

WILDLIFE HAZARD ASSESSMENT

for

***McCook Regional Airport
(November 2009 through October 2010)***

Final Report, January 2011



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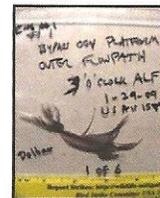
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1.0 INTRODUCTION



Wildlife strikes have occurred since the start of aircraft travel. Calbraith Rodgers, the first man to fly across the United States in a plane, was also the first to die as a result of a bird-aircraft collision. On April 3, 1912, his Wright Pusher struck a gull, causing the aircraft to crash into the surf at Long Beach, California (Blokpoel 1976). More recently, in September 1995 twenty-four military personnel were killed when their Air Force Airborne Warning and Control System (AWACS E-3) aircraft (a modified Boeing 707) crashed after ingesting four Canada Geese into its number one and two engines during takeoff from Elmendorf Air Force Base, Alaska. Along with the tragic loss of lives, a staggering cost of \$189 million was incurred (Wright 1997).

Collisions between aircraft and wildlife (wildlife strikes) are a worldwide concern due to the loss in revenue stemming from costly repairs to aircraft and the reduction of public confidence in the air transport industry as a whole (Linnell et al. 1996, Robinson 1997). Possibly the most important concern is the threat to passenger safety (Thorpe 1997). No airport or aircraft type are immune to the hazards of wildlife strikes. Globally, wildlife strikes have killed more than 219 people and destroyed over 200 aircraft since 1988 (Dolbeer et al. 2008). At the McCook Municipal Airport (MCK), wildlife strikes are a concern. There have been 16 reported wildlife strikes, all of which has occurred within the last 5 years at MCK. Although there has not been any significant strikes reported as having caused extensive damage to any aircraft at MCK, the threat to public safety clearly exists. During the WHA period, there were no reported strikes at MCK. Wildlife strikes are an increasing threat due to the following factors: the trend toward more efficient and quieter jet aircraft; increased population size and distribution of wildlife species that are hazardous to aircraft; and a continued increase in air traffic (Cleary and Dolbeer 2000, Richardson and West 2000, Dolbeer et al. 2008).



Not all wildlife strikes result in human fatalities. For example, a bald eagle shattered the windshield of a Schweizer 300 helicopter at 2,000 feet AGL in Minnesota in June 2007 (pictured above). The passenger was knocked unconscious and suffered cuts and bruises. The pilot landed the aircraft safely with the 12 lb. eagle at his feet. Another example of an averted disaster occurred more recently on January 15, 2009 (see picture to right). A US Airways



Airbus A320, with 155 crew and passengers, hit a flock of Canada Geese shortly after taking off from LaGuardia Airport in New York. The plane immediately lost power to both engines and made an emergency landing in the Hudson River. Thanks to the skill of the pilot, miraculously all aboard survived with only minor injuries. Feathers were found in both engines. DNA analysis of these feathers confirmed that Canada Geese were the cause of the accident.

Although most wildlife strikes cause expensive damage to aircraft, indirect impacts cost substantial amounts of money as well. Indirect impacts can include modified flight schedules, closed runways, passenger delays, fuel dumping, and cost associated with time while the aircraft is out of operation. Based on analysis of eighteen years of wildlife strike data (1990-2007), there have been 82,057 reported wildlife strikes with an estimated cost to the U.S. civil aviation industry in excess of 590,172 hours/year of aircraft down time, \$292.59 million/year in direct monetary losses and \$39.89 million/year in associated costs (Dolbeer et al. 2008). One can only expect that cost to increase in future years.

It is impossible to predict the reaction of any animal to the factors that are encountered on an airfield due to the differences in innate behavior from species to species. Numerous environmental factors can also affect an animal's behavior. A WHA makes it possible to gauge a species' potential for a damaging collision with aircraft. By considering factors such as the body mass and density of the animal, its frequency on the airfield, the observed behaviors of the species, and its abundance and tendencies in the area, a prediction can be made concerning the



risk a particular species may pose on an airfield. Species discussed in this WHA ranked high in one or more of the above factors and are considered a potential hazard. It is important to keep in mind that the following discussions of wildlife hazards focus on the potential for a damaging wildlife strike, but not necessarily the probability of such a strike. For the purposes of this WHA, a wildlife hazard is defined as: *A potential for a damaging aircraft collision with wildlife on or near an airport [14 CFR Part 139.337(a)(3)].*

The FAA is responsible for setting and enforcing the Federal Aviation Regulations (FAR) and policies to enhance public aviation safety. To ensure compliance with FAR Part 139.337, the FAA requires certificated airports to conduct an ecological study or a wildlife hazard assessment (WHA), and if necessary, establish a Wildlife Hazard Management Plan (WHMP) when any of the following events occur on or near an airport:

- An air carrier aircraft experiences multiple wildlife strikes;
- An air carrier aircraft experiences substantial damage from striking wildlife. As used in this paragraph, substantial damage means damage or structural failure incurred by an aircraft that adversely affects the structural strength, performance, or flight characteristics of the aircraft and that would normally require major repair or replacement of the affected component;

- An air carrier aircraft experiences an engine ingestion of wildlife; or
- Wildlife of a size or in numbers capable of causing an event described above is observed to have access to any airport flight pattern or movement area. At MCK the biggest concern are deer.

The first step in preparing an airport WHMP is to conduct a WHA. The WHA is the basis for understanding potential wildlife hazards on an airport. When conducted by a certified wildlife damage management biologist, a WHA provides a scientific basis for the development, implementation and refinement of a WHMP. Data for WHA's are recorded over a one-year period, as per FAR Part 139. This allows the qualified airport biologist the chance to observe seasonal fluctuations, daily behavior changes (such as feeding, roosting habits, attractant areas, etc.), as well as the abundance of migratory and resident species in order to determine what specific attractants and patterns occur at an airport. Upon completion of the study, recommendations designed to reduce site-specific wildlife hazards are developed based on an analysis of the data collected. Though parts of the WHA may be incorporated directly into the WHMP, they are two separate documents. Such a plan addresses the responsibilities, policies, and procedures necessary to reduce wildlife hazards. A WHMP is written in accordance with CFR 14, 139.337, subpart (e). The WHA for MCK was conducted from November 2009 through October 2010.

1.1 Legal Authority of Wildlife Services

The U.S. Department of Agriculture, Wildlife Services (WS) program has a Memorandum of Understanding (MOU) in place with the FAA that established a cooperative relationship between the FAA and WS for reducing wildlife hazards to aviation in a manner that benefits public safety and the airport. The MOU recognizes that WS has wildlife damage management expertise and therefore, may provide technical and operational assistance to reduce and assist in alleviating wildlife hazards at airports. Any programs/projects initiated under this MOU must be funded by the airport or another entity. WS may conduct a WHA to serve as a basis for the WHMP, but the responsibility of development, approval, and implementation of the WHMP lies with the airport.

The primary statutory authority by which WS operates is the Animal Damage Control Act of March 2, 1931, as amended (7 U.S.C. 426-426c; 46 Stat. 1468). WS has the authority to cooperate with States, local jurisdictions, individuals, public and private agencies, organizations, and institutions while conducting a program of wildlife services involving mammal and bird species that are reservoirs for zoonotic diseases, or animal species that are injurious and/or a nuisance to, among other things, agriculture, horticulture, forestry, animal husbandry, wildlife, and human health and safety. WS Directive 2.305, *Wildlife Hazards to Aviation*, provides guidance for WS wildlife biologists in providing technical assistance or direct control to airport managers, State aviation agencies, the aviation industry, the FAA, and the Department of Defense regarding hazards caused by wildlife to airport safety.

WS is a non-regulatory, federal cooperative wildlife management program whose mission is to provide leadership in reducing conflicts between people and wildlife. A growing focus of WS is

to help promote the safe operation of aircraft by working with airport management to document, assess and manage wildlife hazards at airports throughout the country.

The MOU and legislation allow WS to conduct initial on-site investigations, biological assessments (short-term studies), WHA's (ecological studies), wildlife management operations, and to assist airports with the development of a WHMP.

2.0 OBJECTIVES

The Objectives of this WHA were to:

- Determine wildlife population parameters such as abundance and periods of peak activity, and movements, with a particular emphasis on species most threatening to aircraft and safety.
- Identify wildlife attractants at MCK and surrounding areas.
- Provide management recommendations for reducing wildlife hazards at MCK.
- Review available wildlife strike data records.
- Encourage wildlife strike education, recognition, and reporting.

3.0 STATUS OF WILDLIFE SPECIES AT MCK

Federal, State and Local laws may be in place in order to protect most forms of wildlife and the habitats they occupy. Prior to any control measure taking place (lethal or non-lethal), observations should be conducted in order to identify any and all species that will be affected. Proper permits must be in place prior to conducting certain control activities. MCK is responsible for adhering to all current regulations regarding the species to be managed, control activities and methods to be used, and for obtaining the appropriate permits to take and/or harass the species to be managed. All bird species observed on and around MCK property during the course of this assessment, with the exception of European Starlings, feral pigeons (Rock Doves), and House Sparrows, are protected by either Federal or State regulations. All Game species are protected by NGPC and proper permits are required before harassment or lethal removal begins.

3.1 Federal Regulations

The Migratory Bird Treaty Act (MBTA), the Lacey Act, the Endangered Species Act, and the Bald and Golden Eagle Protection Act all regulate the control of specific species and their habitats. These are the basis of most wildlife regulations that have been issued in the Code of Federal Regulations (CFR). Several agencies share the responsibility of implementing and enforcing such regulations. The U.S. Fish and Wildlife Service (USFWS) primarily enforces that of the MBTA as well as the Endangered Species Act. Permits are issued from the USFWS regional office for control actions involving species covered under the MBTA and must be renewed annually as well as all actions conducted under this act being reported at the expiration of the permit. USFWS also issues ninety-day (90) permits for the harassment of Bald and Golden Eagles which also require that all actions taken under the authority of the permit be reported at the end of the permit period. It should be noted that the term "migratory", as referred to in the MBTA, does not necessarily mean that the species has to migrate. For example, Common

Ravens and Black-billed Magpies are year-round residents in Nebraska and are protected as a migratory species under this act. For a complete list of birds protected by the MBTA please visit: <http://www.fws.gov/migratorybirds/intrnltr/mbta/mbtandx.html#d>.

It is recommended that MCK obtain a depredation permit annually to conduct control activities of migratory birds in and around the airfield. MCK must request a new permit at least thirty (30) days prior to the expiration of the current permit, which expires at the end of each calendar year (except a bald eagle permit, which is only active for a 90-day period). Depredation permits (50 CFR 21.41 Depredation Permits) require that activities conducted while acting under the authority of the permit are documented to include the type of action used, species and numbers involved, and the status of the carcass of those species lethally taken. These records should remain available in the event of an inspection.

3.2 State and Local Regulations

Nebraska state law regulates actions concerning game species including: small game, predators, furbearers, game birds, and big game. The Nebraska Game and Parks (NGPC) are responsible for any depredation permits which allow these animals to be taken to protect private property.

The Endangered Species Act of 1972 affords protection to wildlife species in danger of becoming extinct. Nebraska also maintains an endangered species list. One such species is that of the "state threatened" swift fox which has a habitat that overlaps with MCK. Wildlife Services will perform a swift fox survey two weeks prior to construction of fencing, in accordance with NGPC policy. MCK is not currently operating under any permits from NGPC. Should game species become an issue, MCK should contact the NGPC main office in Lincoln at (402) 471-0641.

4.0 BACKGROUND

4.1 Location of McCook Municipal Airport

The McCook Municipal Airport (MCK) is a publically-owned airport located on the east side of McCook, Nebraska. The entire airport property is approximately 667 acres. The airport is fenced by a three-strand and four-strand barbed-wire fence, which encompasses approximately 80% of the total perimeter. There are three runways at MCK. The primary runway is 12/30 which is paved and handles most operations. It is 6,400 feet long by 100 feet wide. The second runway 4/22, which is a cross wind, paved runway, is 4,000 feet long by 75 feet wide. The third runway is 17/35, it is a turf runway that is 1,350 feet long by 160 feet wide. The airport also has an inside access road which is unpaved. Currently there are 38 hangers, 1 terminal, and 1 maintenance shop. There is also a National Guard/Army reserve building that is scheduled to be completed in the spring of 2011.



MCK is an FAA certified general aviation airport, offering commercial service to Grand Island Airport, and Omaha International Airport, as well as Kansas City International Airport.

MCK contracted with WS, per agreement number 10-73-31-6225-RA, to conduct a 12-month ecological study. During the course of the assessment, responsibility for managing airport wildlife hazards remained with the Airport Manager. WS was present at MCK for a one year period from November 1, 2009 to October 31, 2010, during which surveys were conducted.

4.2 Habitat Description

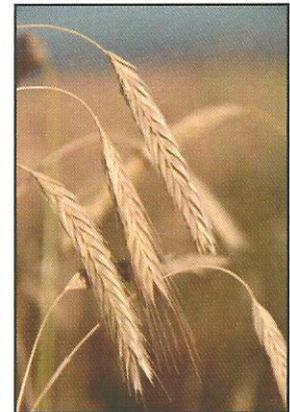
Habitat is described as an area which provides resources required by a particular species to survive. The required resources of any species can be broken down into the following: (1) food, (2) water and (3) cover/shelter. In order to understand why species are attracted to MCK, thorough analysis of these resources is needed.

FOOD

A variety of food sources exist at or surrounding MCK. The following is a description of various food sources, where the attractant can be found, wildlife species attracted to the food source, and seasons the attractant is available:

Seeds

Seed bearing grasses and forbs attract insects, small-sized birds (sparrows, horned larks, european starlings, etc.), medium-sized birds (mourning doves, rock pigeons, etc.), and large-sized birds (common ravens, american crows, etc.), as well as small mammals (mice, rabbits and prairie dogs). Seeds are found from early spring through winter, with the majority of seeds available in late summer through late fall. The areas where seeds are most common include short grass and long grass, native shrubs within the AOA, and surrounding recreational areas. Nearby agriculture fields (corn, oats, and pasture grass) also provide a large supply of seed and cover.



Small Mammals

Small mammals, such as mice, ground squirrels and rabbits attract predators, such as coyotes, raptors (hawks, owls, falcons and eagles), vultures, and ravens. Small mammals prefer medium to long length grass and can be found year-round throughout MCK. This can also include flying mammals (bats).

Birds

Sparrows, finches, other small birds and waterfowl are prey species to predators such as fox, coyotes and raptors. Songbirds and finches are available mainly during spring, summer, and fall, whereas waterfowl are available year-round, but more abundant from early spring through late fall.

Artificial Food Sources (Human Refuse)

Pigeons, rabbits, gulls, vultures and corvids (ravens, crows, and magpies) are attracted to areas that provide artificial food sources such as human refuse (i.e. birdfeeders, garbage bins, pet food, trash in parking lots, landfills, etc.). Deliberate and long-term provision of food to wildlife has been shown to alter natural behavior patterns and population levels. Wildlife can become year-round residents as a result of human handouts. An example would be if dumpsters are left open or people are consciously feeding wildlife.



WATER

Water attracts many species of wildlife. It can provide a source of drinking water, food and/or cover. The primary sources of water at MCK included various low collecting areas. The majority of water sources are actually located outside airport property and include the Republican river as well as Red Willow River.

COVER

Cover includes areas used by wildlife for nesting/burrowing, roosting (sleeping), loafing, and/or protection against predators and weather conditions. The following is a description of the types of cover at MCK, the primary wildlife species using them, and their activities:

Airport Facilities/Structures

Airport facilities and structures include hangars, the terminal building, lights, signs, fences (chain-link and barbed-wire) culverts and parked cars. Airport facilities and structures attract a variety of species including, but not limited to: pigeons, rabbits,



ground squirrels, sparrows, mourning doves, finches, larks, owls and other raptors. Loafing, roosting, nesting, burrowing and feeding were common activities associated with these types of cover.

Short Grass and Long Grass

Blackbirds, corvids, doves, finches, larks and sparrows were particularly attracted to short grass for feeding and loafing. The AOA was generally kept well maintained. Longer grass was generally found along fences, the perimeter roads and buildings. Longer grass allows cover for rodents, as well as larger mammals and birds for scavenging food.

Trees and Shrubs

Trees and shrubs are present at MCK, especially along the south end of the property. Many species of birds utilize trees and shrubs for loafing, nesting and roosting. Some of these species include raptors, blackbirds, starlings and sparrows. Deer also frequented the wooded area as it provided substantial cover from predators.

4.3 Wildlife Strike Analysis for MCK

Reported wildlife strikes at MCK were obtained from the National FAA database. There have been 16 reported wildlife strikes, all of which has occurred within the last 5 years at MCK. The 16 strikes included mammals(raccoon and bat) as well a 6 different birds species (Redtail Hawk, Meadolark, American Kestrel, Mourning Dove, and Killdeer). No Damage was reported from any of the 16 strikes. According to two independent studies, only 20-25% of actual bird strikes are ever reported (Linnell et al. 1999 and Barras at al. 2000). Bird strike statistics based solely on pilot reports may be biased and could lead to inaccurate conclusions. If an airport bases its bird control program solely on pilot-reported bird strikes, it could target the wrong species, use inappropriate control techniques, or focus its efforts in the wrong location on the airfield, which could result in a wasted expenditure of time and money while compromising passenger safety (Linnell et al. 1999). Therefore, it is extremely important to stress to MCK personnel and pilots the importance of reporting any strike that occurs at MCK.

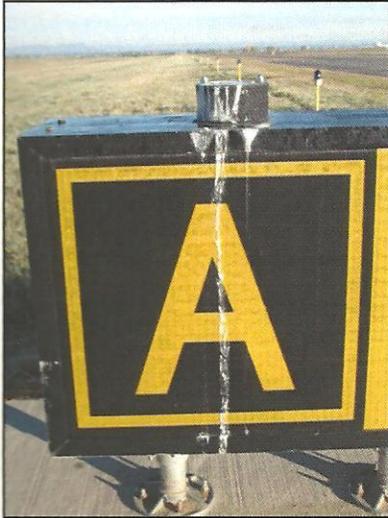


5.0 METHODS

To effectively assess wildlife hazards at MCK, a standardized survey was designed and implemented. Each survey was designed to meet the objective of determining wildlife hazards. The survey included standard point count surveys as well as spotlight surveys. Most survey observations were recorded on a Standardized Point Count Survey form.

5.1 Standardized Point Count Surveys

To quantify wildlife abundance and seasonal occurrence, point count surveys were conducted an average of 2 times per month. Surveys were conducted primarily during early morning and late afternoon hours, in order to obtain an adequate sample of bird activity/presence throughout a survey day. For future reference and comparisons, GPS coordinates for each survey point are noted in Table 1. Survey data was collected from established observation points along a survey route covering the majority of the AOA (Figure 2). Each point was surveyed for a 3-minute period, and all observed wildlife activity (heard or seen) within a ¼ mile radius was recorded. Wildlife species, abundance, behavior, cover type, and other pertinent observations were noted. Binoculars were only used to identify readily visible species and verify the number of animals. The combined area covered by all observation points (with ¼ mile radius buffer) encompassed approximately 100% of the airport property, which provided the biologist with accurate representation of wildlife abundance on the airfield. A complete survey is defined as one visit to all stations along the survey route, proceeding in the same direction for each survey. A total of twenty-one observation points were established around the airport. Smaller birds, such as songbirds, were normally only detected when seen at close range or when flushed from their cover, therefore the number of smaller solitary birds may be underestimated. A total of 24 Standardized Point Count Surveys were conducted at MCK from November 2009 through October 2010.



<u>GPS Coordinates of Standard Point Count Survey</u>		
<u>Observation Locations at MCK</u>		
<u>Survey Point</u>	<u>Latitude</u>	<u>Longitude</u>
1	N4012'21.6"	W-10035'55.0"
2	N4012'16.7"	W-10036'01.3"
3	N4012'08.6"	W-10036'04.8"
4	N4011'59.9"	W-10036'05.3"
5	N4011'56.8"	W-10036'02.1"
6	N4011'55.2	W-10035'55.2"
7	N4011'55.9	W-10035'45.7"
8	N4011'55.8"	W-10035'37.8"
9	N4011'56.2"	W-10035'27.0"
10	N4012'01.3"	W-10035'11.4"
11	N4011'57.8"	W-10035'00.7"
12	N4011'59.2"	W-10034'50.5"
13	N4012'04.6"	W-10034'49.3"
14	N4012'10.5"	W-10034'55.1"

15	N4012'14.3"	W-10034'59.5"
16	N4012'19.2"	W-10035'01.9"
17	N4012'22.9"	W-10035'12.2"
18	N4012'29.2"	W-10035'22.6"
19	N4012'33.5"	W-10035'16.8"
20	N4012'44.0"	W-10035'28.1"
21	N4012'46.4"	W-10035'49.3"

Table 1 GPS Coordinates of Standard Point Count Survey Observation Locations

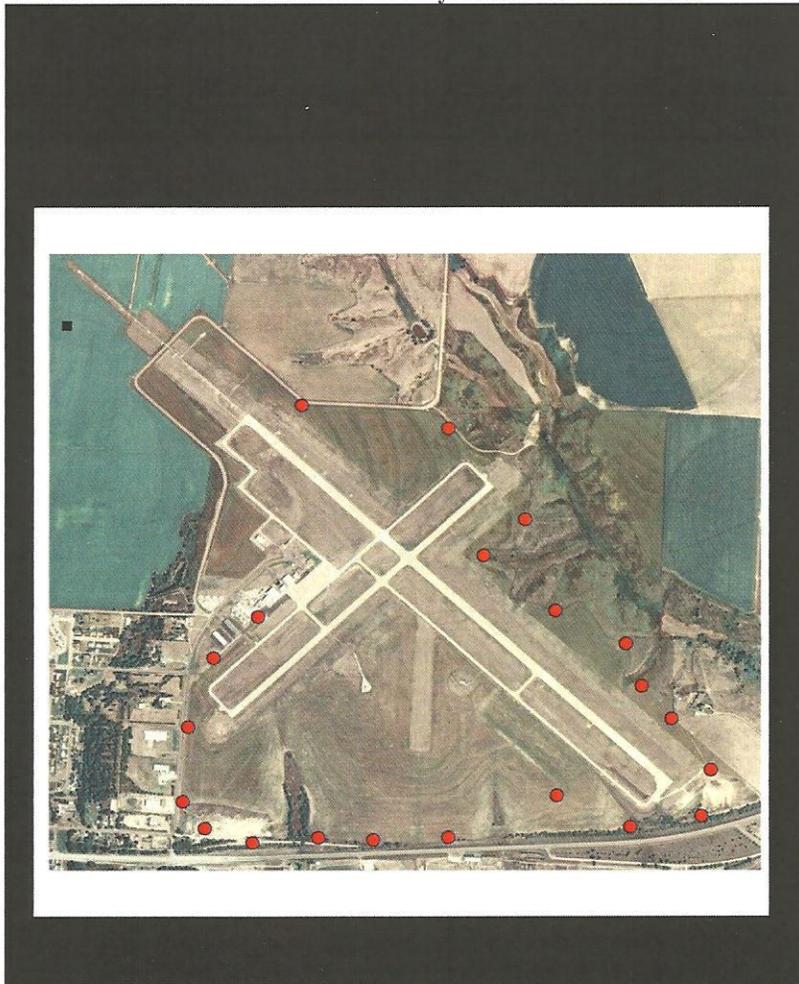


Figure 2 Standard Point Count Survey Locations at MCK – A total of 21 observation points were utilized for point count surveys during the WHA.

5.2 Spotlight Surveys

Spotlight surveys were conducted twice per month. The surveys consisted of driving a continuous route around the airfield at a slow speed (approximately 5 mph) using a 1-million

candle power spotlight at various times after sunset, documenting nocturnal wildlife activity. On average, surveys took approximately 35-45 minutes to complete. Animals were spotted, counted, and locations were notated during each survey. Overall, White-tailed deer were the most common and abundant of all of the mammals seen during spotlight surveys (total of 20 White-tailed deer counted over all surveys). Deer were observed throughout all seasons.

5.3 General Observations

General observations were helpful in detecting wildlife attractants and hazards outside of all other surveys. General Observations did not have a specific format and allowed for greater flexibility when making field observations. This method helped to identify specific wildlife attractants, patterns, and other information that may have been observed outside the temporal and spatial parameters of the other more structured surveys. These observations were most frequently recorded during standardized point count surveys when significant wildlife activity/movement (e.g., flock of geese, coyote crossing runway, circling raptor, etc.) was observed outside the ¼ mile radii or the 3-minute standard period. General observations were difficult to quantify, but often provided the most useful observations for understanding and resolving wildlife hazards. During these observations, wildlife hazards and important environmental changes were also documented.

5.4 Guild Classifications

For the purpose of simplification, species observed during standardized surveys were grouped into guilds. Guild classifications were based on observed behaviors of each species during the assessment, as animals with similar behaviors and habitat requirements can generally be managed by similar techniques. It should be noted that the following guild classifications may differ from those found in standard wildlife literature regarding animal taxonomy, but tend to loosely correspond with traditional taxonomic categories.

Corvids

These are medium to large sized birds which include common ravens, American crows, and black-billed magpies. These birds inhabit many cover types and feed on a wide variety of natural and human-provided food sources. Their primary feeding method involves scavenging. Crows were seen passing over and roosting in trees on the south end of the airfield.

Doves and Pigeons

Doves are smaller sized birds and include Mourning Doves, Eurasian Collared Doves and feral Pigeons (Rock Doves). They are common birds that are abundant in cities and farm land. All are robust flyers and gregarious (flocking) in nature, preferring warm open habitats. Pigeons were most observed around the hangers, while mourning doves were

usually observed perching on fences, trees, and power lines. Mourning doves were routinely observed feeding in the harvested oat field. Eurasian collared doves were also observed in roosting and feeding in the same areas as the mourning doves.

Flycatchers, Thrushes and Shrikes

Western kingbird and American robin are included in this guild. These smaller-sized birds are primarily insectivores but may also eat seeds and worms. Most of these species are found solitary or in pairs, perching on posts, fences or foraging on the ground.

Ictarids and Starlings

These are small to medium sized birds which include red-winged blackbirds, common grackles, European starlings, and western meadowlarks. Members of this guild (excluding Western Meadowlarks) were primarily observed loafing, feeding and flying localized in flocks ranging from 2 to well over 300+ individuals near the north end of the AOA. Western Meadowlarks were observed throughout the AOA at all point count stations.

Larks

Horned larks are small sparrow-like birds that generally feed solitarily or in small groups. Once flushed from a feeding area, flight response will be triggered in several other small groups creating a large group of small birds flying erratically. Horned larks generally feed on seeds and small insects in short grass and are found on the AOA throughout all seasons.

Raptors and Vultures

This group is comprised of hawks, falcons, owls and vultures. Raptors are small to large birds that prey on small birds, mammals, insects, reptiles and fish. These birds are most often seen perching on structures around the airfield and in trees. Red-tailed Hawks and American Kestrels were the most abundant and noticeable members of this group at MCK. Also included in this group are owls (great-horned owl) which were only observed before sunrise and during spotlight surveys. Common nighthawk was also observed only during spotlight surveys.

Turkey vultures can be found in Nebraska during the spring, summer and early fall months. They are usually seen soaring high overhead, looking for carrion (carcass of a dead animals). Due to their large size, weight (4 lbs.) and flying characteristics (high and slow), they are considered very hazardous to aircraft. There is a large summer/fall roost of vultures throughout the city of McCook, with a large portion of vultures roosting just south of MCK.

Shorebirds

This guild consists of killdeer. Killdeer are generally found on any open ground, but can be drawn to open water, generally low areas that collect rain water or irrigation water, where

they forage for aquatic insects. Killdeer nest and forage on gravel parking lots and short grass fields.

Sparrows and Finches

This guild consists of house sparrows, finches, western bluebirds and various other sparrow-like or small passerine (perching) birds. They are all small sized, flocking or semi-solitary birds. Abundance of these species may be under-represented since they tend to be harder to detect and identify. Because of their small size, these birds are generally considered less hazardous to aircraft.

Swallows

Swallows are small birds but have the tendency to form large colonies and forage in groups. The species that are most abundant at MCK include cliff and barn Swallows. These swallows were found most often around water or near taxiways and runways where they fly erratically feeding on insects. They were also observed roosting on power lines near taxiways and hangers.

Waterfowl

This guild includes Mallards, Canada geese, American teal, and other ducks. These are medium to large birds that feed on a variety of aquatic sources including vegetation, insects, and vertebrate species. They are most often associated with water, but some species (e.g. Canada geese) will graze in short grass within community parks, golf courses and adjacent to roads. Most species of waterfowl are migratory and are most abundant during spring and fall migrations. All of the waterfowl observed at MCK were during the spring and fall migrations, and all species were observed in flocks or pairs flying past.

Mammals

The mammal species of the most concern for MCK include the deer, cottontail rabbit, and Black-tailed jackrabbits. Deer were observed on several occasions either standing or crossing runways/taxiways. Deer were also seen feeding in crop fields and taking shelter in wooded areas. Deer were seen throughout the AOA and should be considered an extreme threat to aircraft. Rabbits, which eat grasses and forbs, are found in the safety of covered areas which were concentrated near along the perimeter of the airport property. Mice, voles and ground squirrels are a concern because they attract larger mammals and raptors. They prefer longer grass where they can gather seeds and seek shelter from predators.

Upland birds

Ring-neck Pheasants were observed at several locations within the AOA. Pheasants feed primarily on seeds and insects, and at MCK pheasants were able to take advantage of the cover and food that the surrounding oat fields provided.

5.5 Data Analysis

The results of the WHA are grouped according to survey type. Seasonal trends in wildlife occurrence are noted, as well as spatial distribution, and selected key species are discussed. A key species is one whose frequency of occurrence, abundance, body mass or behavioral characteristics makes it a direct threat to aircraft safety.

Point count data were analyzed to determine the percentage of time when a guild was observed and the average number of individuals in each observation for each survey location. This data was also used to determine the average abundance of each guild throughout the course of the WHA. Results of these analyses are intended as an index over time, not an absolute quantification of population size. Spotlight data was analyzed to determine wildlife hazards occurring at night.

Percent Occurrence is defined as the percentage of surveys for each location in which any particular species was present. For example, a solitary species may have been observed in 80% of all surveys, but, on average, only 2 birds were observed. Conversely, a flocking species may have been infrequently observed (15% of the time), but in large numbers when present (i.e., 100 individuals). The Average Number represents how many individuals, on average, of a particular guild were present at each survey point. Seasonal Distribution graphs represent the average number of individuals, within a given guild, and are derived from point count survey data. Averages are shown by season so individual guild use can be identified on a seasonal basis. Averages also allow for general predictions to be made on the number of individuals to expect.



Effective wildlife hazard management at airports is dependent upon the identification of key species involved. The following tables, figures, and written descriptions focus primarily on key species that may pose the greatest hazard to aircraft at MCK.

6.0 RESULTS AND DISCUSSION

6.1 All Species Combined

Standardized Point Count Survey data is summarized in the Table below. This table shows the Abundance and Average Flock Size (Range) for each species (in alphabetical order). A total of 33 species were recorded during these surveys. Abundance is the total number of individuals seen during the WHA. It can be more accurately defined as the number of "wildlife hazard occurrences" observed during the WHA. Any wildlife species that frequents the airport could potentially occur on or over the runway and therefore, present a potential risk to aircraft safety.

Abundance numbers do not represent an absolute population count because the same individuals may have been counted in multiple surveys. Average Flock Size is the average number of individuals per observation. Not all species presented in the following Table form flocks on a regular basis, for example some may only form flocks while migrating, while others are almost entirely solitary in behavior. Those birds which regularly flock together during foraging and local movements generally pose a greater hazard to aircraft (i.e. Canada Geese) than solitary birds.

Species	Abundance	Average Flock Size
American Crow (<i>Corvus brachyrhynchos</i>)	2	2
American Blue-winged Teal (<i>Anas discors</i>)	4	2
American Green-winged Teal (<i>Anas crecca</i>)	6	2
American Kestrel (<i>Falco sparverius</i>)	1	1
American Robin (<i>Turdus migratorius</i>)	43	2
Barn Swallow (<i>Hirundo rustica</i>)	6	6
Canada Goose (<i>Branta canadensis</i>)	4	4
Chipping Sparrow (<i>Spizella passerine</i>)	2	2
Chimney Swift (<i>Chaetura pelagic</i>)	2	1
Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)	2	2
Common Grackle (<i>Quiscalus quiscula</i>)	12	3
Common Nighthawk (<i>Chordeiles minor</i>)	1	1
Cottontail Rabbit (<i>Sylvilagus floridanus</i>)	3	1
Dark-eyed Junco (<i>Junco hyemalis</i>)	21	10
Eurasian Collared-Dove (<i>Streptopelia decaocto</i>)	10	2
European Starling (<i>Sturnus vulgaris</i>)	479	43
Horned Lark (<i>Eremophila alpestris</i>)	534	16
House Finch (<i>Carpodacus mexicanus</i>)	2	2
House Sparrow (<i>Passer domesticus</i>)	9	3
Jackrabbit (<i>Lepus californicus</i>)	1	1
Killdeer (<i>Charadrius vociferus</i>)	4	2
Mallard (<i>Anas platyrhynchos</i>)	12	12
Mourning Dove (<i>Zenaida macroura</i>)	123	4
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	15	1
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	6	1
Ring-necked Pheasant (<i>Phasianus colchicus</i>)	5	1
Rock Dove (Pigeon) (<i>Columba livia</i>)	1	1
Thirteen Lined Ground Squirrel (<i>Spermophilus tridecemlineatus</i>)	1	1
Turkey Vulture (<i>Cathartes aura</i>)	60	20

Western Bluebird (<i>Sialia mexicana</i>)	2	2
Western Kingbird (<i>Tyrannus verticalis</i>)	9	2
Western Meadowlark (<i>Sturnella neglecta</i>)	56	2
White-tailed Deer (<i>Odocoileus virginianus</i>)	22	3
Grand Total	968	

Table 2 Species Observed at MCK during Point Count Surveys (33 Total Species) - This table should be used to compare the relative risk of the observed species to aircraft safety. *Species having both a high abundance AND flock size pose the greatest hazard to aircraft.* These species were, in most cases, common throughout the year. However, many species had relatively low abundance totals. These low numbers are affected by temporal variation in species abundance, with many species occurring in only one season. The data presented in the table does not give information about population dynamics of the species, but rather, is to be used as an index of the relative abundance of individuals across time. A comparative analysis between years could be established using this data if the airport were to continue periodic surveys, although it may be necessary to decrease the frequency of surveys due to logistical constraints.

The following sections are described by guild. The abundance of birds in each guild throughout the year (categorized by month), their percent occurrence and, the average number of individuals per survey point are shown in the following graphs. The frequency distributions show the percent of time a particular guild was observed at each point during standard surveys. The figures in each section give abundance and frequency information which can be used to rank the relative wildlife activity at various times of year and at various locations on and around the airfield.

6.2 Raptors and Vultures



Raptors and Vultures are predatory birds and scavengers with hooked beaks and talons which are used to capture and feed on prey. This guild includes species such as red-tailed hawks and turkey vultures. Raptor species observed during the WHA at MCK include: red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), great-horned owl (*Bubo virginianus*), and the common nighthawk (*Chordeiles minor*). There is one species of vulture that is known to occur in Red Willow County, the turkey vulture (*Cathartes aura*). The airport environment can be very attractive to raptors and vultures. Open grasslands, large populations of prey-base species, and numerous perching structures, such as fence posts, solitary trees and runway/taxiway structures provide suitable habitat for these birds. Predominant prey-base species at MCK include small mammals (e.g., thirteen-lined ground squirrels, mice, and rabbits), reptiles (e.g. snakes) and smaller birds (e.g., finches, larks, doves, and sparrows). Raptors tend to be solitary individuals or found in mating pairs; they also tend to be very territorial. Raptors range in size from small (8-inch American kestrel) to very large (43-inch bald eagle). Most species have characteristic hunting styles such as soaring (eagles, vultures and hawks), low-flying (northern harriers), ambushing (peregrine falcon), hovering (American kestrel), and watching from perches (hawks and owls). A handful of raptors are migratory, however some



species such as the red-tailed hawk and American kestrel occur here year-round. Turkey vultures are migratory.



There were a total of 18 observations of raptors and vultures during the WHA, consisting of 78 birds (not an indicator of true population size). The majority of activity recorded was loafing, roosting, and flying/passing, which accounted for 100% of all observations.

Damage

Raptors represent a significant hazard to aircraft because they are typically large in size and their hunting and flying behaviors increase the possibility of interaction with aircraft. Raptors are the third most commonly reported species causing bird strikes, accounting for 13 percent of all reported strikes. Strikes with raptors and vultures have been reported 4,545 times and have accounted for over \$34.8 million in damages to civil aircraft from 1990-2007 (Dolbeer et al. 2008).



Legal Status



Raptors and Vultures are protected as migratory birds. The list of protected species should be reviewed and updated at least once per year due to the possibility of a species status changing. An updated listing can be obtained from the USFWS and/or the NGPC. Trained wildlife control personnel should have the ability to identify these species and be aware of the presence of these species in order to avoid potential impacts to them.

Control Measures

Habitat modification, specifically vegetation height and type, perching structure removal, exclusion and prey-base management will have profound effects on the number of raptors found at and around MCK. Perch sites, such as solitary trees, have a substantial effect on the ability of a raptor to hunt and should be in the plans for removal from the airfield or exclusion alterations to deter use. Continual monitoring will help identify perches which should be removed or altered. If raptors remain on the airfield, hazing with pyrotechnics can be used to disperse birds with the proper permits in place (Eagles require a permit to haze/harass). The most non-

respondent individuals may have to be trapped/relocated or lethally removed after all other methods have been unsuccessful (current Eagle Depredation permits restrict the use of lethal control for Bald and Golden Eagles). If stated on the federal permit, raptors can be captured using several styles of traps, including bal-chatri, padded-jaw leg hold, and Swedish goshawk. These traps are designed to relocate specific individuals

6.3 Mammals

Mammals utilized various areas at MCK. Recording observations and frequent inspection of the property surrounding the airfield should be conducted on a regular basis. Mammal populations in some species (rabbits, ground squirrel, etc) can become a problem when no control efforts are being conducted, periodic inspections will help assess if further control measures are needed.

Deer

White-tailed deer (*Odocoileus virginianus*) were a common occurrence at MCK. Deer would utilize wooded areas for cover and feed in the outlying crop fields. On several occasions deer were observed crossing runways and/or taxiways.

Damage

Deer pose a significant threat to aviation, with their large body, a direct strike could cause significant damage to not only the aircraft but the individuals inside the aircraft.



Legal Status

White-tailed deer are a state managed big game species. NGPC should be contacted prior to any control efforts other than habitat management. Lethal control is at the discretion of NGPC.

Control Measures

Habitat management along with exclusion methods are two ways to try and avoid deer in areas with aircraft. Some examples of habitat management would include tree removal particularly on

the south end of the airport property, as well as managing the crops to produce a less desirable food source for the deer. Exclusion methods come in the form of a 10-12 foot tall chain link fence, with 3 strands of barb wire extended on top. Ideally this fence would be buried a foot in the ground and lined with ballast to prevent animals from digging under, or a 4 foot skirt added to the bottom of the fence buried at a 45 degree angle.

7.0 RECOMMENDATIONS

The recommendations for managing wildlife hazards at MCK are divided into three sections: General Recommendations, Habitat Management Recommendations, and Wildlife Deterrence Recommendations. While all recommendation sections are important, the management of habitat will have the most lasting effect by reducing the use of the airport by hazardous animals and should be implemented immediately.

7.1 General

The "Wildlife Hazard Management at Airports: A Manual for Airport Personnel" prepared by the 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. This 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 and 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 also includes many other resources for use in developing and implementing WHMPs and is an excellent resource for airport personnel.

Develop a WHMP based on this WHA

A Wildlife Hazard Management Plan (WHMP) is a critical element for determining how wildlife hazards will be managed and who is responsible for their control. A WHMP should include sections on habitat management, available resources, training, control methods/techniques, and evaluation. The habitat management section should include a timetable outlining wildlife habitat management goals and expected completion dates. Wildlife control methods/techniques will include species/guild-specific techniques for dispersal or removal. These procedures will set guidelines for the appropriate and most effective use of lethal control methods. The plan must be reviewed annually to determine if revisions are necessary to improve or modify the wildlife control program

Assign Wildlife Control Personnel and Encourage Strike Reporting by Pilots

During the assessment wildlife hazards were always imminent. The presence of wildlife habitat surrounding the airport will continue to attract hazardous wildlife to the airfield despite efforts to eliminate wildlife attractants inside the airport property. This will require regular observations and maintenance of habitat by the airport in managing its

wildlife hazards. More frequent control efforts, continual habitat modification recommendations, and ongoing documentation of wildlife control efforts and wildlife activity, all necessitate the involvement of airport personnel. Significant reductions in wildlife hazards should follow if the airport assigns an individual employee who will conduct the following activities:

- Obtain appropriate wildlife control permits and supplies.
- Implement these permits with proper shooting, trapping, and hazing.
- Maintaining cooperative relationships with appropriate wildlife resource management agencies (e.g., USFWS, WS, and NGPC). Such relationships will provide the airport with ongoing biological expertise.
- Ensure that MCK personnel and pilots are familiar with the proper procedures for reporting all types of wildlife strikes and making FAA Form 5200-7 readily available. Whenever possible, wildlife personnel should file wildlife strike reports to ensure accuracy in species identification and other crucial information.
- Create a system of record, such as a database, for reporting wildlife hazard management activities, as well as wildlife strike information collected from pilot reports, mechanical inspections, tower logs, and runway sweeps/inspections.
- Make arrangements for the proper training of MCK personnel who will assist in the implementation of wildlife hazard management.
- Carry out daily wildlife hazard deterrent activities which include the hazing of wildlife from the AOA and advising pilots through a NOTAM of recurring wildlife movements which have the potential to result in a strike with operating aircraft.



Efforts must be made to improve the reporting of wildlife strikes. Throughout the civil air transportation industry there has been a tendency to neglect reporting wildlife strikes. Maintenance personnel, operations staff, and pilots should be encouraged to report every strike using the FAA Form 5200-7 or by using the on-line form which can be found at <http://wildlife.pr.erau.edu/strikeform/birdstrikeform.php>. Personnel should also be encouraged to properly identify the wildlife species. If airport personnel are unable to

identify the wildlife species themselves, a trained biologist should be notified to assist with identification. Preserving the strike sample or carcass can be done by placing the item in the freezer until a properly trained biologist can examine it. If this is not possible, or the remains are merely a blood smear sample or feathers/fur, samples should be collected and submitted to the Smithsonian Lab for DNA analysis to determine species. Personnel should also strive to make an accurate cost estimate of damage caused by the wildlife and keep this as a record in a database, as well as updating the original strike record. Daily sweeps of the AOA should be conducted in order to identify wildlife that may have been struck but not reported. Any unexplainable carcass, in whole or in part, found within 200 feet of a runway centerline should be recorded and reported as a strike, unless another obvious cause of death is determined.

Wildlife control personnel should actively participate in land-use projects or changes (on- or off- airport property) that could increase wildlife hazards at MCK. For example, new buildings or development plans should be reviewed in order to make recommendations in the design to discourage use by wildlife. Any agricultural and use changes on the property surrounding MCK, including public use areas should also be reviewed by a qualified biologist or airport personnel.

Train Personnel in Wildlife Hazing Procedures and Species Identification

MCK personnel involved in wildlife hazard management must be trained to recognize and respond to hazardous wildlife and potential wildlife hazards. Field guides are very useful for wildlife identification and should be made readily available. Such guides include The Sibley Field Guide to Birds of Western North America (Sibley 2006), Field guide to the Birds of North America (National Geographic Society 1999), and The Birders Handbook (Ehrlich et al., 1988). Depending on the situation, responses to wildlife hazards may include active hazing or shooting, trapping, or may require the employee to notify the airport manager and/or tower operator about observed wildlife movements.

All personnel should be trained in the safe handling and most effective use of hazing devices so as to avoid increasing the hazardous situation (e.g., chasing birds into the path of an approaching aircraft). WS offers a formal training course designed to familiarize airport personnel with basic bird identification, dispersal techniques, and safe applications. This 8-hour course involves both classroom instruction and hands-on training in the field and is renewed annually with recurrent training. According to FAA regulations, FAR 139 operating airports must receive training in wildlife hazard management and identification every 12 months.

Adopt a Policy of ZERO Tolerance for Wildlife Presence at MCK

A zero tolerance policy on the airfield should be adopted toward all wildlife. Any bird or mammal observed on the airfield by airport personnel should be considered hazardous since any bird could potentially fly over, or in the case of a mammal, run across the runway. This does not suggest that every individual of every species must be

immediately removed from the airfield, but airport operations must be aware of the treat level, what is in the area and how frequently before the determination to remove, either lethally or by hazing, can be made appropriately. In any wildlife deterrent operation, common sense must have a bearing as to the proper timing and implementation of deterrent actions. Improper timing could result in an employee hazing an animal into the path of approaching/departing air traffic.

Maintain Necessary Federal and State Wildlife Control Permits

MCK must continue to maintain such permits as the Migratory Bird Depredation Permit (renewed annually) as well as a Depredating Eagle Permit (as needed, expires every 90 days) which are issued from U.S. Fish and Wildlife Service. These permits create a legal means for lethal control of migratory birds as well as legal harassment of eagles. Renewal should be applied for one month prior to the expiration date on the permit(s).

Adopt and Enforce a "No Wildlife Feeding" Policy

The airport must become an institution of education in an effort to alert the public and airport tenants that intentionally or unintentionally feed wildlife can contribute to hazards at the airport. Hand-fed wildlife can commonly become acclimated to humans. Wildlife that becomes accustomed to feeding from dumpsters or being hand fed by people are more difficult to disperse from the airport using non-lethal methods. The use of signs in public areas and/or distribution of information via local media sources and meetings are examples of ways to increase employee, tenant, and public awareness of this issue. In addition, businesses that use outdoor containers (e.g., dumpsters) for disposal of food waste should be encouraged to keep these containers securely closed at all times to prevent access by scavenging wildlife. A "no tolerance" approach should be strictly enforced at MCK. This must be a policy that is regularly re-visited at staff/tenant meetings and training.

Encourage Adjacent Land Owners to Minimize Wildlife Activity on Their Land

Many areas outside of and adjacent to MCK may create a synergistic effect. There may be circumstances where two (or more) different land uses that would not, by themselves, be considered hazardous wildlife attractants but are in such alignment with the airport as to create a wildlife corridor directly through the airport and/or surrounding airspace. An example of this situation involves the city of McCook's large roost of turkey vultures.

Adjacent land owners may have the means of removing wildlife attractants and if not, they may be willing to cooperate with MCK's attempts at protecting human health and safety. Habitat modification or elimination of the attractants would be the most effective means of reducing wildlife outside of the airfield. However, since habitat modification is generally inconsistent with the intended use of the land by neighboring owners, wildlife deterrent and population management techniques may be more practical. Some wildlife deterrent measures require a permit from the NGPC and/or USFWS for use. Land

owners should contact the local offices of these agencies to secure permission for techniques prior to use.

Revise Daily Wildlife Control Recording Procedures

Daily wildlife control record keeping should include the documentation of all efforts made to observe and remove/deter hazardous wildlife. Airfield patrols during which no hazardous wildlife are observed as well as observed wildlife should be noted in daily logs by date and time. It is important to document these efforts to detect wildlife in order to ensure that all possible efforts to alleviate hazards are being taken. The observation of hazardous wildlife which does not result in immediate action should also be recorded. This allows other personnel conducting wildlife control operations to focus their efforts on species and areas of the airfield that may have been missed during previous efforts, as well as to encourage personnel to be cognizant of areas and species that have been observed in the past and may become a hazard. Wildlife control records should also document wildlife attractants such as open trash receptacles, changes in grass length or invasion of new species that attract wildlife (e.g., seasonal production of seeds by certain plants), detention pond water levels and temporary standing water in other areas. Documentation of wildlife attractants will alert control personnel to areas that need immediate attention and allow more effective revisions to the WHMP.

Consider Using a Computer Database for Keeping Records

If implemented, a database system can be very user friendly and can be operated by personnel with little or no previous computer training. Employees can enter their own hazing data, print reports, and analyze trends. A database is useful for organizing and keeping data on wildlife observations and reviewing management activities and their results. Information in the database should include: time, date, location, number and species of wildlife seen, any wildlife related incidents, and control methods deployed. A database is also a good way to document activities in the event a major strike occurs, that may involve legal action.

Continue Monitoring Wildlife Activity and Use Patterns on the Airfield

The intent of this WHA was to document species occurrence, habitat use, and population characteristics of wildlife at MCK over a period of 12 months. It must be realized that wildlife abundance and use patterns on airfields are affected by a host of variables that are rarely identical from year-to-year. Hence, conclusions based on wildlife activity and patterns during this study are only meant to be a guide and may or may not be consistent with subsequent years. Survey routes and methods were established to facilitate continued monitoring by an individual trained in wildlife species identification. Data from this study will provide a baseline for comparison in subsequent years. MCK should continue to monitor wildlife activity by conducting periodic surveys at the same points used during this assessment. While surveys conducted in subsequent years may not be conducted with the same frequency or intensity as this initial hazard assessment, they

would still provide general insights into wildlife species and use patterns over time. In addition, they would enable MCK wildlife control personnel to gauge the effectiveness of their control efforts.

7.2 Habitat Management

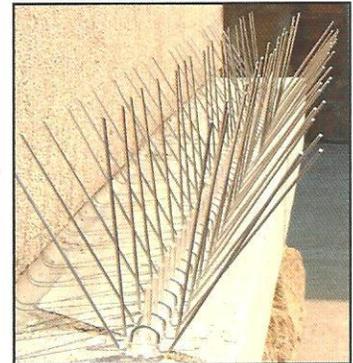
Modifying and managing habitats within airport environments is one of the most important long-term components of an integrated wildlife damage management approach to reduce the use of airfields by birds and mammals that pose hazards to aviation (Washburn and Seamans 2004). Habitat management includes the physical removal or manipulation of food, water, and cover that may attract wildlife. The ultimate goal is to provide an environment which is unappealing to species posing the greatest hazards to air traffic. This is accomplished by promoting an airport environment that is monotypic (uniform) throughout. A primary wildlife attractant at MCK is grass and grass seed which provide food for small mammals. These species become a prey base for raptors and predators, which in turn also become an attractant to corvids and vultures searching for the remains of the prey. In addition the primary deer attractant at MCK are the crop fields within the airport boundaries. All efforts should be made to plant crops that are less attractant to ungulates, or completely phase out crop production on airport property. An additional area of concern are trees on the south end of the property, these trees provide protection to mammals and roosting location for small birds as well as Turkey Vultures. Every effort should be made to eliminate all roosting area for vultures both on airport property as well as surrounding area, particularly any large dead trees, or where large groups of vultures are observed. It should also be noted that the city of McCook is working with Wildlife Services to try and prevent Turkey Vultures from roosting in town.

Areas within the AOA that are not subjected to some form of vegetative management usually contain more wildlife than areas that are managed. Although mechanical mowing is the most widely used tool for vegetation management on airfields, other tools, such as herbicides and plant growth regulators, might also be applied to control vegetation. Most research findings suggest that to be most effective, the vegetation height management regimen for an individual airport should be selected based on the specific bird species that pose the greatest risk to aviation at that airport. Ideally, airfield vegetation should possess a variety of desirable qualities. Vegetation used on airfields should be aesthetically pleasing to the public, relatively inflammable, tolerant to vehicle traffic, drought tolerant, and require minimal maintenance for stand persistence. In addition, airfield vegetation should provide limited food resources for hazardous birds (e.g. seeds, insects), little cover for small mammals (an attractant to raptors and owls), and resist invasion by other plants that provide food and cover for wildlife (Washburn and Seamans 2004). Plant species used in landscaping projects should be carefully selected to avoid creating attractants to wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements and that any plant varieties attractive to hazardous wildlife are not used on the airport. For example, trees and shrubs that produce fruits and berries, such as crab apple trees (*Malus* spp.), should not be included in new airport landscaping projects and should be removed from existing areas. In addition, evergreen trees, such as spruces (*Picea* spp.), pines (*Pinus* spp.), and junipers (*Juniperus* spp.) should not be planted in dense stands as they provide desired roosting habitat for many flocking species of birds (such as European Starlings and blackbirds) (Washburn and

Seamans 2004). 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.

General guidance for MCK would include the following habitat recommendations.

- **Mechanical mowing operations and grass management.** Mowing operations must continue during the growing seasons and may need to be expanded to include all areas of MCK property. Grass height should be kept to a minimum (FAA recommends 7-14 inches) near all active areas (i.e. runways, taxiways, ramp area, hangers, etc).
- **Exclusion devices in areas such as the aircraft hangers, AOA equipment/signs, rotating beacon light, etc.** Exclusion can be a great tool at reducing wildlife use at airports. There are many vendors offering a variety of products to modify an existing area in an effort to deter wildlife. The biggest and most effective method at reducing large mammal (coyote, fox, and deer) use on airports is a properly installed and maintained perimeter fence. The FAA recommends a 10-12 foot chain-link fence with an additional 1-foot tall angled 3-strand barbed wire across the top. Additionally it is recommended to have 4-foot buried skirting to deter digging under by coyotes and foxes. If nesting on beams inside hangers is noticed, Nixalite Bird Spikes, among other products, can work well to deter future use, if installed correctly. Exclusion devices on AOA equipment such as the rotating beacon light, equipment buildings, towers, signs and lights can help to deter perching raptors. If tall perching areas are limited for raptors, the birds will be forced to move outside of the areas adjacent to the AOA, thus reducing the chance for a strike.



7.3 Wildlife Deterrence

A variety of equipment and methods are available on the market for deterring hazardous wildlife. The following wildlife deterrent recommendations represent only a handful of solutions to the hazards observed at MCK. WS encourages the trial of other techniques, particularly non-lethal methods, for eliminating wildlife hazards. It is important to remember that a little imagination and persistence greatly augments the efficiency of any wildlife hazard reduction measure. It is also easy to get “stuck” in a pattern when searching for and deterring wildlife. For example, take a new route daily, if possible, and try not to look at things in the same order. Try implementing various methods in an attempt to be more effective.

Note: Wildlife deterrent measures are designed to deal with hazardous wildlife *after* they are detected. Such measures will not reduce the attractiveness of a particular area, especially if suitable habitat is allowed to remain. Wildlife deterrent techniques can help reduce wildlife hazards to arriving and departing aircraft for short periods of time. The length of time depends on the diversity of methods being used, the target species' ability to adapt, and the persistence of wildlife control personnel. *Therefore, wildlife deterrence should not be used as a replacement for habitat modification, as habitat modification is one of the most useful and effective tools available.*

Expand Wildlife Control Operations to Include All Hours of Operation

According to CFR 14, Part 139.337(e)(5)(ii), the airport should provide for physical inspections of the movement area and other areas critical to wildlife hazard management sufficiently in advance of air carrier operations to allow time for wildlife controls to be effective. Ideally, hazardous wildlife detection efforts should be conducted before every air carrier aircraft movement. Hazing efforts should follow if hazardous wildlife is detected.

The exact schedule of wildlife control operations should be formulated by the wildlife control coordinator and should also be included in the WHMP. All hazardous wildlife should be hazed from the field whenever it is observed. This includes hours of operation during which there are no air carrier operations. This will help reinforce the zero-tolerance policy towards wildlife. Birds in particular can habituate to periods of relative safety (hours when they are not hazed), thus becoming more difficult to deter on a long term basis. Again it is important not to fall into a set pattern for several days at a time.

Previous Roost Sites Must be Periodically Checked and Nests Removed

Places where birds have roosted in the past should be checked periodically. New nests should be removed immediately to discourage use of these areas. Any shorebird nesting (i.e. killdeer) activity must also be monitored, and if needed, ground nests should be removed. Removal of active nests of migrating species, such as the red-tailed hawk, and killdeer must first be listed on the Federal Depredation Permit.

Concentrate Hazing Efforts Early in the Morning

Bird hazing efforts should be heaviest during morning hours. If birds are consistently dispersed each morning before they have a chance to feed or loaf, they will find alternative food sources and be less likely to return later in the day. Once birds become established on the airfield, they become increasingly difficult to disperse. Flocking birds such as sparrow-like birds, starlings, pigeons, and waterfowl (including Geese) are readily attracted to individuals or flocks of birds already present, known as a decoy effect. This results in a dramatic increase in the number of birds on the airport throughout the day. To prevent this, all birds must be dispersed from the airfield immediately upon detection and not allowed to forage, loaf, or roost.

Lethal Control

Please follow these guidelines when using lethal control:

Lethal control should be used only to control birds that do not respond to non-lethal methods (the exact species must first be listed on all federal and state permits) or when an immediate danger to human safety is observed.

- Use lethal control only as reinforcement for non-lethal hazing methods such as pyrotechnics or vehicle hazing, or as a last resort for removing persistent individuals. Occasionally, the removal of one or two individuals generally has the same negative conditioning effect on remaining individuals as the removal of 10-15 individuals of the same group.
- Lethal control of individuals from migrating flocks may not significantly reduce the number of birds landing on the airfield. Negative response conditioning may not affect birds that have never experienced the conditioning technique, such as non-game bird species. During migration, different individuals are likely to be encountered on a day-to-day basis. Birds harassed the day before with a shotgun may not be the same ones observed the next day. Therefore, daily hazing and lethal control may be required several times a day during migration periods in spring and fall.
- Non-lethal control methods are most effective when accompanied by lethal shooting of flocking birds. This helps insure that harassment techniques do not lose effectiveness, resulting in habituation.

Public sensitivity to lethal control should be considered, and discretion is strongly advised. However, concerns over public sensitivity should not supersede those of public safety, and the airport should not hesitate to implement lethal control when the situation warrants such action.

8.0 LITERATURE CITED

The following sources of literature were cited either directly or indirectly in this assessment. In addition to these sources of information, WS relied upon knowledge of MCK airfield employees, the knowledge of other WS biologists, and local wildlife professionals with regards to wildlife history and issues.

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9.0 USEFUL WEBSITES

<http://wildlife-mitigation.tc.faa.gov>

- Federal Aviation Administration Wildlife Mitigation Homepage – report strikes on-line, bird identification information, access data within the National Wildlife Strike Database, locate strikes on maps, FAA Cert Alerts and Advisory Circulars, information on upcoming workshops & conferences, Airport Wildlife Mitigation Newsletter, recent news articles concerning wildlife strikes, research and development, etc.

http://wildlife.pr.erau.edu/EnglishManual/2005_FAA_Manual_complete.pdf

- On-line version of the FAA and USDA Manual for “Wildlife Hazard Management at Airports”, July 2005

<http://wildlife.pr.erau.edu/strikeform/birdstrikeform.php>

- On-line wildlife strike report form (FAA Form 5200-7)

<http://wildlife.pr.erau.edu/BirdIdentification.htm>

- Information on identifying bird remains (“snarge”)
- Instructions on shipping bird evidence to the Smithsonian Institution, Feather Identification Lab

<http://www.birdstrike.org>

- Bird Strike Committee USA

http://www.aphis.usda.gov/publications/wildlife_damage/content/printable_version/fs_wsairport.pdf

- “WS Assistance at Airports” (USDA APHIS Factsheet)

http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_wsland.html

- “Landscaping to Avoid Wildlife Conflicts” (USDA APHIS Factsheet)

http://www.aphis.usda.gov/publications/wildlife_damage/content/printable_version/strikeone2006.pdf

- “Strike One, You’re Out” (USDA APHIS Brochure)