

**BY ORDER OF THE COMMANDER  
452D AIR MOBILITY WING (AFRC)**

**MARCH AIR RESERVE BASE  
INSTRUCTION 91-212**



**21 APRIL 2023**

**Safety**

**MARCH ARB BIRD/WILDLIFE  
AIRCRAFT STRIKE HAZARD (BASH)  
INSTRUCTION**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction provides a base program to minimize aircraft exposure to potentially hazardous wildlife strikes and control bird populations that could jeopardize aircraft at March Air Reserve Base (ARB). It implements and expands guidance in Air Force Instruction (AFI) 91-202, *The United States Air Force (USAF) Mishap Prevention Program*, and AFI 91-212, *Bird Wildlife Aircraft Strike Hazard (BASH) Management Program*. This Instruction applies to all host, associate, and temporary duty organizations on March ARB units, tenants, and the Air National Guard (ANG) units who prepare, manage, review, certify, approve, disseminate and/or use official Air Force Instructions. The 452 Air Mobility Wing (AMW) Flight Safety (SEF) is the Office of Primary Responsibility (OPR). The 452 AMW Commander (CC) is responsible for implementation of this instruction. Higher Headquarters program differences in administrative guidance are authorized and will be discussed locally to ensure compliance. Tasked organizations will develop checklists, etc. as required to fulfill assigned responsibilities. This publication may not be supplemented or further implemented/extended. This instruction is derived from multiple sources. A thorough review of these references must be accomplished before seeking a waiver. As long as other directives do not exist, 452 AMW/SE is the waiver authority for this instruction. This instruction will be reviewed annually and updated, if needed. Refer recommended changes and questions about this publication to the OPR using the Air Force (AF) Form 847, *Recommendation for Change of Publication*; route AF Forms 847 through appropriate chain of command. Ensure that all records created as a result of the processes prescribed in this publication are maintained in accordance with (IAW) Air Force Instruction (AFI) 33-322, *Records Management Information*

*and Governance Program*, and disposed of in accordance with Air Force Records Information Management System Records Disposition Schedule (RDS).

## ***SUMMARY OF CHANGES***

This publication is updated to reflect updated organizational tasking, roles, and responsibilities, airfield changes, and current knowledge of potential wildlife hazards. It should be reviewed in entirety.

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## Chapter 1

### ADMINISTRATIVE GUIDANCE

**1.1. Purpose.** To provide an active program to minimize wildlife strikes to aircraft and prevent loss of life and/or damage to equipment. A bird/wildlife strike hazard exists at March Air Reserve Base (ARB) and in its vicinity. Daily and seasonal migratory bird movements and on-base deer, fox, and coyote population create various hazardous conditions. Local golf courses, landfills, and multiple bodies of water including lakes, ponds, and streams are bird attractants and are especially dangerous during seasonal migratory movements.

**1.2. Scope.** This instruction prescribes local procedures and policies concerning aircraft and airfield vehicular operations at March ARB. It does not supersede United States Air Force, Air Force Reserve Command (AFRC), or Federal Aviation Administration (FAA) directives. Deviation from this instruction is authorized only in emergencies where adherence would jeopardize safe aircraft or vehicular operation. Airfield and flight operations in the March ARB area necessitate compliance with the procedures established herein.

**1.3. Conditions for Execution.** This instruction is based on hazards from both resident and seasonal bird populations as well as for other species of wildlife. Implementation of specific portions of the instruction are continuous, while other portions will be implemented as required by wildlife activity. Specific operations include:

- 1.3.1. Establishment of a Wildlife Hazard Working Group (WHWG).
- 1.3.2. Procedures for reporting hazardous bird activity and altering flying operations.
- 1.3.3. Provisions to disseminate information to all assigned and transient aircrews for specific bird hazards and procedures for avoidance.
- 1.3.4. Procedures to eliminate or reduce environmental conditions that attract birds and other wildlife to the airfield.
- 1.3.5. Procedures to disperse and remove wildlife from the airfield.

**1.4. Policy.** Each partner unit or assigned organization is responsible for ensuring its personnel are familiar with this instruction.

- 1.4.1. Word Meanings. The following definitions apply within this instruction:
- 1.4.2. Shall, will, or must—indicate a mandatory procedure.
- 1.4.3. Should—indicates a recommended procedure.
- 1.4.4. May or need not—indicates an optional procedure.

**1.5. Revisions.** IAW Air Force Manual (AFMAN) 13-204v2, Airfield Management, this instruction will be reviewed annually. Recommendations for revisions to this instruction are encouraged and should be forwarded to the 452 AMW/SEF.

**1.6. Deviations.** Any party subject to these procedures may deviate from the policy contained herein only in the interest of safety. All waiver requests must be approved by the 452 AMW/CC.

**1.7. Tasked Organizations:** As listed in [Chapter 3](#).

## Chapter 2

### BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) INSTRUCTION

**2.1. Introduction.** A wildlife aircraft strike hazard exists at the March ARB installation and its vicinity, due to resident and migratory bird species and other wildlife. Daily and seasonal bird movements create various hazardous conditions. This instruction establishes procedures to minimize the hazard to aircraft at March ARB and 452 AMW aircraft in their operating areas. It integrates the 163 Attack Wing (ATKW), a California Air National Guard tenant flying unit at March ARB, into the base's BASH procedures. This instruction updates existing documents and supersedes all previous March ARB BASH plans. It is based on historical wildlife strike records from the 452 AMW and their operating areas and a 2021 visit by National Guard Bureau Flight Safety (NGB/SEF). As part of that visit, a review of historical records, documentation, and updated hazard assessment are included in APPENDIX 1, attached to the updated BASH instruction. Detailed observations with the biological and operational basis for resulting recommendations are included in the appendix for implementing the March BASH Plan. Birds observed in the vicinity of March ARB are listed in APPENDIX 2. Additional BASH references are attached at APPENDIX 3. No single solution exists to this BASH problem, and a variety of techniques and organizations are involved in the control program. This instruction is designed to:

- 2.1.1. Establish a Wildlife Hazard Working Group (WHWG) and designate responsibilities to its members.
- 2.1.2. Establish procedures to identify high hazard situations and to aid supervisors and aircrews in altering or discontinuing flying operations when required.
- 2.1.3. Provide aircraft and airfield operating procedures to avoid high-hazard situations.
- 2.1.4. Establish guidelines to decrease airfield attractiveness to birds and other wildlife.
- 2.1.5. Provide guidelines for dispersing and removing wildlife on the airfield.
- 2.1.6. Provide guidelines for avoiding birds in operating areas away from the airfield.
- 2.1.7. Identify organizations/OPRs with authority to upgrade, initiate, or downgrade Bird Watch Conditions.
- 2.1.8. Provide guidelines to maintain the working relationship with base tenant units.

### **2.2. BASH Instruction Execution.**

2.2.1. Phases. Designate Phase I and Phase II periods of bird activity based on historical information. Phase II represents heavy bird activity, normally associated with migratory seasons. Records indicate fall and winter months and migratory seasons (October - March) as the most likely periods of significantly increased local bird activity. Airfield Operations will publish a Notice to Airmen when Phase II is implemented.

- 2.2.1.1. Phase I: This phase concentrates on bird control and is in effect whenever Phase II is not in effect.
- 2.2.1.2. Phase II: This phase is in effect during periods of heavy bird activity (normally associated with migration) and concentrates on bird avoidance using scheduling and airfield operating restrictions. Periods and the concentrations of birds are subject to change

based on climatic variations. Therefore, Phase II is not automatically implemented and is employed only when there is an increased population of birds. The 452 OG/CC implements and terminates Phase II upon recommendation from the WHWG. March ARB typically sees increases in avian activity from 1 April thru 31 June and 1 September thru 31 October and can expect to be in Phase II near this timeframe. Airfield observations during BASH Phase II will be conducted between one hour prior until one hour after sunrise and one hour prior through one hour after sunset as long as launches/recoveries are scheduled.

2.2.2. Coordination. Reducing the bird strike hazard at March ARB requires a cooperative effort between several base organizations, tenant units, and the surrounding community. The OPR for coordinating this instruction is 452 AMW/SE.

### **2.3. Wildlife Hazard Working Group (WHWG):**

2.3.1. Function. The WHWG collects, compiles, and reviews data on bird strikes. It identifies and recommends actions to reduce hazards, including changes in operational procedures, informational programs for aircrews, and acts as a point of contact for off-installation BASH issues. It reviews all proposed construction projects prior to initiation.

2.3.2. Authority. The WHWG submits all recommendations to the installation commander for approval and implements through the chain of command.

2.3.3. Composition. The chairperson will be the Vice Wing Commander or designee. See AFI 91-212 for remainder of WHWG composition. Meeting minutes will be maintained and distributed.

2.3.4. Meeting Schedule. The WHWG will meet biannually at a minimum with additional meetings as necessary.

2.3.5. Representatives from tenant units (e.g., 163 ATKW, 144 Fighter Wing (FW), CBP), security forces, and other stakeholders will also be invited to participate in WHWG meetings. Data on bird strikes and mitigating measures should be exchanged. Coordination of efforts on the airfield and surrounding areas is essential for minimizing wildlife hazards.

2.3.6. Per AFI 91-212, 452 AMW Safety will define/designate a Wildlife Exclusion Zone (WEZ) as appropriate for the local airfield. A Wildlife Exclusion Zone is a locally defined, airfield specific, area of zero tolerance for wildlife hazards to aviation assets, encompassing the aircraft movement area, clear zones, and any additional habitat attractants (e.g., water treatment facilities, golf courses, and athletic fields) in proximity to the airfield and low-level flight corridors (approach/departure). March ARB has identified the airfield perimeter to include the fenced area North of the airfield to Cactus Avenue as the WEZ (see [Figure 2.2.3.6](#) on following page). AFI 91-212 contains further processes and procedures relating to wildlife inside the WEZ.

**Figure 2.1. March ARB WEZ.**

2.3.7. Per AFI 91-212, the WHWG and Wings will program funds to ensure wetlands and grasslands are properly relocated away from the airfield and Aircraft Movement Area in accordance with federal regulations. To mitigate the possibility of being designated a delineated wetland, dedicate funds to ensure proper airfield drainage management of all areas within the confines of the Aircraft Movement Area. (T-1)

2.3.8. Per AFI 91-212, Ephemeral (temporary) water sources, such as ponding, are typically shallow depressions that temporarily collect and hold water. This standing water is an attractant to several hazardous bird groups such as gulls, wading birds, shore birds, and waterfowl. When conducting formal wildlife surveys, examine conditions of the airfield, infrastructure, and habitat especially following a significant rain event. Document all low areas retaining water for more than 48 hours and immediately report problematic areas to the appropriate installation agency for resolution. In instances where repairs or drainage improvements are delayed, harassment, exclusion, depredation, or the use of repellents may be warranted. Since federal and state laws strictly control wetlands, coordination with Civil Engineering is required before making any modifications to airfield drainage. However, non-tidal drainage and irrigation ditches excavated on dry land are not generally considered to be “waters of the United States” (51 Code of Federal Regulation 41206, Final Rule for Regulatory Programs of the Corps of Engineers) and, therefore, are not considered wetlands. See Memorandum of Agreement in the attachments section.

## Chapter 3

### ORGANIZATIONAL TASKING, ROLES, AND RESPONSIBILITIES

**3.1. Approval.** 452 AMW/CV chairs the WHWG and approves/disapproves all recommendations. The WHWG will meet IAW [paragraph 2.2.3.4](#).

**3.2. Tasked/Participating Organizations.**

**3.2.1. 452 Air Mobility Wing:**

3.2.1.1. Overall commanding authority for this Operations Instruction. May delegate execution authority of this instruction to 452 AMW/CV.

3.2.1.2. Alternate chairman of the Wildlife Hazard Working Group (WHWG).

**3.2.2. 452 AMW Vice Wing Commander (452 AMW/CV):**

3.2.2.1. Chairs and approves recommendations of WHWG meetings.

3.2.2.2. With 452 AMW/CC approval, has execution authority over this instruction.

3.2.2.3. Reviews notes from the quarterly 452 AMW Safety Meetings.

3.2.2.4. Issues specific guidance to command post concerning actions required to implement this instruction.

**3.2.3. Safety (452 AMW/SE):**

3.2.3.1. Overall OPR for this BASH Instruction.

3.2.3.2. Monitors installation compliance with AFI 91-202, AFI 91-212 and reports all wildlife strikes and hazards per AFI 91-204, AFI 91-202, AFI 91-212, AFMAN 91-223, and [Chapter 5](#) of this instruction.

3.2.3.3. OPR for the WHWG and advises chairman when meetings are necessary.

3.2.3.4. Reports on BASH and includes WHWG recommendations and actions in the agenda and minutes of the wing's semi-annual WHWG meetings.

3.2.3.5. Disseminates BASH data to WHWG and flying units.

3.2.3.6. Provides the WHWG with the current BASH guidance from higher headquarters and supplemental information from the US Fish and Wildlife Service (USFWS) or other agencies.

3.2.3.7. Provides bird activity maps and any additional information on migratory, local, and seasonal bird activities through contact with the USFWS, Audubon Society, local ornithologists, and other agencies.

3.2.3.8. Recommends implementation and termination of Phase II flying operations in response to significant changes in the local bird population or bird strike potential. When Phase II is implemented or discontinued, advises 452 AMW/CV, 452 OG/CC, command post, and airfield management. When the WHWG recommends no Phase II for the current year, it will document the risk management analysis.

3.2.3.9. Refers to the Avian Hazard Advisory System (AHAS) at <http://www.usahas.com/> for use by wing tactics in the development of low-level routes.

3.2.3.10. Monitors wildlife activity and strike statistics and advises the chairperson of the WHWG when a meeting is deemed necessary.

3.2.3.11. Reports all damaging and non-damaging wildlife strikes in accordance with AFI 91-202, AFI 91-212, AFI 91-204, and AFMAN 91-223 through the Air Force Safety Automated System (AFSAS) (Chapter 5).

3.2.3.12. Coordinates with aircrews and maintenance personnel in collecting remains after strikes. Sends any salvaged wildlife strike remains to the Smithsonian Institution (**Chapter 5**).

3.2.3.13. Establishes and maintains a continuity folder with any pertinent BASH data and information to assure continuity of knowledge with personnel turnover.

3.2.3.14. Establishes a bird hazard awareness program in conjunction with squadron flying safety officers, to include films, posters, and information on local bird hazards and reporting procedures.

3.2.3.15. Collects BASH survey data and monitors for conditions attracting birds and other wildlife.

3.2.3.16. Coordinates with airfield management and 452 AMW/SE BASH manager for harassment, trapping and relocation, and depredation of hazardous wildlife.

3.2.3.17. Seek the assistance of the natural resource manager in the environmental management flight (452 MSG/CEV) whenever eagles or federally listed threatened or endangered species are encountered. Eagles and federally listed species remains can be shipped to the Smithsonian Institution for identification (**Chapter 5**). Coordinate with environmental management to ensure the USFWS is notified of all aircraft strikes to eagles and threatened or endangered species.

3.2.3.18. 452 AMW/SE BASH manager will coordinate, obtain, and hold all depredation permits from USFWS for March ARB.

3.2.3.19. 452 AMW/SE BASH manager will act as overall BASH lead and consultant for the installation and assume responsibility for all day-to-day BASH compliance issues. Will establish independent relationships and communicate with all federal, state, and local natural resource agencies, and off base private landowners.

#### 3.2.4. **452 AMW/SE BASH Manager:**

3.2.4.1. Will direct BWC changes to tower and airfield management when on duty. Will recommend increases to Phase II when avian numbers meet annual migration patterns.

3.2.4.2. The 452 AMW/SE BASH manager will establish and maintain a territory around March ARB airfield/runway area and discourage all avian species (e.g., waterfowl including geese, gulls, other birds of prey, passerines, etc.) and harmful mammals, including predators (e.g., coyotes) and predator attractants (e.g., squirrels) from entering this territory. Per AFI 91-202, "Maintain a zero tolerance toward large free-roaming animals on or adjacent to the aircraft movement area (free-roaming animals are, but not limited to, deer, canines, etc.)."

3.2.4.3. The 452 AMW/SE BASH manager will ensure monthly airfield surveys are conducted and that survey information is sent to wing safety in monthly reports.

3.2.4.4. The 452 AMW/SE BASH manager will meet with wing flight safety on a weekly basis to report the wildlife conditions and discuss any BASH issues developing during the week. The 452 AMW/SE BASH manager will also attend the WHWG meetings and contribute to the implementation of the BASH program.

3.2.4.5. The AMW/SE BASH manager can be reached via airfield management or March ATC to respond to wildlife activity and hazards on the airfield.

3.2.4.6. The 452 AMW/SE BASH manager will develop and maintain procedures to implement utilization of dispersal equipment (i.e., a step-by-step flow of increasing harassment techniques to reduce the risk of wildlife strikes).

3.2.4.7. Will provide integrated pest management recommendations on mitigating wildlife hazards to aircraft and human safety to include habitat, prey, and fencing recommendations. 452 AMW/SE BASH manager will provide the nonlethal and lethal control of wildlife to provide the safest air operations possible. These techniques will include but not limited to trapping, hazing with pyrotechnics, and depredation.

3.2.4.8. Will provide training to base personnel in identifying and managing wildlife hazards. In addition, the 452 AMW/SE BASH manager will train airport staff in hazing, wildlife identification, and wildlife strike notification procedures.

3.2.4.9. Storage of weapons and ammunition will be IAW DoDI 5100.76 and AFMAN 91-201. Primary location is the approved safe in Building 394 and alternate location is the Building 457 base armory.

3.2.4.10. Must take appropriate actions, making sure the entire base follows the correct process, management plans, laws, regulations, and policies surrounding BASH while working with and informing base leadership to make the final decision, so risk is not improperly accepted.

### **3.2.5. Operations Group Commander (452 OG/CC):**

3.2.5.1. Declares, disseminates, and terminates Bird Watch Conditions at March ARB and deployed locations through the duty officer (if assigned), airfield manager, or deployment commander (**Chapter 4**).

3.2.5.2. Issues specific guidance for aircrews and duty officers (if assigned) on procedures to be followed under Bird Watch Conditions (**Chapter 4**).

3.2.5.3. Issues specific guidance to airfield management on procedures for Bird Watch Conditions.

3.2.5.4. Approval authority for all aircraft scheduled departures and arrivals during Phase II periods within one hour before through one hour after of sunrise and sunset, multiple patterns and formations during Bird Watch Condition (BWC) MODERATE, and all flight operations during BWC SEVERE. When advised of an increase in the Bird Watch Condition, the 452 OG/CC will identify the designated representative to personally review existing bird threats and consult with 452 AMW/SE BASH manger and/or airfield

management to provide recommendations for launch, arrival or transition operations as scheduled to maximize operational requirements vs. safety considerations.

3.2.5.5. Approval authority for reducing the BWC from SEVERE to a lower condition. This authority may be retained by a higher authority in the chain of command or a designated representative as deemed appropriate by the 452 OG/CC.

3.2.5.6. Makes operational changes to avoid areas and times of known hazardous bird concentrations, mission and operations permitting. Considers the following, during periods of increased bird activity:

- 3.2.5.6.1. Coordinate with Air Traffic Control (ATC) to raise pattern altitude or change pattern direction, if possible.
- 3.2.5.6.2. Avoid takeoffs and landings within one hour of dusk and dawn.
- 3.2.5.6.3. Reschedule local training or transition elsewhere.
- 3.2.5.6.4. Raise altitude enroute to training areas.
- 3.2.5.6.5. Limit time in low-altitude environments to minimum for training requirements.
- 3.2.5.6.6. Select routes or training areas based on bird hazard data obtained from the Avian Hazard Advisory System for low-level route and range analysis (see APPENDIX 1).
- 3.2.5.7. Restrict or delay takeoffs and direct full stop landings or diverts as required.
- 3.2.5.8. Ensures aircrew completes March ARB local wildlife strike form or AF Form 853 if a bird strike occurs.
- 3.2.5.9. Implements and terminates Phase II on recommendation from the WHWG.
- 3.2.5.10. Wing safety suggests changes based on significant changes in bird populations.
- 3.2.5.11. Serves as alternate chairman of the WHWG.
- 3.2.5.12. Monitors compliance with BASH Explosives Safety guidelines for bird dispersal equipment used by 452 OG personnel.

### 3.2.6. **Standards and Evaluation (452 OG/OGV):**

- 3.2.6.1. Reviews with 452 OG/CC all proposed guidance for aircrew and procedures to be followed under Bird Watch Conditions.
- 3.2.6.2. Provides flying squadrons with a list of suggested alternate training bases to include special procedures and/or restrictions.
- 3.2.6.3. Reviews with 452 OG/CC and assists 452 OSS/OSK in reviewing all proposed new routes and training areas or changes to existing routes and areas for BASH potential.

### 3.2.7. **Current Operations (452 OSS/OSO):**

- 3.2.7.1. During Phase II bird watch operations, schedule local takeoffs/arrivals to avoid the increased bird activity periods. Exceptions should only be considered for unique circumstances. In these cases, only one takeoff or one landing per mission will be permitted. Coordinate with Tanker Airlift Control Center (or FGC) to schedule mission

departures to avoid the BASH windows to the maximum extent possible. Schedulers shall make every effort to not schedule takeoffs, landings, and low-levels from one hour before to one hour after sunrise and sunset during the Phase II period. Publish significant bird hazards in Flight Information Publications Area Planning along with the associated airfield operating hour restrictions and avoidance instructions.

**3.2.8. Duty Officer (if assigned by 452 OG/CC):**

3.2.8.1. Per **Chapter 4** of this instruction, the authority to declare Bird Watch Conditions is vested with the duty officer during normal flight operations. The duty officer will coordinate with the airfield manager to determine and communicate these conditions and may designate the airfield manager or other designee as declaring authority at any time. During all other periods, the 452 AMW/SE BASH manager, airfield manager, or designated representative, are the declaring authorities. Ensure that any Bird Watch Conditions passed to the control tower and command post are coordinated such that conflicting conditions are not issued.

3.2.8.2. Declares Bird Watch Conditions based on:

3.2.8.2.1. Information relayed by airborne aircraft.

3.2.8.2.2. Observations made by the air traffic control tower and transient alert personnel.

3.2.8.2.3. Observations made by 452 AMW/SE BASH manager or airfield management.

3.2.8.2.4. Note: The 452 OG/CC or their designated representative will downgrade or cancel Bird Watch conditions. In the absence of either of these options, airfield management has the authority.

3.2.8.3. Notifies airfield management of increased bird activity and of all changes to Bird Watch Conditions.

3.2.8.4. Obtains and posts current bird activity data and ensures it is readily available for aircrew briefings. Advises each crew of the Bird Watch Conditions at the airfield and in training areas.

3.2.8.5. Ensures Bird Watch Conditions are posted and informs aircrews of any changes.

3.2.8.6. Briefs aircrews to report all bird strikes and hazardous conditions promptly.

**3.2.9. Combat Tactics (452 OSS/OSK):**

3.2.9.1. Use the Avian Hazard Advisory System (AHAS) at <http://www.usahas.com/> when developing and planning low-level training routes/missions.

3.2.9.2. Annually assess the wing's risk of bird strikes on established low-level routes and recommend modifications to maximize training and minimize risk to aircrew. Visit the AHAS website for the most bird hazard models.

3.2.9.3. Reviews with 452 OG/CC all proposed new routes and training areas or changes to existing routes and areas for BASH potential.

**3.2.10. Airfield Manager (452 OSS/OSAA):**

3.2.10.1. Per **Chapter 4** of this instruction, the authority to declare Bird Watch Conditions is vested with the duty officer (if assigned), 452 AMW SE BASH manager, and airfield management during normal flight operations. Air traffic control is also authorized to increase the Bird Watch Condition. Airfield management may determine the appropriate BWC for the base with the exception of reducing the status from SEVERE. The 452 OG/CC (or higher authority), or the 452 OG/CC designated representative, will be the approval authority to reduce the status from SEVERE. The 452 AMW SE BASH manager, flight safety officers, maintenance, and transient alert personnel may make recommendations to airfield management to change BWCs. The 452 OG/CC or designated representative must be consulted when agencies do not agree on BWC recommendations (the 452 AMW/SE BASH manager is authorized to declare BWCs).

3.2.10.1.1. Sends a wildlife dispersal team and assists them as needed. When approved to perform dispersal activities on the airfield, this team will be used when birds create a hazardous condition. Prior to using dispersal procedures, coordinate with ATC and advise when complete. The wildlife dispersal team will, as a minimum, have immediate access to bioacoustics and pyrotechnic and shotgun equipment for wildlife dispersal in their vehicle for airfield inspections/surveys. This equipment must be stored where it is readily available. Equipment must be stored in the airfield management safe IAW AFMAN 91-201 site licensing procedures.

3.2.10.1.2. Bioacoustics. Bioacoustics are recorded distress or alarm calls of actual birds. The equipment required to adequately project these calls includes an audio player mounted in a vehicle and a speaker mounted on its roof. Special care must be taken to play the recording in short intervals to prevent habituation by the birds. Play the recording for 20-30 seconds and then pause briefly. Repeat the procedures several times if necessary. The birds should respond by taking flight or becoming alert. These calls are effective for gulls, blackbirds, starlings, cowbirds, grackles, ravens, crows, and some shorebirds. Only bioacoustics for the species to be dispersed should be used, as calls are species-specific. Calls for all species of concern may not be commercially available and other methods must be used in such instances.

3.2.10.1.3. Note: Pyrotechnics should be used in conjunction with bioacoustics to enhance complete dispersal.

3.2.10.1.4. Pyrotechnics. Pyrotechnics include 15mm or 12-gauge scare cartridges that produce a secondary explosion, or screamers that produce a loud whistle to scare birds from the area. The scare cartridges are launched from either a shotgun or a pyrotechnic pistol. A 15mm handheld launcher is available to fire 15mm screamers and bangers (smaller versions of the 12-gauge cartridges). Pyrotechnics are effective for dispersing most bird species and can also be used for coyotes, foxes, and deer.

3.2.10.1.5. Depredation. Bird must be killed occasionally as a reinforcement of other methods. Rock Pigeons (domestic pigeons), European Starlings, and House Sparrows can be killed without a permit. Most other species require federal and state permits. 452 AMW/SE BASH manager will contact the USFWS and the state wildlife agency for permits and assistance in this area. Also see APPENDIX 3, Attachments 2 and 3.

3.2.10.1.6. Other Devices. Ingenuity is encouraged in the bird scare program. Other devices may be used. Falconry, dogs, bird diverters, or radio-controlled model aircraft

may be considered based on availability and problem bird species. Contact the BASH team at Headquarters (HQ) Air Force Safety Center, Flight Safety, Wildlife (BASH Team) (AFSEC/SEFW), Kirtland Air Force Base (AFB), NM for advice in this area.

3.2.10.1.7. Ineffective Methods. Ultrasound, rubber snakes, stuffed owls, rotating and flashing lights, loud music, and other such devices have not proven effective and should not be used.

3.2.10.2. Notifies security forces and ATC when pyrotechnics, firearms, or other significant bird scare activities will be used on the airfield.

3.2.10.3. Removes dead birds, possibly involved in strikes to aircraft, and forwards to wing safety for reporting and identification submission through AFSAS. Bird sighting surveys should be filled out and sent to wing safety as appropriate.

3.2.10.4. Notifies 425 AMW/SE, base civil engineering, and/or contracted personnel of adverse airfield wildlife control conditions, such as: excessive grass height and drainage ditch foliage, standing water, excessive ground squirrels, and so on.

3.2.10.5. Develops and maintains a program identifying personnel who will carry out bird dispersal procedures.

3.2.10.6. The contracted 452 AMW/SE BASH manager or airfield management personnel will inspect the airfield daily for bird hazard conditions. These inspections will be conducted with increased frequency as the bird activity increases. During Phase II periods, BASH airfield inspections should be conducted between one hour prior until one hour after sunrise and one hour prior through one hour after sunset. If takeoffs are scheduled when BASH windows are in effect, the 452 AMW/SE BASH manager and airfield management will visually inspect for bird hazards 20 minutes prior and up to takeoff and landing times.

3.2.10.7. Notifies command post of changes to the current BWC when it is MODERATE or SEVERE. Ensure 452 AMW/CP notifies the 452 OG/CC, 163 OG/CC, AMOC, and 144 FW Det 1 of changes to the current BWC when it is MODERATE or SEVERE.

3.2.10.8. Obtains 452 OG/CC (or designated representative) approval prior to reducing the BWC from a SEVERE status.

3.2.10.9. Maintains a BWC status board in airfield management.

3.2.10.10. Notifies ATC (Tower) of changes to the current BWC when it is MODERATE or SEVERE. All ATC facilities will, in accordance with FAA regulations, broadcast the BWC. This will include the use of ATIS, if practical, when the condition is MODERATE or SEVERE.

3.2.10.11. When aircrews file flight plans, notifies them of significant bird activity, BASH windows, and when the BWC is MODERATE or SEVERE.

3.2.10.12. Provide the 452 AMW/SE BASH manager a monthly copy of the BWC report.

### **3.2.11. Air Traffic Control (452 OSS/OSAB):**

3.2.11.1. Along with the duty officer (if assigned), 452 AMW/SE BASH manager, and airfield management, tower has the authority to declare an elevated BWC. If a hazardous

bird situation develops, tower will notify airfield management and all aircraft on its frequency.

3.2.11.2. March ATC will relay to aircraft under their control any restrictions to takeoffs, transition training, and landings during increased BWC. In addition, during BWC MODERATE or SEVERE, ATC will also relay any takeoff or landing instructions approved by the 452 OG/CC, his designated representative, or higher authority.

3.2.11.3. Issues advisory information on pilot-reported, tower-observed, or radar-observed and pilot-verified bird activity. Advisory includes position, species, or size of birds, if known, course of flight, and altitude. ATC does this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities unless visual observation or subsequent reports reveal the activity is no longer a factor.

3.2.11.4. Reports observed bird activity to the duty officer, airfield management, and the 452 AMW/SE BASH manager as appropriate and required.

3.2.11.5. Provides airfield management and 452 AMW/SE BASH manager expedient access to the runway under Bird Watch Condition MODERATE or SEVERE, traffic permitting.

3.2.11.6. Identify radar targets as possible birds when appropriate to provide warning to pilots as required. Refer to FAA Order 7110.65W ¶2-1-22, Bird Activity Information.

3.2.11.7. Issues bird advisories such that pilots can make missed approaches, delayed takeoffs, or other operational changes when hazards are identified.

3.2.11.8. Updates bird hazard advisories and Bird Watch Condition on ATIS.

3.2.11.9. Coordinates with airfield management when active dispersal is required to prevent inadvertently increasing hazards by harassment activities when aircraft are operating in the airfield environment.

3.2.11.10. Uses specific language to communicate locations, times, and behaviors of birds identified as possible hazards as specified in FAA Order 7110.65W ¶2-1-22.

### **3.2.12. Command Post (452 AMW/CP):**

3.2.12.1. Notify airborne aircraft of the current BWC if MODERATE or SEVERE. In addition, command post will immediately notify 452 OG/CC or designated authority and 163 OG/CC, AMOC, and 144 FW Det 1 any time the BWC goes to MODERATE or SEVERE. Broadcast BWC changes to all aircraft on frequency. Ensure BASH at alternate airfields is considered prior to diverting aircraft.

3.2.12.2. Coordinate with 452 OG/CC or designated authority when aircrews request multiple approaches or formation flights during BWC MODERATE, or any flight operations during BWC SEVERE.

3.2.12.3. Notify Tanker Airlift Control Center when Bird Watch Condition could result in possible aircraft diversions or delays and assign X113 delay code for delayed AMC missions. Coordinate AMC mission deviations with Tanker Airlift Control Center.

3.2.12.4. Notify 144 FW/Det 1 when Bird Watch Condition could result in possible alert aircraft diversions or delays.

3.2.12.5. Assist airborne aircraft in determining whether to proceed to an alternate base, hold, terminate, or divert.

3.2.12.6. Determine bird status of alternate airfields.

3.2.12.7. Coordinate for alternate training bases during periods of increased BWC.

3.2.12.8. Notify 452 AMW/SEF if a wildlife strike (any aircraft) is reported at March ARB.

**3.2.13. Maintenance Group Commander (452 MXG/CC), in coordination with Maintenance Operations Center (452 MOC) and Aircraft Maintenance Squadrons (452 and 752 AMXS):**

3.2.13.1. Notifies flight safety (452 AMW/SEF) of any wildlife strikes to aircraft discovered by 452/752 AMXS during pre/post-flight inspections.

3.2.13.2. Issues specific guidance to personnel for the reporting of all discovered bird strikes on aircraft to quality assurance and safety using the locally produced bird strike reporting form (also see [Chapter 5](#)). Additional guidance available on the Air Force BASH portal website (AFSEC: Aviation Safety Division: BASH).

3.2.13.3. Issues procedures for the preservation of bird remains if discovered on aircraft. Even the smallest fragment of feather or snarge should be forwarded to wing safety for identification ([Chapter 5](#)).

3.2.13.4. Ensures all aircraft cavities and openings are inspected on the ramp or after undergoing maintenance in hangars for birds or nesting materials before returning to operation.

3.2.13.5. Refer to Technical Order 1-1-691, [paragraph 3.5.8](#), for further guidance.

**3.2.14. Base Civil Engineer (452 CES/CC) in synergy with the Airfield Manager (452 OSS/OSAA), and Environmental Management (452 MSG/ CEV):**

3.2.14.1. Coordinates with airfield management and 452 AMW/SE BASH manager on all civil engineering and habitat management issues that could relate to BASH.

3.2.14.2. Provides natural resources representation to the WHWG to monitor and advise group of civil engineering procedures.

3.2.14.3. Advises on procedures for removal or control of bird attractants on base property.

3.2.14.4. Initiates surveys and writes environmental impact assessments.

3.2.14.5. Inspects the base with emphasis on runway clear zones for wildlife attractants.

3.2.14.6. Corrects environmental and infrastructure conditions to decrease BASH potential.

3.2.14.7. Uses land management practices that reduce BASH potential.

3.2.14.8. Modifies airfield habitat consistent with AFI 91-212, runway lateral and approach zone management criteria per UFC3-260-01, Airfield and Heliport Planning and Design, AFI 91-202, and AFI 91-212. Habitat modification to reduce BASH beyond the 1000-foot distance criterion is desired and will further reduce BASH potential.

3.2.14.9. Notifies the USFWS of all aircraft strikes to eagles and threatened & endangered species.

3.2.14.10. Performs actions necessary to reduce plant and animal food sources (seeds, fruits, ground squirrels, rabbits, etc.) that attract birds and other wildlife to the airfield.

3.2.14.11. Incorporates the following practices into the Integrated Natural Resources Management Plan (INRMP) for base leasehold property IAW AFMAN 32-7003, if applicable:

3.2.14.11.1. Managing Grass Height. Maintain a uniform grass height between 7 and 14 inches on the airfield until a majority of airfield can be continually disked. Continually disk keeping the airfield dirt 50 feet or more away from all runways, taxiways, and drainage ditches. Vegetation buffers 50-feet or less will be left along all runways, taxiways, and drainage ditches. Determine mowing frequency as needed to maintain height requirements. Coordinate mowing with periods of low flight activity. Cut grass before it goes to seed to discourage seed eating birds from utilizing the airfield. As a rule, do not permit grass to exceed 14 inches, as taller grass will attract some bird species and rodents which, in turn, attract raptors and mammalian predators. Airfields with a variety of grass species may have a fast-growing strain that reaches 14 inches sooner than the rest of the airfield. Mow when the average grass height reaches 14 inches. Growth inhibitors may be considered to reduce mowing requirements and prevent seed head formation. Obtain assistance in herbicide selection for weed control, appropriate grass seed selection, fertilization, growth inhibitors, and erosion control vegetation from the Agricultural Extension Service, the US Natural Resources Conservation Service, or Air Force Material Command/Air Force Civil Engineer Center (AFCEC), Tyndall AFB, FL.

3.2.14.11.2. Controlling Broad-leaved Weeds. Keep broad-leaved weeds to a minimum on the airfield. Apply herbicides in a limited manner and as necessary IAW March ARB's INRMP. Broad-leaved weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth.

3.2.14.11.3. Planting Bare Areas. Note that bare areas are frequently used by birds as feeding and resting sites, or to obtain grit. Eliminate them on the airfield. Plant grass or disk as necessary and appropriate on the airfield and maintain irrigation, if required.

3.2.14.11.4. Fertilizing. Selectively stimulate grasses to promote a uniform cover based on soil test results. Irrigation may be required to support turf growth for limited times, such as when establishing new cover.

3.2.14.11.5. Reducing Edge Effect. Edge effect refers to the highly attractive transition zone between two distinct habitat types (e.g., brush to grassland). Maintain the airfield as uniformly as possible to reduce this effect.

3.2.14.11.6. Leveling of Airfield. Level high spots and fill low spots on the field to reduce attractiveness to birds and prevent standing water.

3.2.14.11.7. Removing Dead Vegetation. As soon as possible, remove dead vegetation such as brush piles, grass clippings, hay bales, etc., and the cover it affords.

3.2.14.11.8. Removing Dead Birds and Animals. Remove dead birds or other animals from the field to avoid attracting vultures or other birds. Forward remains that may be caused by collision with aircraft to flight safety for identification.

3.2.14.11.9. Controlling Pests. Invertebrates and rodents provide important food sources for birds. When the 452 AMW/SE BASH manager reports increased BASH activity due to the pests, civil engineering pest management section will reduce the pest population.

3.2.14.11.10. Maintaining Drainage Ditches. Annually inspect ditches and keep them clear and obstacle free. Maintain ditch sides as steeply as possible—minimum slope ratio of 5:1—to discourage wading birds and emergent vegetation. Remove vegetation as often as necessary to maintain flow and discourage use by birds. Reference the Land Management Plan for procedures.

3.2.14.11.11. Eliminating Standing Water. Immediately eliminate standing water to avoid or decrease possible development of wetlands. Coordination with the Army Corps of Engineers and the appropriate state environmental permitting office is required prior to altering wetlands. Also see the 2015 Memorandum of Agreement (MOA) between the Corps of Engineers, FAA, USAF, and other federal agencies regarding waivers or exemption for on-site wetland mitigation procedures. The memo may be found at <https://www.epa.gov/>. Survey and eliminate all water bodies attractive to birds hazardous to flight safety. Follow Environmental Policy Act regulations and confer with Army Corps of Engineers if necessary.

3.2.14.11.12. Employing Erosion Control Vegetation. Use vegetation that is appropriate for the region and supports BASH reduction philosophy.

3.2.14.11.13. Fencing. Employ fencing in accordance with FAA and AFI 91-212 guidelines to deter large mammals and other wildlife from entering the airfield environment (see also APPENDIX 3, Attachment 3 for additional guidance).

3.2.14.11.14. Controlling Waste Disposal. Landfills are the most significant attractant to hazardous bird species. Operate disposal sites according to FAA guidelines and ensure they comply with state and federal laws. Do not dispose of wastes on-site and relocate landfills that do not meet FAA guideline criteria.

3.2.14.11.15. Eliminating Roosting Sites. Control bird roosts by vegetation management of roost sites where possible. Prune trees to reduce the number of perches available and remove entire trees or stands if necessary. Refer to the Land Management Plan and AFMAN 32-7003. Use active harassment techniques for blackbird, starling, and crow roosts whenever necessary. USDA can conduct or assist in roost dispersal operations.

3.2.14.11.16. Bird- proofing Buildings and Hangars. Birds frequently occur in buildings and hangars and should be excluded. Denying access by screening windows, closing doors, and blocking entry holes is most effective. When necessary, consider:

3.2.14.11.16.1. Pellet Guns. Shoot birds for a short-term solution. Permits from the US Fish and Wildlife Service and state wildlife agency are required to kill most birds (Permits are not required for Rock Dove, European Starlings, or House

Sparrows). Experience has shown that all birds cannot be removed using this technique. Proper safety equipment and skilled personnel are necessary.

3.2.14.11.16.2. Netting. Install netting under building super-structure to exclude birds from roosting areas. Ensure no gaps or holes are present for birds to get through.

3.2.14.11.16.3. Avitrol, Starlicide, or Other Avicides. Coordinate with USDA, Wildlife Services about using any labeled bird control chemicals.

3.2.14.11.16.4. Trapping/Removal. Trap birds using decoy traps and/or pigeon traps. Traps must be provided with food and water and checked daily. Target species must be dispatched humanely and non-target species must be released (unless the current USFWS depredation permits include these species). Contact USDA-Wildlife Service office for technical and onsite assistance.

3.2.14.11.16.5. Design Features. Consider structures with the support features located on the outside of the building to reduce bird numbers. Consider this design when planning new hangars or structures. Install anti-perching devices (e.g. bird spikes) where appropriate.

3.2.14.11.16.6. Door Coverings. Use netting or plastic strips suspended over the doors to exclude birds. Ensure no tears or holes are present that allow birds access to the hangar.

3.2.14.11.16.7. Bird Spikes. Use in high use areas such as ledges, overhangs, or small places where birds cannot be allowed. Expense prohibits their use over the entire structure.

3.2.14.11.16.8. Night Harassment. Use high pressure air or water to make hangars an undesirable roosting site. Persistence is the key.

**3.2.15. Flying Squadron Commanders (336 ARS/CC, 912 ARS/CC, 729 AS/CC, 160 ATKS/CC, 196 ATKS/CC, 492 ATKS/CC, and 144 FW/Det 1):**

3.2.15.1. Ensures safety representatives brief aircrews to promptly report all bird strikes and hazardous conditions. Ensure adequate supplies of bird strike report forms and this instruction are available to aircrews during flights.

3.2.15.2. Brief aircrews on seasonal bird hazards. Movies, articles, and other information will be used to maintain awareness. Wing flight safety and Squadron Assigned Flight Safety Officers (SAFSO) may provide this information.

3.2.15.3. Ensure all wildlife strikes (damaging and non-damaging) are reported to 452 AMW Flight Safety (452 AMW/SEF). 160 ATKS, 196 ATKS, 492 ATKS, and 144 FW/Det 1 will ensure wildlife strikes are also reported to 163 ATKW/SE or 144 FW/SEF as appropriate.

3.2.15.4. 144 FW/Det 1 provides a representative to the WHWG.

**3.2.16. United States Customs and Border Protection (CBP) Operations/Riverside Air Unit (RAU):**

3.2.16.1. Bird strike hazards exist to a much lesser degree for these aircraft due to their lower airspeeds, reciprocating engines, and mission operations. All CBP aircraft will comply with **Chapter 4** unless approval has been requested and received (through the March command post) from the 452 OG/CC or designated representative. Airfield management and/or March ATC will advise aircraft on the anticipated delay, if known, for bird dispersal or a return to a LOW BWC.

3.2.16.2. Airborne crews will assess the bird strike risk by considering fuel status, weather, bird location, etc., before making any requests.

3.2.16.3. When Phase II is in effect, CBP management, and other flying tenant units will make every effort to assess the increased bird strike risk when scheduling departures or recoveries for flights.

3.2.16.4. Any time the March BWC is SEVERE, all non-emergency flight operations (takeoffs, landings, and approaches) are prohibited. Arriving aircraft will either hold awaiting a lower BWC or divert. Non-emergency flight operations require approval by the 452 OG/CC (or designated representative). CBP aircraft also require approval from CBP operations management.

3.2.16.5. When the March BWC is MODERATE or SEVERE all CBP aircrews will have the current BWC relayed to them by their dispatchers, ATIS, airfield management, and/or March ATC personnel.

3.2.16.6. Airfield management (452 OSS/OSAA) will be the coordinating agent for on-base bird control (harassment, grounds maintenance, habitat) for runways 30/12 and 32/14. If CBP requests to raise the BWC to MODERATE or SEVERE, they will immediately notify airfield management. CBP and other flying tenant unit managers will:

3.2.16.6.1. Be responsible for notifying their aircrews of the BWC when the aircrews file their flight plan.

3.2.16.6.2. Be the overall coordinating agent for delay, diversion, and release of their controlled aircraft based on bird activity for runways 30/12 and 32/14.

3.2.16.6.3. Ensure excerpts from this attachment will be included in their respective standard operating procedures.

3.2.16.6.4. Ensure their aircrews pass known or observed bird activity within the airfield environment to March ATC and/or airfield management personnel.

3.2.16.6.5. Encourage pilots to use the BWC definitions and operational restrictions as a guide when assessing the risk of bird hazards to flight operations at military or civilian airfields that do not have BASH programs.

3.2.16.6.6. Ensure their crews report all wildlife strikes at March ARB to wing safety.

**3.2.17. Operations Support Squadron Weather Station (452 OSS/OSAW):**

3.2.17.1. The weather observer will advise airfield management personnel if flocks of birds are observed in the vicinity of the runway.

**3.2.18. Operations Plans (452 OSS/OSTX):**

3.2.18.1. Monitors developments and periodically reviews updates of the instruction.

**3.2.19. Security Forces Squadron Commander (452 SFS/CC):**

- 3.2.19.1. SFS personnel will notify airfield management if wildlife is seen near the runway.
- 3.2.19.2. SFS personnel will assist airfield management in wildlife harassment if needed and based on availability of SFS personnel.
- 3.2.19.3. Alternate wildlife control management weapons and ammunition storage will be in the base armory (Building 457) IAW DoDI 5100.76.

**3.2.20. Public Affairs (452 AMW/PA):**

- 3.2.20.1. Public affairs will participate as required and, upon request, will provide a public information program designed to inform base personnel, dependents, and the public on the hazards and costs of uncontrolled wildlife activity and the measures being taken to minimize them.
- 3.2.20.2. Provides photographic services to document bird strikes and related activities.
- 3.2.20.3. Provides graphic support to publicize bird hazards and actions to minimize them.

**3.2.21. 163 ATKW Safety (163 ATKW/SE):**

- 3.2.21.1. Overall OPR for this BASH Instruction for all matters relating to its implementation concerning 163 ATKW aircraft, personnel, and facilities.
- 3.2.21.2. Monitors unit's compliance with AFI 91-202 and reports all wildlife strikes and hazards per AFI 91-204, AFI 91-202, AFMAN 91-223, and **Chapter 5** of this instruction.
- 3.2.21.3. Sends a 163 ATKW Safety representative to the WHWG.
- 3.2.21.4. Disseminates BASH data to 163 ATKW flying units.
- 3.2.21.5. Provides bird activity maps and any additional information on migratory, local, and seasonal bird activities through contact with the USFWS, Audubon Society, local ornithologists, and other agencies.
- 3.2.21.6. Recommends implementation and termination of Phase II flying operations at deployed 163 ATKW locations in response to significant changes in the local bird population or bird strike potential. When Phase II is implemented or discontinued, advises 163 ATKW flying units.
- 3.2.21.7. Refers to the Avian Hazard Advisory System (AHAS) at <http://www.usahas.com/> for use by wing tactics in the development of low-level routes.
- 3.2.21.8. Monitors wildlife activity and strike statistics and advises 452 AMW/SE when a meeting is deemed necessary.
- 3.2.21.9. Reports all damaging and non-damaging wildlife strikes to 163 ATKW aircraft in accordance with AFI 91-202, AFI 91-204, and AFMAN 91-223 through the Air Force Safety Automated System (AFSAS) (Chapter 5).
- 3.2.21.10. Coordinates with 163 ATKW aircrews and maintenance personnel in collecting remains after strikes. Sends any salvaged wildlife strike remains to the Smithsonian Institution (**Chapter 5**).

3.2.21.11. Establishes and maintains a continuity folder with any pertinent BASH data and information to assure continuity of knowledge with personnel turnover.

3.2.21.12. Establishes a bird hazard awareness program in conjunction with squadron flying safety officers, to include films, posters, and information on local bird hazards and reporting procedures.

3.2.21.13. Collects BASH data and monitors for conditions attracting wildlife.

3.2.21.14. Coordinates with airfield management and 452 AMW/SE for harassment and depredation of hazardous wildlife.

3.2.21.15. Coordinates with 452 AMW/SE to ensure the USFWS is notified of all aircraft strikes to eagles and threatened & endangered species.

**3.2.22. 163 ATKW Operations Group Commander (163 OG/CC):**

3.2.22.1. The 163 OG/CC is the 452 OG/CC designated BASH representative for all 163 ATKW aircraft operating in March ARB airspace.

3.2.22.2. Declares, disseminates, and terminates BWCs at 163 ATKW deployed locations through the duty officer (if assigned), airfield management, or deployment commander ([Chapter 4](#)).

3.2.22.3. Issues specific guidance for 163 ATKW aircrews and duty officers (if assigned) on procedures to be followed under BWCs ([Chapter 4](#)).

3.2.22.4. Issues specific guidance to airfield management on procedures for BWCs.

3.2.22.5. Approval authority for scheduled 163 ATKW aircraft departures and arrivals during Phase II periods, multiple patterns and formations during BWC MODERATE, and all flight operations during BWC SEVERE. When advised of an increase in the BWC, the 163 OG/CC will identify the designated representative to personally review existing bird threats and consult with airfield management to provide recommendations for 163 ATKW launch, arrival or transition operations as scheduled to maximize operational requirements vs. safety considerations.

3.2.22.6. Makes operational changes to avoid areas and times of known hazardous bird concentrations, 163 ATKW mission and operations permitting. Considers the following, during periods of increased bird activity:

3.2.22.6.1. Coordinate with 452 OG and ATC to raise pattern altitude or change pattern direction, if possible.

3.2.22.6.2. Avoid takeoffs and landings within one hour of dusk and dawn.

3.2.22.6.3. Reschedule local training or transition elsewhere.

3.2.22.6.4. Raise altitude enroute to training areas.

3.2.22.6.5. Limit time in low-altitude environments to minimum for training requirements.

3.2.22.6.6. Select routes or training areas based on bird hazard data obtained from the Avian Hazard Advisory System for low-level route and range analysis (see APPENDIX 1).

- 3.2.22.6.7. Restrict or delay takeoffs and direct full stop landings or diverts as required.
- 3.2.22.7. Ensures aircrew completes March local wildlife strike form or AF Form 853 if a bird strike occurs.
- 3.2.22.8. Sends a 163 ATKW operations representative to the WHWG.
- 3.2.22.9. The 24 hours point of contact for the 163 OG/CC is the 160 ATKS Operations Supervisor, cell phone: (951) 488-8021. Note: this list represents the key players in the BASH instruction. Other interested or required agencies may be involved as needed. Contact 452 AMW/SE with any requests.

## Chapter 4

### BIRD HAZARD WARNING SYSTEM

**4.1. General.** This operation establishes procedures for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds that could pose a hazard to flight safety. All aircraft will comply with the restrictions in AFI 11-202V3, paragraph 6.4.3, unless specifically waived by 452 AMW/CC or higher. The restrictions to aircraft operations during Bird Watch Condition (BWC) MODERATE and SEVERE listed below apply to all local and 452 AMW off-station operations.

**4.2. Bird Watch Condition (BWC).** Use the following terminology for rapid communications to disseminate bird activity information and implement unit operational procedures. Give bird locations with the condition code.

4.2.1. **BWC SEVERE** . Wildlife activity on or immediately above the active runway or other specific location(s) representing a high potential for strikes. One animal in relationship to the Aircraft Movement Area may justify a severe condition (such as a vulture in the approach/departure corridor, or a large mammal or reptile on or near the runway). Supervisors and aircrews will thoroughly evaluate mission requirements utilizing all available risk assessment methods and tools before conducting flight operations in areas under Bird Watch Condition SEVERE.

4.2.1.1. Traffic Pattern. Do not conduct flight operations except in an emergency. Arriving aircraft will either hold awaiting a lower BWC or divert. Launches under an Emergency War Order using Emergency Action Messages are considered “emergencies” for this paragraph. Launches under Mandatory Scramble will comply with NORAD ACA and Continental Region Special Instructions guidance. All other flight operations require approval from 452 OG/CC (or designated representative). Dispatch bird control unit immediately to disperse birds from the airfield.

4.2.1.2. Training Areas/Transition Airfields (452 AMW). Use of transition areas may be authorized, but aircrews should check conditions using the AHAS system and request information from airfield operations or ATC to determine observed conditions. Aircrews will terminate training if SEVERE hazards are observed or forecasted. Also see Paragraphs **5** and **6** below.

4.2.1.3. Low-Level Training (452 AMW). The pilot in command will obtain 452 OG/CC approval prior to conducting any flight on affected route segments. Restrict speed to 250 knots and fly no lower than 1,000 feet above ground level (3,000 feet above ground level at night) on the affected route segments. See Paragraphs **5** and **6** below.

4.2.2. **BWC MODERATE** . Bird Watch Condition MODERATE. Wildlife activity near the active runway or other specific location representing increased potential for strikes. BWC MODERATE requires increased vigilance by all agencies and supervisors and caution by aircrews utilizing appropriate risk assessment methods and tools.

4.2.2.1. Traffic Pattern. All local Instrument Flight Rules/Visual Flight Rules approach and traffic pattern activity for aircraft ceases. No formations in the March ARB patterns. Airborne aircraft/crews will terminate transition training in the March local pattern. Initial takeoffs and final landings allowed only when departure and arrival routes will avoid bird

activity. Aircraft commanders may request reassessment of bird conditions at any time by calling March ATC or airfield management. March ATC, command post, and airfield management will advise aircraft on the anticipated delay, if known, for a return to BWC LOW. Dispatch bird control unit immediately to disperse birds from the airfield.

4.2.2.2. Training Areas (452 AMW). Use of transition areas is authorized, but aircrews should keep training events to a minimum to accomplish mission objectives if MODERATE conditions are observed or forecasted. Mission profiles may be altered to mitigate risk. Changes include avoidance of known/observed concentrations, raising flight altitudes, and reducing airspeed. Also see paragraphs 5 and 6 below.

4.2.2.3. Low- Level Training (452 AMW). Restrict speed to 250 knots on the affected route segments. No altitude restrictions. Also see Paragraphs 5 and 6 below.

4.2.3. **BWC LOW**. Bird Watch Condition LOW. Wildlife activity on and around the airfield representing low potential for strikes.

**4.3. Authority.** The Duty Officer (if assigned), 452 AMW/SE BASH manager, and airfield management (452 OSS/OSAA) share the authority to declare a BWC during normal duty hours. Air Traffic Control is also authorized to increase the BWC at all times. The declaring authority can declare conditions based on ground observations, pilot reports, radar observations, etc. 452 OG/CC or his/her designate is the authority to downgrade BWC SEVERE.

4.3.1. The Duty Officer (if assigned)/Airfield Management will perform the following any time the BWC is changed:

4.3.1.1. Attempt to notify arriving and departing aircraft within radio range.

4.3.1.2. Notify ATC to include a brief description of the reason the Bird Watch Condition changed.

4.3.1.3. Notify 452 AMW Command Post.

4.3.1.4. Notify the Duty Officer (if assigned), Airfield Management, and Wildlife Dispersal Teams as appropriate.

**4.4. Communications.** Disseminate BWC by the following means:

4.4.1. Airfield Management will monitor BWC and ATC Tower personnel will update the BWC other than LOW in the hourly ATIS information, if available, as specified in FAA Order 7110.65. When the Duty Officer (if assigned), Airfield Management, USDA, or ATC declares BWC MODERATE or SEVERE, notify ATC tower personnel. ATC tower personnel will contact Airfield Management who will further disseminate the declaration to command post, wing safety, and the flying units (336/912 ARS, 729 AS, 163 ATKW, 144 FW/Det 1, CBP). Airfield management personnel will post the BWC and change the airfield status display in airfield management.

4.4.2. Note that the primary means of transmitting the BWC will be via ATIS and the airfield status monitor. However, under BWC SEVERE, the duty officer, airfield management, command post, and/or air traffic control agency will ensure that the pilot understands the condition and is provided the option to delay, divert, or continue the proposed operation into the hazardous area.

#### 4.5. Off-Station Locations.

4.5.1. Aircrews experiencing enroute wildlife strikes should comply with MAJCOM guidance or (if not applicable) abort the mission when possible. While engine ingestion or a windscreen strike may readily be apparent from the flight deck, the damage resulting from fuselage, wing, tail, or radome strikes cannot be adequately assessed. Continuing a mission may cause greater structural damage and a serious in-flight emergency situation later. Since USAF BASH programs are not usually established at non-DoD airfields, aircrew awareness is the best method to avoid a wildlife strike. Generally, bird activity is at its highest one hour before to one hour after sunrise and sunset. Aircrews should avoid proficiency training at non-DoD airfields during this sunrise/sunset period. In addition, missions should be scheduled to avoid known peak wildlife activity periods for particular airfields. Airfield management, tower facilities, aircrew publications, the Giant Report and the AHAS website provide a good source of information on wildlife activity periods for both USAF and non-USAF locations. Prior to transitioning non-DoD airfields, planner/aircrews will obtain any available wildlife activity information prior to and during operations at those airfields. Upon arrival at an airfield, aircraft commanders must recheck the wildlife hazard condition by any means available.

4.5.2. ATIS usually broadcasts increased wildlife activity. Aircrews experiencing high wildlife activity at off-station locations will advise the controllers of the activity so they can announce this information to other aircrews and update the ATIS as necessary. After the mission, aircrews should notify their respective safety office BASH representative concerning any high wildlife activity. Note: For AMC tasked missions, approval authority at non-AMC locations lies solely with the AMC/Director of Operations. Aircrews requesting waivers while at non-AMC locations will coordinate with the AMC/ Director of Operations through the Tanker Airlift Control Center. For missions tasked via the FGC, AFRC A/3 will be the waiver authority.

**4.6. Low-level Planning.** Prior to flying any low-level route, aircrews are required to check the Avian Hazard Advisory System (AHAS) for the scheduled route. Strike hazards for low-level routes in the US can be viewed at the following web site: [www.usahas.com](http://www.usahas.com).

4.6.1. **Formation Considerations** : Formation departures increase the risk of damaging bird strikes when birds are feeding or loafing on or near the runway. During BWC SEVERE or MODERATE, formations are prohibited. The lead aircraft typically scares birds up often resulting in an increased potential for bird strikes to the wingmen. If the lead aircraft scares up a large flock of birds, wingmen may want to delay their departures until the birds are clear of the runway. Wingmen should abort the takeoff if flocks of birds pose a hazard. Safety permitting, pilots of lead aircraft must alert and warn wingmen of bird hazards during takeoff roll.

4.6.2. **Suspected Wildlife Strikes** : Wildlife strike damage cannot be accurately assessed in flight and may result in a complex airborne emergency. Only maintenance personnel can make damage assessments. Aircraft commanders should report the strike, land the aircraft and have maintenance inspect the aircraft if they suspect a wildlife strike. Comply with normal landing weight limitations unless emergency conditions warrant landing above them. If maintenance fails to detect damage, continue the mission. If there is any doubt as to the existence of damage or maintenance qualification to adequately evaluate the impact area, contact March command post for further OG/MXG guidance. In all cases, the aircraft commanders will complete a

March wildlife strike form or an AF Form 853 (Wildlife Strike Report) and email it to 452 AMW safety at [452amw.se@us.af.mil](mailto:452amw.se@us.af.mil).

4.6.3. **Aircrew Responsibilities and Procedures** : If an aircrew observes or encounters any wildlife activity while in flight that could constitute a hazard, the aircrew should contact the control tower or command post and request that the observed wildlife activity be passed on to the duty officer, airfield manager and wing safety. The following information is necessary: Call sign, Location, Altitude, Time of sighting, type of wildlife (if known), approximate number of wildlife, and behavior of wildlife (crossing over runway, etc.)

## Chapter 5

### REPORTS AND FORMS

**5.1. General.** This section outlines the procedures and forms required to report wildlife strikes per AFI 91-204 to enhance the BASH program at March ARB.

**5.2. Reporting Wildlife Strikes (AFI 91-204 and AFMAN 91-223):**

5.2.1. All damaging and non-damaging wildlife strikes shall be reported to the BASH Team through the Air Force Safety Automated System (AFSAS). Additional information may be obtained on the Air Force Safety Center web page (AF Portal: AFSEC - Air Force Safety Center: Aviation Safety Division: Bird/Wildlife Aircraft Strike Hazard (BASH)). When wildlife strikes occur to captive or live munitions (explosive/missiles), these are reported as if the wildlife hit the aircraft. Reporting all wildlife strikes is a necessary part of an effective BASH instruction. An in-depth knowledge of the circumstances leading to a wildlife strike is vital before realistic recommendations can be made.

5.2.2. Flight safety offices of the organization credited with the aircraft's flying hours will report all wildlife strikes.

5.2.3. Report wildlife strikes using the AFSAS in accordance with AFMAN 91-223. AFSAS requires a user profile (username and password). MAJCOM safety offices have designated AFSAS administrators to create BASH AFSAS accounts for each unit. Aircrews and maintenance personnel documenting the necessary data for reporting wildlife strikes through AFSAS can use the March local generated wildlife strike form or AF Form 853.

5.2.4. For every wildlife strike, send remains (if available) to the Smithsonian National Museum of Natural History for identification.

5.2.4.1. Feather collection. Collect a variety (breast, back, wing, tail) of feathers by plucking (don't cut or use adhesives).

5.2.4.2. Snarge collection. Use sterile foam-tipped applicator from bird strike kits to wipe snarge or blood from surface. If snarge is dry, use pre-packaged 40% (minimum) alcohol wipes or spray area with 70% (minimum) alcohol to moisten for removal. Do not use water or bleach for sample collection. Open the "Indicating FTA Micro Card" from the kit and press the foam tip of the applicator onto the circle using light pressure. Without lifting the foam tip from the card, rock the applicator tip from side to side until the sample area is saturated. Use one card per impact point and label accordingly. Do not overload card since not much material is needed. If possible, include the applicator with the card and allow sample to air dry for 30 minutes. Close the card and place in a sealed plastic bag.

5.2.4.3. General collection information. It is recommended to use latex gloves, face masks, and eye protection. Always practice good hygiene before and after handling remains by thoroughly washing hands with soap or using gel hand sanitizer. If Avian flu is a concern, Centers for Disease Control recommends National Institute for Occupational Safety and Health N95 face masks. Place remains in a sealed plastic bag and use a permanent marker to indicated impact point, tail number, and date on the outside of the bag.

5.2.4.4. Send a copy of the corresponding AFSAS report with the strike evidence to the following address: "Smithsonian Institution, Feather Identification Lab, NHB, E600, MRC

116, Post Office Box 37012, Washington, DC 20013-7012.” For high priority mishap identifications ship remains via overnight delivery to the following address: “Smithsonian Institution, Feather Identification Lab, NHB, E600, MRC 116, 10th and Constitution Avenue NW, Washington, DC 20560.” To ensure overnight delivery, time shipments to the Smithsonian to arrive Monday - Friday. (Also see APPENDIX 3, Attachment 3). Remains, including carcasses, found within 200 feet of the runway centerline must be reported as a strike unless it was determined that the animal died as a result of something other than an aircraft strike. These will be recorded in AFSAS and sent to the Smithsonian for identification. Once the Smithsonian has entered the identification into the AFSAS report, AFSAS will automatically notify the reporting unit of the species identification through email. If there are any questions, contact HQ AFSEC/SEFW. (Also see APPENDIX 3, Attachments 7 and 8 for avian influenza guidelines).

5.2.4.5. For wildlife strikes other than birds, send samples of skin, fur, teeth, or other non-fleshy remains, if possible, or a photograph of the remains along with the corresponding BASH AFSAS report to the Smithsonian for identification.

**5.3. Technical Assistance:** AFI 91-202, The U.S. Air Force Mishap Prevention Program, outlines responsibilities for reducing wildlife strike hazards. Obtain additional information on BASH management from Air Force Pamphlet 91-212, Bird/Wildlife Strike Hazard (BASH) Management Techniques. Technical assistance is available through the USAF BASH Team, HQ AFSEC/SEFW, 9700 Avenue G SE, Building 24499, Kirtland AFB, NM 87117- 5671. They may be contacted via DSN 246-5674/5673/5848, Commercial (505) 846- 5674/5673/5848, or e-mail address: [sefw@us.af.mil](mailto:sefw@us.af.mil).

#### **5.4. Wildlife Sighting Report:**

5.4.1. Wildlife control management will provide a wildlife sighting report to wing safety.

5.4.2. Data collected in a sighting report may be kept in the daily events log for reference.

5.4.3. The sighting report will be distributed for use by flying squadrons, Civil Engineering (CE), airfield management, or other applicable offices and can be used to target areas of concern.

ERIK L. AUFDERHEIDE, Colonel, USAF  
Commander, 452D Air Mobility Wing

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 16-1404, *Air Force Information Security Program*

DAFMAN 21-201, *Munitions Management*

AFI 31-117, *Arming and Use of Force by Air Force Personnel*

AFMAN 32-1053, *Pest Management Program*

AFMAN 32-7002, *Environmental Compliance*

AFMAN 32-7003, *Environmental Conservation*

DAFI 33-360, *Publications and Forms Management*

AFI 33-322, *Records Management and Information Governance Program*

DAFI 64-117, *Air Force Government-Wide Purchase Card Program*

AFI 91-202, *The US Air Force Mishap Prevention Program*

DAFI 91-204, *Safety Investigations and Reports* AFMAN 91-201, *Explosives Safety Standards*

DAFMAN 91-223, *Aviation Safety Investigations and Reports*

AFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*

AFFD 91-2, *Safety Programs*

32 CFR Part 989, *Environmental Impact Analysis Process*

DoDI 5100.76, *Safeguarding Sensitive Conventional Arms, Ammunition, and Explosives (AA&E)*

DoD 5200.01, *DoD Information Security Program*

FAA Order 7110.65W, *Air Traffic Control*

FAA AC 150/5200-33B, *Hazardous Wildlife Attractants On or Near Airports*

FAR Title 14, §139.337, *Wildlife Hazard Management*

Public Law 104-13, *The Paperwork Reduction Act of 1995*

TO 1-1-691, *Cleaning and Corrosion Prevention and Control, Aerospace and Non- Aerospace Equipment*

UFC 3-260-01, *Airfield and Heliport Planning and Design*

***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*

AF Form 853, *Air Force Wildlife Strike Report*

AF Form 857, *USAF Propellant Sale/Transfer/Return Report*

*Abbreviations and Acronyms*

**AFB**—Air Force Base

**AFCEC**—Air Force Civil Engineer Center

**AFI**—Air Force Instruction

**AFMAN**—Air Force Manual

**AFRC**—Air Force Reserve Command

**AFSAS**—Air Force Safety Automated System

**AFSEC**—Air Force Safety Center

**AFSEC/SEFW**—Air Force Safety Center, Flight Safety, Wildlife (BASH Team)

**AHAS**—Avian Hazard Advisory System

**AMC**—Air Mobility Command

**AMW**—Air Mobility Wing

**ANG**—Air National Guard

**AOA**—Airport Operating Area

**APHIS**—Animal and Plant Health Inspection Service

**ARB**—Air Reserve Base

**ATC**—Air Traffic Control

**ATIS**—Automatic Terminal Information System

**ATKW**—Attack Wing

**BASH**—Bird/Wildlife Aircraft Strike Hazard

**BWC**—Bird Watch Condition

**CBP**—U.S. Customs and Border Protection

**CE**—Civil Engineering

**DET**—Detachment

**DoD**—Department of Defense

**DSN**—Defense Switch Network

**EPA**—Environmental Protection Agency

**FAA**—Federal Aviation Administration

**FSO**—Squadron Flying Safety Officer

**FW**—Fighter Wing

**HQ**—Headquarters

**IAW**—In Accordance With

**IMT**—Information Management Tool  
**INRMP**—Integrated Natural Resources Management Plan  
**IPM**—Integrated Pest Management  
**IPMP**—Integrated Pest Management Plan  
**JVISDA**—Joint Visual Information Services Distribution Activity ma  
**MAJCOM**—Major Command  
**MOA**—Memorandum of Agreement  
**NEPA**—National Environmental Policy Act  
**NGB**—National Guard Bureau  
**NORAD**—North American Aerospace Defense Command  
**NPWRC**—Northern Prairie Wildlife Research Center  
**OPR**—Office of Primary Responsibility  
**PA**—Public Affairs  
**RAU**—Riverside Air Unit  
**SAFSO**—Squadron Assigned Flight Safety Officer  
**SE**—Safety  
**SEF**—Flight Safety  
**SFS**—Security Forces Squadron  
**USA**—United States Army  
**USAF**—United States Air Force  
**USDA**—United States Department of Agriculture  
**USFWS**—United States Fish and Wildlife Service  
**WEZ**—Wildlife Exclusion Zone  
**WHWG**—Wildlife Hazard Working Group

## Attachment 2

### BIRD/WILDLIFE HAZARD ASSESSMENT AND RECOMMENDATIONS

**A2.1. March ARB Background.** March ARB is home to the 452 Air Mobility Wing (AMW) and is the largest wing in the Air Force Reserve Command (AFRC). The 452 AMW is responsible for all operational functions of March ARB. March ARB is located in Riverside County, California, approximately 70 miles east of Los Angeles between the cities of Riverside, Moreno Valley, and Perris. As host wing, the 452 AMW maintains two active runways: Runway 14/32 (13,300 by 200 feet and Runway 12/30 (3,000 by 100 feet). The 452 AMW operates C-17 Globemaster III and KC-135 Stratotanker at March ARB. Two California Air National Guard (ANG) units operate at March ARB: the 163rd Attack Wing (operates the RQ-9 Reaper) and 144 Fighter Wing (FW) (operates F-16C Alert Aircraft). Civilian flying assets at March ARB include a US Customs Air Unit, civilian cargo aircraft, and passenger aircraft for transient uniformed personnel.

A2.1.1. Both avian and mammalian wildlife hazards are present at March ARB, including resident and migratory populations of birds. Situated inland approximately 40 miles northeast of the California coast, March ARB is located within the Pacific Flyway bird migration corridor. The west border of March ARB is US Route 215 and is surrounded by suburban and industrial development around the entire installation. March ARB is 2,150 acres in size. Many neighboring properties around March ARB were previously owned by the Department of Defense (DoD) but were converted to private ownership. Several state wilderness areas, reserves, and National Forests are located in proximity to March ARB.

A2.1.2. The natural environment at March ARB is arid desert with most precipitation occurring between November and March. The soil of the installation consists of multiple sandy loam soil types with scrub-grassland and non-native vegetation. Common vegetative ground cover at March ARB includes species of bromes (*Bromes* spp.), wild oat (*Avena* spp.), bur clover (*Medicago polymorpha*), Bermuda grass (*Cynodon dactylon*), and rabbitsfoot grass (*Polypogon monspeliensis*). Interspersed wetlands and vernal pools (i.e. protected, sensitive habitats) exist on March ARB and are documented in the Integrated Natural Resources Management Plan (INRMP); although current delineations for these areas were not completed by the time of this survey. Habitat on the airfield is attractive to several species of wildlife that pose a direct and indirect strike hazard to aircraft. Common wildlife and strike hazards at March ARB include: coyotes (*Canis latrans*), Northern harriers (*Circus cyaneus*), ferruginous hawks (*Buteo regalis*), red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), European starlings (*Sturnus vulgaris*), house finches (*Carpodacus mexicanus*), mourning doves (*Zenaida macroura*), common ravens (*Corvus corax*), western meadowlarks (*Sturnella neglecta*), and burrowing owls (*Athene cunicularia*). Food attractants (prey species) on the airfield, such as the California ground squirrel (*Spermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*), and dessert cottontail rabbit (*Sylvilagus audubonii*) are indirect strike hazards that can attract large-bodied avian and mammalian predators to the airfield.

**A2.2. BASH Program.** The primary role of every military aviation facility is to ensure mission readiness and combat capability by providing the safest flying environment possible. Military airfields are artificially maintained environments designed for the safe launch and recovery of all aircraft. Maintaining an active BASH Program that includes habitat management, exclusion/mitigation, harassment, depredation, and avoidance to reduce the risk of wildlife strikes on military airfields is essential for providing a safe flying environment. Excluding all wildlife

away from the airfield environment may not be practical, but it is important to discourage wildlife to the extent possible and minimize all wildlife attractants in the aerodrome. The presence of wildlife on the airfield is mutually detrimental to both mission readiness and wildlife species when attractive habitat is promoted or allowed to exist within an active airfield environment.

A2.2.1. The goal of all BASH programs is to decrease the probability of a wildlife strike to aircraft. The most effective BASH programs employ an Integrated Pest Management (IPM) strategy to combat the threat that wildlife pose to aircraft. This approach involves application of a range of methods and techniques to prevent and reduce damage. IPM may involve a combination of habitat modification, exclusion, harassment, trapping and relocation, and depredation; with one method often complimenting another. Controlling and/or removing wildlife attractants on an airfield including food, water, and cover is the most effective, long-term strategy for wildlife control.

A2.2.2. Several areas of concern are evident in the surroundings and on the airfield itself. Only a small portion of the airfield is covered in grasses as recommended. A large amount of turf is outside ideal height limits, with extensive bare areas, weedy patches, brush, and limited water features which are potentially attractive to a variety of bird species. The airfield is surrounded by a fence for security and to deter wildlife such as Coyotes (*Canis latrans*), Feral dogs, and other mammals from entering the airfield. Breeches under the fence or through gaps in the gates do occur and are addressed as required.

A2.2.3. The area surrounding the installation also contains numerous features that attract a variety of birds and other wildlife potentially hazardous to nearby flying operations. Notables are nearby lakes such as Lake Perris, sewage treatment facilities, cemetery, golf courses, limited agricultural activities, parks, and urban development. Encroachment of development in the immediate area surrounding the base causes some species to seek the airfield or base property as some of the remaining open areas in the vicinity.

A2.2.3.1. **California Ground Squirrels:** California Ground Squirrels (*Spermophilus beecheyi*) have been residing on the airfield and much of the base property for many years. They have dug extensive burrows near the runway, causing damage to the runway lighting systems. The squirrels pose an indirect threat to aircraft but attract a variety of hazardous wildlife to the airfield including predators such as canids and raptors, scavengers such as vultures and mammals, and other species that share their burrow systems such as Burrowing Owls, snakes, and other small mammals. Their burrowing has also brought the runway base course (gravel) to the surface on the runway apron, increasing the potential for foreign object damage and compromising the integrity of operating surfaces. They may also chew through wiring and other airfield infrastructure. The ground squirrels frequent hangars and parked aircraft and have bitten 452 AMW members while being handled. Ground squirrels are classified as non-game mammals by the California Fish and Game code. A permit to kill individual ground squirrels is not required. However, application of specific control methods (including use of rodenticides) may require approvals, certifications, and licenses for pesticide applicators to comply with regulations (Federal, State, and DoD). When developing ground squirrel control strategies, apply methods and techniques that prevent the take of non-target wildlife, including species with a listed status. Federal and state listed species, including the Stephen's kangaroo rat (*Dipodomys stephensi*) and burrowing owl, have been detected at March ARB and must not be harmed from ground squirrel control.

A2.2.3.1.1. Multiple factors can influence the effectiveness of each method, including: seasonality, fiscal resources, squirrel behavior, and applied strategy. Use of an IPM strategy (i.e., implementing more than one control technique) will provide the best long term, overall success for effective ground squirrel management. Each summary below evaluates methods that could be applied to manage California ground squirrels at March ARB:

A2.2.3.1.1.1. •Rodenticide:

A2.2.3.1.1.1.1. Treatment using rodenticide is a common and economical method for controlling ground squirrels. Zinc phosphide is registered with the Environmental Protection Agency as an approved form of rodenticide and is most effective when pre baiting is applied before treatment. A single feeding of an appropriate bait quantity treated with zinc phosphide can be lethal for ground squirrels. Pre-baiting manipulates ground squirrel behavior to reduce aversion to treated baits, ensuring enough zinc phosphide is consumed. Zinc phosphide is commonly applied by broadcasting treated bait around active burrows (Marsh, 1994).

A2.2.3.1.1.1.2. Anticoagulant baits are another rodenticide which requires multiple feedings for target pests to consume a lethal dose of poison. However, ground squirrels are less likely to develop bait shyness to anticoagulant baits compared to zinc phosphide. Anticoagulants are often applied using bait stations, per product label requirements. Ground squirrels may be reluctant to enter bait stations, lengthening the duration of control (Marsh, 1994). Application of anticoagulant baits requires two to four weeks for effective results (Salmon and Gorenzel, 2002).

A2.2.3.1.1.2. •Fumigation:

A2.2.3.1.1.2.1. Fumigation involves application of toxic gases into the burrows of ground squirrels, euthanizing all squirrels by suffocation. Two common types of fumigation are gas cartridges and aluminum phosphide. Ground squirrels use soil to barricade themselves inside their burrows during hibernation, which will inhibit any gas from reaching squirrels during fumigation applications. Fumigation methods must be applied immediately after squirrels begin to emerge from hibernation to ensure effectiveness (Marsh, 1994). Gas cartridges are a common fumigant consisting of a cylinder tube with chemical components that are ignited using a fuse inserted into the cylinder. Once ignited, the cartridge is inserted into the burrow, buried, and emits carbon monoxide gas. Aluminum phosphide fumigants are applied to burrows in a tablet or pellet form, placed at the deepest point of the burrow and sealed with a wad of newspaper and covered with soil. Moisture in the soil reacts with the pellet to create a phosphide gas in the sealed burrow (Marsh, 1994). Treated burrows should be inspected the following day to determine effectiveness and re-treat any burrow that is dug out (Salmon and Gorenzel, 2002). Application of pressurized, carbon monoxide - producing exhaust machines have also proven effective (Baldwin and Meinerz, 2016).

A2.2.3.1.1.3. •Trapping:

A2.2.3.1.1.3.1. Trapping can be accomplished using lethal traps (snap traps and body-gripping, conibear traps) and non-lethal traps (live, box, or cage traps). Trapping is most effective when squirrels are active and occurring in low abundance and isolated concentrations. Body-gripping traps do not require bait and can be applied at burrow sites. However, body-gripping traps are indiscriminate, and will kill any non-target wildlife species attempting to utilize a burrow with a trap. Live traps must be baited, and may require some acclimation by squirrels, but allow for the release of captured non-target wildlife. Live traps are required to be checked daily.

A2.2.3.1.1.4. •Exclusion:

A2.2.3.1.1.4.1. Sheet metal, electric fencing, and other barrier products can be applied at fences to discourage perimeter entry by ground squirrels. However, these methods are not practical for resolving ground squirrel issues on the airfield. Inclusion of other control methods (trapping, toxicants, and fumigation) can be concentrated along fence line areas to discourage migration of ground squirrels onto March ARB from neighboring properties.

A2.2.3.1.1.5. •Shooting:

A2.2.3.1.1.5.1. Firearms can be utilized to opportunistically remove ground squirrels on the airfield. BASH managers can remove ground squirrels if shooting can be accomplished safely. Shotguns with bird shot, air rifles, and rimfire rifles chambered in .22 or .17 caliber are appropriate for targeting ground squirrels. USDA-WS currently has the capabilities and equipment to shoot ground squirrels. Ground squirrels may become evasive quickly if individual squirrels are targeted within a colony. Shooting ground squirrels is best applied when not conducting fumigation or rodenticide treatments.

A2.2.3.1.1.5.2. The 2021 March ARB Integrated Pest Management Plan (IPMP) included stipulations and approval for use of two registered pesticides for ground squirrel management: P.C.Q. Pelleted Rodent Bait (anticoagulant/rodenticide, EPA No: CA-780146) and Fumitoxin® (fumigant, EPA No: 72959-2). March ARB Natural Resources (452 MSG/CEV) informed the BASH Team that Fumitoxin® is not being used on the installation, and P.C.Q. was previously used in bait boxes on the airfield. P.C.Q Pelleted Rodent Bait is a first-generation anticoagulant (Active Ingredient: Diphacinone (Chemical Abstracts Service #82-66-6) with 0.01% concentration) that is formulated into a pellet to compete with natural ground squirrel foods. This product is formulated specifically for use in the State of California.

A2.2.3.1.1.5.3. Commit to an integrated management strategy for California ground squirrels at March ARB, implemented over the entire year. Management of California ground squirrels should be a priority for the BASH program. Ground squirrels are a key attractant to multiple birds of prey (raptors) that have been struck at March ARB, including: red-tailed hawks, ferruginous hawks, and Northern harriers.

A2.2.3.1.1.5.4. Update the IPMP to include ground squirrel control protocol,

applying an integrated management approach. The IPMP update should reflect all approved pesticides for ground squirrel control at March ARB. Applying multiple treatment methods and pesticide products will ensure the most effective control outcome.

A2.2.3.1.1.5.5. Conduct fumigant pesticide treatments using products approved for use in California and on USAF airfields. Fumigation targets an important biological period in the ground squirrel's life cycle [i.e. removal of one female after hibernation may remove up to eight squirrels in a single litter that otherwise would occur on the airfield] (Marsh, 1994). Apply Fumitoxin® (or another approved aluminum phosphide-based fumigant product) on ground squirrel burrows after inspecting for the presence of burrowing owls. If owls are present, do not treat the burrow (owl management will be discussed in the next observation).

A2.2.3.1.1.5.6. Consider approval and use of gas cartridges (EPA No: 56228-61, 56228-2) as a supplemental fumigant method for ground squirrel control. Application of EPA No: 56228-2 gas cartridges are restricted to use by USDA-WS employees only. Label guidance for EPA No 56228-61 requires application by qualified wildlife biologists capable of detecting burrowing owl and Stephen's kangaroo rat sign, and also restricts use from May to July where burrowing owls are present.

A2.2.3.1.1.5.7. Consider employing USDA-WS to conduct pesticide treatments. USDA-WS already maintains a significant role in the BASH program and has extensive knowledge of the airfield. USDA-WS has the ability to attain necessary pesticide applicator certifications for conducting pesticide treatments on the airfield. As a federal partner, USDA-WS can be relied on to implement pesticide management in the interest of safety rather than for a profit. Additional work may require an increase in USDA-WS funding and may necessitate additional USDA-WS staff working at the installation (i.e. addition of part-time, temporary staff for conducting field work at March ARB).

A2.2.3.1.1.5.8. Continue trapping and shooting for ground squirrels to complement pesticide treatments. Trapping and shooting should not be used exclusively as the primary control method. These methods are beneficial on smaller infestations of ground squirrels. Elimination of the observed abundance of ground squirrels at March ARB using trapping and shooting alone is unrealistic. Trapping, focused around buildings and isolated areas, may be effective to remove targeted infestations of ground squirrels, especially if pesticide label requirements restrict use in such areas.

A2.2.3.1.1.5.9. Excluding ground squirrels from the airfield at March ARB would be cost prohibitive and impractical for resolving ground squirrel issues. Exclusion may be practical at site-specific locations, and consideration for exclusion must be evaluated on a case-by-case basis. Ground squirrel habitat exists on base property in the approach path of Runway 14, outside of the airfield fence line.

A2.2.3.1.1.5.9.1. Remove ground squirrel food sources and reduce available

ground squirrel habitat on the airfield. Eliminate brush and any debris piles to reduce available habitat and cover for ground squirrels. Convert airfield vegetation to less attractive species, reducing forbs and other palatable plants used as food sources for ground squirrels.

A2.2.3.1.1.5.10. Ground squirrel management updates should be provided to leadership during the Wildlife Hazard Working Group, and openly communicated throughout all management phases of the program. Control activities involving rodenticides and fumigants must be conducted in compliance with EPA Product Labels and be approved for use by the State of California and USAF. Contact the AFRC Entomologist for questions and approval of ground squirrel pesticides. Use the AFCEC Non-Standard Pesticide Approval Form 20140101 (Attachment 3) to request new pesticides for ground squirrel control.

A2.2.3.2. **Burrowing Owls:** The burrowing owl is a brown and white owl with yellow eyes, approximately ten inches tall, and weighing 0.3 pounds. The western burrowing owl subspecies (*Athene cunicularia hypugaea*) is found throughout most of the western United States, including southern California's arid environment. Burrowing owls utilize rodent burrows for cover and nesting. Fidelity to nesting sites is high, but burrowing owls won't necessarily reuse the same burrow depending on the previous year's nesting success (Klute et al, 2003). Burrowing owl breeding in California occurs from March to August, utilizing up to 15 burrows in one colony (California Department of Pesticide Regulation, 2018).

A2.2.3.2.1. Burrowing owls are listed as a Species of Special Concern in the State of California. The largest year-round, resident population of burrowing owls occurs in California. Owl distribution in California is impacted by increases in urbanization and industrial agriculture. Burrowing owls are susceptible to predation by multiple species of hawks, feral cats/dogs, coyotes, American crows (*Corvis brachyrhynchos*), and Northern harriers – all of which are present at March ARB and pose a strike risk. Within California, burrowing owls have been found to adapt to habitat loss, utilizing landfills, golf courses, and airports for nesting. Although burrowing owls have learned to adapt to urban areas, owl persistence in urban areas increases the number of individuals involved in vehicle collisions (Klute et al, 2003). Burrowing owls have been recorded in the March ARB strike record, (four strikes recorded since 2014).

A2.2.3.2.2. Migratory burrowing owls can be mitigated from the airfield by destroying unused burrow sites prior to owl migration. Destroy burrows from 1 September to 31 January after using one-way doors for 48-hours to avoid the burrowing owl nesting season (Quon, 2010). If burrows are not destroyed, owls may utilize them to nest and persist as a hazard on the airfield. Active owl nest burrows are protected under the Migratory Bird Treaty Act and California Fish and Game Code. The unapproved destruction of an active owl burrow or nest is a violation of the Migratory Bird Treaty Act, referred to as "take" and punishable by civil and criminal penalties. Removal of active burrowing owl nests will require a Depredation Permit from the USFWS and California Department of Fish and Game.

A2.2.3.2.3. Burrowing owls at San Jose Airport, California were managed away from runway and movement areas using artificial burrowing system. After analyzing 17

years of data, researchers determined that population trends were dependent on adult burrowing owl survival rates and independent of juvenile survival rates, concluding that sustaining survivability of adult burrowing owls should be the focus of management to benefit burrowing owl populations.

A2.2.3.2.4. The survival of adult burrowing owls is threatened by promoting their occurrence on the airfield. Effective management for sustaining burrowing owls on the airfield is incompatible with flight safety. Burrowing owls have been struck by aircraft at March ARB, are prey to other raptor species occurring at March ARB and are susceptible to airfield mowing; a military readiness activity that sustains safe aviation operations on the airfield. Safety must take precedence over management of burrowing owls at March ARB, and mitigation of this species off the airfield must occur in support of both flight safety and conservation of the burrowing owl.

A2.2.3.3. Designate a WEZ at March ARB as mandated in AFI 91-212 [1.3.10.2]. Include this designation clearly in the BASH Instruction. Identifying a WEZ in compliance with AFI 91-212 will prioritize BASH safety and restrict any incompatible land use that would conflict with flight safety. Discuss WEZ designation with agencies in the Bird Hazard Working Group to ensure agency coordination and commitment of resources to effectively discouraging wildlife from this area.

**A2.3. Airfield Hazard Assessment and Recommendations.** Airfield management staff and the 452 AMW/SE BASH manager are responsible for ensuring that airfield vegetation and drainage are managed to minimize bird and wildlife attractants. The base civil engineering staff and the airfield manager should maintain base property in support of these objectives and provide guidance to other base agencies as necessary.

A2.3.1. Airfield Turf. The airfield turf was a mixture of grasses, shrubs, forbs, and bare ground. Turf and other airfield vegetation is not always being kept mowed to the height of 7-14 inches. Per AFI 91-202, "Mow aircraft movement area to maintain a grass height between 7 and 14 inches. The aircraft movement area is that area of the airfield encompassed by the Primary Surface and the Clear Zones, as well as apron areas and taxiways, regardless of their location. As a minimum, turf shall be maintained 500 feet outside the aircraft movement area boundary where able." Elevated lights and signs do not require special clearance and areas near the edges of operating surfaces should not be mown to separate standards. Ideally, the entire infield area of the airfield should be established in a thick, uniform stand of grass without openings or weedy vegetation present or be kept dirt by discing.

A2.3.1.1. Mowing the vegetation short or allowing it to reach heights where it goes to seed and becomes uneven encourages the growth of broad-leaved weedy vegetation. Such vegetation provides feeding and cover resources that increase bird hazards at the airfield. Mowing vegetation, especially if mown short, actually stimulates production and encourages weedy vegetation to invade grass stands.

A2.3.1.2. Selective application of herbicides may initially be necessary to eliminate weeds and allow grass to become reestablished in areas where it has been disturbed or after construction projects. Taller grass excludes many birds due to limited visibility for flocking species, difficulty for birds to locate invertebrate food sources, and difficulty in predator detection. Grass should not be allowed to exceed 14 inches and to go to seed, as it may attract rodents and raptors, as well as hide large mammals.

A2.3.1.3. Maintaining grass as recommended also reduces costs of mowing operations through the growing season. Mowing may attract some birds during operations and dispersal techniques must be on hand at such times. More information on airfield turf management may be obtained from the Air Force Civil Engineer Support Agency at DSN 523-6465, Commercial (850) 283-6465, or the local County Extension Agent. Also see APPENDIX 3, Attachment 1, 3, and 7.

A2.3.2. Vegetation Maintenance as a Wildlife Deterrent. March ARB maintains a Vegetation Maintenance as a Wildlife Deterrent as part of their INRMP. Only areas of base property inside the AOA need be maintained as described above; other areas around facilities outside the secure areas of the airfield can be maintained as to minimize hazardous wildlife as necessary.

A2.3.3. Agricultural Outleases. March ARB does not currently outlease any of its property for agricultural practices. There is only limited agriculture outside the base property. Agricultural practices are considered incompatible with safe airport operations and such practices should not be considered on airport property (see also AFMAN 32-7003, AFI 91-212 and FAA AC 150/5200-33B).

A2.3.4. Bare Areas. There were extensive bare areas on the airfield, some associated with prior construction activities, or with soil and hydric conditions that made maintenance difficult, but largely due to deteriorating old operating surfaces. Bare areas provide ideal roosting and loafing sites for Mourning Doves, Rock Doves, Killdeer, Horned Larks, American Crows, Ring-billed Gulls, Herring Gulls, and other species including ground squirrels and other rodents. They also provide nesting sites for birds such as Killdeer and grassland passerines and prevent turf management as described above. Bare areas also contain gravel and grit that is highly attractive to birds such as doves that use these materials to aid in digestion. These areas also capture windblown seeds that are visible and attractive to a variety of birds. Bare areas should be eliminated and seeded with grass or preferably disked to discourage avian activity. The extensive areas on the airfield where old operating surfaces had deteriorated, and broken tarmac was still in place should ideally be targeted for removal if not planned for future use. Millings and cracks in these surfaces were filled with a mixture of vegetation, and gravel and grit were scattered over the areas. The areas are relatively open so that visual communication between flock members can occur. The sparse vegetation also serves to capture windblown seeds and insects as food sources. Several Killdeer and a small flock European Starlings were observed in these areas during the spring 2012 visit by NGB; nesting killdeer were noted in the visit as well. Unfortunately, some of these surfaces occur in the most vulnerable areas of the airfield operating areas, alongside runways and taxiways and in the overruns. Ideally, deteriorating operating surfaces should be repaved and unused surfaces targeted for removal, and they should be reseeded with grass. The base's long-range plan should address these conditions and target funding to assist in budgeting for such projects, if applicable. In the interim, it is best to remove the vegetation and routinely sweep the gravel and grit from cracked surfaces. Construction debris and millings from deconstructed surfaces can be effectively used on site to line the base of airfield perimeter fencing. Such treatments can significantly reduce access to the airfield by large mammals such as coyotes and foxes and even smaller mammals such as rabbits and squirrels. Limited areas along access routes and perimeter roads were formed with gravel and attract birds as described above. Access routes and old surfaces can be sealed with binding agents to limit available grit.

A2.3.5. Drainage. Most of the airfield is very well drained with a system of drainage ditches, percolation through sandy soils, and natural runoff. Areas of standing water were noted only in small areas. Temporary ponding following heavy rains and especially ephemeral pools on the airfield are significant attractants to birds and other wildlife. Such areas could attract waterfowl, gulls, shorebirds, and other species to the airfield. Areas around these features supported limited aquatic vegetation such as cattails, sedges, rushes, willows, and other brushy vegetation. Wetland vegetation should be routinely removed from all such areas and flow of drainage water maintained to prevent standing water and recurrence of aquatic vegetation. Wetland vegetation must be removed whenever it develops in any of the airfield ditches through the use of gang or boom mowers, or by hand if necessary, to reduce the attractiveness to birds and to prevent heavy vegetative growth from complicating maintenance. Use of rock rip-rap lining can also aid in ditch maintenance in the long term. Permanent and temporary ponded water should be removed through draining or filling of these areas. Alternatively, a grid system of wires or heavy monofilament spaced at one-meter intervals over the ponds can effectively deter waterfowl, gulls, and other species from accessing ponded water. Ensure alteration of any potential wetland habitat complies with Federal and State regulations. Any potential wetlands mitigation efforts should never occur in the AOA and cooperation between federal agencies, especially the Corps of Engineers, must be sought so as not to compromise flight safety for the objectives of wetlands mitigation programs. Consult Air Force Pamphlet 91-212 and the 2004 MOA between the FAA, USAF, Corps of Engineers, and several other federal agencies for specific guidance. The documented agreement allows for exemptions to on-site wetlands mitigation projects and may be found at <http://water.epa.gov> and <http://www.faa.gov>. These exemptions apply to all wetland projects and impacts within the standard separation criteria defined in FAA Advisory Circular 150/5200-33B and Federal Register/Vol. 73, No. 70/Thursday, April 10, 2008/Rules and Regulations. Conditions on the March ARB certainly qualify for such needed exemptions and any existing agreements must be re-negotiated with the Corps of Engineers or any other agencies that prevent proper airfield management objectives. Also, contact the USAF BASH Team and FAA Wildlife Biologist for further assistance, if required.

A2.3.6. Security Fencing. The entire airfield is currently enclosed in chain link fence for security and to deter wildlife from entering the field. However, some of the fence is below necessary height to completely deter wildlife from entering the airfield. Gaps under fences and in gates were also noted along several sections of the fence. Coyotes, foxes, and other mammals have been noted regularly on the airfield in the past and breaches were very evident by the tracks as observed from the air and ground during the spring 2012 NGB and 2018 HQ Safety Center visits. Unfortunately, fences are as effective at confining animals inside as they are at deterring them from entering in the first place. This is especially true when there is suitable habitat inside the fences, as observed at the base. Proper fencing can deter access to the airfield by wildlife such as coyotes, red foxes, feral dogs, and other wildlife. Coyotes, foxes, domestic dogs, and other wildlife will frequently breach fences by digging under them or will access any small openings such as gates that are not tightly secured. They can also climb chain link fences, though do not routinely do so unless pressured or drawn to attractive habitat inside fences.

A2.3.6.1. Installed properly, fencing can significantly limit wildlife breaches and the requirement for routine monitoring and maintenance (see also APPENDIX 3, Attachment

3 for FAA fencing guidelines). FAA fencing standards were developed specifically to deter deer from airfields and these animals are not present near the March ARB, but such fencing can deter all mammal species from entering airfields. To ideally comply with these guidelines, the fence should contain at least eight feet of chain link topped by angled strands of barbed wire up to eleven feet. The angled top assists by necessitating wildlife not only clear the height, but also the width of the fence. Additionally, a four-foot skirt attached to the outside base of the fence and buried at a 45° angle will deter animals from digging under the fence. The current fence does not contain vertical or angled footers. Stiff brushes may also be added to the bottom of gates where gaps may be exploited by wildlife. Alternatively, and more permanently, concrete or asphalt should be poured in a broad “speed bump” to maintain a tight fit for gates against the substrate. Improvements to the fence can be made over time and should be identified in the base’s long-range plan. Digs under the fence can be used to trap mammals using snares. The fence is checked regularly for breeches by wildlife, to ensure all gates are closed, and for security reasons. As noted above, construction debris or rock riprap may be piled against the base of the fence in areas routinely undermined by burrowing wildlife. It may not be possible to completely exclude all wildlife from the field and controlled hunting or depredation may continue to be necessary on an as-needed basis. Such activity has been conducted with great effect in the past.

A2.3.7. Trees and Landscaping. There are several small areas along the fence line where weeds grew abutting or through the fences. Remove all vegetation growing on and through the fence and maintain a buffer zone of at least 15-30 feet on both sides of the fence and along its entire length. Vegetation can hide breeches and woody vegetation can cause uplift of the fence allowing wildlife access to the airfield. Additionally, an abrupt transition between brush and grass should be maintained to limit edge effect. Edge effect, or the gradual transition from one cover type to another, is highly attractive to species of both cover types and can significantly increase local population densities.

A2.3.7.1. Continue to monitor any stands of trees within the base property outside the airfield to ensure no bird roosts develop. If roosts are noted, active dispersal can be employed to disrupt any such sites. The USDA Wildlife Services can assist in roost dispersal (see APPENDIX 3, Attachment 1 for contact information in this area). Alternately, individual trees or stands can be targeted for thinning or removal to reduce attractiveness to birds. Open canopies and sparse stands of trees eliminate these sanctuaries.

A2.3.7.2. Ornamental trees and shrubs on the airfield and surrounding facilities should be carefully selected to reduce attractiveness to hazardous bird and other wildlife species. Ensure species are chosen with open canopies and sparse foliage to prevent roosting birds from becoming established near the airfield. Ornamental vegetation should be chosen so that feeding and shelter are minimized. Vegetation that produces berries, seeds, fruits, etc. or that provides dense cover should be avoided.

A2.3.8. Perch and Nest Sites. Sites such as isolated trees, airfield structures, runway markers, poles, equipment, and others should be monitored for birds using them as perches or nesting sites. Several species of birds such as Red-tailed Hawks, American Kestrels, Golden Eagles, Turkey Vultures, American Crows, and other songbirds frequently use these sites. Where practical, remove these structures or configure them to limit suitable perching sites. For

isolated structures such as poles and runway markers, anti-perching devices such as spike strips can be used on a limited basis. These devices are much more effective and persistent than sticky tactile repellents that may melt in heat, deteriorate in ultraviolet light, dry, and collect dust. Additionally, rubber snakes, owls, and effigies should not be used as they rapidly lose effectiveness due to habituation by birds. If not feasible to eliminate or configure such attractants, target these structures for active dispersal techniques as described below. Routinely inspect anti-perching devices in the airfield environment to ensure they do not become a foreign object damage hazard.

A2.3.8.1. As a last resort, depredation permits may be used to remove persistent individual problem birds, but recognize that as long as the structure remains attractive, those birds will be replaced by others in the long run.

A2.3.9. Birds in Structures. Birds such as Rock Doves (pigeons) and European Starlings commonly nest and roost in buildings in industrial complexes and hangars. Continue to remove birds to limit the hazards associated with their proximity to the airfield. (Also see [Attachment 3](#)). March ARB's USDA BASH Manager/Biologist can assist in this area.

A2.3.10. Nesting Swallows. There are a number of Cliff Swallows and Barn Swallows that nest under structures such as hangars and drainage culverts. Swallows are frequently struck by AF aircraft, despite causing little damage. However, the potential for significant damage with some aircraft, such as the F-16, is greater. Bird feces may also pose a health hazard to area personnel, cause damage to nearby aircraft, and pose an aesthetic problem to the facility. Swallows can be discouraged through persistent harassment that must be initiated at the moment they begin to build mud nests under the eaves of buildings or under structures such as bridges and culverts. Primarily this can be accomplished by hosing the surfaces with a high-pressure water stream, such as from a fire truck. This should be backed up by harassment of the birds themselves using standard frightening techniques such as pyrotechnics. Ensure proper federal and state permits are followed. Alternately and more permanently, clear plastic sheets can be screwed or glued to the perpendicular surfaces where they join to prevent the birds from gaining purchase to begin nest building. Clear plastic may be used to prevent any aesthetic disruption to personnel. Strips should be extended a minimum of twelve inches on each of the adjoining surfaces preferably to the shade line at which sunlight reaches the highest point on the wall. Swallows will not place nests in locations with direct exposed sunlight. NOTE: Swallow nests containing eggs or young cannot be removed unless a proper permit is obtained through the USFWS. Empty nests void of young, and eggs can be removed at any time without a permit. The Migratory Bird Treaty Act protects swallows and swallow nests with eggs. See [Attachment 3](#) for additional guidance for keeping birds out of structures such as hangars.

A2.3.11. Wildlife Attractants. All base personnel are prohibited by this instruction from building structures, erecting nesting platforms or boxes, feeding birds, improperly disposing of wastes, or otherwise encouraging birds or other hazardous wildlife in areas of the installation that may threaten flight operations. Continue to work with the local community to prevent feeding of birds and other wildlife near the base as well.

**A2.4. Wildlife Management Techniques and Recommendations.** Bird control and dispersal is primarily accomplished by contracted wildlife control personnel. However, a variety of dispersal and control measures must also be available to 452 AMW and tenant personnel to use on an as-

needed basis. These measures should be readily available at any time when birds or other wildlife threaten airfield operations. Pyrotechnic equipment may be stored in airfield management for immediate access.

A2.4.1. Active Harassment. A combination of frightening devices should be available for use whenever birds are present on the airfield or in surrounding areas. Primary among those are pyrotechnic devices that can be fired from 15mm “starter” pistols, standard 12-gauge shotguns, or modified flare pistols. Pyrotechnics are listed in the Air Force Table of Allowances for airfield bird control and may also be ordered through local purchase mechanisms if necessary. These devices project pyrotechnics many meters over flocks of birds that present hazards. Skillful use of the devices can disperse birds from the field in desired directions. They produce a variety of loud sounds and explosions, bright flashes of light, and/or trailing smoke. Training for safely using the devices and coordination with ATC Tower is imperative. 452 AMW individuals are required to use single hearing protection and safety glasses during use of pyrotechnics. All individuals will be trained prior to use of the pyrotechnic devices. Units will maintain a list of those certified and will forward the list to 452 AMW Safety. Minimally, the airfield manager should be trained in the use of the pistol. Coordination with the fire department, security forces, and air traffic control is required prior to any training with these devices or use for actual dispersal of wildlife. Individuals using pyrotechnics will notify airfield management on termination, and airfield management will make any other required notifications. Pyrotechnic devices can be extremely effective in dispersing waterfowl, gulls, crows, shorebirds, starlings, and flocks of blackbirds. Gulls, starlings, crows, and blackbirds may also be dispersed using a combination of pyrotechnics and bioacoustics. Limited depredation of target species will reinforce pyrotechnics by decreasing habituation to non-lethal methods. Ensure all proper federal, state, and local permits are obtained before conducting depredation activities.

A2.4.1.1. Bioacoustics are the recorded distress and alarm calls of species to be dispersed. Ensure species-specific calls are used. They are projected over a speaker system that may be mounted on the roof or through the window of a vehicle. Birds will sometimes disperse upon hearing species-specific calls, but may come to investigate the source of the sound and can then be encouraged to leave using pyrotechnic devices. Bioacoustics are effective against blackbirds, starlings, crows, gulls, and some shorebirds. Non-discriminant use of these calls rapidly leads to habituation and compromises other dispersal efforts. The calls can be used effectively, but only if broadcast when target species are actually present, and then best combined with pyrotechnics or other methods to reinforce the effect of the calls.

A2.4.1.2. Additional harassment techniques such as the use of contracted falconry efforts and dogs as observed, or networks of remotely triggered gas cannons such as the scare wars system, or radio-controlled model aircraft, or others can be considered as effective supplements to other dispersal techniques. Creativity and intensity of such programs will make the overall effort much more successful and delay habituation to the combination of techniques.

A2.4.1.3. These active harassment techniques should be used on the airfield and in all hazardous surrounding areas. These techniques may also be used in coordination with local property owners, to disperse any known bird roosts from dense trees such as found in nearby parks, golf courses, ponds, and so on. Active harassment devices may also be taken to areas where airfield bird control may not be conducted by local agencies.

A2.4.1.4. It will also be important to conduct active harassment, primarily by use of pyrotechnic devices, during off-duty hours. Airfield management should have the equipment available to conduct wildlife dispersal operations outside normal duty hours. Such activity will ensure birds remain off the airfield and prevent habituation problems that complicate efforts during regular operations.

A2.4.2. Mammal/Predator Control. Large mammals and especially coyotes are best controlled by removing attractive habitat and small mammals from the airfield that can draw them to the site. Improved fencing will also serve to deter and virtually eliminate these animals from gaining access to the airfield, but can also trap these animals inside the airport operating area should they gain access through breeches, gaps, or open gates. Depredation can continue to be used to limit populations and train surviving members to avoid open spaces where they are most vulnerable. Depredation should be encouraged outside airfield perimeter fences to limit these animals, but treating the sources of attraction and preventing access are the best options in the long run.

A2.4.3. Rodent Control. Rodents such as California Ground Squirrels (*Spermophilus beecheyi*), voles (*Microtus sp.*), and mice (*Peromyscus sp.*) are abundant throughout the region and have established populations in the immediate surrounding areas and on the airfield itself. Rodents attract a variety of raptors such as Red-tailed Hawks and Kestrels that feed on them. Rodents may also damage wiring and undermine the integrity of pavements and overruns. Colonial or burrowing rodents such as ground squirrels also attract other species such as Burrowing Owls that use their burrows for shelter or nesting sites. Burrowing Owls are protected as a state-listed Species of Special Concern, and are not only attracted to these animals' burrow systems, but can compromise standard airfield habitat management recommendations. Additionally, these requirements violate the provisions of USAF airfield management requirements (AFMAN 32-7003) that are mirrored by FAA requirements as well (see also FAA CertAlert 06-07 "Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State-Listed Threatened and Endangered Species and Species of Special Concern on Airports" APPENDIX 3, Attachment 6). The latter document specifically states that "Managing the on-airport environment to facilitate or encourage the presence of hazardous wildlife species can create conditions that are incompatible with, or pose a threat to, aviation safety". It further states that "Airport operators must decline to adopt habitat management techniques that jeopardize aviation safety." Caution must be exercised in protecting state-listed species that may indirectly jeopardize flight safety. Federal installations are not required to manage state-listed species; however, if it can be accomplished without increasing risk to aircrews and aircraft, then all efforts should be made to assist in managing these species.

A2.4.3.1. Removal of all rodents by trapping or poisoning in accordance with California law must be conducted by USDA, Pest Management personnel or under contract with certified pest control personnel. Rodenticides are most effective and may be used to eliminate burrowing rodents such as ground squirrels from the airfield. Treated grain in bait stations is largely effective as observed, but will not eliminate rodent populations from the airfield. Selective use of Phostoxin (aluminum phosphide), a moisture activated rodenticide for treatment of rodent burrow systems, and even selective shooting programs should be considered to supplement the toxic baiting procedures in accordance with local and federal restrictions. Smaller rodents can most effectively be limited by proper turf

management practices as described above. AFRC is committed to decreasing the use of pesticides; however, the use of proper pesticides to protect flight safety takes precedence.

A2.4.3.2. Inactive burrows can remain habitable for many years following abandonment and are an inducement for squirrels to return to the area, as it is easier for them to reoccupy abandoned burrows than to create new systems. Portions of the field along runways, taxiways and drainage ditches should be disked and replanted in dense grass, to further deter the return of ground squirrels, other rodents, lagomorphs, and other wildlife on the airfield. The portions of the field 50+ feet away from runways, taxiways, and ditches should be continually disked and kept dirt. Disking the areas with active or abandoned rodent burrows is essential, but may also be required over other areas of the field in order to properly manage turf on the entire airfield.

A2.4.4. Invertebrate Control. Various invertebrates including earthworms and grasshoppers present on the airfield may attract a wide variety of birds including raptors, blackbirds, starlings, and gulls. Be prepared to sweep the operating surfaces any time heavy rains force worms or other invertebrates onto the tarmac. Additional bird dispersal techniques must be available during those times as well. Insecticides can be applied on a limited basis as necessary and in compliance with state and federal law.

A2.4.5. Depredation. Removal of nuisance birds and other wildlife may be conducted with appropriate federal and state permits by base or contracted personnel. The base's wildlife contractor currently conducts such operations, and they may be assisted in their efforts by personnel listed on the base's depredation permits. Lethal control including falconry, trapping, poisoning, or shooting of individuals or flocks of birds such as blackbirds, starlings, gulls, or other wildlife such as predators and small mammals may be required on a periodic basis and as permitted by state and federal law. Lethal control is a last resort measure that may reinforce other habitat management or active control efforts and is recommended when a severe hazard persists for several days. Such an effort must be carefully controlled and conducted in full compliance with conditions of state and federal permits. Leaving a dead bird or two exposed for a day or two following such efforts may also reinforce these techniques though dead birds should not be left near the operating surfaces as they may attract scavengers. See Air Force and USFWS Policy Letters in APPENDIX 3, Attachments 2 and 3 for additional guidance in this area. Depredation pressure makes animals such as flocking birds and predators more wary and less likely to enter open areas such as the airfield.

**Attachment 3**

**BIRDS OBSERVED IN THE VICINITY OF MARCH AIR RESERVE BASE**

**A3.1.** These lists are compiled as a combination of observations made by NGB/SEF in 2021, birds listed in DoD Bird Strike Record Database, problematic species listed in the previous March ARB BASH Instruction, and those birds listed in the United States Geological Survey, Northern Prairie Wildlife Research Center (NPWRC) report entitled “*Bird Checklists of the United States, Checklist of Birds, U.S. Army Corps of Engineers, Los Angeles District, LACDA & Prado Regions.*” This report may be found at <http://www.npwrc.usgs.gov/resource/othrdata/chekbird/r1/losange.htm> or by contacting the NPWRC at tel. (701)253-5557/5500. Rare and erratic bird species were eliminated from the following list for brevity. The lists may be supplemented with local observations as needed.

A3.1.1. List 1 contains bird species considered potentially hazardous to 452 AMW operations because of large size, abundance, flocking behavior, formation of large roost sites, habit of occupying airfields, or negative secondary effects due to their presence on the field. These species should be addressed by management measures implemented through this instruction.

A3.1.2. List 2 contains bird species known to occur in the vicinity of March ARB and the 452 AMW operating areas that are considered less hazardous or minimally so because they are not common, small sized, or their behaviors limit their exposure to aircraft operations. These species are listed as they are resident or migratory in the Southern California region and may therefore be recorded in bird strike reports and identified by the Smithsonian Institution in local strike reports.

**Table A3.1. List 1.**

List 1. Order and Species of Most Hazardous Birds Identified in the Vicinity of March ARB and Local Operating Areas:	
<u>Plecaniformes – Pelicans and Allies</u>	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
<u>Anseriformes – Waterfowl</u>	
Canada Goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Northern Pintail	<i>Anas acuta</i>
Gadwall	<i>Anas strepera</i>
American Wigeon	<i>Anas americana</i>
Northern Shoveler	<i>Anas clypeata</i>
Green-winged Teal	<i>Anas crecca</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Lesser Scaup	<i>Aythya affinis</i>
Ring-necked Duck	<i>Aythya collaris</i>
<u>Falconiformes – Vultures, Hawks, and Falcons</u>	
Turkey Vulture	<i>Cathartes aura</i>
Golden Eagle	<i>Aquila chrysaetos</i>
Northern Harrier	<i>Circus cyaneus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>

American Kestrel	<i>Falco sparverius</i>
<u>Ciconiiformes – Herons and Egrets</u>	
Great Egret	<i>Ardea alba</i>
Great Blue Heron	<i>Ardea herodias</i>
Snowy Egret	<i>Egretta thula</i>
<u>Charadriiformes – Shorebirds and Gulls</u>	
Killdeer	<i>Charadrius vociferous</i>
Long-billed Curlew	<i>Numenius americanus</i>
Marbled Godwit	<i>Limosa fedoa</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Least Sandpiper	<i>Calidris minutilla</i>
Western Sandpiper	<i>Calidris mauri</i>
Short-billed Dowitcher	<i>Limnodromus griseus</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Herring Gull	<i>Larus argentatus</i>
California Gull	<i>Larus californicus</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Western Gull	<i>Larus occidentalis</i>
<u>Strigiformes – Owls</u>	
Burrowing Owl	<i>Athene cunicularia</i>
<u>Columbiformes – Pigeons and Doves</u>	
Rock Pigeon	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
<u>Passeriformes – Perching Birds</u>	
Horned Lark	<i>Eremophila alpestris</i>
Barn Swallow	<i>Hirundo rustica</i>
Cliff Swallow	<i>Hirundo pyrrhonota</i>
Common Raven	<i>Corvus corax</i>
American Crow	<i>Corvus brachyrhynchos</i>
European Starling	<i>Sturnus vulgaris</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>

**Table A3.2. List 2.**

List 2. Order and Species of Other Birds Identified in the Vicinity of March ARB and Local Operating Areas:	
<u>Pelecaniformes – Pelicans and Allies</u>	
American White Pelican	<i>Pelecanus erythrorhynchos</i>
Brown Pelican	<i>Pelecanus occidentalis</i>
<u>Gaviiformes – Loons</u>	
Common Loon	<i>Gavia immer</i>
<u>Podicipediformes – Grebes</u>	
Western Grebe	<i>Aechmophorus occidentalis</i>

Clark's Grebe	<i>Aechmophorus clarki</i>
Horned Grebe	<i>Podiceps auritus</i>
Eared Grebe	<i>Podiceps nigricollis</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
<u>Anseriformes – Waterfowl</u>	
Snow Goose	<i>Chen caerulescens</i>
Ross' Goose	<i>Chen rossii</i>
Brant	<i>Branta bernicla</i>
Wood Duck	<i>Aix sponsa</i>
Blue-winged Teal	<i>Anas discors</i>
Canvasback	<i>Aythya valisineria</i>
Redhead	<i>Aythya americana</i>
Greater Scaup	<i>Aythya marila</i>
Surf Scoter	<i>Melanitta perspicillata</i>
Common Goldeneye	<i>Bucephala clangula</i>
Bufflehead	<i>Bucephala albeola</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Common Merganser	<i>Mergus merganser</i>
Red-breasted Merganser	<i>Mergus serrator</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
<u>Falconiformes – Vultures, Hawks, and Falcons</u>	
Osprey	<i>Pandion haliaetus</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
Ferruginous Hawk	<i>Buteo regalis</i>
White-tailed Kite	<i>Elanus leucurus</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Prairie Falcon	<i>Falco mexicanus</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Merlin	<i>Falco columbarius</i>
<u>Galliformes – Gallinaceous Birds</u>	
California Quail	<i>Callipepla californica</i>
<u>Ciconiiformes – Herons and Egrets</u>	
Green Heron	<i>Butorides virescens</i>
American Bittern	<i>Botaurus lentiginosus</i>
Least Bittern	<i>Ixobrychus exilis</i>
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>
White-faced Ibis	<i>Plegadis chihi</i>
<u>Gruiformes – Cranes and Allies</u>	
Clapper Rail	<i>Rallus longirostris</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Common Moorhen	<i>Gallinula chloropus</i>
American Coot	<i>Fulica americana</i>
<u>Charadriiformes – Shorebirds and Gulls</u>	
American Avocet	<i>Recurvirostra americana</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>

American Golden Plover	<i>Pluvialis dominica</i>
Pacific Golden Plover	<i>Pluvialis fulva</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Solitary Sandpiper	<i>Tringa solitaria</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Whimbrel	<i>Numenius phaeopus</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Red Knot	<i>Calidris canutus</i>
Pectoral Sandpiper	<i>Calidris melanotos</i>
Baird's Sandpiper	<i>Calidris bairdii</i>
Dunlin	<i>Calidris alpina</i>
Wilson's Phalarope	<i>Phalaropus tricolor</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>
Red Phalarope	<i>Phalaropus fulicaria</i>
Common Snipe	<i>Gallinago gallinago</i>
Franklin's Gull	<i>Larus pipixcan</i>
Heermann's Gull	<i>Larus heermanni</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Mew Gull	<i>Larus canus</i>
Thayer's Gull	<i>Larus thayeri</i>
Glaucous-winged Gull	<i>Larus glaucescens</i>
Elegant Tern	<i>Sterna elegans</i>
Caspian Tern	<i>Sterna caspia</i>
Royal Tern	<i>Sterna maxima</i>
Common Tern	<i>Sterna hirundo</i>
Forster's Tern	<i>Sterna forsteri</i>
Least Tern	<i>Sterna antillarum</i>
Black Tern	<i>Chlidonias niger</i>
<u>Cuculiformes – Cuckoos, Roadrunners, Anis</u>	
Greater Roadrunner	<i>Geococcyx californianus</i>
<u>Strigiformes – Owls</u>	
Great Horned Owl	<i>Bubo virginianus</i>
Western Screech Owl	<i>Otus kennicottii</i>
Barn Owl	<i>Tyto alba</i>
<u>Columbiformes – Pigeons and Doves</u>	
Band-tailed Pigeon	<i>Columba fasciata</i>
Spotted Dove	<i>Streptopelia chiensis</i>
Common Ground Dove	<i>Columbina passerina</i>
<u>Caprimulgiformes – Goatsuckers</u>	
Lesser Nighthawk	<i>Chordeiles acutipennis</i>
Common Poorwill	<i>Phalaenoptilus nuttallii</i>
<u>Apodiformes – Swifts and Hummingbirds</u>	
BlackSwift	<i>Cypseloides niger</i>
Vaux's Swift	<i>Chaetura vauxi</i>
Chimney Swift	<i>Chaetura pelagica</i>
White-throated Swift	<i>Aeronautes saxatalis</i>
Black-chinned Hummingbird	<i>Archilochus alexandri</i>

Costa's Hummingbird	<i>Calypte costae</i>
Anna's Hummingbird	<i>Calypte anna</i>
Calliope Hummingbird	<i>Stellula calliope</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Allen's Hummingbird	<i>Selasphorus sasin</i>
<u>Coraciiformes – Kingfishers</u>	
Belted Kingfisher	<i>Ceryle alcyon</i>
<u>Piciformes – Woodpeckers</u>	
Acorn Woodpecker	<i>Melanerpes formicivorus</i>
Lewis's Woodpecker	<i>Melanerpes lewis</i>
Common Flicker	<i>Colaptes auratus</i>
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>
Nuttall's Woodpecker	<i>Picoides nuttallii</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Hairy Woodpecker	<i>Picoides villosus</i>
<u>Passeriformes – Perching Birds</u>	
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Western Wood Pewee	<i>Contopus sordidulus</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Hammond's Flycatcher	<i>Empidonax hammondii</i>
Dusky Flycatcher	<i>Empidonax oberholseri</i>
Pacific-slope Flycatcher	<i>Empidonax difcilis</i>
Say's Phoebe	<i>Sayornis saya</i>
Black Phoebe	<i>Sayornis nigricans</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Cassin's Kingbird	<i>Tyrannus vociferans</i>
Violet-green Swallow	<i>Tachycineta thalissina</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Purple Martin	<i>Progne subis</i>
Bank Swallow	<i>Riparia</i>
Oak Titmouse	<i>Baeolophus inornatus</i>
Bushtit	<i>Psaltriparus minimus</i>
House Wren	<i>Troglodytes aedon</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Cactus Wren	<i>Campylorhynchus bruneicapillus</i>
Rock Wren	<i>Salpinctes obsoletus</i>
Canyon Wren	<i>Catherpes mexicanus</i>
Marsh Wren	<i>Cistothorus palustris</i>
American Dipper	<i>Cinclus mexicanus</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>
California Gnatcatcher	<i>Poliophtila californica</i>
Western Bluebird	<i>Sialia mexicana</i>
American Robin	<i>Turdus migratorius</i>
Hermit Thrush	<i>Catharus guttatus</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
California Thrasher	<i>Toxostoma redivivum</i>

American Pipit	<i>Anthus rubescens</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Phainopepla	<i>Phainopepla nitens</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Western Scrub Jay	<i>Aphelocoma californica</i>
Bell's Vireo	<i>Vireo bellii</i>
Cassin's Vireo	<i>Vireo cassinii</i>
Hutton's Vireo	<i>Vireo huttoni</i>
Warbling Vireo	<i>Vireo gilvus</i>
Tennessee Warbler	<i>Vermivora peregrina</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Nashville Warbler	<i>Vermivora ruficapilla</i>
Northern Parula	<i>Parula americana</i>
Black-and-white Warbler	<i>Mniotilta varia</i>
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
Yellow Warbler	<i>Dendroica petechia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Townsend's Warbler	<i>Dendroica townsendi</i>
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>
Hermit Warbler	<i>Dendroica occidentalis</i>
Blackpoll Warbler	<i>Dendroica striata</i>
Palm Warbler	<i>Dendroica palmarum</i>
Townsend's Warbler	<i>Dendroica townsendi</i>
MacGillivray's Warbler	<i>Oporornis tolmiei</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Yellow-breasted Chat	<i>Icteria virens</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
American Redstart	<i>Setophaga ruticilla</i>
House Sparrow	<i>Passer domesticus</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Tricolored Blackbird	<i>Agelaius tricolor</i>
Great-tailed Grackle	<i>Quiscalus mexicanus</i>
Hooded Oriole	<i>Icterus cucullatus</i>
Bullock's Oriole	<i>Icterus bullockii</i>
Scott's Oriole	<i>Icterus parisorum</i>
Western Tanager	<i>Piranga ludoviciana</i>
Northern Cardinal	<i>Cardinalis</i>
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Blue Grosbeak	<i>Passerina caerulea</i>
Lazuli Bunting	<i>Passerina amoena</i>
Purple Finch	<i>Carpodacus purpureus</i>
Red Crossbill	<i>Loxia curvirostra</i>
Pine Siskin	<i>Carduelis pinus</i>
American Goldfinch	<i>Carduelis tristis</i>
Lesser Goldfinch	<i>Carduelis psaltria</i>
Lawrence's Goldfinch	<i>Carduelis lawrencei</i>
House Finch	<i>Carpodacus mexicanus</i>

Green-tailed Towhee	<i>Pipilo chlorurus</i>
California Towhee	<i>Pipilo crissalis</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Fox Sparrow	<i>Passerella iliaca</i>
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>
Chipping Sparrow	<i>Spizella passerina</i>
Clay-colored Sparrow	<i>Spizella pallida</i>
Brewer's Sparrow	<i>Spizella breweri</i>
Black-chinned Sparrow	<i>Spizella atrogularis</i>
Lark Sparrow	<i>Chondestes grammacus</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
White-throated Sparrow	<i>Zonotrichia albicollis</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Lincoln's Sparrow	<i>Melospiza lincolnii</i>
Song Sparrow	<i>Melospiza melodia</i>
Swamp Sparrow	<i>Melospiza georgiana</i>
Dark-eyed Junco	<i>Junco hyemalis</i>

## Attachment 4

## LIST OF BASH REFERENCES

**A4.1. General.** This appendix includes sources of information and points of contact for BASH related issues. Vendor lists are not inclusive and do not imply endorsement of specific vendors.

**A4.2. Technical Points of Contact.** The following are available to discuss BASH issues:

**Table A4.1. Technical Points of Contact.**

<p><b>USAF BASH Team:</b>  HQ AFSEC/SEFW  HQ AFSEC/SEFW  9700 Avenue G, Suite 266, SE  Kirtland AFB, NM 87117-5671  DSN 246-5674/5848/5673  (505) 846-5674/5848/5673</p>
<p><b>AFRC Flight Safety</b>  AFRC/SEF  155 Richard Ray Boulevard  Robins AFB, GA 31098-1635  DSN 497-2236</p>
<p><b>National Guard Bureau, Plans and Requirements Branch:</b>  NGB/A7AM  3500 Fetchet Avenue  3500 Fetchet Avenue  JB Andrews, MD 20762-5157  DSN 612-8859</p>
<p><b>Air National Guard Safety Office:</b>  DSN 612-8859  HQ NGB/SEF  ANGRC, JB Andrews, MD 20762 DSN 612-8549</p>
<p><b>FAA:</b>  FAA – Airports  800 Independence Avenue, SW, Room 615  Washington D.C. 20591  (202) 267-3778</p>
<p><b>USDA/APHIS/WS:</b></p>
<p><b>US Department of Agriculture, Wildlife Services (California):</b>  California Wildlife Services State Director 3419-A Arden Way  Sacramento, CA 95825  (916) 979-2675 phone, (916) 979-2680 FAX</p>

<http://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage>

**A4.3. Meetings.** Bird Strike Committee – USA. This organization was formed in 1991 as a joint effort by the FAA, USAF, and USDA. Bird Strike Committee – USA facilitates the exchange of information, promotes the collection and analysis of accurate wildlife strike data, promotes the development of new technologies for reducing wildlife hazards, promotes professionalism in wildlife management programs on airports through training and advocacy of high standards of conduct for airport biologists and bird patrol personnel, and is a liaison to similar organizations in other countries. The organization is directed by an eight-person steering committee consisting of two members each from the FAA, USDA, Department of Defense, and the aviation industry Wildlife Hazard Working Group. Bird Strike Committee – USA meets annually. For more information, visit [www.birdstrike.org](http://www.birdstrike.org).

**A4.4. BASH Information Sheet.** An informational sheet on available training videos and other BASH references is attached to this appendix as **Attachment 1**

**Attachment 5****POLICY ON TAKING OF MIGRATORY BIRDS**

Current policy on the taking of migratory birds was published 6 May 2015 on the AF Portal BASH website (Removal/Depredation):

The following bullets describe changes in U.S. Fish and Wildlife Service (USFWS) policy on the taking of migratory birds. The USFWS is currently working on an Executive Order clarifying federal agencies' responsibilities. NOTE:

1. Air Force installations must have a depredation permit issued by the USFWS prior to any take of migratory birds necessary for health or safety reasons, including BASH program implementation.
2. Every effort must first be made to use non-lethal control methods to solve the problem before taking lethal action.
3. Federal agencies are still bound by the Endangered Species Act. Consult with the USFWS informally to ensure take operations are handled in accordance with the Endangered Species Act.
4. Installations must comply with migratory bird treaties entered into between the U.S. and other nations.
5. Federal contractors and volunteers are not exempt from the mandates of the Migratory Bird Treaty Act.
6. Although federal agencies are normally not bound by state laws pertaining to migratory birds, AFMAN 32-7003, para. 3.38 directs installations to protect state-listed endangered, threatened, or rare species when practical. Installations should coordinate proposed takes with their state fish and game agency and/or other stakeholders and be sensitive to state's concerns.
7. Any proposal to take, or otherwise impact, migratory bird species is subject to the National Environmental Policy Act (NEPA) (42 USC 4321-4347) and 32 CFR Part 989, The Environmental Impact Analysis Process. For emergency situations, MAJCOMs and installations

will follow the procedures outlined in 32 CFR Part 989, Section 989.34, Special and Emergency Procedures.

8. When the decision has been made to take migratory birds, installations shall prepare an administrative record to document the "take". At a minimum, this will consist of a memo for record with reasons for control measures previous actions taken, consultations, USDA-WS concurrence and total number by species of birds killed.

9. Each Air Force installation located in the US, or its territories will:

- a) Apply for a depredation permit from the USFWS.
- b) Apply for any required State permits.
- c) Consult with the USFWS informally on issues of bird conservation.
- d) Retain records of take (or any other activity) of species regulated under the Migratory Bird Treaty Act and Bald & Golden Eagle Protection Act.

## Attachment 6

### SAFETY PRECUATIONS FOR HANDLING WILDLIFE REMAINS

#### Safety Precautions for Handling Wildlife Remains - Ref: T.O. 1-1-691

3.5.8. Bird Strike Cleaning. Aircraft occasionally collide with birds in the air during take-off or landing resulting in residue that must be cleaned from the exterior and/or interior of the aircraft after landing. In areas where avian influenza A (H5N1) outbreaks are ongoing among bird populations (See Embargo of Birds from Specified Countries: <http://www.cdc.gov/flu/avian/outbreaks/embargo.htm>), special precautions and cleaning procedures must be followed. Collisions with interior surface of the aircraft with infectious blood, feces, feathers, or other materials.

#### 3.5.8.1. Bird Strike Cleanup.

## WARNING

- Any potential risk of human exposure to infectious material from bird strikes may be reduced by observing the following cleaning recommendations.
- Use non-sterile vinyl or nitrile gloves that cover part of the arm.
- If the cleaning method may create splashing, safety goggles or glasses and an N-95 Disposable Respirator (Appendix B, Table B-2, Item No. 70), or equivalent, surgical mask may be worn to protect mucous membranes.
- Under the advisement of the Base Safety Office and Bioenvironmental, flexibility in modifying personal protective equipment requirements may be necessary as determined on the basis of the task and circumstances of the cleaning activity.
- Wear disposable coveralls to protect clothing and skin while cleaning.
- Avoid touching the mouth or face area with soiled hands or gloves. Wash hands thoroughly with soap and water after cleaning or before eating or smoking. Clean hands with an alcohol- based hand gel (at least 60% alcohol) when not visibly soiled or when soap and water are not available.

The following procedures describe a normal bird strike cleanup.

- a. Place bird carcasses and/or parts in a double plastic bag and contact the installation safety office in accordance with AFMAN 91-223 Aviation Safety Investigations and Reports.
- b. If the bird strike occurred in a suspected H5N1 area, use one of the four approved treatment methods and include necessary documentation when shipping remains to the Smithsonian Institution, Division of Birds NHB, E610, MRC 116, 10th and Constitution Avenue., NW, Washington, DC 20560. The USDA approved methods include:
  - (1) Immerse in 70% alcohol and allow to dry.
  - (2) Heat to 130° F for at least 30 minutes.

- (3) Immerse in phenol and allow to dry.
- (4) Immerse in 10% formalin and allow to dry.
- (5) Required documentation includes:
  - (a) Certificate of Origin.
  - (b) Certificate of Treatment.
  - (c) Copy of Smithsonian U.S. Dept. of Agriculture Animal and Plant Health Inspection Service (APHIS) permit. All documents can be accessed at [http://afsafety.af.mil/SEF/Bash/SEFW\\_new.shtml](http://afsafety.af.mil/SEF/Bash/SEFW_new.shtml) or contact the Bird/Wildlife Aircraft Strike Hazard (BASH) Team at (505) 846-1440/5673/5679. Reference Air Force Pamphlet 91-212 for more information on the BASH Team.

## WARNING

- Do not wash contaminated surfaces with high pressurized water or cleaner, which could aerosolize H5N1 viral particles that could be inhaled.
  - Consult the installation's Civil Engineering Environmental Flight and Bioenvironmental Engineering Flight for proper containment, decontamination and/or disposal of contaminated wastewater.
- c. Clean the exterior and interior surfaces of the aircraft, removing blood, feces, feathers, or other material thoroughly using hand-cleaning method only as outlined in **Paragraph 3.5.2.5**, step g of this TO. Apply a solution of MIL-PRF-87937 or MIL-PRF-85570 mixed per Paragraph 3.3. of this TO. Apply the cleaning solution to the surface with an aircraft wash pad and agitate.
  - d. Rinse the area using low pressure water. In areas where water could damage components or create drainage problems, rinse area with rag wetted with clean water.
  - e. Wipe the area with a clean, dry rag.
  - f. Repeat the above procedure, as necessary, for extremely soiled/contaminated areas.

## WARNING

Consult the Base Bioenvironmental Office for proper disposal and handling of contaminated cleaning tools and materials.

### NOTE

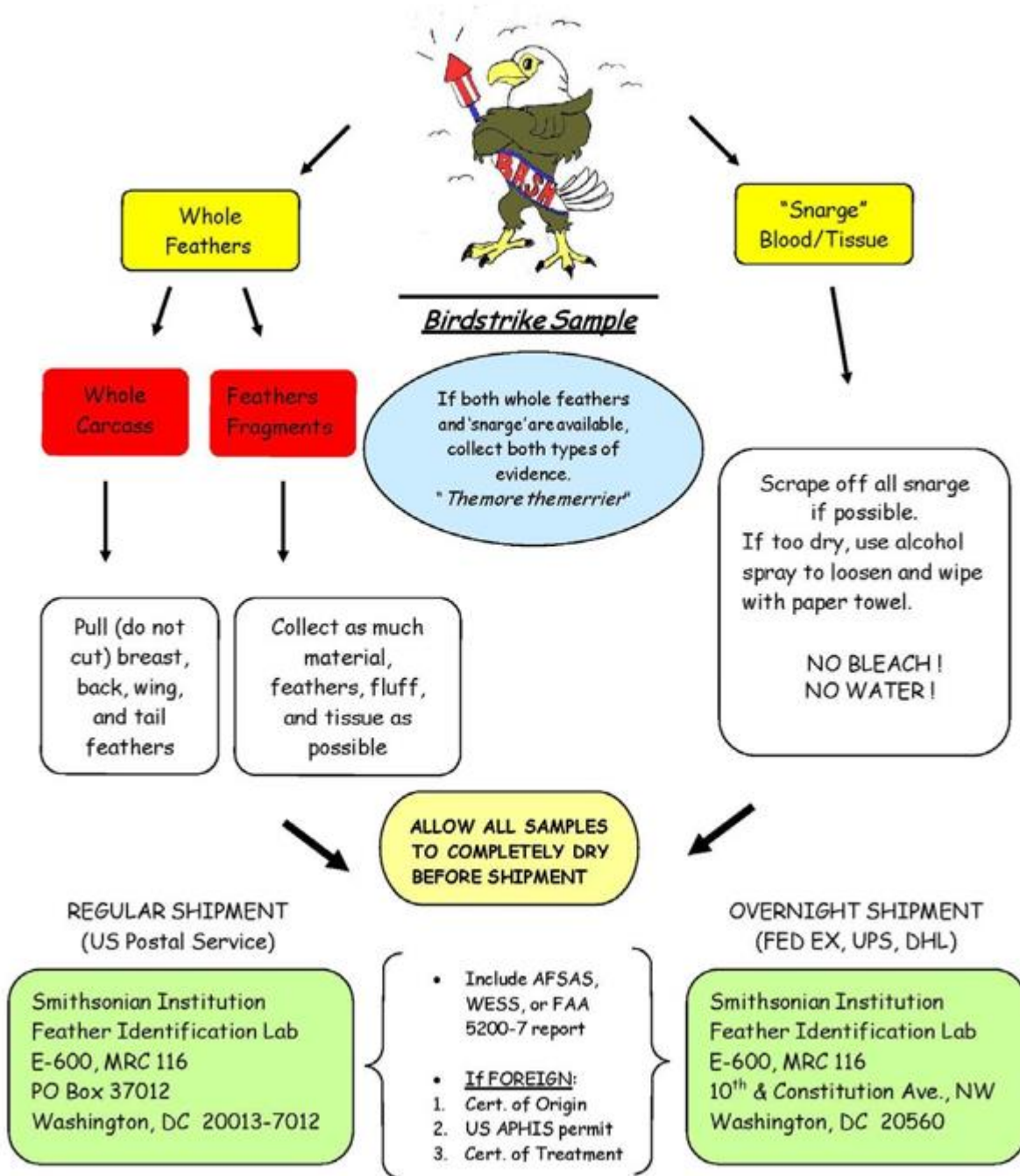
Consult the weapons system specific, (-23, or equivalent), manual for cleaning requirements in addition to those in this manual.

- g. Place all scrapers, brushes, rags and other cleaning tools in a designated receptacle for proper cleaning and/or disposal.

Attachment 7

HOW TO COLLECT BIRDSTRIKE EVIDENCE

**HOW TO COLLECT BIRDSTRIKE EVIDENCE**



**Guidelines For  
Collecting Birdstrike Material**  
Feather Identification Lab, Smithsonian Institution  
<http://www.mnh.si.edu/vz/birds/index.html>

**COLLECTING REMAINS**

**Feathers:**

Whole Bird - Pluck a variety of feathers (breast, back, wing, tail)

Partial Bird - Collect a variety of feathers with color or pattern

Feathers only - Send all material available

Do not cut feathers from the bird (we need the downy part at the base of the feathers)

Do not use any sticky substance (no tape or glue)

**Tissue/blood ("Snarge"):**

Dry material - Scrape or wipe off into a clean re-closeable bag or wipe area with pre-packaged alcohol wipe or spray with alcohol to loosen material then wipe with clean cloth/gauze. (\*please do not use water, bleach, or other cleansers – they destroy DNA)

Fresh material - Wipe area with alcohol wipe and/or clean cloth/gauze or apply fresh tissue/blood to an FTA® DNA collecting card

- Always include any feather material available
- Include copy of report (AFSAS, WESS, or FAA 5200-7)
- Always secure all remains in re-sealable plastic bag

**SHIPPING**

**Routine / Non-Damaging Cases**  
***US Postal Service***



Feather Identification Lab  
Smithsonian Institution  
NHB, E600, MRC 116  
P.O. Box 37012  
Washington, DC 20013-7012

**Priority / Damaging Cases**  
***Overnight Shipping***



Feather Identification Lab  
Smithsonian Institution  
NHB, E600, MRC 116  
10<sup>th</sup> & Constitution Ave., NW  
Washington, DC 20560-0116

**WEBSITES**

Birdstrike Committee: [www.birdstrike.org](http://www.birdstrike.org)

Air Force: <http://www.afsc.af.mil/organizations/bash/index.asp>

AF Portal: AFSEC - Air Force Safety Center : Aviation Safety Division : Bird/Wildlife Aircraft Strike Hazard (BASH)

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

[http://www.faa.gov/airports/airport\\_safety/wildlife/smithsonian/](http://www.faa.gov/airports/airport_safety/wildlife/smithsonian/)

Navy: [www.safetycenter.navy.mil/aviation/operations/bash](http://www.safetycenter.navy.mil/aviation/operations/bash)

<http://www.public.navy.mil/comnavsafecen/Pages/Aviation/AirfieldOperations.aspx>

**Feather Lab Contact Information**

202-633-0801

dovec@si.edu

heackerm@si.edu

dahlanno@si.edu

whattonj@si.edu

### "MAKE-YOUR-OWN" - BIRDSTRIKE COLLECTING KITS

*Birdstrike Collecting Kits* are cheap to make and easy to assemble. Having pre-made kits available improves birdstrike reporting and encourages the sampling of birdstrike remains. Most folks assemble the contents into individual bags or envelopes and keep a supply in field vehicles or office supply cabinets for quick access. Below is a list of recommended items to include in your birdstrike collecting kits; mix and match as budgets permit:

#### Re-sealable plastic bags

A variety of sizes for various amounts of debris; Re-sealable bags help contain liquids and keeps odors to a minimum.

#### Sharpie Markers

Permanent markers are water resistant and used for writing data (date, time, aircraft, etc) directly on the bag of remains.

#### Alcohol Wipes

Pre-packaged alcohol hand-wipes can be used to wipe "snarge" off aircraft. Alcohol is better than water at preserving DNA, preventing mold growth, and is more sanitary for humans. Alternatively, use a spray bottle with 70% alcohol to spray the area before wiping with paper towels.

\*Do not use wipes with bleach or other cleansers, it destroys DNA.

#### FTA® Micro Card and Sterile Applicators

If you send a lot of fresh blood/tissue samples for DNA identification, you may want to look into getting Whatman FTA® DNA cards. The material is sampled with a sterile applicator and placed onto the surface of the card that "fixes" the DNA in the sample. For more information on ordering these items contact the Feather Lab.

\*Note: If you only occasionally send blood/tissue samples, a paper towel with alcohol, or alcohol wipe is still a good option for this type of material.

#### Miscellaneous Items for Birdstrike Collecting

Kitchen shears - good for cutting feet, wings, bills

Tongue depressors, tweezers, cotton swabs/cotton-tipped applicators

Hand cleaners, or other alcohol based gel hand sanitizers.

(collecting kits cont.)

### **Extra Safety Items**

Latex Gloves

Protective Eyewear

Face Masks: Regular surgical-type hygiene masks. If avian flu is a concern, the Center for Disease Control recommends NIOSH rated N95 face masks. (These may be referred to as respirators.) There is a disposable version of these masks by 3M that looks similar to the regular "cup" style face masks.

Hand sanitizing gels

### **Reminders**

Always encourage proper hygiene & provide personnel easy access to cleaning/hygiene supplies.

Do not cut off the fluffy down at the bottom of feathers.

Do not use water, bleach or other cleansers on samples.

Be sure personnel are briefed on proper carcass disposal protocols.

Stay informed to the status of the HPAI H5N1 avian flu virus.

The following websites have excellent coverage on current avian flu info:

**U.S. Geological Survey Wildlife Health Center**

<http://www.nwhc.usgs.gov/>

**Centers for Disease Control and Prevention**

<http://www.cdc.gov/flu/avian/gen-info/facts.htm>

**The American Ornithologists' Union Ornithological Council**

<http://www.nmnh.si.edu/BIRDNET/OC/avianinfluenza.html>



### **Contact Information:**

The Feather Identification Lab

Smithsonian Institution

MRC 116, E-600,

PO Box 37012

Washington, DC 20013-7012

(202) 633-0801

### **Email:**

[dovec@si.edu](mailto:dovec@si.edu)

[heackerm@si.edu](mailto:heackerm@si.edu)

[dahlanno@si.edu](mailto:dahlanno@si.edu)

[whattonj@si.edu](mailto:whattonj@si.edu)

(rev 09/09 jfw)

**Whatman FTA® DNA collecting cards**

Whatman FTA® DNA cards are a good option for collecting birdstrike remains that consist of mostly blood and tissue. To purchase the supplies needed, contact the sales reps at Government Scientific Source, Inc.:

**U.S. Air Force and Navy-**  
Nicole White  
1-800-248-8030 ext. 151  
nwhite@govsci.com

**USDA WS and Airport Ops/Operators -**  
Todd Carl  
1-800-248-8030 ext. 170  
tcarl@govsci.com

The supplies needed are:

**FTA® Micro Indicating Cards (one circle)**  
Item # WB120211

**Sterile Foam-tipped Applicators**  
Item # WB100032

The FTA® cards need to be kept dry & secure after sampling. We recommend putting the card in a small re-sealable plastic bag for shipping. If FTA® cards are not an option for collecting fresh "snarge", we recommend using alcohol to wipe the remains from the area. Pre-packaged alcohol wipes are fine. Please no water, bleach, or other cleansers. If remains are dry there is no need for alcohol (dried tissue also works well for DNA analysis).

**FTA® CARD DNA COLLECTION FOR BIRDSTRIKE IDENTIFICATION**

- 1) Use foam tip of sterile applicator to wipe snarge / blood from surface.
- 2) Open FTA® card and press the foam tip of applicator with material onto the circle sample area of the card using light pressure. Without lifting the foam tip from the card, rock the applicator tip side-to-side until sample area is saturated.
  - Use one card for each impact point; label accordingly
- 3) Allow the sample area of the card to air dry (recommend dry for 30 minutes)
  - Keep the sterile applicator and send with card.
  - Label card with report number or incident information.
- 4) Place card and sterile applicator in clean re-sealable plastic bag.
  - If whole feather material is present in birdstrike remains, send in a separate plastic bag with the card & applicator.
- 5) Place all material in mailing envelope with a copy of the bird strike report and send to the Feather Lab.

The use of latex gloves, face masks and eye protection is encouraged when working with birdstrike remains. Always practice good hygiene before and after handling remains by thoroughly washing hands with soap and/or using gel hand sanitizer. (5/09)

Attachment 8

**REQUESTS BY STATE WILDLIFE AGENCIES TO FACILITATE AND ENCOURAGE HABITAT FOR STATE-LISTED THREATENED AND ENDANGERED SPECIES AND SPECIES OF SPECIAL CONCERN ON AIRPORTS**

**CERTALERT**

**ADVISORY CAUTIONARY NON-DIRECTIVE**  
**AIRPORT SAFETY AND OPERATIONS DIVISION AAS-**  
**300 FOR INFORMATION, CONTACT Ed Cleary, AAS-300, (202) 267-**  
 3389

<b>Date:</b>	<b>11/21/2006</b>	<b>No. 06-07</b>
<b>To:</b>	<i>Airport Operators, FAA Airport Certification Safety Inspectors</i>	
<b>Topic:</b>	<b>Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State-Listed Threatened and Endangered Species and Species of Special Concern on Airports</b>	

**PURPOSE:**

This Certalert describes procedures for responding to requests by state wildlife agencies to facilitate and encourage habitats for state-listed threatened and endangered species or species of special concern that occur on airports and may pose a threat to aviation safety. This Certalert does not apply to federally listed threatened and endangered species. Federal Aviation Administration (FAA) guidance on dealing with federally listed threatened and endangered species can be found in FAA Order 1050.1E, *Environmental Impacts - Policies and Procedures*, Appendix A, Section 8.

**BACKGROUND:**

An airport’s air operations area (AOA) is an artificial environment that has been created and maintained for aircraft operations. Because an AOA can be markedly different from the surrounding native landscapes, it may attract wildlife species that do not normally occur, or that occur only in low numbers in the area. Some of the grassland species attracted to an airport’s AOA are at the edge of their natural ranges but are attracted to habitat features found in the airport environment. Also, some wildlife species may occur on the airport in higher numbers than occur naturally in the region because the airport offers habitat features the species prefer. Some of these wildlife species are state-listed threatened and endangered species or have been designated by state resource agencies as species of special concern.

Many state wildlife agencies have requested that airport operators facilitate and encourage habitat on airports for state-listed threatened and endangered species or species of special concern. Airport operators should exercise great caution in adopting new management techniques; new techniques may increase wildlife hazards and be inconsistent with safe airport operations. Managing the on-airport environment to facilitate or encourage the

presence of hazardous wildlife species can create conditions that are incompatible with, or pose a threat to, aviation safety.

#### **DISCUSSION:**

Hazardous wildlife are those species of wildlife (50 CFR 10.12), including feral animals and domesticated animals not under control (14 CFR 139.5, Definitions), that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard. (FAA Advisory Circular 150/5200-33A, *Hazardous Wildlife Attractants on or Near Airports*, July 27, 2004.) Not all state-listed threatened and endangered species or species of concern pose a direct threat to aviation safety. However, these species may pose an indirect threat and be hazardous because they attract other wildlife species or support prey species attractive to other species that are directly hazardous. Also, the habitat management practices that benefit these state-listed threatened and endangered species and species of special concern may attract other hazardous wildlife species. For example, the grassland habitat preferred by grasshopper sparrows, which are listed as threatened in New York<sup>1</sup>, also supports a wide variety of insects and small mammals. These insects and small mammals are an indirect threat to aviation safety because they are very attractive to hawks, owls, gulls and other birds. It is these large birds that can pose a direct threat to aviation safety. On-airport habitat and wildlife management practices designed to benefit wildlife that directly or indirectly create safety hazard where none existed before are incompatible with safe airport operations.

Airport operators must decline to adopt habitat management techniques that jeopardize aviation safety. Adopting such techniques could place them in violation of their obligations and subject to an FAA enforcement action and possible civil penalties under 49 U.S.C. §44706, as implemented by 14 CFR § 139.337. In particular, an airport operator that has received federal grant-in-aid assistance is obligated through its grant assurances to maintain compatible land uses. Failure to do so may lead to noncompliance with its grant obligations. Further, airports that serve commercial air carriers are required to be certificated under 49 U.S.C. §44706, as implemented by 14 CFR Part 139. Title 14 CFR § 139.337(a) requires airport operators holding a **Part 139** certificate to “take immediate action to alleviate wildlife hazards whenever they are detected.” Accordingly, **Part 139**-certificated airport operators should make state wildlife agencies aware of the airport’s FAA-approved Wildlife Hazard Management Plan (WHMP), AC 150/5200-33A, and the joint FAA-Wildlife Services manual, *Wildlife Hazard Management at Airports* (6/05) (joint FAA/WS manual). Before making any changes in land management practices, the airport operator should carefully review the above documents to assure that any changes are consistent with its obligations under federal law to control wildlife hazards and attractants in the AOA. For ease of reference, the key land management practices bearing upon aviation safety are summarized and highlighted below:

#### **RECOMMENDATIONS:**

1. Adhere to the turf, landscaping, and habitat management practices described in the airport’s WHMP, AC 150/5200-33A, and the joint FAA/WS manual. Do not change these practices specifically to encourage the presence of, or to attract hazardous wildlife species even if the species are state-listed or of special concern.

a. Do not deliberately preserve or develop on-airport wildlife habitats such as wetlands, forest, brush, or native grasslands having characteristics that attract hazardous wildlife (See the airport's WHMP, AC 150/5200-33A, and the joint FAA/WS Manual.)

<sup>1</sup> Those species listed by states as threatened, endangered, or species of special concern vary from state to state. For information on state listed species, contact the appropriate state wildlife management Agency.

b. Manage the airport's AOA vegetation as recommended in the airport's WHMP, AC 150/5200-33A, and the joint FAA/WS manual.

c. Do not deliberately preserve or develop on-airport wildlife habitats such as wetlands, forest, brush, or native grasslands having characteristics that attract hazardous wildlife (See the airport's WHMP, AC 150/5200-33A, and the joint FAA/WS Manual.)

d. Manage the airport's AOA vegetation as recommended in the airport's WHMP, AC 150/5200-33A, and the joint FAA/WS manual.

2. Adhere to the wildlife harassment and repellent techniques described in the airport's WHMP, AC 150/5200-33A, and the joint FAA/WS manual to prevent hazardous wildlife species from becoming established and complicating the ability to adhere to prescribed habitat management practices.

3. Do not allow hazardous state-listed threatened and endangered species or species of special concern to remain on the airport if it requires managing the airport environment contrary to FAA recommendations.

4. Reevaluate existing and evaluate future agreements with federal, state, or local wildlife agencies where the terms of the agreements are or may be contrary to federal obligations concerning hazardous wildlife on or near public-use airports and aviation safety.

5. Whenever practicable, wetland mitigation for state-listed threatened and endangered species or species of special concern should be sited off-airport (see AC 150/5200-33A, §2-4.c (1)).

OSB	11/21/2006
Ben Castellano, Manager Airport Safety & Operations Division	Date

DISTRIBUTION CERTALERT DISTRIBUTION LIST

**Attachment 9****MEMORANDUM OF AGREEMENT BETWEEN FEDERAL AVIATION****Memorandum of Agreement  
Between the Federal Aviation  
Administration,  
the U.S. Air Force,  
the U.S. Army,  
the U.S. Environmental Protection  
Agency, the U.S. Fish and Wildlife  
Service, and  
the U.S. Department of  
Agriculture to Address Aircraft-  
Wildlife Strikes****PURPOSE**

The signatory agencies know the risks that aircraft-wildlife strikes pose to safe aviation.

This Memorandum of Agreement (MOA) acknowledges each signatory agency's respective missions. Through this MOA, the agencies establish procedures necessary to coordinate their missions to more effectively address existing and future environmental conditions contributing to aircraft-wildlife strikes throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety, while protecting the Nation's valuable environmental resources.

**BACKGROUND**

Aircraft-wildlife strikes are the second leading causes of aviation-related fatalities. Globally, these strikes have killed over 400 people and destroyed more than 420 aircraft. While these extreme events are rare when compared to the millions of annual aircraft operations, the potential for catastrophic loss of human life resulting from one incident is substantial. The most recent accident demonstrating the grievous nature of these strikes occurred in September 1995, when a U.S. Air Force reconnaissance jet struck a flock of Canada geese during takeoff, killing all 24 people aboard.

The Federal Aviation Administration (FAA) and the United States Air Force (USAF) databases contain information on more than 54,000 United States civilian and military aircraft-wildlife strikes reported to them between 1990 and 1999<sup>1</sup>. During that decade, the FAA received reports indicating that aircraft-wildlife strikes, damaged 4,500 civilian U.S. aircraft (1,500 substantially), destroyed 19 aircraft, injured 91 people, and killed 6 people. Additionally, there were 216 incidents where birds struck two or more engines on civilian aircraft, with damage occurring to 26 percent of the 449 engines involved in these incidents. The FAA estimates that during the same decade, civilian U.S. aircraft sustained \$4 billion worth of damages and associated losses and 4.7 million hours of aircraft downtime due to aircraft-wildlife strikes. For the same period, USAF planes colliding with

wildlife resulted in 10 Class A Mishaps<sup>2</sup>, 26 airmen deaths, and over \$217 million in damages.

<sup>1</sup> FAA estimates that the 28,150 aircraft-wildlife strike reports it received represent less than 20% of the actual number of strikes that occurred during the decade.

<sup>2</sup> See glossary for the definition of a Class A Mishap and similar terms.

Approximately 97 percent of the reported civilian aircraft-wildlife strikes involved common, large-bodied birds or large flocks of small birds. Almost 70 percent of these events involved gulls, waterfowl, and raptors ([Table 1](#)).

About 90 percent of aircraft-wildlife strikes occur on or near airports, when aircraft are below altitudes of 2,000 feet. Aircraft-wildlife strikes at these elevations are especially dangerous because aircraft are moving at high speeds and are close to or on the ground. Aircrews are intently focused on complex take-off or landing procedures and monitoring the movements of other aircraft in the airport vicinity. Aircrew attention to these activities while at low altitudes often compromises their ability to successfully recover from unexpected collisions with wildlife and to deal with rapidly changing flight procedures. As a result, crews have minimal time and space to recover from aircraft-wildlife strikes.

Increasing bird and wildlife populations in urban and suburban areas near airports contribute to escalating aircraft-wildlife strike rates. FAA, USAF, and Wildlife Services (WS) experts expect the risks, frequencies, and potential severities of aircraft-wildlife strikes to increase during the next decade as the numbers of civilian and military aircraft operations grow to meet expanding transportation and military demands.

## **SECTION I SCOPE OF COOPERATION AND COORDINATION**

Based on the preceding information and to achieve this MOA's purpose, the signatory agencies:

- A. Agree to strongly encourage their respective regional and local offices, as appropriate, to develop interagency coordination procedures necessary to effectively and efficiently implement this MOA. Local procedures should clarify time frames and other general coordination guidelines.
- B. Agree that the term "airport" applies only to those facilities as defined in the attached glossary.
- C. Agree that the three major activities of most concern include, but are not limited to:
  1. airport siting and expansion;
  2. development of conservation/mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas; and
  3. responses to known wildlife hazards or aircraft-wildlife strikes.

D. Agree that “hazardous wildlife” are those animals, identified to species and listed in FAA and USAF databases, are most often involved in aircraft-wildlife strikes. Many of the species frequently inhabit areas on or near airports, cause structural damage to airport facilities, or attract other wildlife that pose an aircraft-wildlife strike hazard. **Table 1** lists many of these species. It is included solely to provide information on identified wildlife species that have been involved in aircraft-wildlife strikes. It is not intended to represent the universe of species concerning the signatory agencies, since more than 50 percent of the aircraft-wildlife strikes reported to FAA or the USAF did not identify the species involved.

E. Agree to focus on habitats attractive to the species noted in **Table 1**, but the signatory agencies realize that it is imperative to recognize that wildlife hazard determinations discussed in Paragraph L of this section may involve other animals.

F. Agree that not all habitat types attract hazardous wildlife. The signatory agencies, during their consultative or decision-making activities, will inform regional and local land use authorities of this MOA’s purpose. The signatory agencies will consider regional, local, and site-specific factors (e.g., geographic setting and/or ecological concerns) when conducting these activities and will work cooperatively with the authorities as they develop and implement local land use programs under their respective jurisdictions. The signatory agencies will encourage these stakeholders to develop land uses within the siting criteria noted in Section 1-3 of FAA Advisory Circular (AC) 150.5200-33\* (Attachment A) that do not attract hazardous wildlife. Conversely, the agencies will promote the establishment of land uses attractive to hazardous wildlife outside those siting criteria. Exceptions to the above siting criteria, as described in Section 2.4.b of the AC, will be considered because they typically involve habitats that provide unique ecological functions or values (e.g., critical habitat for federally listed endangered or threatened species, ground water recharge).

G. Agree that wetlands provide many important ecological functions and values, including fish and wildlife habitats; flood protection; shoreline erosion control; water quality improvement; and recreational, educational, and research opportunities. To protect jurisdictional wetlands, Section 404 of the Clean Water Act (CWA) establishes a program to regulate dredge and/or fill activities in these wetlands and navigable waters. In recognizing Section 404 requirements and the Clean Water Action Plan’s goal to annually increase the Nation’s net wetland acreage by 100,000 acres through 2005, the signatory agencies agree to resolve aircraft-wildlife conflicts. They will do so by avoiding and minimizing wetland impacts to the maximum extent practicable and will work to compensate for all associated unavoidable wetland impacts. The agencies agree to work with landowners and communities to encourage and support wetland restoration or enhancement efforts that do not increase aircraft-wildlife strike potentials.

H. Agree that the: U.S. Army Corps of Engineers (ACOE) has expertise in protecting and managing jurisdictional wetlands and their associated wildlife; U.S. Environmental Protection Agency (EPA) has expertise in protecting environmental resources; and the U.S. Fish and Wildlife Service (USFWS) has expertise in protecting and managing wildlife and their habitats, including migratory birds and wetlands. Appropriate signatory agencies will cooperatively review proposals to develop or expand wetland mitigation sites, or wildlife refuges that may attract hazardous wildlife. When planning these sites or refuges, the signatory agencies will diligently consider the siting criteria and land use practice recommendations stated in FAA AC 150/5200-33. The agencies will make every effort to undertake actions that are consistent with those criteria and recommendations, but recognize that exceptions to the siting criteria may be appropriate (see Paragraph F of this section).

I. Agree to consult with airport proponents during initial airport planning efforts. As appropriate, the FAA or USAF will initiate signatory agency participation in these efforts. When evaluating proposals to build new civilian or military aviation facilities or to expand existing ones, the FAA or the USAF, will work with appropriate signatory agencies to diligently evaluate alternatives that may avoid adverse effects on wetlands, other aquatic resources, and Federal wildlife refuges.

\* AC 150/5200-33 was cancelled. See Section 1 of attached AC 150/5200-33B (452 AMW/SEF note)

If these or other habitats support hazardous wildlife, and there is no practicable alternative location for the proposed aviation project, the appropriate signatory agencies, consistent with applicable laws, regulations, and policies, will develop mutually acceptable measures, to protect aviation safety and mitigate any unavoidable wildlife impacts.

J. Agree that a variety of other land uses (e.g., storm water management facilities, wastewater treatment systems, landfills, golf courses, parks, agricultural or aquacultural facilities, and landscapes) attract hazardous wildlife and are, therefore, normally incompatible with airports. Accordingly, new, federally-funded airport construction or airport expansion projects near habitats or other land uses that may attract hazardous wildlife must conform to the siting criteria established in the FAA Advisory Circular (AC) 150/5200- 33, Section 1-3.

K. Agree to encourage and advise owners and/or operators of non-airport facilities that are known hazardous wildlife attractants (See Paragraph J) to follow the siting criteria in Section 1-3 of AC 150/5200-33. As appropriate, each signatory agency will inform proponents of these or other land uses about the land use's potential to attract hazardous species to airport areas. The signatory agencies will urge facility owners and/or operators about the critical need to consider the land uses' effects on aviation safety.

L. Agree that FAA, USAF, and WS personnel have the expertise necessary to determine the aircraft-wildlife strike potentials of various land uses. When there is disagreement among signatory agencies about a particular land use and its potential to attract hazardous wildlife, the FAA, USAF, or WS will prepare a wildlife hazard assessment. Then, the appropriate signatory agencies will meet at the local level to review the assessment. At a minimum, that assessment will:

1. identify each species causing the aviation hazard, its seasonal and daily populations, and the population's local movements;
2. discuss locations and features on and near the airport or land use attractive to hazardous wildlife; and
3. evaluate the extent of the wildlife hazard to aviation.

M. Agree to cooperate with the airport operator to develop a specific, wildlife hazard management plan for a given location, when a potential wildlife hazard is identified. The plan will meet applicable FAA, USAF, and other relevant requirements. In developing the plan, the appropriate agencies will use their expertise and attempt to integrate their respective programmatic responsibilities, while complying with existing laws, regulations, and policies. The plan should avoid adverse impacts to wildlife populations, wetlands, or other sensitive habitats to the maximum extent practical. Unavoidable impacts resulting from

implementing the plan will be fully compensated pursuant to all applicable Federal laws, regulations, and policies.

N. Agree that whenever a significant aircraft-wildlife strike occurs or a potential for one is identified, any signatory agency may initiate actions with other appropriate signatory agencies to evaluate the situation and develop mutually acceptable solutions to reduce the identified strike probability. The agencies will work cooperatively, preferably at the local level, to determine the causes of the strike and what can and should be done at the airport or in its vicinity to reduce potential strikes involving that species.

O. Agree that information and analyses relating to mitigation that could cause or contribute to aircraft-wildlife strikes should, whenever possible, be included in documents prepared to satisfy the National Environmental Policy Act (NEPA). This should be done in coordination with appropriate signatory agencies to inform the public and Federal decision makers about important ecological factors that may affect aviation. This concurrent review of environmental issues will promote the streamlining of the NEPA review process.

P. Agree to cooperatively develop mutually acceptable and consistent guidance, manuals, or procedures addressing the management of habitats attractive to hazardous wildlife, when those habitats are or will be within the siting criteria noted in Section 1-3 of FAA AC 5200-33. As appropriate, the signatory agencies will also consult each other when they propose revisions to any regulations or guidance relevant to the purpose of this MOA, and agree to modify this MOA accordingly.

## **SECTION II GENERAL RULES AND INFORMATION**

A. Development of this MOA fulfills the National Transportation Safety Board's recommendation of November 19, 1999, to form an inter-departmental task force to address aircraft-wildlife strike issues.

B. This MOA does not nullify any obligations of the signatory agencies to enter into separate MOAs with the USFWS addressing the conservation of migratory birds, as outlined in Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, dated January 10, 2001 (66 *Federal Register*, No. 11, pg. 3853).

C. This MOA in no way restricts a signatory agency's participation in similar activities or arrangements with other public or private agencies, organizations, or individuals.

D. This MOA does not alter or modify compliance with any Federal law, regulation or guidance (e.g., Clean Water Act; Endangered Species Act; Migratory Bird Treaty Act; National Environmental Policy Act; North American Wetlands Conservation Act; Safe Drinking Water Act; or the "no-net loss" policy for wetland protection). The signatory agencies will employ this MOA in concert with the Federal guidance addressing wetland mitigation banking dated March 6, 1995 (60 *Federal Register*, No. 43, pg. 12286).

E. The statutory provisions and regulations mentioned above contain legally binding requirements. However, this MOA does not substitute for those provisions or regulations, nor is it a regulation itself. This MOA does not impose legally binding requirements on the signatory agencies or any other party, and may not apply to a particular situation in certain

circumstances. The signatory agencies retain the discretion to adopt approaches on a case-by-case basis that differ from this MOA when they determine it is appropriate to do so. Such decisions will be based on the facts of a particular case and applicable legal requirements. Therefore, interested parties are free to raise questions and objections about the substance of this MOA and the appropriateness of its application to a particular situation.

F. This MOA is based on evolving information and may be revised periodically without public notice. The signatory agencies welcome public comments on this MOA at any time and will consider those comments in any future revision of this MOA.

G. This MOA is intended to improve the internal management of the Executive Branch to address conflicts between aviation safety and wildlife. This MOA does not create any right, benefit, or trust responsibility, either substantively or procedurally. No party, by law or equity, may enforce this MOA against the United States, its agencies, its officers, or any person.

H. This MOA does not obligate any signatory agency to allocate or spend appropriations or enter into any contract or other obligations.

I. This MOA does not reduce or affect the authority of Federal, State, or local agencies regarding land uses under their respective purviews. When requested, the signatory agencies will provide technical expertise to agencies making decisions regarding land uses within the siting criteria in Section 1-3 of FAA AC 150/5200-33 to minimize or prevent attracting hazardous wildlife to airport areas.

J. Any signatory agency may request changes to this MOA by submitting a written request to any other signatory agency and subsequently obtaining the written concurrence of all signatory agencies.

K. Any signatory agency may terminate its participation in this MOA within 60 days of providing written notice to the other agencies. This MOA will remain in effect until all signatory agencies terminate their participation in it.

**SECTION III. PRINCIPAL SIGNATORY AGENCY CONTACTS**

The following list identifies contact offices for each signatory agency.

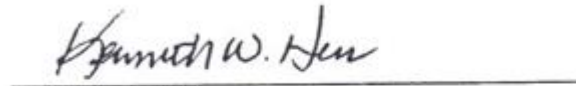
Federal Aviation Administration Office Airport Safety and Standards Airport Safety and Compliance Branch (AAS-310) 800 Independence Avenue, S.W. Washington, D.C. 20591 V: 202-267-1799 F: 202-267-7546	U.S. Air Force HQ AFSC/SEFW 9700 Avenue, G. SE, Building. 24499 Kirtland AFB, NM 87117 V: 505-846-5679 F: 505-846-0684
--	--

<p>U.S. Army Directorate of Civil Works Regulatory Branch (CECW-OR) 441 G Street, N.W. Washington, D.C. 20314 V: 202-761-4750 F: 202-761-4150</p>	<p>U.S. Environmental Protection Agency. Office of Water Wetlands Division Ariel Rios Building, MC 4502F 1200 Pennsylvania Avenue, SW Washington, D.C. 20460 V: 202-260-1799 F: 202-260-7546</p>
<p>U.S. Fish and Wildlife Service Division of Migratory Bird Management 4401 North Fairfax Drive, Room 634 Arlington, VA 22203 V: 703-358-1714 F: 703-358-2272</p>	<p>U.S. Department of Agriculture Animal and Plant Inspection Service Wildlife Services Operational Support Staff 4700 River Road, Unit 87 Riverdale, MD 20737 V: 301-734-7921 F: 301-734-5157</p>

Signature Page

  
Associate Administrator for Airports,  
Federal Aviation Administration

12/17/02  
Date

  
Chief of Safety,  
U. S. Air Force

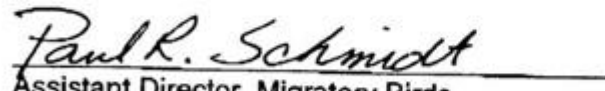
27 May 2003  
Date

  
Acting Assistant Secretary of the Army  
(Civil Works)  
Department of the Army

December 9, 2002  
Date

  
Assistant Administrator, Office of Water,  
U.S. Environmental Protection Agency

1/17/03

  
Assistant Director, Migratory Birds  
and State Programs,  
U.S. Fish and Wildlife Service


7/29/03  
Date

  
*Acting* Deputy Administrator, Wildlife Services  
U.S. Department of Agriculture

09 January 2003  
Date

## Attachment 10

## HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

 <p>U.S. Department of Transportation</p> <p><b>Federal Aviation Administration</b></p>	<h1 style="text-align: center;">Advisory Circular</h1>	
<p><b>Subject: HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS</b></p>	<p><b>Date:</b> 8/28/2007 <b>Initiated by:</b> AAS-300</p>	<p><b>AC No:</b> 150/5200-33B <b>Change:</b></p>

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

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

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

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

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

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

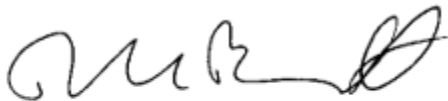
involved in damaging strikes in the United States according to their relative hazard to aircraft. The ranking is based on the 47,212 records in the FAA National Wildlife Strike Database for the years 1990 through 2003. These hazard rankings, in conjunction with site-specific Wildlife Hazards Assessments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

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

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

#### **6. MEMORANDUM OF AGREEMENT BETWEEN FEDERAL RESOURCE**

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



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Table 1. Ranking of 25 species groups as to relative hazard to aircraft (1=most hazardous) based on three criteria (damage, major damage, and effect-on-flight), a composite ranking based on all three rankings, and a relative hazard score. Data were derived from the FAA National Wildlife Strike Database, January 1990–April 2003. <sup>1</sup>					
Ranking by criteria					
Species group	Damage <sup>4</sup>	Major damage <sup>5</sup>	Effect on flight <sup>6</sup>	Composite ranking <sup>2</sup>	Relative hazard score <sup>3</sup>
Deer	1	1	1	1	100
Vultures	2	2	2	2	64
Geese	3	3	6	3	55
Cormorants/pelicans	4	5	3	4	54
Cranes	7	6	4	5	47
Eagles	6	9	7	6	41
Ducks	5	8	10	7	39
Osprey	8	4	8	8	39
Turkey/pheasants	9	7	11	9	33
Hérons	11	14	9	10	27
Hawks (buteos)	10	12	12	11	25
Gulls	12	11	13	12	24
Rock pigeon	13	10	14	13	23
Owls	14	13	20	14	23
H. lark/s. bunting	18	15	15	15	17
Crows/ravens	15	16	16	16	16
Coyote	16	19	5	17	14
Mourning dove	17	17	17	18	14
Shorebirds	19	21	18	19	10
Blackbirds/starling	20	22	19	20	10
American kestrel	21	18	21	21	9
Meadowlarks	22	20	22	22	7
Swallows	24	23	24	23	4
Sparrows	25	24	23	24	4
Nighthawks	23	25	25	25	1

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

<sup>2</sup> Relative rank of each species group was compared with every other group for the three variables, placing the species group with the greatest hazard rank for  $\geq 2$  of the 3 variables above the next highest ranked group, then proceeding down the list.

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

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

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

<sup>6</sup> Aborted takeoff, engine shutdown, precautionary landing, or other.

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## SECTION 1.

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

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

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

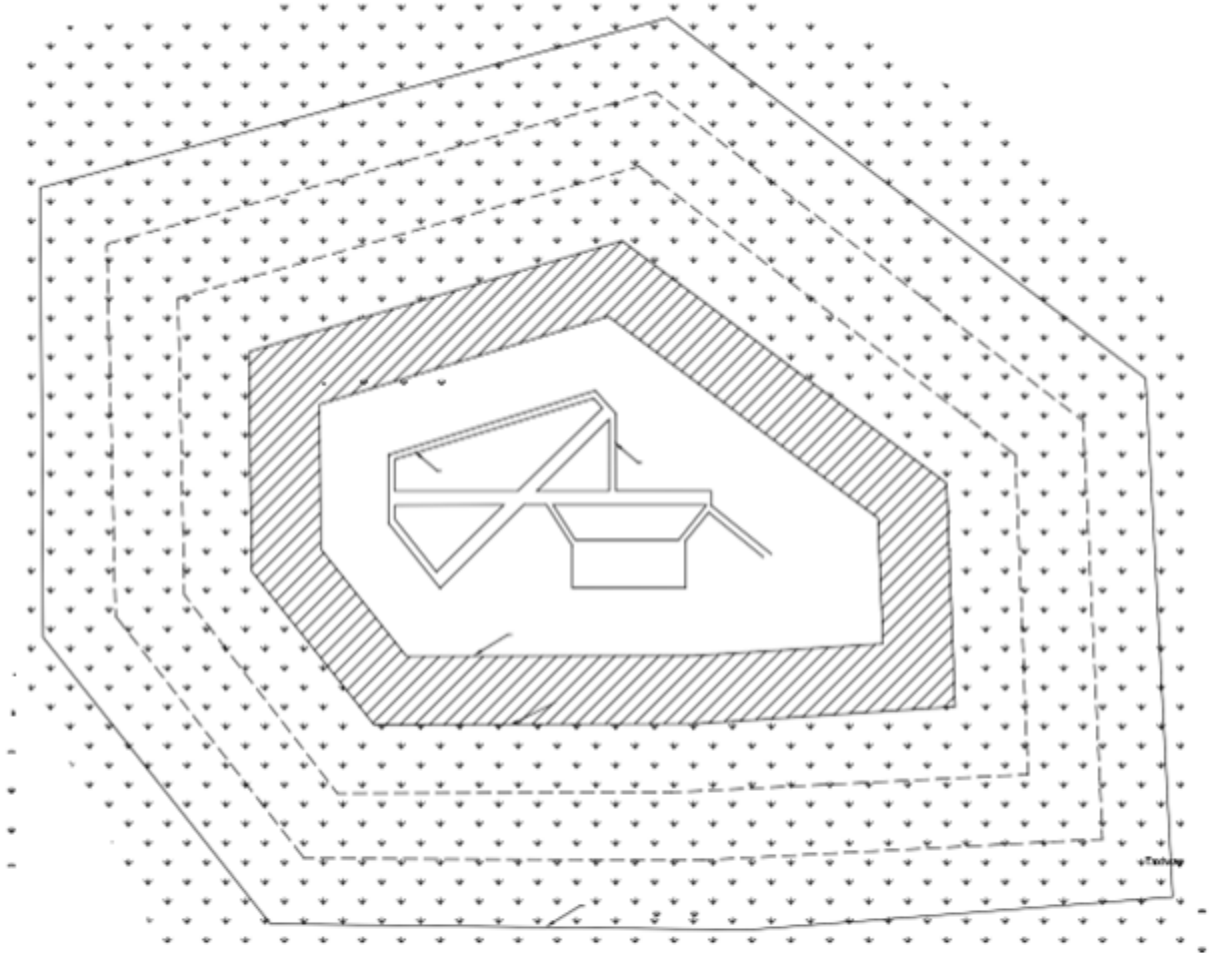
The basis for the separation criteria contained in this section can be found in existing FAA regulations. The separation distances are based on (1) flight patterns of piston-powered aircraft and turbine-powered aircraft, (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet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

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

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

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

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



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

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

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

**SECTION 2.**

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

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

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

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

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

The proposed MSWLF must (1) be within 6 miles of the airport, as measured from airport property line to MSWLF property line, and (2) have started construction or establishment on or after April 5, 2001. Public Law 106-181 only limits the construction or establishment of some new MSWLF. It does not limit the expansion, either vertical or horizontal, of existing landfills. NOTE: Consult the most recent version of AC 150/5200-34, *Construction or Establishment of Landfills Near Public Airports*, for a more detailed discussion of these restrictions.

**b. Siting for new MSWLF not subject to AIR 21.** If an airport and MSWLF do not meet the restrictions of Public Law 106-181, the FAA recommends against locating MSWLF within the separation distances identified in Sections 1-2 through 1-4. The separation distances should be measured from the closest point of the airport's AOA to the closest planned MSWLF cell.

**c. Considerations for existing waste disposal facilities within the limits of separation criteria.** The FAA recommends against airport development projects that would increase the number of aircraft operations or accommodate larger or faster aircraft near MSWLF operations located within the separations identified in Sections 1-2 through 1-4. In addition, in accordance with 40 CFR 258.10, owners or operators of existing MSWLF units that are located within the separations listed in Sections 1-2 through 1-4 must demonstrate that the unit is designed and operated so it does not pose a bird hazard to aircraft. (See Section 4-2(b) of this AC for a discussion of this demonstration requirement.)

**d. Enclosed trash transfer stations.** Enclosed waste-handling facilities that receive garbage behind closed doors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles generally are compatible with safe airport operations, provided they are not located on airport property or within the Runway Protection Zone (RPZ). These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations. The FAA considers these facilities incompatible with safe airport operations if they are located closer than the separation distances specified in Sections 1-2 through 1-4.

**e. Composting operations on or near airport property.** Composting operations that accept only yard waste (e.g., leaves, lawn clippings, or branches) generally do not attract hazardous wildlife. Sewage sludge, woodchips, and similar material are not municipal solid wastes and may be used as compost bulking agents. The compost, however, must never include food or other municipal solid waste. Composting operations should not be located on airport property. Off-airport property composting operations should be located no closer than the greater of the following distances: 1,200 feet from any AOA or the distance called for by airport design requirements (see AC 150/5300-13, *Airport Design*). This spacing should prevent material, personnel, or equipment from penetrating any Object Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway. Airport operators should monitor composting operations located in proximity to the airport to ensure that steam or thermal rise does not adversely affect air traffic. On-airport disposal of compost by-products should not be conducted for the reasons stated in 2-3f.

**f. Underwater waste discharges.** The FAA recommends against the underwater discharge of any food waste (e.g., fish processing offal) within the separations identified in Sections 1-2 through 1-4 because it could attract scavenging hazardous wildlife.

**g. Recycling centers.** Recycling centers that accept previously sorted non-food items, such as glass, newspaper, cardboard, or aluminum, are, in most cases, not attractive to hazardous wildlife and are acceptable.

**h. Construction and demolition (C&D) debris facilities.** C&D landfills do not generally attract hazardous wildlife and are acceptable if maintained in an orderly manner, admit no putrescible waste, and are not co-located with other waste disposal operations. However, C&D landfills have similar visual and operational characteristics to putrescible waste disposal sites. When co-located with putrescible waste disposal operations, C&D landfills are more likely to attract hazardous wildlife because of the similarities between these disposal facilities. Therefore, a C&D landfill co-located with another waste disposal operation should be located outside of the separations identified in Sections 1-2 through 1-4.

**i. Fly ash disposal.** The incinerated residue from resource recovery power/heat-generating facilities that are fired by municipal solid waste, coal, or wood is generally not a wildlife attractant because it no longer contains putrescible matter. Landfills accepting only fly ash are generally not considered to be wildlife attractants and are acceptable as long as they are

maintained in an orderly manner, admit no putrescible waste of any kind, and are not co-located with other disposal operations that attract hazardous wildlife.

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

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

**a. Existing storm water management facilities.** On-airport storm water management facilities allow the quick removal of surface water, including discharges related to aircraft deicing, from impervious surfaces, such as pavement and terminal/hangar building roofs. Existing on-airport detention ponds collect storm water, protect water quality, and control runoff. Because they slowly release water after storms, they create standing bodies of water that can attract hazardous wildlife. Where the airport has developed a Wildlife Hazard Management Plan (WHMP) in accordance with [Part 139](#), the FAA requires immediate correction of any wildlife hazards arising from existing storm water facilities located on or near airports, using appropriate wildlife hazard mitigation techniques. Airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.

Where possible, airport operators should modify storm water detention ponds to allow a maximum 48-hour detention period for the design storm. The FAA recommends that airport operators avoid or remove retention ponds and detention ponds featuring dead storage to eliminate standing water. Detention basins should remain totally dry between rainfalls.

Where constant flow of water is anticipated through the basin, or where any portion of the basin bottom may remain wet, the detention facility should include a concrete or paved pad and/or ditch/swale in the bottom to prevent vegetation that may provide nesting habitat.

When it is not possible to drain a large detention pond completely, airport operators may use physical barriers, such as bird balls, wires grids, pillows, or netting, to deter birds and other hazardous wildlife. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on [Part 139](#) airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office. The FAA recommends that airport operators encourage off-airport storm water treatment facility operators to incorporate appropriate wildlife hazard mitigation techniques into storm water treatment facility operating practices when their facility is located within the separation criteria specified in Sections 1-2 through 1-4.

**b. New storm water management facilities.** The FAA strongly recommends that off-airport storm water management systems located within the separations identified in

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

**c. Existing wastewater treatment facilities.** The FAA strongly recommends that airport operators immediately correct any wildlife hazards arising from existing wastewater treatment facilities located on or near the airport. Where required, a WHMP developed in accordance with [Part 139](#) will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should encourage wastewater treatment facility operators to incorporate measures, developed in consultation with a wildlife damage management biologist, to minimize hazardous wildlife attractants. Airport operators should also encourage those wastewater treatment facility operators to incorporate these mitigation techniques into their standard operating practices. In addition, airport operators should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

**d. New wastewater treatment facilities.** The FAA strongly recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in Sections 1-2 through 1-4. Appendix 1 defines wastewater treatment facility as "any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes." The definition includes any pretreatment involving the reduction of the amount of pollutants or the elimination of pollutants prior to introducing such pollutants into a publicly owned treatment works (wastewater treatment facility). During the site-location analysis for wastewater treatment facilities, developers should consider the potential to attract hazardous wildlife if an airport is in the vicinity of the proposed site, and airport operators should voice their opposition to such facilities if they are in proximity to the airport.

**e. Artificial marshes.** In warmer climates, wastewater treatment facilities sometimes employ artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. The FAA strongly recommends against establishing artificial marshes within the separations identified in Sections 1-2 through 1-4.

**f. Wastewater discharge and sludge disposal.** The FAA recommends against the discharge of wastewater or sludge on airport property because it may improve soil moisture and quality on unpaved areas and lead to improved turf growth that can be an attractive food source for many species of animals. Also, the turf requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw, both of which can attract hazardous wildlife. In addition, the improved turf may attract grazing wildlife, such as deer and geese. Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

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

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

**a. Existing wetlands on or near airport property.** If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports. Where required, a WHMP will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a wildlife damage management biologist.

**b. New airport development.** Whenever possible, the FAA recommends locating new airports using the separations from wetlands identified in Sections 1-2 through 1-4. Where alternative sites are not practicable, or when airport operators are expanding an existing airport into or near wetlands, a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the state wildlife management agency should evaluate the wildlife hazards and prepare a WHMP that indicates methods of minimizing the hazards.

**c. Mitigation for wetland impacts from airport projects.** Wetland mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects or projects required to correct wildlife hazards from wetlands. Wetland mitigation must be designed so it does not create a wildlife hazard. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Sections 1-2 through 1-4.

**(1) Onsite mitigation of wetland functions.** The FAA may consider exceptions to locating mitigation activities outside the separations identified in Sections 1-2 through 1-4 if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge, which cannot be replicated when moved to a different location. Using existing airport property is sometimes the only feasible way to achieve the mitigation ratios mandated in regulatory orders and/or settlement agreements

with the resource agencies. Conservation easements are an additional means of providing mitigation for project impacts. Typically, the airport operator continues to own the property, and an easement is created stipulating that the property will be maintained as habitat for state or Federally listed species.

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

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

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

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

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

accidents should be weighed against the income produced by the on-airport crops when deciding whether to allow crops on the airport.

**a. Livestock production.** Confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg laying operations) often attract flocking birds, such as starlings, that pose a hazard to aviation. Therefore, The FAA recommends against such facilities within the separations identified in Sections 1-2 through 1-4. Any livestock operation within these separations should have a program developed to reduce the attractiveness of the site to species that are hazardous to aviation safety. Free-ranging livestock must not be grazed on airport property because the animals may wander onto the AOA. Furthermore, livestock feed, water, and manure may attract birds.

**b. Aquaculture.** Aquaculture activities (i.e. catfish or trout production) conducted outside of fully enclosed buildings are inherently attractive to a wide variety of birds. Existing aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4 must have a program developed to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should also oppose the establishment of new aquaculture facilities/activities within the separations listed in Sections 1-2 through 1-4.

**c. Alternative uses of agricultural land.** Some airports are surrounded by vast areas of farmed land within the distances specified in Sections 1-2 through 1-4. Seasonal uses of agricultural land for activities such as hunting can create a hazardous wildlife situation. In some areas, farmers will rent their land for hunting purposes. Rice farmers, for example, flood their land during waterfowl hunting season and obtain additional revenue by renting out duck blinds. The duck hunters then use decoys and call in hundreds, if not thousands, of birds, creating a tremendous threat to aircraft safety. A wildlife damage management biologist should review, in coordination with local farmers and producers, these types of seasonal land uses and incorporate them into the WHMP.

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

**a. Golf courses.** The large grassy areas and open water found on most golf courses are attractive to hazardous wildlife, particularly Canada geese and some species of gulls. These species can pose a threat to aviation safety. The FAA recommends against construction of new golf courses within the separations identified in Sections 1-2 through 1-4. Existing golf courses located within these separations must develop a program to reduce the attractiveness of the sites to species that are hazardous to aviation safety. Airport operators should ensure these golf courses are monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

**b. Landscaping and landscape maintenance.** Depending on its geographic location, landscaping can attract hazardous wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. A wildlife damage management biologist should review all landscaping plans. Airport operators should also monitor all landscaped areas on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

Turf grass areas can be highly attractive to a variety of hazardous wildlife species. Research conducted by the USDA Wildlife Services' National Wildlife Research Center

has shown that no one grass management regime will deter all species of hazardous wildlife in all situations. In cooperation with wildlife damage management biologist, airport operators should develop airport turf grass management plans on a prescription basis, depending on the airport's geographic locations and the type of hazardous wildlife likely to frequent the airport

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

**c. Airports surrounded by wildlife habitat.** The FAA recommends that operators of airports surrounded by woodlands, water, or wetlands refer to Section 2.4 of this AC. Operators of such airports should provide for a Wildlife Hazard Assessment (WHA) conducted by a wildlife damage management biologist. This WHA is the first step in preparing a WHMP, where required.

**d. Other hazardous wildlife attractants.** Other specific land uses or activities (e.g., sport or commercial fishing, shellfish harvesting, etc.), perhaps unique to certain regions of the country, have the potential to attract hazardous wildlife. Regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, airport operators must take prompt remedial action(s) to protect aviation safety.

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

### **SECTION 3.**

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

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

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

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

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

Hazardous wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, qualified wildlife damage management biologists must direct the development of a WHMP and the implementation of management actions by airport personnel.

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

**3-4. WILDLIFE HAZARD ASSESSMENTS, TITLE 14, CODE OF FEDERAL REGULATIONS, PART 139.** Part 139.337(b) requires airport operators to conduct a Wildlife Hazard Assessment (WHA) when certain events occur on or near the airport. Part 139.337 (c) provides specific guidance as to what facts must be addressed in a WHA.

**3-5. WILDLIFE HAZARD MANAGEMENT PLAN (WHMP).** The FAA will consider the results of the WHA, along with the aeronautical activity at the airport and the views of the airport operator and airport users, in determining whether a formal WHMP is needed, in

accordance with Part 139.337. If the FAA determines that a WHMP is needed, the airport operator must formulate and implement a WHMP, using the WHA as the basis for the plan.

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

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

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

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

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

## **SECTION 4.**

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

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

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

#### **4-2. WASTE MANAGEMENT FACILITIES.**

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

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

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

**b. Waste handling facilities within separations identified in Sections 1-2 through 1-4.** To claim successfully that a waste-handling facility sited within the separations identified in Sections 1-2 through 1-4 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 2-2.d. The FAA strongly recommends against any facility other than that as outlined in 2-2.d (enclosed transfer stations). The FAA will use this information to determine if the facility will be a hazard to aviation.

**c. Putrescible-Waste Facilities.** In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, no such facility has been able to demonstrate an ability to reduce and sustain hazardous wildlife to levels that existed before the putrescible-waste landfill began operating. For this reason, demonstrations of experimental wildlife control measures may not be conducted within the separation identified in Sections 1-2 through 1-4.

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

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

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

**a. Airports that have received Federal grant-in-aid assistance.** Airports that have received Federal grant-in-aid assistance are required by their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations. The FAA recommends that airport operators to the extent practicable oppose off-airport land-use changes or practices within the separations identified in Sections 1-2 through 1-4 that may attract hazardous wildlife. Failure to do so may lead to noncompliance with applicable grant assurances. The FAA will not approve the placement of airport development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants without appropriate mitigating measures. Increasing the intensity of wildlife control efforts is not a substitute for eliminating or reducing a proposed wildlife hazard. Airport operators should identify hazardous wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

## **DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR.**

**1. GENERAL.** This appendix provides definitions of terms used throughout this AC.

**1. Air operations area.** Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.

**2. Airport operator.** The operator (private or public) or sponsor of a public-use airport.

**3. Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.

- 4. Bird balls.** High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.
- 5. Certificate holder.** The holder of an Airport Operating Certificate issued under Title 14, Code of Federal Regulations, [Part 139](#).
- 6. Construct a new MSWLF.** To begin to excavate, grade land, or raise structures to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting agency.
- 7. Detention ponds.** Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.
- 8. Establish a new MSWLF.** When the first load of putrescible waste is received on-site for placement in a prepared municipal solid waste landfill.
- 9. Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.
- 10. General aviation aircraft.** Any civil aviation aircraft not operating under 14 CFR Part 119, Certification: Air Carriers and Commercial Operators.
- 11. Hazardous wildlife.** Species of wildlife (birds, mammals, reptiles), including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard
- 12. Municipal Solid Waste Landfill (MSWLF).** A publicly or privately owned discrete area of land or an excavation that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. An MSWLF may receive other types wastes, such as commercial solid waste, non-hazardous sludge, small-quantity generator waste, and industrial solid waste, as defined under 40 CFR § 258.2. An MSWLF can consist of either a stand-alone unit or several cells that receive household waste.
- 13. New MSWLF.** A municipal solid waste landfill that was established or constructed after April 5, 2001.
- 14. Piston-powered aircraft.** Fixed-wing aircraft powered by piston engines.
- 15. Piston-use airport.** Any airport that does not sell Jet-A fuel for fixed-wing turbine-powered aircraft, and primarily serves fixed-wing, piston-powered aircraft. Incidental use of the airport by turbine-powered, fixed-wing aircraft would not affect this designation. However, such aircraft should not be based at the airport.
- 16. Public agency.** A State or political subdivision of a State, a tax-supported organization, or an Indian tribe or pueblo (49 U.S.C. § 47102(19)).

**17. Public airport.** An airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(20)).

**18. Public-use airport.** An airport used or intended to be used for public purposes, and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft may be under the control of a public agency or privately owned and used for public purposes (49 U.S.C. § 47102(21)).

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

**20. Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.

**21. Retention ponds.** Storm water management ponds that hold water for several months.

**22. Runway protection zone (RPZ).** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the airport design, aircraft, type of operation, and visibility minimum.

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

**24. Sewage sludge.** Any solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works. (40 CFR 257.2)

**25. Sludge.** Any solid, semi-solid, or liquid waste generated from a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. (40 CFR 257.2)

**26. Solid waste.** Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including, solid liquid, semisolid, or contained gaseous material resulting from industrial, commercial,

mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or by product material as defined by the Atomic Energy Act of 1954, as amended, (68 Stat. 923). (40 CFR 257.2)

**27. Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.

**28. Turbine-use airport.** Any airport that sells Jet-A fuel for fixed-wing turbine-powered aircraft.

**29. Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including Publicly Owned Treatment Works (POTW), as defined by Section 212 of the Federal Water Pollution Control Act (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-576) and the Water Quality Act of 1987 (P.L. 100-4). This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. (See 40 CFR Section 403.3 (q), (r), & (s)).

**30. Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, wildlife includes feral animals and domestic animals out of the control of their owners (14 CFR Part 139, Certification of Airports).

**31. Wildlife attractants.** Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's AOA. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.

**32. Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport.

**33. Wildlife strike.** A wildlife strike is deemed to have occurred when:

- a. A pilot reports striking 1 or more birds or other wildlife;
- b. Aircraft maintenance personnel identify aircraft damage as having been caused by a wildlife strike;
- c. Personnel on the ground report seeing an aircraft strike 1 or more birds or other wildlife;

d. Bird or other wildlife remains, whether in whole or in part, are found within 200 feet of a runway centerline, unless another reason for the animal's death is identified;

e. The animal's presence on the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal) (Transport Canada, Airports Group, *Wildlife Control Procedures Manual*, Technical Publication 11500E, 1994).

**Attachment 11****LIST OF PREPARERS**

This plan was prepared for March ARB in coordination with the Air National Guard Safety Office (HQ NGB/SE) and Environmental Planning Branch (NGB/A7CVP) by BASH Inc as part of NGB's recurrent program to assist in updating BASH Plans on installations with Air National Guard presence as hosts or tenants. NGB provides assistance with assessments and updating BASH Instructions only at the request of host organizations when the host has primary responsibility for the BASH Instruction and program. Members of the professional staff are listed below:

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Updates

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