	T	None

		E	C
<i>Elliptio spinosa</i>	Altamaha Spiny mussel	E	
<i>Elliptoideus sloatianus</i>	Purple Bankclimber	T	LT
<i>Epioblasma metastriata</i>	Upland Combshell	E	LE
<i>Epioblasma othcaloogensis</i>	Southern Acornshell	E	LE
<i>Fusconaia masoni</i>	Atlantic Pigtoe	E	None
<i>Gomphus consanguis</i>	Cherokee Clubtail	T	None
<i>Hamiota altilis</i>	Finelined Pocketbook	T	LT
<i>Hamiota subangulata</i>	Shinyrayed Pocketbook	E	LE
<i>Lampsilis perovalis</i>	Orange-nacre Mucket	T	None
<i>Leptoxis foremani</i>	Interrupted Rocksnail	E	C
<i>Medionidus acutissimus</i>	Alabama Moccasinshell	T	LT
<i>Medionidus parvulus</i>	Coosa Moccasinshell	E	LE
<i>Medionidus penicillatus</i>	Gulf Moccasinshell	E	LE
<i>Medionidus simpsonianus</i>	Ochlockonee Moccasinshell	E	LE
<i>Ophiogomphus edmundo</i>	Edmund's Snaketail	E	None
<i>Pleurobema decisum</i>	Southern Clubshell	E	LE
<i>Pleurobema georgianum</i>	Southern Pigtoe	E	LE
<i>Pleurobema hanleyianum</i>	Georgia Pigtoe	E	None
<i>Pleurobema pyriforme</i>	Oval Pigtoe	E	LE
<i>Procambarus gibbus</i>	Muckalee Crayfish	T	None
<i>Procambarus verrucosus</i>	Grainy Crayfish	R	None
<i>Procambarus versutus</i>	Sly Crayfish	R	None
<i>Ptychobranchus foremanianus</i>	Rayed Kidneyshell	E	LE
<i>Strophitus connasaugaensis</i>	Alabama Creekmussel	E	None
<i>Toxolasma pullus</i>	Savannah Lilliput	T	None

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on **Georgia DNR - Wildlife Resources Division**
 (<http://georgiawildlife.com>)

Protected Fish of Georgia

57 fish on this list

Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	E	LE
<i>Alosa alabamae</i>	Alabama Shad	T	None
<i>Ameiurus serracanthus</i>	Spotted Bullhead	R	None
<i>Cyprinella caerulea</i>	Blue Shiner	E	LT
<i>Cyprinella callitaenia</i>	Bluestripe Shiner	R	None
<i>Cyprinella xanura</i>	Altamaha Shiner	T	None
<i>Elassoma okatie</i>	Bluebarred Pygmy Sunfish	E	None
<i>Enneacanthus chaetodon</i>	Blackbanded Sunfish	E	None
<i>Erimystax insignis</i>	Blotched Chub	E	None
<i>Etheostoma brevirostrum</i>	Holiday Darter	E	None
<i>Etheostoma chlorobranchium</i>	Greenfin Darter	T	None
<i>Etheostoma chuckwachatte</i>	Lipstick Darter	E	None
<i>Etheostoma ditrema</i>	Coldwater Darter	E	None
<i>Etheostoma duryi</i>	Black Darter	R	None
<i>Etheostoma etowahae</i>	Etowah Darter	E	LE
<i>Etheostoma parvipinne</i>	Goldstripe Darter	R	None
<i>Etheostoma rupestre</i>	Rock Darter	R	None
<i>Etheostoma scotti</i>	Cherokee Darter	T	LT
<i>Etheostoma tallapoosae</i>	Tallapoosa Darter	R	None
<i>Etheostoma trisella</i>	Trispot Darter	E	None
<i>Etheostoma vulneratum</i>	Wounded Darter	E	None
<i>Fundulus bifax</i>	Stippled Stdfish	E	None
<i>Fundulus catenatus</i>	Northern Stdfish	R	None
<i>Hemitremia flammea</i>	Flame Chub	E	None
<i>Hybopsis lineapunctata</i>	Lined Chub	R	None
<i>Ichthyomyzon bdellium</i>	Ohio Lamprey	R	None

<i>Lucania goodei</i>	Bluefin Killifish	R	None
<i>Macrhybopsis sp. 1</i>	Coosa Chub	E	None
<i>Micropterus notius</i>	Suwannee Bass	R	None
<i>Moxostoma carinatum</i>	River Redhorse	R	None
<i>Moxostoma robustum</i>	Robust Redhorse	E	None
<i>Moxostoma sp. 2</i>	Sicklefin Redhorse	E	C
<i>Notropis ariommus</i>	Popeye Shiner	E	None
<i>Notropis asperifrons</i>	Burrhead Shiner	T	None
<i>Notropis hypsilepis</i>	Highscale Shiner	R	None
<i>Notropis photogenis</i>	Silver Shiner	E	None
<i>Notropis scepticus</i>	Sandbar Shiner	R	None
<i>Noturus eleutherus</i>	Mountain Madtom	E	None
<i>Noturus munitus</i>	Frecklebelly Madtom	E	None
<i>Percina antesella</i>	Amber Darter	E	LE
<i>Percina aurantiaca</i>	Tangerine Darter	E	None
<i>Percina aurolineata</i>	Goldline Darter	E	LT
<i>Percina crypta</i>	Halloween Darter	T	None
<i>Percina jenkinsi</i>	Conasauga Logperch	E	LE
<i>Percina kusha</i>	Bridled Darter	E	None
<i>Percina lenticula</i>	Freckled Darter	E	None
<i>Percina sciera</i>	Dusky Darter	R	None
<i>Percina shumardi</i>	River Darter	E	None
<i>Percina smithvanizi</i>	Muscadine Darter	R	None
<i>Percina squamata</i>	Olive Darter	E	None
<i>Percina tanasi</i>	Snail Darter	E	LT
<i>Phenacobius crassilabrum</i>	Fatlips Minnow	E	None
<i>Phenacobius uranops</i>	Stargazing Minnow	T	None
<i>Phoxinus tennesseensis</i>	Tennessee Dace	E	None
<i>Pteronotropis euryzonus</i>	Broadstripe Shiner	R	None
<i>Pteronotropis welaka</i>	Bluenose Shiner	T	None
<i>Typhlichthys subterraneus</i>	Southern Cavefish	E	None

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Published on *Georgia DNR - Wildlife Resources Division*
<http://georgiawildlife.com>

Protected Amphibians of Georgia

10 amphibians on this list
Generated from conservation database on July 13, 2010

Scientific Name	Common Name	State Status	Federal Status
<i>Ambystoma cingulatum</i>	Frosted Flatwoods Salamander	T	LT
<i>Amphiuma pholeter</i>	One-toed Amphiuma	R	None
<i>Aneides aeneus</i>	Green Salamander	R	None
<i>Cryptobranchus alleganiensis alleganiensis</i>	Eastern Hellbender	T	None
<i>Gyrinophilus palleucus</i>	Tennessee Cave Salamander	T	None
<i>Haideotriton wallacei</i>	Georgia Blind Salamander	T	None
<i>Notophthalmus perstriatus</i>	Striped Newt	T	None
<i>Plethodon petraeus</i>	Pigeon Mountain Salamander	R	None
<i>Rana capito</i>	Gopher Frog	R	None

Find details for plants on this list at <http://NatureServe.org/explorer>

Georgia Wildlife Resources Division
2070 U.S. Hwy. 278, SE, Social Circle, GA 30025

Appendix L

Appendix M



U.S. Department of Transportation
Federal Aviation Administration

BIRD / OTHER WILDLIFE STRIKE REPORT

1. Name of Operator 4. Aircraft Registration 7. Airport Name 10. Height (AGL)			2. Aircraft Make/Model 5. Date of Incident 8. Runway Used 11. Speed (IAS)			3. Engine Make/Model 6. Local Time of Incident <input type="checkbox"/> Dawn <input type="checkbox"/> Dusk HR MIN <input type="checkbox"/> Day <input type="checkbox"/> Night AM PM																																																		
12. Phase of Flight <input type="checkbox"/> A. Parked <input type="checkbox"/> B. Taxi <input type="checkbox"/> C. Take-off Run <input type="checkbox"/> D. Climb <input type="checkbox"/> E. En Route <input type="checkbox"/> F. Descent <input type="checkbox"/> G. Approach <input type="checkbox"/> H. Landing Roll			13. Part(s) of Aircraft Struck or Damaged <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Struck</th> <th>Damaged</th> <th></th> <th>Struck</th> <th>Damaged</th> </tr> </thead> <tbody> <tr> <td>A. Radome</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>H. Propeller</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>B. Windshield</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>I. Wing/Rotor</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>C. Nose</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>J. Fuselage</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>D. Engine No. 1</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>K. Landing Gear</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>E. Engine No. 2</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>L. Tail</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>F. Engine No. 3</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>M. Lights</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>G. Engine No. 4</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>N. Other: (Specify)</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>							Struck	Damaged		Struck	Damaged	A. Radome	<input type="checkbox"/>	<input type="checkbox"/>	H. Propeller	<input type="checkbox"/>	<input type="checkbox"/>	B. Windshield	<input type="checkbox"/>	<input type="checkbox"/>	I. Wing/Rotor	<input type="checkbox"/>	<input type="checkbox"/>	C. Nose	<input type="checkbox"/>	<input type="checkbox"/>	J. Fuselage	<input type="checkbox"/>	<input type="checkbox"/>	D. Engine No. 1	<input type="checkbox"/>	<input type="checkbox"/>	K. Landing Gear	<input type="checkbox"/>	<input type="checkbox"/>	E. Engine No. 2	<input type="checkbox"/>	<input type="checkbox"/>	L. Tail	<input type="checkbox"/>	<input type="checkbox"/>	F. Engine No. 3	<input type="checkbox"/>	<input type="checkbox"/>	M. Lights	<input type="checkbox"/>	<input type="checkbox"/>	G. Engine No. 4	<input type="checkbox"/>	<input type="checkbox"/>	N. Other: (Specify)	<input type="checkbox"/>	<input type="checkbox"/>
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G. Engine No. 4	<input type="checkbox"/>	<input type="checkbox"/>	N. Other: (Specify)	<input type="checkbox"/>	<input type="checkbox"/>																																																			
14. Effect on Flight <input type="checkbox"/> None <input type="checkbox"/> Aborted Take-Off <input type="checkbox"/> Precautionary Landing <input type="checkbox"/> Engines Shut Down <input type="checkbox"/> Other: (Specify)			15. Sky Condition <input type="checkbox"/> No Cloud <input type="checkbox"/> Some Cloud <input type="checkbox"/> Overcast			16. Precipitation <input type="checkbox"/> Fog <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> None																																																		
			17. Bird/Other Wildlife Species			18. Number of birds seen and/or struck <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Number of Birds</th> <th>Seen</th> <th>Struck</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>2-10</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>11-100</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>more than 100</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>			Number of Birds	Seen	Struck	1	<input type="checkbox"/>	<input type="checkbox"/>	2-10	<input type="checkbox"/>	<input type="checkbox"/>	11-100	<input type="checkbox"/>	<input type="checkbox"/>	more than 100	<input type="checkbox"/>	<input type="checkbox"/>	19. Size of Bird(s) <input type="checkbox"/> Small <input type="checkbox"/> Medium <input type="checkbox"/> Large																																
Number of Birds	Seen	Struck																																																						
1	<input type="checkbox"/>	<input type="checkbox"/>																																																						
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more than 100	<input type="checkbox"/>	<input type="checkbox"/>																																																						
20. Pilot Warned of Birds <input type="checkbox"/> Yes <input type="checkbox"/> No			21. Remarks (Describe damage, injuries and other pertinent information)																																																					
DAMAGE / COST INFORMATION																																																								
22. Aircraft time out of service: _____ hours	23. Estimated cost of repairs or replacement (U.S. \$): \$ _____			24. Estimated other Cost (U.S. \$) (e.g. loss of revenue, fuel, hotels): \$ _____																																																				
Reported by (Optional)		Title				Date																																																		

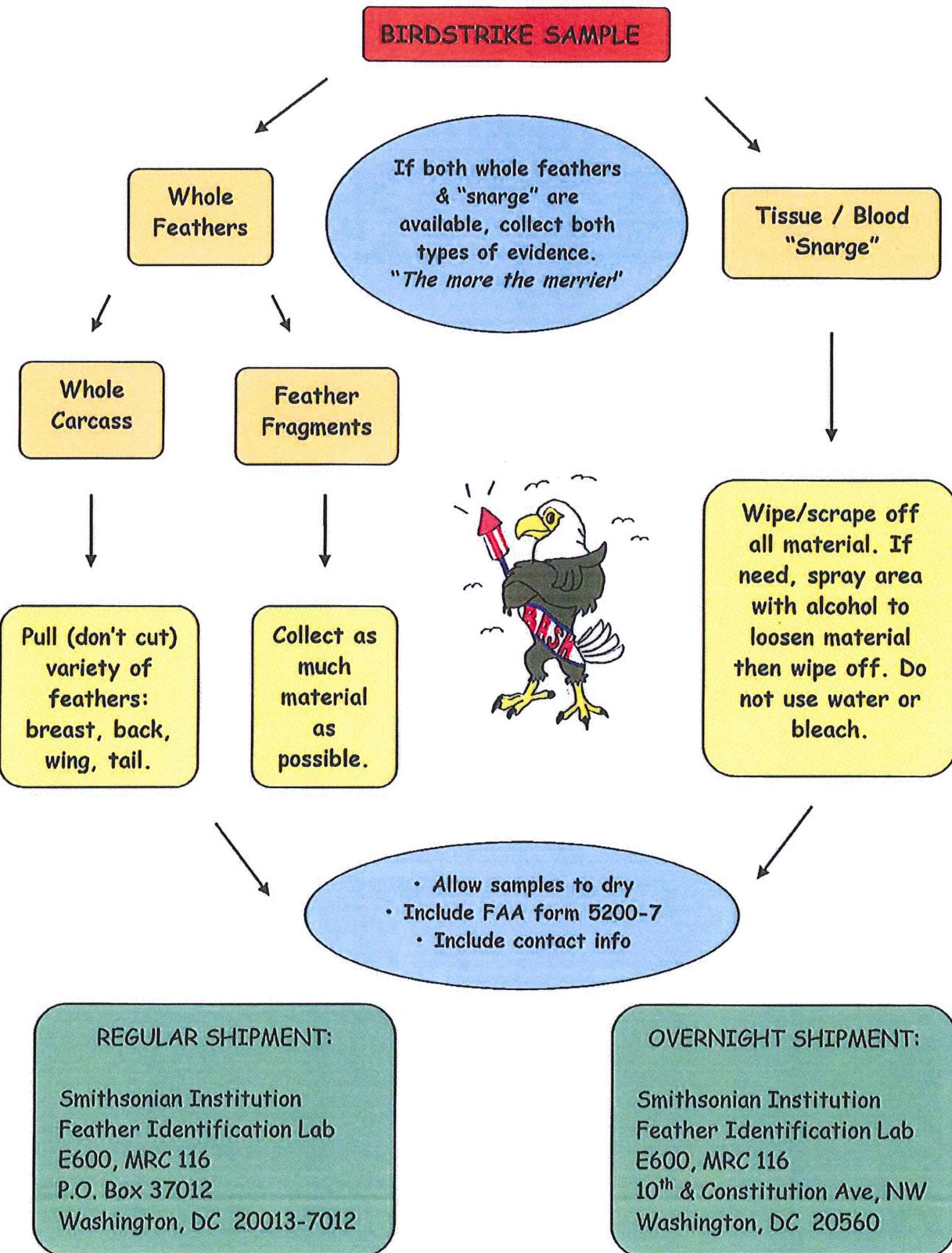
Paperwork Reduction Act Statement: The information collected on this form is necessary to allow the Federal Aviation Administration to assess the magnitude and severity of the wildlife-aircraft strike problem in the U.S. The information is used in determining the best management practices for reducing the hazard to aviation safety caused by wildlife-aircraft strikes. We estimate that it will take approximately 6 minutes to complete the form. The information collected is voluntary. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0045.

Directions for FAA Form 5200-7
Bird/Other Wildlife Strike Report

1. Name of Operator - This can be an airline (abbreviations okay - UAL, AAL, etc.), business (Coca Cola), government agency (Police Dept., FAA) or if a private pilot, his/her name.
2. Aircraft Make/Model - Abbreviations are okay, but to include the model (e.g. B737-200).
3. Engine Make/Model - Abbreviations are allowed (e.g., PW 4060, GECT7, LYC 580).
4. Aircraft Registration - This means the N# (for USA registered aircraft).
5. Date of Incident - Give the local date, not the ZULU or GMT date.
6. Local Time of Incident - Check the appropriate light conditions and fill in the hour and minute local time and check AM or PM or use the 24 clock and skip AM/PM.
7. Airport Name - Use the airport name or 3 letter code if a US airport. If a foreign airport, use the full name or 3 letter code and location (city/country).
8. Runway used - Self explanatory.
9. Location if En Route - Put the name of the nearest city and state.
10. Height AGL - Put the feet above ground level at the time of the strike (if you don't know, use MSL and indicate this). For take-off run and landing roll, it must be 0.
11. Speed (IAS) - Speed at which the aircraft was traveling when the strike occurred.
12. Phase of Flight - Phase of flight during which the strike occurred. Take-off run and landing roll should both be 0 AGL.
13. Part(s) of Aircraft Struck or Damaged - Check which parts were struck and damaged. If a part was damaged but not struck indicate this with a check on the damaged column only and indicate in comments (#21) why this happened (e.g., the landing gear might be damaged by deer strike, causing the aircraft to flip over and damage parts not struck by deer).
14. Effect on Flight - You can check more than one and if you check (Other), please explain in Comments (#21).
15. Sky condition - Check the one that applies.
16. Precipitation - You may check more than one.
17. Bird/Other Wildlife Species - Try to be accurate. If you don't know, put unknown and some description. Collect feathers or remains for identification for damaging strikes.
18. Number of birds seen and/or struck - check the box in the Seen column with the correct number if you saw the birds/other wildlife before the strike and check the box in the Struck column to show how many were hit. The exact number, can be written next to the box.
19. Size of Bird(s) - Check what you think is the correct size (e.g. sparrow = small, gull = medium and geese = large).
20. Pilot Warned of Birds - Check the correct box (even if it was an ATIS warning or NOTAM).
21. Remarks - Be as specific as you can. Include information about the extent of the damage, injuries, anything you think would be helpful to know. (e.g., number of birds ingested).
22. Aircraft time out of service - Record how many hours the aircraft was out of service.
23. Estimated cost of repairs or replacement - This may not be known immediately, but the data can be sent at a later date or put down a contact name and number for this data.
24. Estimated other cost - Include loss of revenue, fuel, hotels, etc. (see directions for #23).
25. Reported by - Although this is optional, it is helpful if questions arise about the information on the form (a phone number could also be included).
26. Title - This can be Pilot, Tower, Airport Operations, Airline Operations, Flight Safety, etc.
27. Date - Date the form was filled out.

Appendix N

HOW TO COLLECT BIRDSTRIKE EVIDENCE



General Information for Collecting Birdstrike Material

Feather Identification Lab, Smithsonian Institution

COLLECTING REMAINS

Feathers:

Whole Bird: Pluck a variety of feathers (breast, back, wing, tail)

Partial Bird: Collect a variety of feathers with color or pattern

Feathers only: Send all materials

Do not cut feathers from the bird (we need the down at the base)

Do not use any sticky substance (no tape or glue)

Place remains in a re-closeable bag

Allow remains to dry before sealing bag.

Blood / Tissue (“Snarge”):

Place dry snarge in a re-closeable bag

If need, wipe off with alcohol wipe or paper towel sprayed with 70% alcohol

Please do not use water or bleach – it is not compatible with our dna analysis

- Include copy of FAA 5200-7 report
- Include contact information

SHIPPING

Routine / Non-Damaging Cases: *US Postal Service*

Feather Identification Lab

Smithsonian Institution

NHB E600, MRC 116

P.O. Box 37012

Washington, DC 20013-7012

Priority / Damaging Cases: *Overnight Shipping*

Feather Identification Lab

Smithsonian Institution

NHB, E600, MRC 116

10th & Constitution Ave., NW

Washington, DC 20560-0116

WEBSITES

Civil Aviation:

<http://wildlife-mitigation.tc.faa.gov>

Birdstrike Committee:

www.birdstrike.org

Feather Lab Contact Information

202-633-0801

dovec@si.edu

heackerm@si.edu

* Basic safety measures and good hygiene when collecting material is encouraged. Use latex gloves, face mask and eye protection; always thoroughly wash hands after handling remains.

"MAKE-YOUR-OWN" - BIRDSTRIKE COLLECTING KITS

Birdstrike Collecting Kits are cheap to make and easy to assemble. Having pre-made kits available improves birdstrike reporting and encourages the sampling of birdstrike remains. Most folks assemble the contents into individual bags or envelopes and keep a supply in field vehicles or office supply cabinets for quick access. Below is a list of recommended items to include in your birdstrike collecting kits; mix and match as budgets permit:

Re-sealable Plastic Bags

A variety of sizes; Re-sealable bags help contain liquids and keeps odors to a minimum.

Sharpie Markers

Permanent markers are water resistant and used for writing data (date, time, aircraft, etc) directly on the bag of remains.

Alcohol Wipes

Pre-packaged alcohol hand-wipes can be used to wipe "snarge" off aircraft. Alcohol is better than water at preserving DNA, preventing mold growth, and is more sanitary for humans. Alternatively, use a spray bottle with 70% alcohol to spray the area before wiping with paper towels. Do not use bleach wipes, it destroys DNA.

Miscellaneous Items for Birdstrike Collecting

Kitchen shears - good for cutting feet, wings, bills

Tongue depressors, tweezers, cotton swabs/cotton-tipped applicators

Hand cleaners, or other alcohol based gel hand sanitizers.

FTA® DNA collecting cards: If you send a lot of blood/tissue ("snarge") samples for DNA identification, you may want to look into getting Whatman FTA® DNA cards. The material is sampled with a sterile applicator and placed onto the surface of the card that "fixes" the dna in the sample. For more information on ordering these items contact the Feather Lab.

Note: If you only occasionally send blood/tissue samples - a paper towel with alcohol, or alcohol wipe is still a good option for blood/tissue samples.

(collecting kit cont.)

Extra Safety Items

Latex Gloves

Protective Eyewear

Face masks: If avian flu is a concern, the Center for Disease Control recommends NIOSH rated N95 face masks. (These may be referred to as respirators.) There is a disposable version of these masks by 3M that looks similar to the regular "cup" style face masks.

Reminders

Always encourage proper hygiene & provide personnel easy access to cleaning/hygiene supplies

Do not cut off the fluffy down at the bottom of feathers

Do not use bleach on samples

Be sure personnel are briefed on proper carcass disposal protocols

Stay informed to the status of HPAI H5N1 avian flu virus. The following website has excellent coverage:

The American Ornithologists' Union Ornithological Council

<http://www.nmnh.si.edu/BIRDNET/OC/avianinfluenza.html>

Contact Information

Feather Identification Lab 202-633-0801

Carla Dove dovec@si.edu

Marcy Heacker heackerm@si.edu

Appendix O

WILDLIFE MANAGEMENT LOG

AIRPORT NAME

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NAME OF OBSERVER

WEATHER ACTIVITY
S11 = Sunny ED = feeding

SU = sunny	FD = feeding	FP = flying/passing
PS = partly sunny	LF = loafing	TW = towering
PC = partly cloudy	RS = roosting	HW = hawking/insect
CL = cloudy	NS = nesting	ST = standing
CR = rain	VO = vocalizing	RN = running
SN = snow/sleet	FL = flying/localized	BD = bedded down
FG = fog		

LOCATION

<u>LOCATION</u>	
RWY	runway
TWY	taxiway
RMP	ramp
ASP	asphalt/concrete
UNP	unpaved road
STR	structure
DTC	ditch
GSH	grass, short
GLG	grass, long
SHR	shrubs
WDL	woodland
MAR	marsh/wetland
CRX	creek/stream
TSM	temporary standing water
PND	pond
RES	reservoir

GSH = grass, short
 GLG = grass, long
 SHR = shrubs
 WDL = woodland
 MAR = marsh/wetland
 CRX = -creek/stream
 TSW = temporary standing water