

# Wildlife Hazard Assessment

Submitted to



**Yuma International Airport**  
**2191 E. 32nd St. Suite 218**  
**Yuma, AZ 85365**

Submitted by

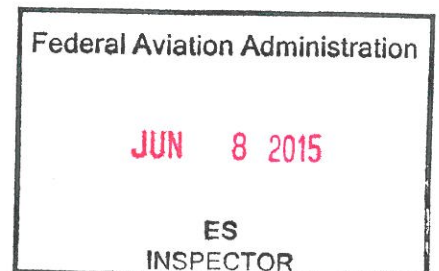
Airport Wildlife Consultants, LLC



480 - 993 - 9357

**Airport Wildlife Consultants LLC**  
**Steve Fairaizl, Senior Biologist**  
**4735 E Melanie Dr**  
**Cave Creek, AZ 85331**  
**Phone 480-993-9357**  
**E-Mail: [steveandgale@awcphx.com](mailto:steveandgale@awcphx.com)**  
**Web Site: [www.awcphx.com](http://www.awcphx.com)**

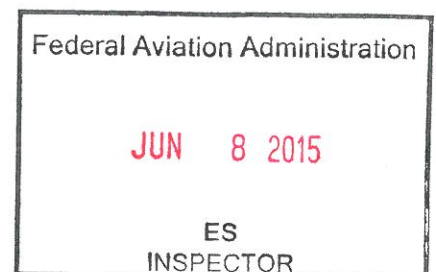
March 2015



# Table of Contents

---

<b>Executive Summary</b> .....	1
<b>Chapter 1. Introduction</b> .....	2
1A. WHA Overview .....	2
1B. NYL Triggering Event .....	3
1C. Airport History .....	4
<b>Chapter 2. Surrounding Land Use</b> .....	5
2A. Yuma City General Plan .....	5
2B. Marine Corp Air Station Yuma Master Plan.....	5
<b>Chapter 3. Results of Wildlife Surveys</b> .....	6
3A.1. Survey Methodology.....	6
3A.2. Habitat Description .....	10
3B.1. Survey Route Description .....	10
3B.2. General Results .....	10
3B.3. Individual Route Results .....	12
3B.3A. Transfer Station Route Survey Results .....	13
3B.3B. Agriculture Route Survey Results .....	14
3B.3C. Urban Ornamental Landscape Route Survey Results .....	15
3B.3D. Wetland Route Survey Results.....	16
3B.3E. AOA Route Survey Results .....	17
3B.3F. Mammal Survey Results .....	18
3C. Wildlife Daily and Seasonal Movements.....	18
3D. Legal Status of Species .....	20
3E. Overview of Current Wildlife Management Program.....	21
<b>Chapter 4. Hazard Analysis and Recommendations</b> .....	21
4A. Hazard Analysis .....	21
4B. Recommendations .....	24
<b>Literature Cited</b> .....	26
<b>Appendix A: GIS Map and GPS Waypoints</b> .....	27
<b>Appendix B: Site Photos</b> .....	28



## Executive Summary:

The Yuma County Airport Authority (YCAA) initiated a Wildlife Hazard Assessment (WHA) based on the presence of wildlife attractants within five miles of Yuma International Airport/Marine Corp Air Station Yuma (NYL), the presence of wildlife species known to be hazardous to aviation, and the occurrence of a Federal Aviation Administration (FAA) defined Triggering Event. YCAA retained Airport Wildlife Consultants (AWC) in 2013 to conduct a WHA according to FAA standards and guidelines outlined in 14 CFR § 139.337. The WHA was conducted by a Qualified Biologist as defined in Advisory Circular 150/5200-36A. The WHA was a twelve month study designed to identify wildlife attractants and hazardous wildlife species as defined in Advisory Circular 150/5200-33B. This WHA includes a discussion of the Triggering Event that initiated the WHA, status of adjoining land uses, results of the twelve month wildlife survey, a hazard analysis, and recommendations. Based on the wildlife survey data collected, the Qualified Biologist concluded that migratory birds in the Aircraft Operations Area (AOA) and the Allied Waste Transfer Station, pose the primary wildlife hazards at NYL.

Federal Aviation Administration

JUN 8 2015

ES  
INSPECTOR

## Chapter 1: Introduction:

### Chapter 1A. WHA Overview

Since the earliest history of flight in the United States, aircraft collisions with wildlife have occurred. The first reported strike occurred during a flight by Orville Wright on September 7 1905 when a bird was struck and killed during a flight over a cornfield in Ohio. As air traffic has increased, the magnitude of the problem of wildlife strikes has increased to the point that, during the last 20 years, at least 210 civilian aircraft have been destroyed by these types of accidents (Dolbeer 2009). It is important to note that in part, the problem of airstrikes is related to increases in many species of large bird populations that has occurred in North America (Dolbeer and Eschenfelder 2003).

Although wildlife strikes have been an important economic problem for decades, public awareness of the issue was relatively low. This all changed when US Airways Flight 1549 ingested Canada geese after take-off from LaGuardia Airport in New York (NTSB 2009). When the plane was able to safely land in the Hudson River with no loss of life, the media coverage of the event greatly heightened public awareness of the issue. After this incident, as part of the FAA's effort to improve air operation safety, the agency issued Cert Alert No. 09-10, which required all Part 139 airports that have had a triggering event, to conduct a Wildlife Hazard Assessment (WHA).

Airport Wildlife Consultants<sub>LLC</sub> (AWC) was retained by the YCAA, in September 2013, to conduct a WHA at NYL.

Initiation of the WHA was based on the presence of wildlife attractants within five miles of the airport, the presence of wildlife species known to be hazardous to aviation, and the occurrence of a Federal Aviation Administration (FAA) defined Triggering Event.

As defined in the Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B, a wildlife hazard means a potential for a damaging aircraft collision with wildlife on or near an airport. Therefore, by definition, all airports have a wildlife hazard(s).

Key components of this WHA include:

- Identification of wildlife attractants known to occur within a 5-mile radius of NYL.
- Identification of the presence and seasonal distribution of species known to be wildlife hazards.
- Determination of which species pose the greatest risk to aircraft operations at NYL.
- Recommendation of mitigation measures to allow NYL to manage and minimize wildlife hazards.

A WHA is a comprehensive, detailed study and evaluation of factors contributing to wildlife hazards at and within a 5-mile radius of the airport. A qualified airport wildlife biologist (Advisory Circular 150/5200-36A) accomplishes this process by collecting systematic quantitative data using on-site observations and wildlife surveys, and combining current airport information with relevant information such as historical strike data and an evaluation of maintenance, patrol and wildlife mitigation procedures. Specific to the conduct of a WHA, 14 CFR Part 139.337 states: (c) The wildlife hazard assessment required in paragraph (b) of this

Federal Aviation Administration  
JUN 8 2015  
ES  
INSPECTOR

section must be conducted by a qualified wildlife damage management biologist (AC 150/ 5200-36A) who has professional training and/or experience in wildlife hazard management at airports or an individual working under direct supervision of such an individual. AWC's qualified biologist, Steve Fairaizl was the qualified biologist assigned to the NYL WHA.

The airport's FAA Certification Inspector is the individual who approves the WHA which is prepared by the Qualified Biologist and submitted by the Airport Manager. The Certification Inspector uses 14 CFR Part 139.337 (c)(1-5) as the checklist to ensure the WHA complies with all FAA regulations. This regulation requires that a wildlife hazard assessment must contain at least the following components:

- (1) An analysis of the events or circumstances that prompted the assessment.
- (2) Identification of the wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences.
- (3) Identification and location of features on and near the airport that attract wildlife.
- (4) A description of wildlife hazards to air carrier operations.
- (5) Recommended actions for reducing identified wildlife hazards to air carrier operations.

The WHA is conducted for a minimum of four seasons, or twelve months, to adequately assess the seasonal patterns of birds and other wildlife using the airport and surrounding area during an annual cycle. Specifically, the WHA is undertaken to sample bird and mammal species occurrence and frequency, seasonal and behavioral patterns, and locations of wildlife activity and attractants in relation to the airport. This completed assessment includes all of the necessary elements of a WHA as outlined in 14 CFR § 139.337 and also includes prioritized recommendations for mitigating the hazardous wildlife attractants identified.

### **Chapter 1.B. NYL History of Wildlife Strikes and the Triggering Event**

NYL runways are monitored daily by airport personnel for foreign object debris (FOD), including dead wildlife. Airport staff drives the entire length of the runway, either on the runway or along the runway or taxiway, to accomplish searches. Any strikes or bird remains are identified and recorded in airport logbooks and entered into the FAA National Wildlife Strike Database.

Guidelines for reporting of wildlife strikes have been established in the FAA Advisory Circular 150/5200-32B, which defines a wildlife strike as:

- A pilot reports striking 1 or more birds or other wildlife;
- Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;
- Personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;
- Bird or other wildlife remains, whether in whole or in part, are found within 250 feet of a runway centerline, unless another reason for the animal's death is identified; or
- 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).

Federal Aviation Administration  
JUN 8 2015  
ES  
INSPECTOR

To develop an understanding of the history of wildlife strikes at NYL and relate those data to the wildlife survey data obtained during this WHA, we searched the National Wildlife Strike Database maintained by the FAA for the period of 1990 through 2013 (Table 1). AWC queried the Database and found 14 strikes reported at NYL between 1990- 2012. Wildlife Survey data documents the presence of hazardous bird species at NYL including doves, vultures, hawks, and egrets. These data show that an FAA defined triggering event has occurred at NYL.

Table 1. Summary of Bird Strikes at NYL from 1990-2013.

Incident Year	Operator	Bird Species	Aircraft Damage
2013	US CUSTOMS AND BORDER PROTECTION	Unknown bird - small	N
2013	US CUSTOMS AND BORDER PROTECTION	Unknown bird	N
2012	PHI INC	Doves	N
2012	MILITARY	Mourning dove	N
2012	US CUSTOMS AND BORDER PROTECTION	Doves	N
2011	MESA AIRLINES	Unknown bird - medium	N
2011	MILITARY		N
2010	US CUSTOMS AND BORDER PROTECTION	Unknown bird	N
2009	MESA AIRLINES	Unknown bird - small	N
2009	US CUSTOMS AND BORDER PROTECTION	Unknown bird	N
2008	MESA AIRLINES	Unknown bird - medium	N
2008	MESA AIRLINES	Unknown bird - medium	N
2007	MESA AIRLINES	Unknown bird - small	N
1998	AMERICA WEST AIRLINES	Unknown bird - small	N

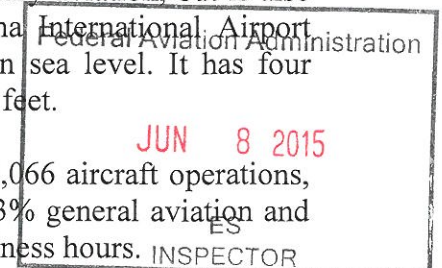
FAA regulations codified in 14 CFR § 139.337 define a triggering event as:

- An air carrier aircraft experiences multiple wildlife strikes;
- An air carrier aircraft experience substantial damage from striking wildlife;
- An air carrier aircraft experiences an engine ingestion of wildlife; or
- Wildlife of a size or in numbers, capable of causing an event described in the bullets above is observed to have access to any airport flight pattern or aircraft movement

### Chapter 1.C. Airport History

YIA, a shared-use airport together with MCAS Yuma, is located three nautical miles south of the central business district of the City of Yuma. It is mostly used for military aviation, but is also served by one commercial airlines and one Medevac company. Yuma International Airport covers an area of 3,100 acres at an elevation of 213 feet above mean sea level. It has four runways which range in size from 5,711 by 150 feet up to 13,300 by 200 feet.

For the 12-month period ending December 31, 2013, the airport had 88,066 aircraft operations, an average of 241 per day: 52% military, 9% commercial air carrier, 33% general aviation and 7% air taxi. Additional aircraft operations may occur outside normal business hours.



## Chapter 2: Surrounding Land Use Plans

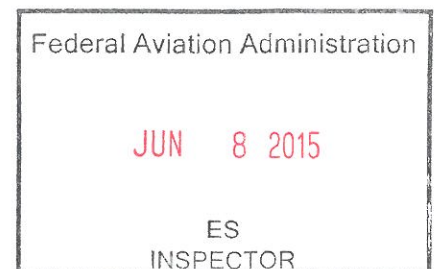
The City of Yuma General Plan dated June 2012, does not identify any specific developments that could inadvertently create new wildlife attractants. However the plan emphasizes creation of open spaces when possible, which includes developments such as habitat restoration projects.

YIA is encouraged to meet at least annually with the City Planning Department to educate staff on the FAA definition of wildlife attractants outlined in AC 150/5200-33B and encourage staff to abide by recommended separation distances when permitting developments that could inadvertently create new wildlife attractants.

The Yuma International Airport Master Plan dated December 2008 does not identify any future construction projects that could create new wildlife attractants. The Airport Director is encouraged to review all future construction plans to ensure that new buildings do not create bird roosts and that all drainage projects do not create new wetlands or ponds.

The Marine Corp Air Station Yuma Master Plan Dated March 2014 does not identify any future construction projects that could create new wildlife attractants. The station's recommended plant list contains only native species that minimize wildlife habitat development and drainage facilities are designed to percolate water quickly with minimal vegetation plantings. The Airport Director is encouraged to meet at least annually with station planners to educate staff on the FAA definition of wildlife attractants and separation distances.

Yuma Conservation Garden and Education Center is located across the street from the NE corner of Yuma International airport and labeled on the GIS Map as Wetland 1. The Garden is privately owned and contains approximately five acres of desert xeriscape and an approximately one acre wetland. The Garden was constructed for conservation and education purposes. Although no formal Master Plan exists for the Garden there are informal plans for expansion to accommodate additional student visitors. The wetland meets the FAA definition of a wildlife attractant but the desert xeriscape provides minimal wildlife habitat. The migratory and domestic birds associated with the wetland are attracted by the supplemental feeding actively encouraged by Garden management. Due to the conservation oriented mission of the Garden, wildlife management is not an option. Additional information regarding the Conservation Garden can be found on their web site: <http://www.yumaconservationgarden.org/index.htm> .



## CHAPTER 3 RESULTS OF WILDLIFE SURVEYS

FAA regulations codified in 14 CFR § 139.337 require a WHA, in part, to:

- (1) Identify wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences.
- (2) Identify and locate features on and near the airport that attract wildlife.
- (3) Describe wildlife hazards to air carrier operations.

The wildlife surveys conducted as part of the WHA at NYL were designed to comply with these requirements. The following is a discussion of the methods used to conduct the wildlife surveys.

### Chapter 3A. 1. Survey Methodology

In accordance with FAA recognition of potential aviation hazards, survey points were chosen to include:

- Points at which aircraft would be below critical altitudes for bird strikes,
- Points that address various habitats or wildlife attractants on and near the airfield and,
- Points that include movement corridors by which hazardous wildlife would be attracted into the flight path and to the area surrounding the airfield.

The first step in selection of the survey points for the NYL WHA was to obtain aerial photos of the region, which allowed us to develop an understanding of the area within the five-mile separation distance around the airport. In particular, we were able to obtain information on the locations of FAA defined wildlife attractants such as agricultural areas, and urban ornamental landscaping.

In November 2013, AWC traveled to Yuma International Airport to conduct the project setup which resulted in the establishment of survey routes and survey points. The field surveys for this study ran from December 2013 through November 2014. The sampling design was based on FAA AC 150/5200-33B (Hazardous Wildlife Attractants on or near Airports), which defines several habitat types that the FAA identifies as wildlife attractants. AWC followed the US Fish and Wildlife Service Breeding Bird Survey protocol (Robbins et al. 1967, Droege 1990). This survey protocol allows establishment of survey routes or transects through each of the FAA defined wildlife attractants. Survey points were established at regular intervals along the routes, usually at ½ to 1 mile intervals. At each survey point, a five-minute count, commonly referred to as a time area count, was conducted and each bird or flock of birds observed with an ¼ mile radius of the survey point was identified to the lowest taxon possible and data recorded on a standardized data sheet. The data were entered into Excel spreadsheets within a week of data collection and tabulated as to total number of birds observed by taxon. All data entry was hand verified with the original data sheet to ensure accuracy of the entry.

During this project kick off and setup, a total of 29 sample locations were selected that represent four of the six FAA defined wildlife attractants plus the Aircraft Operating Area (AOA) Habitats which would represent the other two FAA defined wildlife attractants (Spoil Pile and Water Management Facility) did not exist or were not accessible within the 5-mile radius around NYL.

Federal Aviation Administration

INSPECTOR



Table 2. Number of survey points in each wildlife attractant route.

Wildlife Attractant	Number of Survey Points
Transfer Station	1
Agriculture	10
Urban Landscaping	2
Wetland	3
<u>Aircraft Operations Area</u>	<u>13</u>
Total	29

This sampling scheme accounts for 29 individual survey points and duplicate counts by censusing points twice per month for a total of 58 points per month. This technique allows AWC to achieve repeat sampling as recommended in the FAA manual *Wildlife Hazard Management at Airports*. Surveys were conducted for two days during the first week of each month for 12 consecutive months. A GIS based map showing the locations of all survey routes and points was prepared. All birds observed were identified to species and numbers recorded.

Time-area avian surveys were conducted at each of these sites twice during each month beginning in December 2013 and ending in November 2014. During the first survey of each month, sites were surveyed in the mornings (AM) starting around sunrise and concluding near noon. During the second survey of each month, the same sites were surveyed in the afternoon (PM) starting near noon and concluding near sunset. This survey protocol accounted for the FAA requirement to evaluate morning, mid-day, and evening wildlife activity periods.

The sampling design accounted for 29 points being surveyed twice each month for 12 consecutive months for a total of 696 individual surveys. Each survey required the majority of two days of staff time to visit each of the 29 survey points. Of the two monthly surveys, AM and PM, the highest count was used for data analysis as this represents the greatest wildlife hazard at that point in time.

A GIS based map was prepared showing the locations of all 29 survey points (Appendix A). The five mile separation distances are represented by a circle drawn from the center of the airport.

Wildlife species observed were grouped into guilds (Serveringhaus 1981). For our purposes, we used the guild concept suggested by Root (1967) where a guild is a group of organisms that exploit the available environmental resources in a similar way. When grouped according to species, the sample size was often too small for effective analyses; therefore, development of guilds improved the interpretation of the data. Moreover, the guilds we selected tend to loosely correspond to taxonomic classifications traditionally used. Gulls and Canada geese were listed individually because of the history these species have in major bird strikes.

Based upon the data collected during the NYL WHA, we selected the following guilds:

***Gulls and Canada Geese***- These two species of birds were recorded and analyzed as separate guilds because of their extensive wildlife strike history. Gulls are responsible for more damage to

Federal Aviation Administration  
 JUN 8 2015  
 INSPECTOR

aircraft than any other species and Canada Geese are responsible for more human fatalities than any other species.

Specific hazards posed by gulls to air carrier operations: Gulls are medium-sized birds that prefer open areas near water. They are often observed forming large flocks where food is present. They commonly loaf on airport movement areas during heavy rain events.

Specific hazards posed by Canada geese are well documented. These birds are responsible for significant damage to aircraft and several accidents which resulted in the loss of life. This was also the species responsible for the aircraft crash into the Hudson River in 2009.

**Waterfowl-** For the purposes of this study, this guild consists of Ducks, Coots, and Grebes. Waterfowl are generally medium to large birds that feed on a variety of aquatic sources including vegetation, insects, and fish. They are most often associated with water, but some species graze in short grass on or near airport properties. Many of the species are migratory and are most abundant during spring and fall migrations.

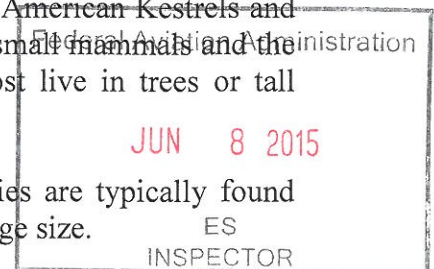
Specific hazards posed by waterfowl to air carrier operations: Waterfowl are medium to large-sized birds that can pose a significant threat to aircraft as individuals. However, these birds often form larger flocks during migrations causing an increase in risk to aircraft collisions. Foraging preferences can put these birds in close proximity to aircraft movement areas where wet areas are located.

**Doves and Pigeons-** Doves and Pigeons are small to medium sized birds. These are common grainivores that are abundant in urban and rural areas throughout the state of Arizona. They are robust flyers, gregarious (flocking) in nature, and prefer warm open habitats. They tend to nest in or on tall structures such as trees and buildings.

Specific hazards posed by doves and pigeons to air carrier operations: Doves are a small-sized bird that does not pose a large threat to aircraft as individuals; however, these birds are known to flock during the non-nesting season. The greatest risk with the Mourning Dove comes from their preference for open habitat and bare areas. Therefore, not only do these birds flock, but they feed, roost, and loaf on movement areas putting them at a greater risk of an aircraft collision. Pigeons are typically seen roosting on rooftops, under bridges, on building ledges, under canopies and other sheltered structures, and feed on grains, seeds, insects as well as garbage. Pigeons are not typically found within the movement area and pose a low risk to aircraft at NYL.

**Hawks and Owls-** This guild consists of raptors such as Great Horned Owls, Barn Owls, Nighthawks, Red-tailed Hawks, Cooper's Hawks, Sharp-shinned Hawks, American Kestrels and Bald and Golden Eagles. The larger hawks and owls feed on medium to small mammals and the smaller hawks and owls feed on small rodents, birds, and insects. Most live in trees or tall structures such as towers, barns, and buildings.

Specific hazards posed by raptors to air carrier operations: These species are typically found flying solo or in pairs and pose significant threat to aircraft due to their large size.



**Vultures** - Although turkey vultures are often considered raptors, they have been separated out for the purposes of this study. These large birds soar at high altitudes, congregate in flocks, and feed on carrion as opposed to most raptors that feed on live prey items. Most vultures roost on power poles and high voltage transmission towers.

Specific hazards posed by vultures include large flock size and are generally observed soaring or hunting in flight; therefore, have a greater risk of colliding with aircraft.

**Corvids** - This guild includes American crows, Magpies, and Common ravens. Members of this guild fly solitarily or in flocks and commonly forage in agricultural fields, open spaces, and at landfills.

**Blackbirds** - We considered this guild to consist of great-tailed grackles, red-winged blackbirds, Brewer's blackbirds, European starlings, and brown-headed cowbirds. They frequent areas with water and forage near livestock feeding and agriculture fields.

Specific hazards posed by corvids and blackbirds to air carrier operations: Crows and grackles are typically larger birds and could cause significant damage if struck. They are not commonly found in large flocks; however, they will form large congregations in the fall and throughout winter. During the nesting season (February to May) they are seen in pairs or in small family groups. These species are highly intelligent and are able to avoid most collisions with aircraft. They are also rarely seen soaring at high elevations with aircraft and frequently observed scavenging for carcasses. Blackbirds and Starlings do not pose a threat to aircraft as individuals but the risk comes from their flocking behaviors. A bird strike involving a flock could have serious consequences.

**Shorebirds**- This guild consists of Killdeer, Bitterns, Plovers, White faced Ibis, Stilts, Avocets, and Sandpipers. These birds are often found along shorelines, in irrigated agricultural fields and near standing water, foraging and wading into the water. Shorebirds feed on a variety of animals including invertebrates, frogs, and fish.

Specific hazards posed by shorebirds to air carrier operations: Shorebirds are medium-sized birds that do not pose a significant threat to aircraft as individuals. However, these birds do often form larger flocks during winter months causing an increase in risk to aircraft collisions. Tendencies of these birds to prefer open habitats with bare ground make movement areas at airports attractive.

**Fish Eating Birds**- This guild consists of Pelicans, Cormorants, Herons, and Egrets. These birds are often found along shorelines in wetlands, drainage ditches, lakes, and ponds. As the name implies, these birds feed mostly on fish and aquatic invertebrates.

Specific hazards posed by fish eating birds to air carrier operations: Herons and egrets can be of high risk to aircraft due to their large size and slow, low flying behaviors. These birds are of highest risk during migration periods when these species are known to form large flocks.

Federal Aviation Administration  
JUN 8 2015  
ES  
INSPECTOR

**Ground birds-** This guild consists of small to medium sized birds that spend most of their time on the ground and only fly short distances in the air, typically low to the ground but will flush wildly and fly for short distances when startled. These birds include Horned Larks, Meadowlarks, Sparrows, Swallows, Robins, Martins, and Mockingbirds. These birds forage and loaf on the ground, but they also perch and roost in trees.

This guild also encompassed songbirds, which consisted of small perching birds including, but not limited to Sparrows, Finches, Warblers, Hummingbirds, Larks, Woodpeckers, Flickers, Flycatchers, and Shrikes. These birds tend to be associated with shrubs, trees and dense foliage. Larks however, are found in open spaces such as grasslands and along runways. Swallows are slender aerialists with long, pointed wings.

Specific hazards posed by ground birds to air carrier operations: Ground Birds do not pose a threat to aircraft as individuals. The risk comes from their flocking behaviors. A bird strike involving a flock of Ground Birds could have serious consequences.

### **Chapter 3A 2. Habitat Description**

The airfield is mostly devoid of vegetation with only isolated patches of sparse creosote bush. The urban area surrounding the airfield was composed of typical urban ornamental landscaping including turf grass, native trees and shrubs. The area west of the airfield was dominated by agricultural lands where row crops of vegetables and alfalfa were grown.

### **Chapter 3B. Wildlife Survey Results:**

#### **Chapter 3B.1. Survey Route Description:**

**Transfer Station or Landfill Route:** A putrescible waste Transfer Station owned and operated by Allied Waste is located approximately one half mile NE of the end of runway 3. Only one survey point was needed to observe the entire area.

**Agriculture Route:** This route surveyed agricultural croplands surrounding the airport. These croplands consisted of various vegetables and alfalfa. This route consisted of 10 survey points.

**Urban Ornamental Landscaping Route:** This route surveyed a golf course and a desert botanical garden. This route consisted of 2 survey points.

**Wetland Route:** This route surveyed natural and man-made wetlands along the Colorado River. The man-made wetlands were part of the East Wetland Restoration Project which was designed to enhance wildlife habitat along the Colorado River. This route consisted of 3 survey points.

**Aircraft Operations Area Route:** Encompassed the Aircraft Operations Area. A total of 13 survey points were located at one mile intervals along the perimeter fence of the Airport Operations Area. The points along this route are labeled YAOA and MAOA to distinguish between the area under control of Yuma International Airport vs. the Marine Corp Air Station.

#### **Chapter 3B.2. General Results**

During these surveys, a total of 37,109 birds were counted (Table 3 and Figure 1)

Federal Aviation Administration  
JUN 8 2015  
ES  
INSPECTOR

Table 3. Total wildlife observed along each wildlife attractant route.

	Dec-13	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Total
Transfer Station	535	444	438	315	86	84	80	112	121	261	192	311	2979
AG	1937	922	997	1230	1098	997	2110	2680	1387	1609	2178	841	17986
Urban	157	264	235	365	322	244	228	286	303	251	431	498	3584
	465	742	796	274	242	440	411	592	410	454	763	898	6487
AOA	81	268	670	331	289	347	1115	1399	798	233	131	411	6073
Total	3175	2640	3136	2515	2037	2112	3944	5069	3019	2808	3695	2959	37109

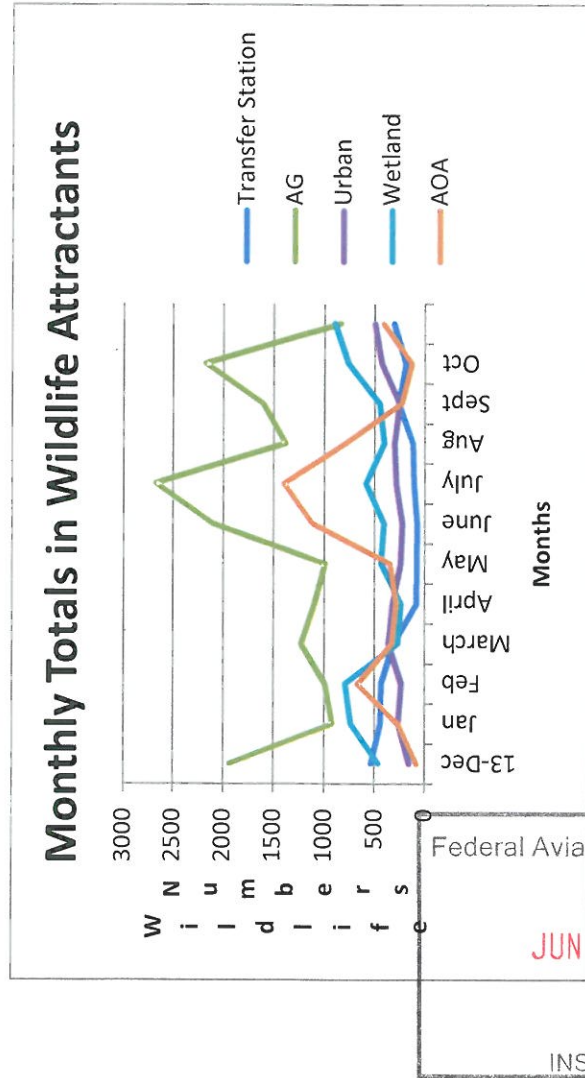


Figure 1. Total wildlife observed along each wildlife attractant route.

In addition to determining the seasonal pattern and wildlife attractants for the total number of birds observed during the NYL WHA, we also analyzed the data to determine which guilds were most prevalent in the study area. The most abundant guilds within the study area were: doves 61%, blackbirds 19% and ground birds 10% (Table 4 and Figure 2).

The Agricultural Route clearly retained the highest number of hazardous species. The Wetland Route and AOA route ranked next due to the high number of doves observed during spring and summer.

Table 4. Total wildlife numbers by guild along each wildlife attractant route.

	TS	AG	Urban	Wetland	AOA	Total	% Total
Gulls	135	2	0	1	4	142	0%
C. Geese	0	0	0	0	0	0	0%
Waterfowl	0	91	817	92	0	1000	3%
Dove	636	10799	1818	5197	4172	22622	61%
Hawk Owls	1	51	9	39	96	196	1%
Blackbirds	780	3439	655	689	1345	6908	19%
Vultures	0	53	5	3	24	85	0%
Corvids	0	0	0	0	0	0	0%
Shorebirds	9	180	100	27	18	334	1%
Ground Birds	99	2780	173	375	336	3763	10%
Fish Eating	1319	591	7	64	78	2059	6%
Total	2979	17986	3584	6487	6073	37109	100%
% Total	9%	48%	10%	17%	16%		

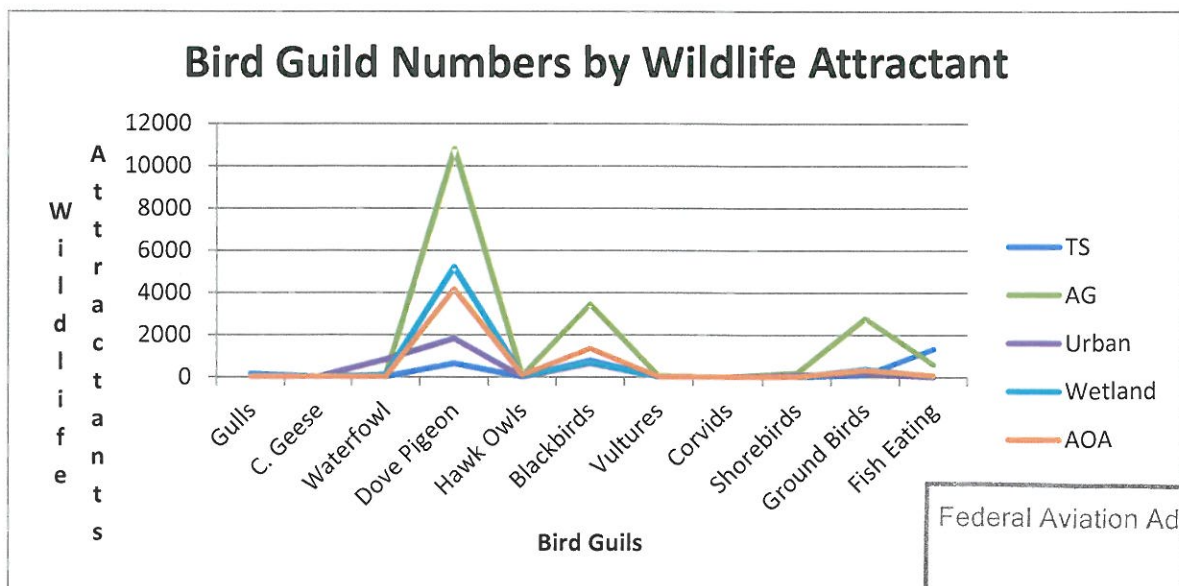


Figure 2. Total guild counts in each wildlife attractant.

Federal Aviation Administration  
JUN 8 2015  
INSPECTOR

Table 5. Comparison of AM vs. PM surveys.

	Dec-13	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Total
AM	2037	2640	3136	1949	1429	2112	2174	3175	3019	2808	3695	2959	31133
PM	3175	2485	2741	2515	2037	1907	3944	5069	2977	2171	2805	2312	34138

These data suggest that PM surveys produced slightly higher but not statistically significantly different counts than AM surveys (Table 5 and Figure 3). This data is consistent with the statistical analysis conducted on the Phoenix Sky Harbor WHA that also showed no statistical difference in morning vs. evening surveys (Servos et.al. 2000).

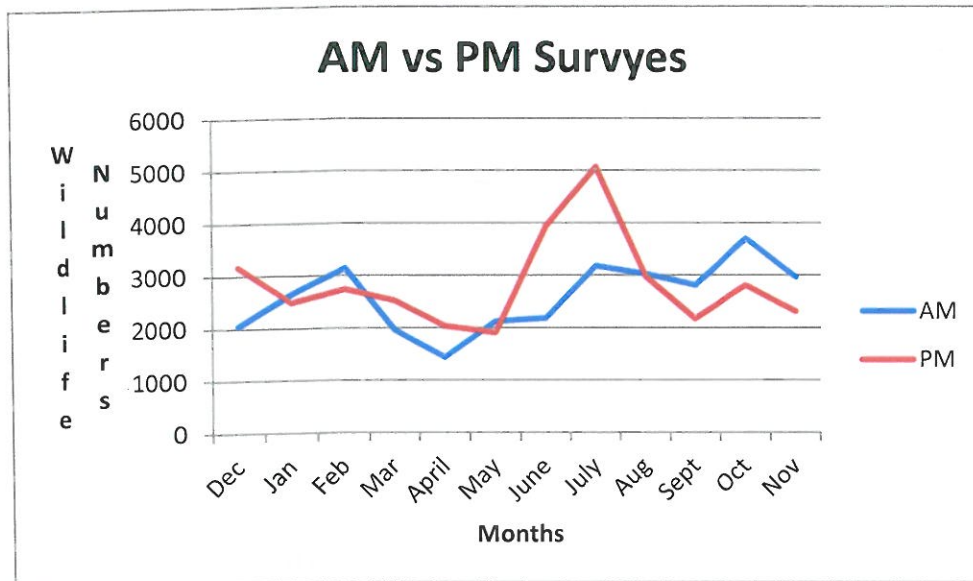
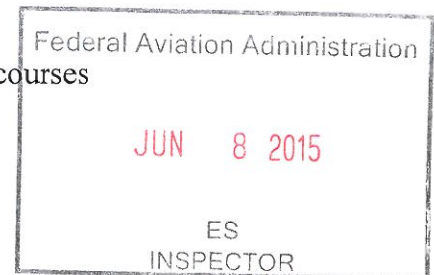


Figure 3. Comparison of AM vs. PM surveys.

### Chapter 3B. 3. Individual Survey Results for Wildlife Attractant Routes.

To identify potential wildlife attractants within the 5-mile radius of NYL we searched the area for the following wildlife attractants or habitat classifications as described in FAA AC 5200-33b as follows:

1. Ornamental landscaping – Urban areas including parks and golf courses
2. Wetlands
3. Agriculture – farmlands and grazing areas
4. Landfills or Transfer Stations
5. Dredge or Spoil Piles
6. Water Management Facilities



During the development phase of the NYL WHA, we determined that the first four of the six wildlife attractants from the list above occurred within 5 miles of NYL. Habitat for the remaining two wildlife attractants (5&6) did not exist or were not accessible within five miles of NYL.

### Chapter 3B.3D. Wetland Route Results

This wildlife attractant route consisted of several man made wetlands associated with a habitat restoration project on the Colorado River. A total of 6,487 birds were observed along this route. White Winged Doves accounted for 80% of all the birds observed along this route, while blackbirds accounted for 11% (Table 9 and Figure 7). Doves exhibited a seasonal distribution.

Table 9. Wetland Route Survey Results

Bird Group	Dec-13	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Total
Gulls	0	1	0	0	0	0	0	0	0	0	0	0	1
C. Geese	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterfowl	2	39	9	9	0	1	0	0	2	0	7	23	92
Dove	439	545	646	181	152	174	370	567	357	407	578	781	5197
Hawk Owls	1	4	0	1	0	1	0	0	2	25	3	2	39
Blackbirds	8	127	102	34	41	103	19	18	36	21	124	56	689
Vultures	0	0	0	1	0	1	0	0	0	0	0	1	3
Corvids	0	0	0	0	0	0	0	0	0	0	0	0	0
Shorebirds	0	10	2	0	2	3	2	2	2	1	3	0	27
Ground Birds	8	15	29	26	31	154	18	5	9	0	48	32	375
Fish Eating	7	1	8	22	16	3	2	0	2	0	0	3	64
Total	465	742	796	274	242	440	411	592	410	454	763	898	6487

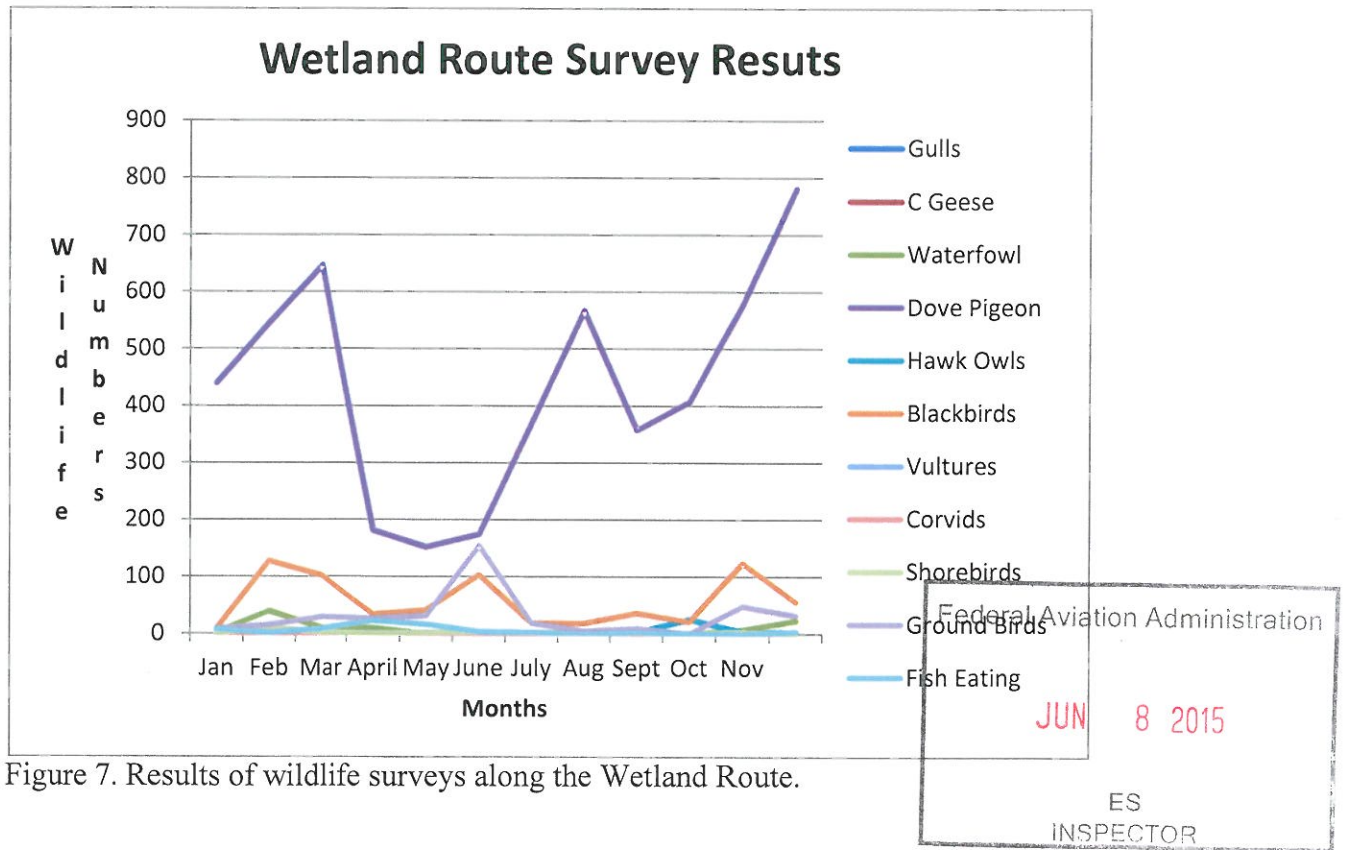


Figure 7. Results of wildlife surveys along the Wetland Route.



### Chapter 3B.3E. Aircraft Operations Area (AOA) Route Results

This wildlife attractant route surveyed birds along the perimeter road inside the perimeter fence. Survey points YAOA 2 & 3 and MAOA 2 & 3 recorded birds around airport buildings and the terminal. A small number of pigeons were observed roosting on and a hangar at point YAOA 3. A total of 6,073 birds were observed along this route. White Winged Doves accounted for 69% of all the birds observed along this route and Blackbirds accounted for 22% (Table 10 and Figure 8). Doves exhibited a seasonal distribution.

Table 10. AOA Route Survey Results

Bird Group	Dec-13	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Total
Gulls	0	1	3	0	0	0	0	0	0	0	0	0	4
C. Geese	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterfowl	0	0	0	0	0	0	0	0	0	0	0	0	0
Dove	31	134	169	73	141	262	1037	1366	699	143	34	83	4172
Hawk Owls	7	11	18	4	8	4	8	5	14	7	8	2	96
Blackbirds	18	62	434	155	121	37	50	16	55	40	50	307	1345
Vultures	7	0	1	1	0	5	0	2	1	2	3	2	24
Corvids	0	0	0	0	0	0	0	0	0	0	0	0	0
Shorebirds	0	13	0	0	0	1	0	0	0	1	2	1	18
Ground Birds	18	47	45	28	19	37	15	8	29	40	34	16	336
Fish Eating	0	0	0	70	0	1	5	2	0	0	0	0	78
Total	81	268	670	331	289	347	1115	1399	798	233	131	411	6073

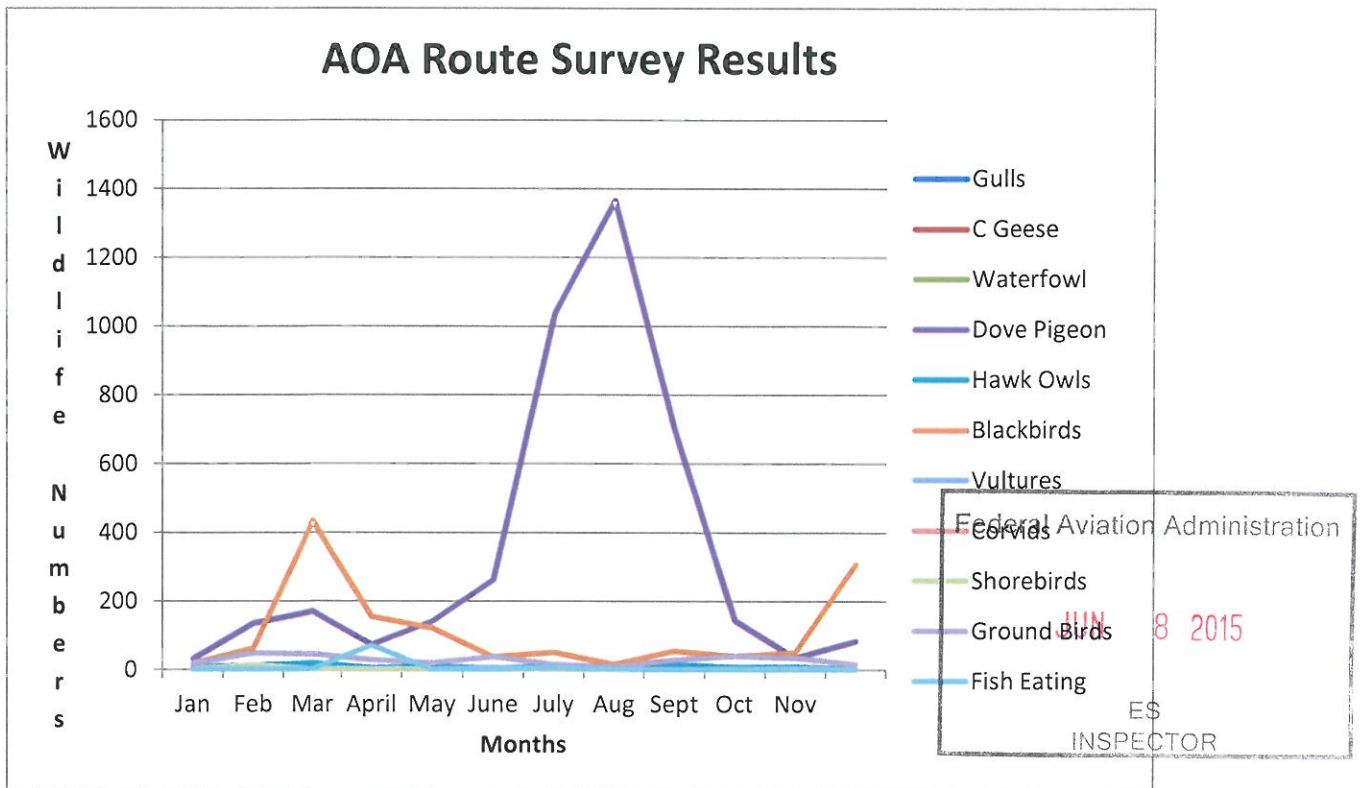


Figure 8. Results of wildlife surveys in the Aircraft Operations Area

vacated the area in favor of a communal nesting and roosting site. White winged doves also exhibited a seasonal movement pattern vacating the area in September to migrate south for the winter returning in March.

Both Egrets and White Winged Doves developed daily flightlines that intersected aircraft approach and departure corridors. AWC field biologists located a large communal roost and nesting area that was utilized by egrets on a daily basis. The roost was located in the Yuma Valley south of County 14<sup>th</sup> between Avenue A and Highway 95 (Figure 9). The birds would fly from the SW to the NE in the morning when flying from the roost to the feeding site at the Allied Waste Transfer Station and return in the opposite direction in the evening. The birds would fly at elevations of less than 300 feet AGL.

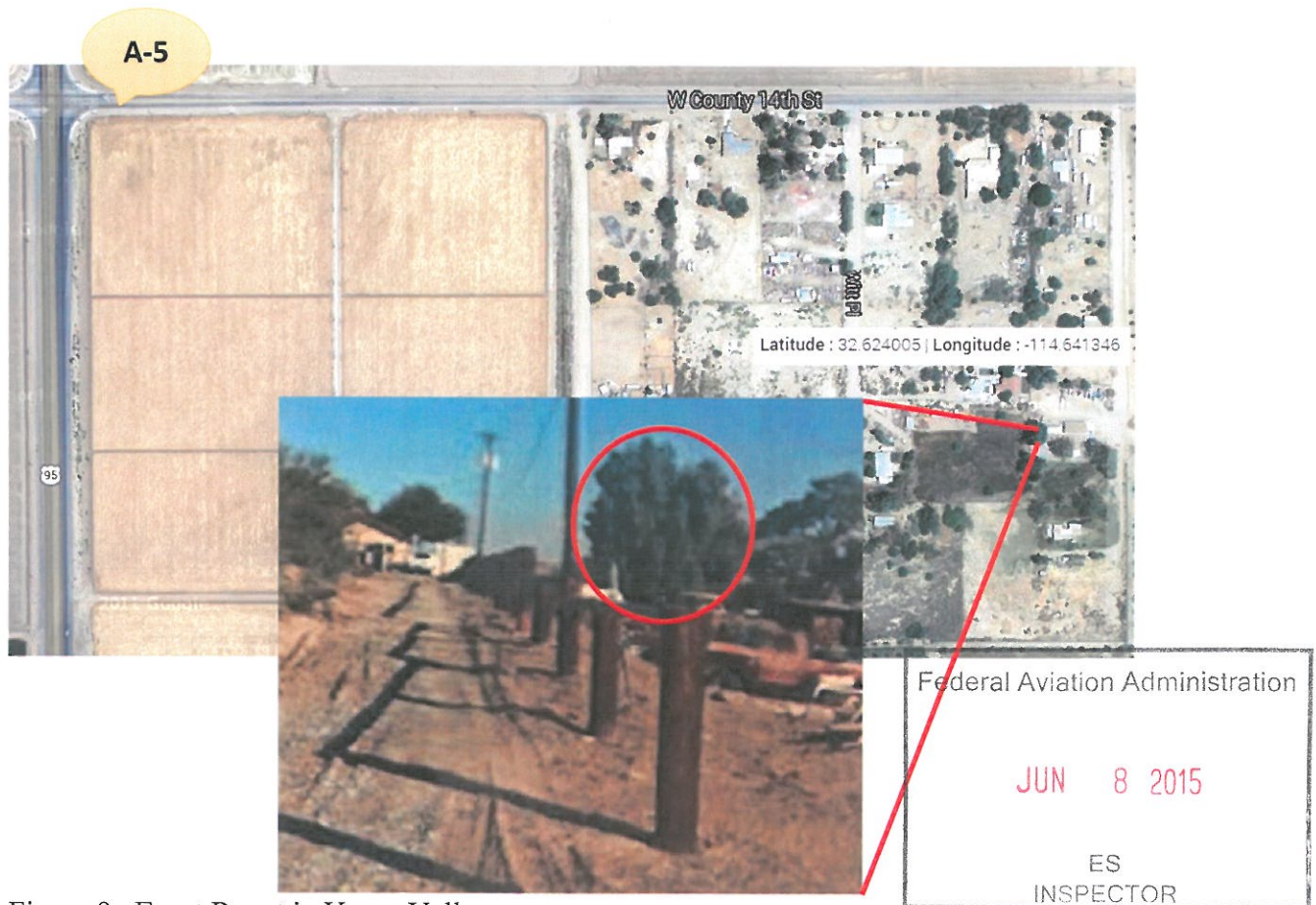


Figure 9. Egret Roost in Yuma Valley.

White Winged Doves roost and nest in a large citrus growing area east and south of the airport on the Yuma Mesa (Figure 10). The doves fly east to west in the morning to feed in the agricultural fields west of the airport in the Yuma Valley and return in the opposite direction in the evening. The doves fly at an estimated elevation of less than 300 feet AGL intersecting the aircraft approach and departure corridors.



Figure 10. White Wing Dove roosting and nesting habitat east and south of the airport, shaded green, and feeding habitat west of the airport, shaded tan.

### Chapter 3D: Legal Status of Species

AWC reviewed records supplied by the US Fish and Wildlife Service, and Arizona Game and Fish Department for known occurrences of federally and state listed Threatened and Endangered (T&E) species in the vicinity of NYL (Table 13). The US Fish and Wildlife Service and the Arizona Game and Fish Department records contained no known observations of T&E species on or near NYL. AWC’s field observations indicate no suitable habitat is present for any T&E species on or near NYL.

Table 13. List of Threatened and Endangered Species Known to Occur Near NYL.

Species	Federal Status	State Status	Historical Observation Records near NYL	Suitable Habitat on or near NYL
Yellow Billed Cuckoo	PT	WSC	NO	NO
Southwestern Willow Flycatcher	LE	WSC	NO	NO
Yuma Clapper Rail	LE	WSC	NO	NO
Desert Pupfish	LE	WSC	NO	NO
Razorback Sucker	LE	WSC	NO	NO
Sonoran Pronghorn	LE	WSC	NO	NO
Lesser Long Nosed Bat	LE	WSC	NO	NO
Sonoran Desert Tortoise	C	WSC	NO	NO
Flat Tailed Horned Lizzard	Conservation Agreement	WSC	YES	YES

Federal Aviation Administration  
 JUN 8 2015  
 INSPECTOR

Codes: WSC—State of Arizona Wildlife of Special Concern, C-Candidate, PT-Proposed Threatened, LE-Listed Endangered, LT-Listed Threatened

## Chapter 3E: Overview of Current Wildlife Management Program at NYL

MCAS-Yuma personnel are primarily responsible for wildlife management actions and conduct limited lethal control according to provisions of a federal depredation permit issued by the US Fish and Wildlife Service (Permit #MB87954A-0). Wildlife Management activities are outlined in the base Bird Aircraft Strike Hazard Plan (BASH) Plan dated December 2007. MCAS-Yuma appears to have sufficient personnel and equipment to conduct the wildlife management program and additional contractor assistance is not needed at this time. This BASH Plan requires semi-annual meetings of a Wildlife Working Group, but does not include participants from YIA.

Wildlife management activities conducted within the AOA consist primarily of preventative controls through habitat modifications. The entire AOA is devoid of trees and tall vegetation thereby eliminating all wildlife roosting and nesting habitat. The habitat existing in the AOA is composed of sparse creosote bush, which provides minimal wildlife roosting and nesting habitat. The AOA is graded to permit drainage of stormwater into retention basins that hold water for a short period of time after storm events. These habitat modifications reduce the amount of food, water, and shelter available to wildlife, thus preventing wildlife from inhabiting the AOA. This preventative control is nonlethal, long term, and publicly acceptable.

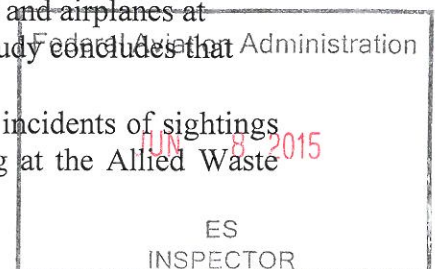
These preventative controls are supplemented with limited lethal and nonlethal control techniques. Nonlethal techniques include wildlife hazing with sirens, horns, vehicle herding and human harassment. The YIA Operations staff conduct daily wildlife patrols in the AOA. These patrol personnel identify wildlife hazards on the airport and recommend appropriate control actions.

## Chapter 4. Hazard Analysis and Recommendations

### Chapter 4A. Hazard Analysis

#### Allied Waste Transfer Station

- Several species of egrets were observed feeding at the open air putrescible waste Transfer Station owned and operated by Allied Waste.
- This facility is located approximately one half mile off the end of Runway 3.
- Egrets utilizing this facility used a flightline to and from roosting sites that intersected aircraft approach and departure corridors.
- Although there are no documented collisions between egrets and airplanes at NYL and egrets have a relatively low hazard ranking, this study concludes that egrets do present a threat to aircraft operations at NYL.
- Based on the potential for these birds to cause damage, the incidents of sightings in and near the AOA AWC determined that egrets feeding at the Allied Waste Transfer Station pose a wildlife hazard at NYL.



**Hazards:** FAA AC 150/5200-33B provides a hazard ranking for various species of wildlife as does a recent USDA publication (DeVault et. at. 2011) (Table 14.). Both publications assign a hazard ranking on a scale of 1-100 where 100 is the highest hazard ranking score.

The species of wildlife listed below have the potential to produce engine ingestions and cause structural damage to aircraft. The following table presents the hazard ranking for species of birds observed in the AOA.

Table 14. Hazard rankings for wildlife observed at NYL.

Species	AC 150/5200-33B	DeVault et.al. 2011
Egrets	27	28
Doves	14	10
Pigeons	23	20
Hawks	25	25
Vultures	64	44
Coyotes	14	22
Jackrabbits	N/A	13

*Transfer Station Mitigation:*

Enlist assistance from the FAA to coordinate with Allied Waste Corporate Office to develop a plan to enclose the Transfer Station. The FAA has successfully conducted similar projects with Waste Management. Non-lethal controls will have limited effectiveness due to the difficulty in chasing birds away from a high quality food source such as the one that exists at the Transfer Station. Lethal control is not practical in this highly urbanized area. Therefore conversion to a fully enclosed facility is, in reality, the only practical solution for mitigation of this wildlife hazard.

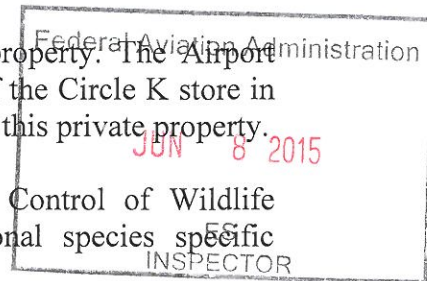
**Pigeons in the AOA**

- A small number of pigeons were observed roosting on and in hangar in the AOA.
- The source of the pigeon problem in the area appeared to be the Circle K store across the street from the Main Terminal Building where 30-50 pigeons were observed feeding in open trash containers and on refuse left in the parking lot.
- Based on their hazard ranking, the potential for these birds to cause damage, and the incidents of sightings in and near the AOA AWC determined that pigeons pose a wildlife hazard at NYL.

*Pigeon Mitigation:*

YIA Operations staff should begin trapping pigeons on airport property. The Airport Director should initiate a meeting with the owners and managers of the Circle K store in an attempt to secure a pest control contract for pigeon removal from this private property.

YIA should also refer to the manual entitled “Prevention and Control of Wildlife Damage” published by the University of Nebraska for additional species specific recommendations for mitigations (Hyngstrom et.al.).



## Hawks and Vultures in the AOA

- Hawks were observed roosting on airport towers and soaring in the AOA looking for food.
- Vultures were observed soaring in the AOA.
- Based on their hazard ranking, the potential for these birds to cause damage, and the incidents of sightings in and near the AOA AWC determined that hawks and vultures pose a wildlife hazard at NYL.

### *Hawk and Vulture Mitigation:*

YIA Operations staff should begin installation of bird spikes on towers commonly used by hawks as perching sites. YIA Operations staff should acquire a supply of pyrotechnics and begin hazing hawks and vultures from the AOA.

YIA should also refer to the manual entitled “Prevention and Control of Wildlife Damage” published by the University of Nebraska for additional species specific recommendations for mitigations (Hygnsstrom et.al.).

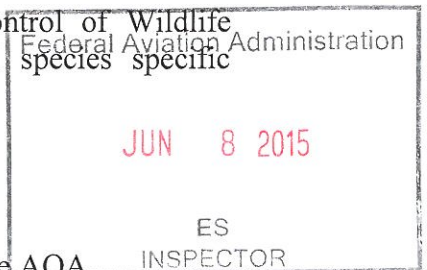
## White Winged and Mourning Doves in and near the AOA

- Both species of doves are quite common in and near the AOA.
- A flightline of doves exists that intersects the aircraft approach and departure corridors.
- Based on their hazard ranking, the potential for these birds to cause damage, and the incidents of sightings in and near the AOA AWC determined that doves pose a wildlife hazard at NYL.

### *Dove Mitigation:*

MCAS Yuma Range Management Department implements an active dove hunting program on the agricultural fields under its ownership south and east of the runway. YIA should support sport hunting of doves in the area surrounding NYL. The YIA Airport Director should meet at least annually with the county planning and zoning department to advocate intensified residential and commercial developments in the area east and south of the airport in order to remove dove roosting habitat.

YIA should also refer to the manual entitled “Prevention and Control of Wildlife Damage” published by the University of Nebraska for additional species specific recommendations for mitigations (Hygnsstrom et.al.).



## Mammals in the AOA

- Coyotes and small mammals are minimally present in the AOA.
- Jackrabbits are routinely observed during nighttime patrols in the AOA.
- MCAS-Yuma Range Management Department Range Wardens have conducted jackrabbit population reductions in years past.

- Based on the potential for these developments to create new wildlife attractants, AWC concludes that Development of Lands Adjacent to NYL poses a wildlife hazard.

### *Mammal Mitigation*

The YIA Airport Manager is encouraged to continue working with the MCAS-Yuma personnel and participate in the wildlife hazard working group to monitor the jackrabbit population and determine future mitigations.

## **Chapter 4B. Recommendations:**

- 1) Develop a Wildlife Hazard Management Plan (WHMP).

Based on the presence of FAA defined wildlife attractants, and presence of wildlife species known to be hazardous to aviation AWC recommends YIA develop a WHMP. The WHMP will include (a) identification of key personnel to implement the plan; (2) identification of hazardous wildlife attractants on or near the airport; (3) identification of wildlife management techniques to minimize the hazard; (4) prioritization of appropriate management measures; (5) recommendation for necessary permits, equipment, and supplies; and (6) identification of training requirements for airport personnel.

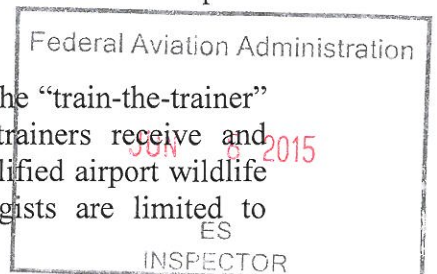
- 2) Continuation of Annual Monitoring and Management

Airports are required to update the Wildlife Hazard Management Plan every 12 consecutive months. The update will include a review of plan effectiveness when a triggering event occurs. The goal of a monitoring plan should be to determine if wildlife attractants or hazardous wildlife species have changed compared to the baseline established in the original WHA and to determine if a WHMP should be implemented or to evaluate an on-going WHMP. Currently YIA OPS Staff and MCAS-Yuma OPS and Natural Resources staff do an excellent job of monitoring wildlife populations day and night and mitigating wildlife hazards. MCAS-Yuma appears to have sufficient personnel and equipment to conduct the wildlife management program and additional contractor assistance is not needed at this time. Acquisition of an outside contractor to conduct wildlife monitoring and management is not recommended.

YIA staff should participate in the MCAS-Yuma Wildlife Hazard Working Group or consider forming a separate group that would include adjacent landowners and stakeholders. YIA should also continue the wildlife management program being conducted by airport staff using a combination of lethal and nonlethal control techniques.

- 3) Development of a Wildlife Hazard Training Program

14 CFR § 139.337(f) and AC 150/5200-35A allow Airports to use the “train-the-trainer” approach when providing the requisite training, provided the trainers receive and successfully complete their initial and recurrent training from a qualified airport wildlife biologist. Trainers who are not qualified airport wildlife biologists are limited to providing training to their airport employees.

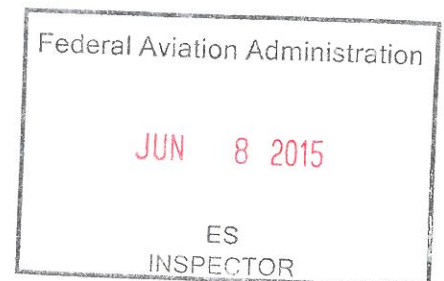


The purpose of the training will be to familiarize personnel involved with wildlife hazard management with basic wildlife identification and dispersal techniques. The training may

include hands-on training using pyrotechnics, and other deterrent equipment, with an emphasis on safety and effectiveness. These training courses will be available to all personnel who have responsibility in dispersing wildlife at NYL. Wildlife Hazard Training is required for all airport personnel involved in wildlife management every 12 consecutive months. The training will be customized to fit the needs of individual recipients and situations, and will incorporate management issues relating directly to NYL wildlife strikes, populations, and physical environment. Instruction will be tailored to competence levels and areas of participating personnel.

At a minimum the initial and recurrent training must include:

- Summary of bird strike data from the National Wildlife Strike Database
- Review of wildlife strikes, control actions, and observations over the past 12 months
- Review of the airports Wildlife Hazard Assessment
- Review of the airports Wildlife Hazard Management Plan to include:
  - Wildlife attractants
  - Wildlife permits
  - Airport specific management actions and responsibilities
- Wildlife identification
- Process for accurate voluntary reporting of wildlife strikes into the National Wildlife Strike Database
- Pyrotechnic training as appropriate
- Oral exam





## Literature Cited

DeVault, T.L. et.al. 2011. Interspecific Variation in Wildlife Hazards to Aircraft: Implications for Airport Wildlife Management. *Wildlife Society Bulletin* 35(4):394-402.

Dolbeer, R. A. 2009. Birds and aircraft – fighting for airspace in ever more crowded skies. *Human – Wildlife Conflicts* 3(2):165-166

Dolbeer, R. A., and P. Eschenfelder. 2003. Amplified bird-strike risks related to population increases of large birds in North America. Pages 49-67 *in* Proceedings of the International Bird Strike Committee meeting, Warsaw, Poland.

Droege, S. 1990. The North American Breeding Bird Survey. Pg. 1-4 *in* J. R. Sauer, and S. Droege, eds. Survey designs and statistical methods for estimation of population trends. U. S. Fish and Wildlife Service Biological Report 90(1)

Hygnstrom, S. et.al. 1994. Prevention and Control of Wildlife Damage, Univ of Neb Press.

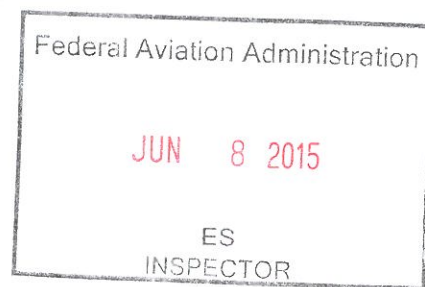
NTSB. 2009. Fourth update on investigation into ditching of US Airways jetliner into Hudson River. NTSB Advisory, 12 February 2009. National Transportation Safety Board, Washington, D.C., USA, <[http://www.nts.gov/ Pressrel/2009/090212b.html](http://www.nts.gov/Pressrel/2009/090212b.html)>.

Robbins, C. S., and W. T. Van Velzen. 1967. The breeding bird survey, 1966. US Department of Interior, Bureau of Sport Fisheries and Wildlife, Division of Wildlife Research, Migratory Bird Populations Station, Washington, DC. Special Scientific Report—Wildlife No. 102. 43pp.

Root, R. B. 1967. The niche exploration pattern of the blue-grey gnatcatcher. *Ecological Monographs* 37:317-350

Serveringhaus, W. 1981. Guild theory development as a mechanism for assessing environmental impact. *Environmental Management* 5:187-18=90

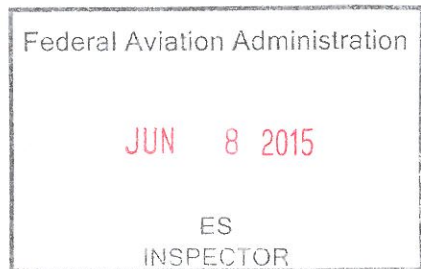
Servoss, W. et.al. 2000. Wildlife Hazard Assessment for Phoenix Sky Harbor International Airport. *International Biodeterioration and Biodegradation* 45:11-127.

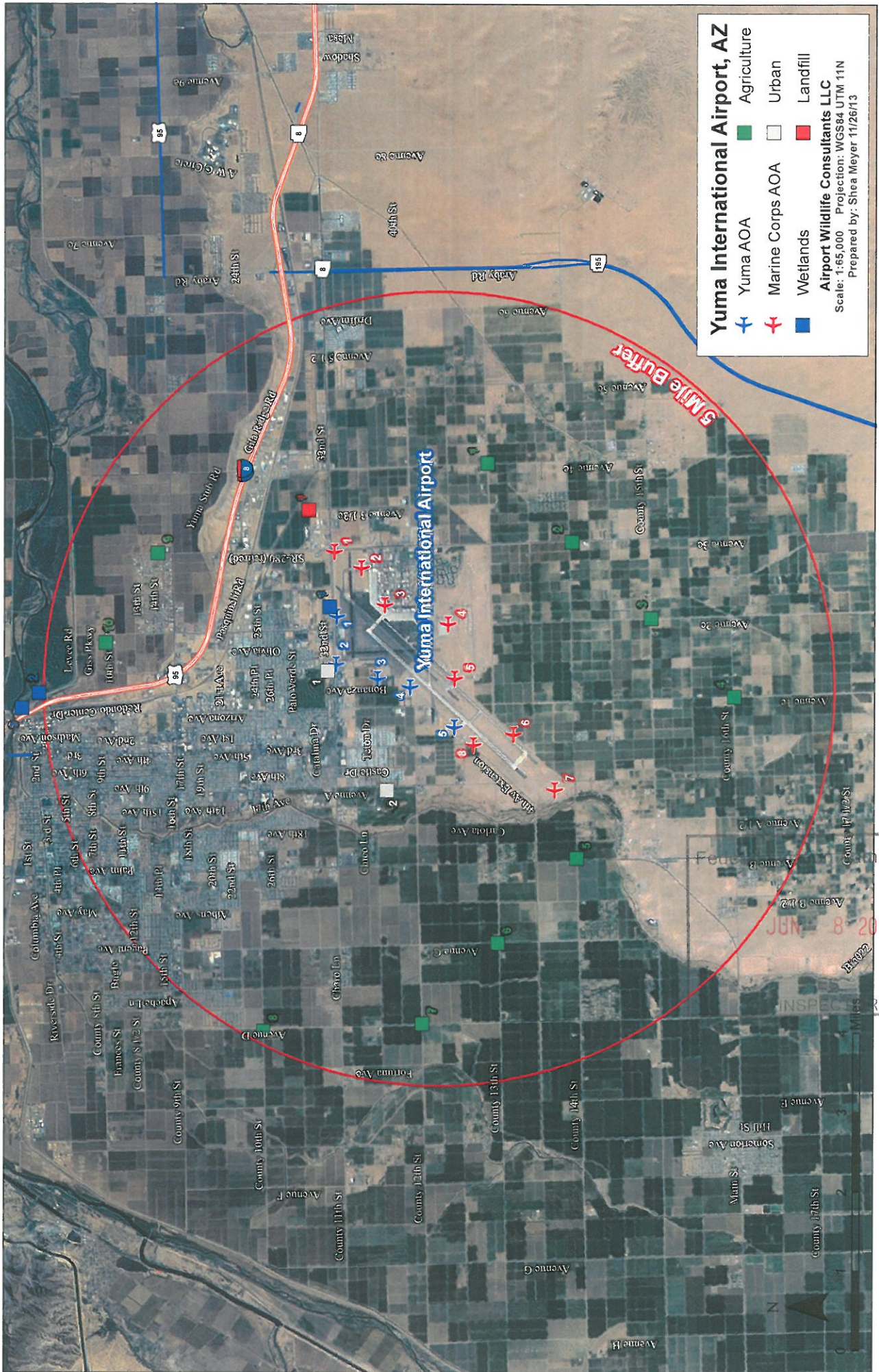


## Appendix A

### GIS Map and GPS Locations of Wildlife Survey Points

NAME	UTMN	UTME	Lat	Long
AG 1	728548	3614067	32.6406	-114.563574
AG 2	726958	3612345	32.625408	-114.580929
AG 3	725404	3610748	32.61134	-114.597855
AG 4	723820	3609057	32.596413	-114.615137
AG 5	720552	3612243	32.625785	-114.649182
AG 6	718832	3613839	32.640512	-114.667129
AG 7	717198	3615372	32.654652	-114.68418
AG 8	717037	3618600	32.68378	-114.685144
AG 9	726714	3620771	32.7014	-114.581482
AG 10	724896	3621835	32.711362	-114.600605
TS 1	727594	3617697	32.673514	-114.572852
MAOA 1	726743	3617169	32.66893	-114.582049
MAOA 2	726420	3616619	32.664039	-114.585624
MAOA 3	725665	3616144	32.659913	-114.593783
MAOA 4	725277	3614855	32.648374	-114.598228
MAOA 5	724176	3614727	32.647445	-114.609988
MAOA 6	723048	3613520	32.636794	-114.622293
MAOA 7	721928	3612686	32.629503	-114.634421
MAOA 8	722829	3614338	32.644211	-114.624431
YAOA 1	725427	3617125	32.668803	-114.596082
YAOA 2	724462	3617135	32.66909	-114.606363
YAOA 3	724166	3616292	32.661552	-114.609719
YAOA 4	724003	3615637	32.655682	-114.611613
YAOA 5	723189	3614736	32.647726	-114.620501
URB 1	724326	3617313	32.670722	-114.607769
URB 2	721917	3616101	32.660285	-114.633728
WET 1	725630	3617270	32.670068	-114.593884
WET 2	723875	3623204	32.723909	-114.61116
WET 3	723569	3623547	32.727062	-114.614341





### Yuma International Airport, AZ

- Agriculture
- Urban
- Landfill
- Wetlands
- + Marine Corps AOA
- + Yuma AOA

**Airport Wildlife Consultants LLC**  
 Scale: 1:65,000 Projection: WGS84 UTM 11N  
 Prepared by: Shea Meyer 11/26/13

Federal Administration

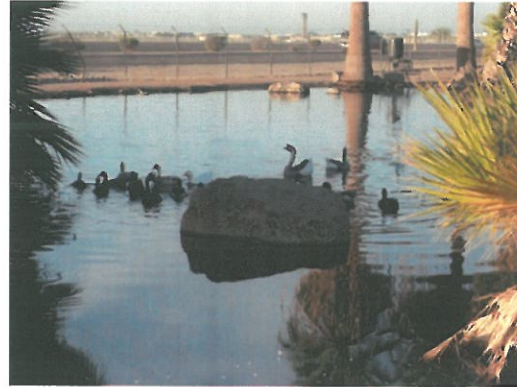
JUN 8 2015

INSPECTION

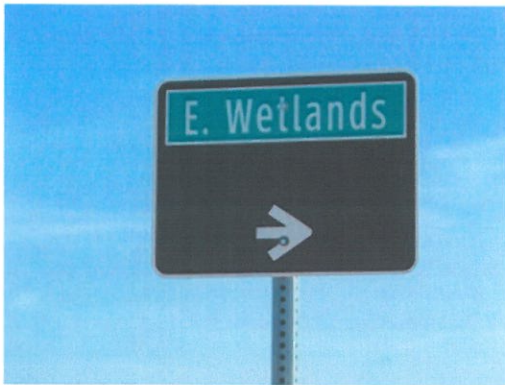
## Appendix B: Site Photos



Allied Waste Transfer Station



Conservation Garden Artificial Wetland



Colorado River Habitat Restoration Project with Resident Birds



Urban Route Golf Course



Urban Sports Complex

Federal Aviation Administration

JUN 8 2015

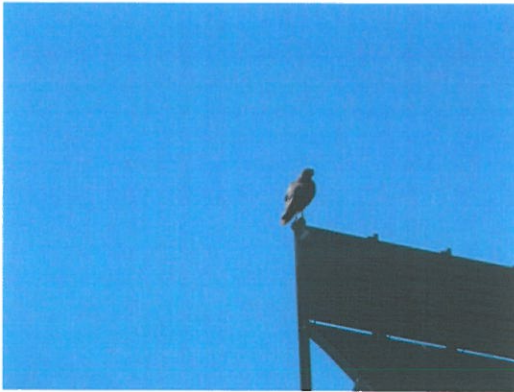
ES  
INSPECTOR



AOA Route, Note Lack of Habitat



AOA Basin with Excellent Drainage



AOA Fence Used as Hawk Perch



AOA Building Used as Pigeon Roost



AG route



AG Route

