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OF THE AIR FORCE**

**DEPARTMENT OF THE AIR FORCE
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Safety

**BIRD/WILDLIFE AIRCRAFT STRIKE
HAZARD (BASH) MANAGEMENT
PROGRAM**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements the requirements of Air Force Policy Directive (AFPD) 91-2, Safety Programs. It provides guidance and responsibilities for implementing an effective Bird/wildlife Aircraft Strike Hazard (BASH) management program for the United States Air Force (USAF) and United States Space Force (USSF). It establishes program requirements, assigns responsibilities for program elements, and contains program management information. This instruction provides guidance on programs as specified in Air Force Instruction (AFI) 91-202, *The US Air Force Mishap Prevention Program*, Department of the Air Force Instruction (DAFI) 91-204, *Safety Investigations and Reports*, and Department of the Air Force Manual (DAFMAN) 91-223, *Aviation Safety Investigations and Reports*. This publication applies to Department of the Air Force (DAF) civilian employees and uniformed members of the United States Space Force (USSF), Regular Air Force (RegAF), Air Force Reserve (AFR), and Air National Guard (ANG). Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Form 847 from the field through the appropriate major command (MAJCOM) or field command (FLDCOM) safety office. Send MAJCOM/FLDCOM/field operating agency (FOA)/direct reporting unit (DRU) supplements to AFSEC/SEF, 9700 G Avenue SE, Kirtland AFB, NM 87117-5670, for approval before publication or via the AFSEC/SEF organizational email, BASH2@us.af.mil. The requirement for AFSEC/SEF approval does not apply to installation BASH Plans implemented by USAF and USSF units under paragraphs **1.3.5.1** and **1.3.9.1** of this instruction. The authorities to waive requirements in this publication are identified with a Tier (“**T-0**, **T-1**, **T-2**, and **T-3**”) number following the compliance statement. Submit

requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor's commander for non-tiered compliance items. See DAFMAN 90-161, *Publishing Processes and Procedures*, Table A10.1 for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval. Ensure all records generated from processes prescribed in this publication adhere to AFI 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with (IAW) the Air Force Records Disposition Schedule, located in the Air Force Records Information Management System. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the DAF.

SUMMARY OF CHANGES

This document has been revised and should be completely reviewed. It incorporates multiple format changes for ease of use and currency. Changes include the renaming of the document from an Air Force Instruction to the Department of the Air Force Instruction to include the United States Space Force, designation of a BASH program manager (s) and their qualification (s), defines vegetation management as a military readiness activity as defined in Unified Facilities Criteria (UFC) 3-260-01, insecticide application, and clarification on mandated wildlife hazard assessments and formal surveys.

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Chapter 1

GENERAL ROLES AND RESPONSIBILITIES

1.1. Overview. This instruction applies to the BASH program operations of manned and unmanned aircraft, remotely piloted aircraft (RPA), small unmanned aircraft systems (sUAS), and space vehicles. Aircraft collisions with wildlife cause millions of dollars in damage annually resulting in the potential loss of combat capability, safety of aircrews, and damage/loss of aircraft. Damage to airfield infrastructure by burrowing animals degrades airfield surfaces, presenting additional hazards. Wildlife strike hazards to aircrew and aircraft (as well as operations and maintenance expenditures) may be significantly reduced by utilizing an integrated program will follow the Sikes Act, Sec. 670a., Section 101, *Cooperative Plan for Conservation and Rehabilitation*, Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, and Air Force Manual (AFMAN) 32-7003, *Environmental Conservation* for wildlife conservation consistent with the intended use of the military installation subject to aviation safety requirements.

1.2. DAF BASH Team. The DAF BASH Team is responsible for coordinating efforts throughout the USAF and USSF, assisting organizations worldwide to reduce the risk of wildlife strikes. The BASH Team is located at Air Force Safety Center (9700 G Avenue SE, Suite 266, Kirtland AFB, NM 87117-5670). Additional information regarding BASH topics may be accessed through the USAF Portal and Air Force Safety Center - BASH Team website (<https://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH/>).

1.3. Roles and Responsibilities.

1.3.1. The Department of the Air Force, Chief of Safety (AF/SE) will:

1.3.1.1. Create policy and provide guidance for the DAF BASH management program.

1.3.2. The Headquarters, Air Force Safety Center, Bird/wildlife Aircraft Strike Hazard Team (AFSEC/SEFW) will:

1.3.2.1. Propose program management policies and guidelines to AF/SE.

1.3.2.2. Analyze wildlife strike data to provide baseline information to DAF agencies.

1.3.2.3. Approve the exchange and distribution of wildlife strike information to U.S. Government and foreign agencies.

1.3.2.4. Assist MAJCOMs/FLDCOMs with program management, development, and implementation, as necessary.

1.3.2.5. Provide instruction or instruction material to flight safety officers (FSO), flight safety noncommissioned officers (FSNCO) and civilian equivalents in program management and provide basic BASH training at Air Education and Training Command (AETC) sponsored training programs.

1.3.2.6. Maintain a technical reference library on hazard studies and other records in accordance with respective records disposition schedule.

1.3.2.7. Provide subject matter experts to communicate BASH issues at MAJCOM/FLDCOM or unit request.

1.3.2.8. Provide technical assistance to the Safety Investigation Board President or Investigating Officer anytime birds/wildlife may be a contributing or causal factor in a mishap, or upon request.

1.3.2.9. Identify specific training requirements for AETC.

1.3.2.10. Review proposed conservation projects, as well as federal and state legislation affecting the DAF BASH reduction program and coordinate the AF/SE response within the DAF and other agencies.

1.3.2.11. At the request of each installation (when coordinated through respective MAJCOM/FLDCOM and external agencies), provide:

1.3.2.11.1. Technical assistance to reduce wildlife hazards at installations with flying operations.

1.3.2.11.2. Technical assistance in evaluating installation BASH management plans.

1.3.2.11.3. Recommendations for changes in operational procedures to installation flight safety to reduce wildlife strike risk.

1.3.2.11.4. A BASH Staff Assistance Visit at each DAF installation is recommended once every five to seven years, unless prompted earlier following a Safety Investigation Board recommendation. With MAJCOM/FLDCOM/SE approval, execution of an AFSEC BASH Staff Assistance Visit will meet requirements IAW **paragraph 1.3.5.3.**

1.3.2.12. Identify research requirements for wildlife strike data and wildlife control techniques as well as develop, fund, and manage relevant research projects.

1.3.2.13. Identify, develop, test, and approve programs to aid in evaluating potential bird strike hazards in low-level airspace, including the Avian Hazard Advisory System (AHAS).

1.3.2.14. Establish and maintain liaison with international, federal, state, and private agencies.

1.3.2.15. Oversee management of AHAS and the Smithsonian Institution Feather Identification program.

1.3.2.16. Chair the DAF BASH Steering Group meetings (as needed).

1.3.2.17. Develop compatibility criteria and land use guidelines to support the BASH prevention and Air Installation Compatible Use Zone (AICUZ) programs. Coordinate with the Air Force Deputy Chief of Staff, Operations (AF/A3) Global Mobility and Homeland Operations Division (AF/A3O). Coordinate reviews and guidance changes with the DAF AICUZ program management team.

1.3.3. AF/A3 will:

1.3.3.1. Establish and monitor operational procedures to reduce the frequency and severity of wildlife strikes.

1.3.3.2. Assist other DAF agencies in developing and implementing wildlife avoidance techniques (as requested).

1.3.4. The Director of Air Force Civil Engineers (AF/A4C) will:

1.3.4.1. Propose additional wildlife hazard reduction policies and guidelines to AF/SE or AFSEC/SEFW.

1.3.4.2. Develop policy management strategy to ensure military readiness and combat capability while reducing wildlife hazards to flight operations.

1.3.4.3. Oversee installation training in wildlife identification to ensure federally listed species are protected from inadvertent harassment or removal unless permitted. Review training materials annually in coordination with AFSEC/SEFW.

1.3.5. MAJCOM/FLDCOM safety offices (SE) will:

1.3.5.1. Ensure each installation/unit conducting or supporting flight operations has a BASH program and annually reviews their published BASH plan.

1.3.5.2. Verify installations within their command annually evaluate installation and low-altitude airspace (such as flight routes, operating areas, and Low Altitude Tactical Navigation [LATN] areas) for BASH concerns and make appropriate changes in mitigating risk to include assessing potential wildlife strike hazards, or when establishing or revising operational procedures.

1.3.5.3. Conduct on-site reviews of BASH management programs (to include observation of potential hazards and effectiveness of mitigation techniques) for installations that support flight operations every 36 months, consistent with AFI 91-202, Table 3.1. **(T-1)** MAJCOMs/FLDCOMs are recommended, but not required, to utilize AFSEC/SEFW-generated checklists to coordinate with installation safety offices to communicate requirements for program sustainment and guide on-site BASH program evaluations. Forward completed on-site reviews to AFSEC/SEFW electronically or using the Air Force Safety Automated System (AFSAS). **(T-1)** Tenant unit programs will be reviewed by owning MAJCOMs/FLDCOMs. Reviews may be scheduled during recurring inspections or AFSEC BASH Staff Assistance Visits.

1.3.5.3.1. Coordinate with AFSEC/SEFW to conduct telephonic/remote 36-month BASH management program reviews at geographically separated locations in lieu of on-site visits. **(T-1)** Geographically separated units must complete BASH management program reviews consistent with wing/delta-level safety evaluations, assessments, and inspections.

1.3.5.3.2. MAJCOMs/FLDCOMs may utilize the AFSEC/SEFW-generated checklist to guide review of applicable program elements. Forward completed on-site reviews to AFSEC/SEFW electronically or using the AFSAS. **(T-1)**

1.3.5.4. Ensure coordination of BASH plan and program activities with host nation authorities for installations outside the continental United States.

1.3.6. AETC, in addition to [paragraph 1.3.5](#), will:

1.3.6.1. Incorporate wildlife strike hazard reduction training in AETC-sponsored installation pest management specialist, safety technician, and airfield manager formal training courses.

1.3.6.2. Incorporate safety awareness of wildlife hazards in formal undergraduate and follow-on aviation training program safety briefings.

1.3.6.3. Forward all BASH-related training to AFSEC/SEFW for content review. **(T-1)**

1.3.7. Air Force Materiel Command (AFMC), in addition to **paragraph 1.3.5**, will:

1.3.7.1. Ensure AFMC Program Offices implement wildlife impact resistance into the design of manned and unmanned aircraft subsystems as validated by requirement(s) from the Using Command.

1.3.7.2. Consult with AFSEC/SEFW for roles and responsibilities when conducting research projects to develop and demonstrate components or subsystems that improve wildlife impact resistance. **(T-1)**

1.3.7.3. Provide technical consultation when requested by AETC for building/updating training necessary to maintain wildlife impact resistant subsystems.

1.3.7.4. Exchange appropriate wildlife impact resistance information with representatives of domestic and international industrial, academic, Department of Defense (DoD) and other government agencies.

1.3.8. National Guard Bureau (NGB) will:

1.3.8.1. Ensure each ANG installation/unit conducting or supporting flight operations has a written BASH plan. Ensure all tenant units are included in the ANG installation plan. ANG units operating at joint use airfields may adopt use of the host organization (civilian airport authority or other DoD service) Wildlife Hazard Management Plan or BASH plan, if: The host organization plan addresses requirements from **paragraph 2.2.1**, is reviewed annually by the ANG unit, and approved by AFSEC/SEFW. **(T-2)** **Note:** Units that operate RPAs and sUAS beyond line of sight, and have no other local physical flying assets assigned, are not required to maintain a BASH plan for a geographically separated operating location.

1.3.8.2. Review ANG installation BASH plans annually. Conduct on-site reviews of installation programs by a Federal Aviation Administration (FAA) Qualified Airport Wildlife Biologist at least every 72 months (to include potential hazards and mitigation techniques). Coordinate as needed with AFSEC/SEFW. Utilize the AFSEC/SEFW-generated checklist (available at the USAF Portal/Safety/BASH page) to guide on-site evaluations of critical BASH management program requirements. NGB will forward completed on-site reviews to AFSEC/SEFW electronically or using the AFSAS. **(T-1)**

1.3.8.3. Verify installations under NGB command annually evaluate installation and low-altitude airspace (such as flights routes, operating areas, and LATN) for BASH concerns and make appropriate changes in mitigating risk to include assessing potential wildlife strike hazards, or when establishing or revising operational procedures.

1.3.9. Host wing, delta, or installation safety offices will:

1.3.9.1. Installation Chief(s)/Director(s) of Safety will establish a local program. **(T-1)** In support of the local program, a BASH Program Manager(s) must be designated for all DAF, AFR, joint service, and ANG installations/units hosting or supporting flight operations. **(T-2)** Wing/delta Safety is the OPR for development and oversight of the local BASH program (in coordination with Civil Engineering/Natural Resources). **(T-1)** The BASH Program Manager(s) may be delegated to another organization(s) for augmentation (e.g., USDA Wildlife Services, vendor/contractor, internal DAF stakeholder, or host nation

partner). This designation may be established through a formal agreement (e.g., contract, host-tenant Support Agreement, Military Operating Area, etc.) in lieu of an internal-DAF subject matter expert. **(T-2)**

1.3.9.1.1. For joint bases, the DAF unit with the preponderance of aviation resources will have the overall responsibility for the administration of the installation BASH plan. Maintain communications with surrounding airfields within the local vicinity to ensure the BASH plans do not conflict (harassment effects for wildlife movement between airfields). At installations with multiple wing/delta safety offices, establish a Memorandum of Agreement between all wings/deltas designating which organization will be the OPR for development and oversight of the program. **(T-2)**

1.3.9.1.2. Tenant DAF units operating from non-DAF hosted locations will establish a BASH plan. **(T-2)** Tenant DAF units operating at non-DAF hosted locations may adopt use of the host organization's Wildlife Hazard Management Plan or BASH plan, if: that plan addresses requirements from all subparagraphs of **paragraph 2.2**, is reviewed annually by the unit, and approved by AFSEC/SEFW (certified in a Memorandum for Record, maintained by the local BASH program OPR). **(T-2)** Establish a Memorandum of Understanding between the tenant DAF unit commander and equivalent host organization commander/director, identifying each organization's responsibilities for managing wildlife hazards. **(T-2)**

1.3.9.2. The Chief/Director of Safety will designate the BASH Program Manager, in writing. **(T-3)**

1.3.9.3. The Chief(s)/Director(s) of Safety will serve as the focal point between the wing/delta leadership and the BASH Program Manager for risk assessment of identified hazards and program issues. **(T-3)** The Flight Safety Officer/Manager will serve this role in the absence of the Chief/Director of Safety or equivalent civilian Director of Safety. **(T-3)**

1.3.9.4. Establish and annually review the BASH plan for compliance with current directives and changing conditions/environment. **(T-1)** Include all BASH plan requirements listed under **paragraph 2.2.1** Update the BASH plan as necessary to address current wildlife hazards and implement proactive safety procedures.

1.3.9.5. Coordinate BASH plan and program activities with host nation authorities for installations outside the continental United States. **(T-1)**

1.3.9.6. Incorporate BASH program requirements into the installation Integrated Natural Resources Management Plan (INRMP), if appropriate and maintained for the airfield. **(T-1)**

1.3.9.7. Ensure Operations Commanders define restrictive flight guidance for aircrews during specific airfield Bird Watch Conditions to limit exposure to wildlife hazards. **(T-2)**

1.3.9.8. Ensure operational flying deployments, exercises, or training schedules account for wildlife hazard risk management/avoidance considerations. Incorporate hazard evaluation criteria into local risk assessment tools, methods, and policies. **(T-3)**

1.3.9.9. Report all wildlife strikes in accordance with DAFMAN 91-223. **(T-1)**

1.3.9.10. Forward wildlife remains in accordance with the BASH reporting requirements in T.O. 1-1-691, *Cleaning and Corrosion Prevention and Control, Aerospace and Non-Aerospace Equipment*, and DAFMAN 91-223. **(T-1)**

1.3.9.11. Procure and maintain two BASH M870 shotguns (NSN 1005-01-604-1156), for all installations with a BASH program) for the organizations responsible for wildlife depredation. BASH M870 shotguns are refurbished M870 shotguns with features necessary for wildlife control on airfields, available at no cost to the wing/delta. **(T-3)**

1.3.9.12. Conduct a stand-alone, year-long Wildlife Hazard Assessment consistent with [paragraph 2.4.2](#). **(T-1)**

1.3.9.13. Annually evaluate installation and frequently used, low-altitude airspace (such as flight routes, operating areas, and low-level routes) for bird hazard concerns and make appropriate changes to mitigate risk. **(T-2)** Additionally, the installation safety office will evaluate airfields other than home station that are used for training (e.g., practice approaches, low-level flying) for wildlife hazards. **(T-2)** Include evaluation of bird hazards during Military Training Route evaluations, consistent with DAFMAN 13-201, *Airspace Management*. **(T-3)**

1.3.9.14. Evaluate all local development proposals potentially affecting airfield operations, to promote awareness with stakeholders and recommend mitigation strategies to minimize the risk of creating wildlife attractants on and around airfields. Delegate evaluation responsibilities within installation flight safety office or to the designated BASH Program Manager. **(T-3)**

1.3.9.15. Coordinate with the Integrated Installation Planning Team in support of various base planning functions (e.g., Air Installation Compatible Use Zone designation), ensuring consideration and awareness for wildlife hazards, consistent with AFI 32-1015, *Integrated Installation Planning*. **(T-3)**

1.3.9.16. Assist Airfield Management in the development of a chart, map or computer-generated illustration depicting local bird/wildlife hazards on the airfield and surrounding areas IAW AFMAN 13-204 Volume 2 (V2), *Airfield Management*. **(T-3)**

1.3.10. Designated BASH Program Manager, at a minimum, will:

1.3.10.1. Conduct oversight, coordination, and execution of the installation BASH management program. **(T-2)** The BASH Program Manager is responsible for implementing the commander- endorsed BASH plan, to include developing program elements ([paragraph 2.2](#)), leading the Bird Hazard Working Group meetings ([paragraph 2.3](#)), documenting all wildlife hazards ([paragraph 2.4](#)), and reporting/analyzing wildlife strike events ([paragraph 2.5](#)).

1.3.10.2. Support implementation of the host wing/delta or installation safety office BASH management program, including mitigation and control of airfield wildlife hazards. **(T-1)**

1.3.10.3. Due to the highly specialized nature of wildlife hazard management, staffing a dedicated wildlife hazard management professional is critical. The BASH Program Manager will maintain minimum qualifications in the Wildlife Biology Series (0486) or General Natural Resources and Biological Science Series (0401), under the United States Office of Personnel Management General Schedule Qualification Standards. **(T-1)** The

BASH Program Manager must meet the training and experience requirements for a Qualified Airport Wildlife Biologist, consistent with requirements defined in FAA Advisory Circular (AC) 150/5200-36B, *Qualification for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports*. **(T-1)** The BASH Program Manager must complete DAF-prescribed training requirements equivalent to a flight safety noncommissioned officer, as defined in AFI 91-202. **(T-1)** The BASH Program Manager will attend and participate in annual conferences (e.g., Bird Strike Committee USA) and training opportunities to maintain Qualified Airport Wildlife Biologist credentials and remain current with continuing education related to wildlife damage management. **(T-3)**

1.3.10.4. Implement all requirements for documenting wildlife hazards and mishap event investigations, including the formal wildlife survey program for the host wing/delta or installation safety office unless specifically exempted in this instruction. **(T-1)**. Ensure completion of a Wildlife Hazard Assessment has been completed, consistent with [paragraph 2.4.2](#), unless specifically exempted in this instruction **(T-1)**

1.3.10.5. Establish and conduct Bird Hazard Working Groups consistent with [paragraph 2.3](#). **(T-1)**

1.3.10.6. Designate a Wildlife Exclusion Zone or other appropriate mitigation zones (airfield specific) consistent with [paragraph 2.2.1.9](#). **(T-1)** ANG units and other tenant DAF BASH programs at civil or non-DAF military fields may lack jurisdiction for wildlife control operations and airfield authority. ANG units and tenant DAF BASH programs at non-DAF airfields (civil or military) are exempted from designating a Wildlife Exclusion Zone but are strongly encouraged to consider designating critical areas for wildlife hazard mitigation for communicating with host organizations.

1.3.10.7. Implement Bird/wildlife Hazard Warning Procedures to inform aircrews of possible flight hazards due to wildlife activity on the airfield and in local areas. **(T-1)**

1.3.10.8. Designate Phase I and Phase II periods for flight operations based on wildlife activity. **(T-1)** Wildlife activity information may include historical or current observation information for local airfield conditions. **(T-1)** Establish flight and scheduling procedures to minimize risks based on local hazards associated with Phase I and II (See [paragraph 2.3.3](#) and [4.1.2](#)). **(T-1)**

1.3.10.9. Coordinate with local and regional planning and zoning boards to be aware of proposed land-use changes, or modification of existing land uses, that could create hazardous wildlife attractants. **(T-3)** Communicate with Public Affairs for notifications from local planning boards or equivalent organizations to review proposed land uses for all communities located within five-miles of the installation with the potential to attract hazardous wildlife. **(T-3)**

1.3.10.10. Maintain all depredation permits for wildlife control implemented under the installation BASH program. **(T-3)** Apply for permits and maintain records associated with harassment and depredation activities. **(T-3)** A copy of the permit shall be carried by those exercising depredation authority. **(T-0)**

1.3.10.11. Ensure all wildlife control activities supporting the BASH program are effectively implemented to safeguard aviation operations. **(T-1)** Oversee execution of any local contracts or cooperatively funded agreements for the control of wildlife hazards. **(T-3)**

1.3.10.12. Provide training in wildlife identification for all sub-permittees listed on the depredation permit(s). **(T-3)** Maintain personnel records for completion of installation wildlife control activities in accordance with respective records disposition schedule. **(T-3)**

1.3.10.13. Coordinate BASH plan inclusion into the installation INRMP. **(T-3)** Participate in reviews and revisions to the INRMP and communicate with the installation Civil Engineering Environmental Directorate regarding BASH program elements, as necessary.

1.3.10.14. Establish independent relationships and communicate with all federal, state, and local wildlife related agencies, and off base private landowners, as necessary. **(T-3)** Communications should include installation Community Planners, local city planners/authorities, or Non-Government Officials (consistent with FAA AC 150/5200-33C, *Hazardous Wildlife Attractants on or near Airports*).

1.3.10.15. Maintain recurrent communication to AFSEC/SEFW for ongoing wildlife management challenges. **(T-3)** Recurrent communication should be achieved through individual or multiple methods, including but not limited to phone/email, annual Bird Strike Conferences, and/or DAF safety meetings. Include MAJCOM/FLDCOM Safety representatives on recurrent communication for awareness and support. **(T-3)**

1.3.10.16. Responsible for maintaining inventory of installation BASH munitions and property inventory of BASH firearms. **(T-3)** The BASH Program Manager will maintain a Theater Integrated Combat Munitions System (TICMS) account for wildlife hazard management control operations, as necessary. **(T-3)**

1.3.10.17. Implement an annual equipment safety and familiarization training program for all installation Wildlife Dispersal Team personnel. **(T-3)** At a minimum, the installation training program will include use of pyrotechnics, DAF-approved firearms, and/or lasers. Programs functioning as tenants at either host nation facilities, civil airports, or non-DAF military installations may be restricted in what equipment is authorized for use or jurisdiction for airfield access and management responsibilities.

1.3.11. Installation Wildlife Dispersal Team will:

1.3.11.1. Wing/delta commanders will designate the installation agency(ies) responsible for controlling wildlife on the airfield during all hours of flying (at a minimum) in the installation BASH Plan and consistent with AFMAN 13-204V2. **(T-2)** Contingency response must be identified if a lead Dispersal Team organization is unable to respond. When the potential for flight operations exists, an agency within the Wildlife Dispersal Team must be on duty and equipped to mitigate all wildlife hazards on the airfield. **(T-3)**

1.3.11.2. Maintain all airfield driving qualifications and credentials for access onto the airfield for wildlife control, consistent with DAFI 13-213, *Airfield Driving*. Maintain training currency on all BASH equipment annually, at a minimum (e.g., pyrotechnics, bird cannons, air rifles, shotguns). Ensure inclusion of all agencies involved in wildlife control activities on all wildlife depredation permits. (T-3)

1.3.11.3. Record daily wildlife control activities (e.g., species and abundance harassed/depredated), reporting all control data to the BASH Program Manager.

1.4. Technical Assistance. Current information and technical assistance are available through multiple sources, including (but not limited to):

1.4.1. The DAF BASH Team. Contact DAF BASH Team at AFSEC/SEFW, 9700 G Avenue, Suite 266, Kirtland AFB, NM 87117-5670. DSN: 246-5674/5848/5673/0827 or Commercial: (505) 846-5674/5848/5673/0827, at BASH2@us.af.mil, and electronically by accessing the USAF Portal and Air Force Safety Center - BASH Team website. The AFSEC/SEFW Team is available to assist in wildlife hazard reduction throughout the DAF. Personnel are trained in wildlife control and are experienced in wildlife ecology, land management, and flight operations. They also maintain current information regarding authorized control equipment and techniques.

1.4.2. Air Force Civil Engineer Center (AFCEC). AFSEC/SEFW works closely with center personnel to control wildlife, insects, habitat management, drainage, pavements and structures. Contact the Technical Support Division (AFCEC/CZT) Administrative Workflow and Support by email: afcec.czt.workflow@us.af.mil.

1.4.3. Federal and State Agencies. DoD airfields often employ professional wildlife biologists, foresters, entomologists, or agronomists who have valuable insights into installation-specific issues. Normally these professionals are embedded within base Civil Engineering. Local expertise and assistance are available (utilizing an interagency agreement) through the United States Fish and Wildlife Service, United States Department of Agriculture (USDA) Wildlife Services, state natural resources and/or wildlife departments, and game wardens. Certain federal and state wildlife agencies may prioritize wildlife conservation over flight safety (see [paragraph 3.1](#)). Private contractors must not be hired to perform natural resources and/or BASH management services on DoD airfields unless federal or state agencies are unable or unwilling to provide these services according to the “Sikes Act,” Title 16 United States Code (U.S.C.), Section (§) 670a(a-f), DoDI 4715.03, Natural Resources Conservation Program, and AFMAN 32-7003. (T-0)

1.4.4. Private consultants. If federal and state wildlife agencies are unable or unwilling to provide wildlife control services, or the installation is located outside the continental United States, private consultants are available (i.e., contract) to assist in resolving wildlife hazards. Ensure all installation requirements for wildlife control are clearly written in the contract. Confirm the contractor has a credible wildlife hazard management background, experience with managing wildlife in an airfield environment, and is willing to (and possesses the capability to) employ all legal integrated pest management techniques available prior to hiring.

1.4.5. Literature. Refer to the BASH website to reference the most current listing of information on wildlife control methods, BASH equipment, and hazard reduction.

Chapter 2

PROGRAM MANAGEMENT

2.1. Program Overview. The primary role of every military aviation facility is to ensure mission readiness and combat capability while providing the safest flying environment possible. Military airfields are artificial environments designed solely to minimize risk for safe local aircraft operations. Proper habitat management on and surrounding military airfields will reduce the probability of wildlife strikes and provide an adequate safety margin (Wildlife Exclusion Zone). While it is impossible to keep all wildlife away from the airfield environment, it is important to discourage habitats that directly (e.g., availability of food, water, cover, and nesting) or indirectly (e.g., increasing prey species) attract wildlife. Attracting wildlife to an airfield is detrimental to wildlife and mission capability.

2.1.1. Local conditions that enhance the potential for wildlife/aircraft strikes vary at each installation. Bird hazards may occur seasonally or year-round, present en route to, or on airfields. Wildlife activity may vary as local conditions change due to crop selection, land use choices (e.g., landfill operations), established wildlife refuges, or other potentially attractive landscapes. Installation-level personnel must remain vigilant and be aware of all practices both on and in the surrounding areas of the airfield.

2.1.1.1. The installation BASH plan and INRMP must be mutually supportive. The INRMP, developed in accordance with AFMAN 32-7003 must address wildlife management/conservation techniques that will reduce the potential risk wildlife hazards pose to aircraft operations. Installations experiencing issues should first contact their respective MAJCOM or FLDCOM/SE for assistance. Installations may also contact the jurisdictional agency for technical assistance in planning future actions, which will help ensure compliance with federal requirements and consideration of State regulatory provisions. Where appropriate, AFSEC/SEFW or the AFCEC Environmental Quality Technical Support Branch (AFCEC/CZTQ), Environmental Quality Technical Support, will provide additional assistance to resolve or reduce potential hazards. Technical assistance provided may include, but not limited to application of proven methods for wildlife dispersal, avoidance procedures, or recommend land management techniques that discourage wildlife from on or surrounding the airfield. However, the installation commander retains final authority and responsibility of the installation BASH program.

2.1.1.2. Host nation instructions receive precedence over this publication in overseas locations. Adhere to this instruction in the absence of host nation guidance if it is consistent with host country laws and Status of Forces Agreements.

2.1.2. The key to a successful wildlife hazard reduction program is the participation of well-trained individuals who are assigned specific tasks. While wildlife strikes will never be eliminated, an aggressive, well-planned program focused on wildlife behavior, the environment/habitat, and mission may limit the potential for strike occurrence and/or severity. The following are guidelines for developing an effective program.

2.1.2.1. The operational requirements of the installation BASH program may require the assistance of non-DAF wildlife hazard management professionals, in support or augmentation of the designated BASH Program Manager. It is USAF policy that non-DAF wildlife hazard management personnel shall meet “Qualified Airport Wildlife Biologist” criteria, as recommended in FAA AC 150/5200-36B. This requirement applies in the continental United States, Alaska, and Hawaii. Installations outside the United States should utilize similarly qualified local wildlife professionals, consistent with obligations to the host nation.

2.1.2.2. Program personnel will be granted access and authority to conduct wildlife hazard management operations within all installation-owned lands that directly affect mission capability and flight safety. **(T-3)**

2.1.2.3. The Sikes Act, at 16 U.S.C. § 670a(b)(1)(H)(1), requires that wildlife conservation activities in an INRMP do not result in a net loss in the capability of the installation to support the military mission of the installation. BASH personnel (with the oversight of the installation safety office) shall ensure the airfield, Aircraft Movement Area, and areas within a Wildlife Exclusion Zone are not utilized as wildlife conservation areas. Work with surrounding communities to reduce risks to aircraft in operational airspace (approach/departure corridors, drop zones, etc.) off the installation. **(T-2)**

2.1.2.4. BASH Program Managers will establish independent relationships and communicate with all federal, state, and local wildlife related agencies, and off base private landowners, as necessary. **(T-2)** Coordinate external communications with other concerned installation agencies (e.g., Civil Engineering).

2.2. Developing a BASH Program. Each installation supporting a flying mission shall develop and publish a BASH plan listing responsibilities and procedures. **(T-1)** A properly written, flexible BASH plan is necessary to reduce strike hazards and ensure continuity of knowledge with personnel turnover. Tailor plans to meet the specific hazards encountered locally. **(T-1)** Ensure all habitat modification procedures are coordinated with flight safety to ensure INRMPs and other installation plans are compatible with the installation BASH plan. Contact AFSEC/SEFW for a BASH plan template or access the DAF BASH Team Portal website.

2.2.1. The designated BASH Program Manager is responsible for maintenance and sustainment of the plan, including all revisions, updates, and endorsements by the commander. **(T-3)** As a minimum this plan shall:

2.2.1.1. Identify local conditions (whether manmade or natural) on or surrounding the airfield that are attractive to wildlife (e.g., vegetative conditions, insects, water, drainage, signage, towers). **(T-1)**

2.2.1.2. Identify the Wildlife Dispersal Team, to include harassment/depredation procedures, equipment, methodologies, permitting and designate an OPR. **(T-2)**

2.2.1.3. Bird Watch Condition and Phase I/II designations. Specify installation Wildlife Hazard Warning System procedures, including Bird Watch Conditions, Phases, location where codes/phases will be displayed, implementation procedures, authorization for declaring codes/phases, and flight operations under specified Bird Watch Conditions and Phases, consistent with requirements in [paragraph 4.1.1](#). **(T-1)** Identify method and procedures for communicating Bird Watch Condition to aircrews. **(T-1)**

2.2.1.4. Phase I/II designation criteria. Phase I represents normal, baseline wildlife activity. Phase II represents periods of significant increases in local wildlife activity normally associated with migratory movements, seasonal increases of local wildlife populations, or local land use practices (e.g., farming, ranching, or hunting).

2.2.1.5. Outline locally defined procedures for handling of non-damaging strike reports, damaging strike reports, remains for purposes of identification, wildlife sighting reports and any other locally established wildlife forms and reports, consistent with DAFMAN 91-223. **(T-1)**

2.2.1.6. Ensure specific BASH requirements or limitations are addressed for all assigned aircraft, flying tenant units, and transient aircraft. **(T-2)**

2.2.1.7. Include requirements and procedures for maintaining wildlife management records with Natural Resources or Environmental personnel in the BASH Plan, consistent with AFMAN 32-7003. **(T-2)**

2.2.1.8. Formal Wildlife Survey Program. Identify installation-specific agencies and protocols for implementing formal wildlife surveys for wildlife hazards and attractants, consistent with [paragraph 2.4.1](#), including avian point count surveys, night surveys/patrols, insect, and rodent abundance surveys. **(T-1)** ANG units and other DAF BASH programs at civil or non-DAF military fields may lack jurisdiction for movement area access and airfield authority to conduct formal wildlife surveys or share data. ANG units and tenant DAF BASH programs at non-DAF airfields (civil or military) are exempted from implementing formal wildlife survey programs (i.e., Wildlife Hazard Assessments and wildlife monitoring surveys) at these locations but are strongly encouraged to consider implementing these programs when possible. Formal wildlife survey data facilitates risk management decisions and supports mishap investigations involving wildlife strikes. Submit an electronic version of the completed Wildlife Hazard Assessment to AFSEC/SEFW. AFSEC/SEFW will acknowledge confirmation of receipt and approval for the Wildlife Hazard Assessment in a Memorandum for Record that will be included in the installation BASH plan. **(T-1)**

2.2.1.9. Designate a Wildlife Exclusion Zone. A Wildlife Exclusion Zone is a locally defined, site-specific area where a zero-tolerance goal for wildlife is maintained. At a minimum, the Wildlife Exclusion Zone will include the airfield (encompassing the Aircraft Movement Area and clear zones) but may also include additional wildlife hazard attractants (such as water treatment facilities, golf courses, landfills, and athletic fields) within five nautical miles of the airfield and low-level flight corridors (such as final approach/departure paths). The Wildlife Exclusion Zone must be consistent with the installation BASH program and airfield mission. **(T-1)** The self-defined Wildlife Exclusion Zone may exceed the boundaries of the installation to increase awareness of local wildlife hazards and attractants. However, installation BASH programs should note inclusion of non-DAF properties in the Wildlife Exclusion Zone designation may have limitations for management authority.

2.2.1.9.1. Ensure the Wildlife Exclusion Zone is integrated into base mapping products such as imaginary surfaces criteria, land use maps, and operational constraint maps, along with a narrative of prohibited actions, as necessary. **(T-1)**

- 2.2.1.9.2. Wildlife Dispersal Team personnel shall be given priority access on the runway to disperse wildlife in the Wildlife Exclusion Zone, especially during, SEVERE or MODERATE Bird Watch Conditions. **(T-3)** Coordinate active control methods with appropriate agencies (such as the Tower Supervisor, Airfield Management, Command Post, Public Affairs, and Security Forces) prior to initiation, if the situation permits. Include coordination procedures in the BASH plan. **(T-3)**
- 2.2.1.10. The airfield perimeter security fence must be patrolled, at least monthly and after a significant weather event, inspecting for compromises in the fence. **(T-3)** Designate agency(ies) (approved by installation/wing/delta commander) to inspect the airfield perimeter security fence. Maintain a record of detected fence breaches that allow wildlife to enter the airfield environment. The BASH Program Manager will maintain records of completed fence repairs. **(T-3)** Airfield fence inspections may require initial/recurrent coordination with multiple base agencies (e.g., Airfield Management and Security Forces) or with host nation partners.
- 2.2.1.11. Identify local training requirements for personnel implementing wildlife control activities, including but not limited to wildlife identification, pyrotechnic, and firearm safety. Ensure all training procedures are included in the installation BASH plan. **(T-3)** Minimum firearm training requirements must be consistent with AFI 36-2654, *Combat Arms Program* and **paragraph 3.2.3.4.** of this instruction.
- 2.2.1.12. Include all tenant units, auxiliary airfields, forward operating locations, transit centers, landing zones, drop zones (without a landing strip), low-level routes, ranges, and low-altitude tactical navigation (LATN) areas in the plan. Ensure that airfield training (e.g., practice approaches, low-level flying, etc.) conducted at other than home station have wildlife hazard and management procedures addressed in the Memorandum of Agreement or Memorandum of Understanding for airfield operation/use.
- 2.3. Bird Hazard Working Group.** The formal Bird Hazard Working Group shall meet at least semi-annually. **(T-1)**

2.3.1. Establish documented tasks and responsibilities for all organizations within the Bird Hazard Working Group. **(T-2)**

2.3.2. The Bird Hazard Working Group will be comprised of a comprehensive group of representatives from the following organizations, to include but not limited to: Safety, the BASH Program Manager, Operations (flying squadrons, Air Traffic Control, Airfield Management, and Operations Group Standardizations/Evaluations), Civil Engineers (Natural Resources, Pest Management, and as needed, operations, community planning, aircraft rescue and firefighting), Judge Advocate, Public Affairs, Security Forces, joint force tenants, privatized housing representative (if necessary), Wildlife Biologist (if assigned), and flying tenant units.

2.3.3. The host installation wing/delta vice commander will chair the formal Bird Hazard Working Group meetings. **(T-2)** Formal Bird Hazard Working Group Chair responsibilities can be delegated, in writing, by the host wing/delta vice commander or, deferred to the vice commander of the wing/delta holding the preponderance of USAF or USSF flight assets at the installation. **(T-2)** The BASH Program Manager will organize and execute the Working Group agenda. Safety will act as the executive secretary for the group and at a minimum, maintain original meeting minutes. **(T-3)**

2.3.4. The Bird Hazard Working Group will assist the safety office with drafting and implementing the BASH plan for any improvement projects on the installation. **(T-3)** Action officers from each tasked organization will meet prior to the formal Bird Hazard Working Group meeting to discuss and resolve issues for presentation at this meeting. **(T-3)**

2.3.5. Bird Hazard Working Group meeting topics may include but are not limited to:

2.3.5.1. DAF BASH Team information updates.

2.3.5.2. Reporting DAF wildlife mishaps and hazards. An analysis of wildlife strike data should use a rate per 100,000 flying hours (i.e., the number of events, multiplied by 100,000 flight hours, divided by the number of flying hours). This normalized rate will support annual comparisons for bird strike events at each installation.

2.3.5.3. Locally observed/reported wildlife activity (to include observations in low level ranges/routes).

2.3.5.4. Airfield inspection findings, formal wildlife survey data trends, recovered wildlife strike remains, wildlife strike metrics.

2.3.5.5. Local hazardous wildlife habitat management/modifications (to include dispersal/depredation activity), environmental/land management activity, land uses (landfills, agriculture crop seasons), current or projected community projects off installation with the potential to affect wildlife activity on or near the installation, and encroachment issues.

2.3.5.6. All proposed outdoor construction or modification projects.

2.3.5.7. Annual bird migrations, to include activity that could impact low-altitude airspace (e.g., flight routes, low-level routes, and operating areas).

2.3.5.8. BASH-related budgeting issues.

2.3.5.9. Local BASH plan procedures and responsibilities (to include observed effectiveness/deficiencies).

2.3.5.10. BASH awareness training/education (to include Bird Watch Condition code definitions and communications).

2.3.5.11. Flying schedule and wildlife activity conflicts.

2.3.5.12. Status of BASH equipment and bird dispersal supplies.

2.3.5.13. Review of Flight Information Publication (FLIP) documents for wildlife hazard advisories (Phase I / II designations).

2.3.6. The Bird Hazard Working Group shall ensure no improvement projects to the airfield, Aircraft Movement Area, or clear zones are made with the purpose of attracting wildlife. **(T-2)** If conservation projects are approved, commanders shall dedicate adequate funds to remove/mitigate such projects should the wildlife hazard risk become unmanageable. **(T-2)** Civil Engineering will be responsible for coordinating construction projects with Working Group members. **(T-3)**

2.3.7. Appropriate Bird Hazard Working Group agencies shall define a Wildlife Exclusion Zone, or other relevant mitigation zones, specific to the airfield, installation, and flying mission. **(T-1)**

2.4. Documenting Wildlife Hazards.

2.4.1. Formal Wildlife Survey Program. The presence and behavior of wildlife on an airfield is dynamic and influenced by many variables that may change from year to year, season to season, and even hour to hour. Conducting formal wildlife surveys and documenting dispersal/removal efforts helps personnel capture temporal (seasonal and diurnal) and spatial airfield use as well as behavior, abundance, and diversity of species. Wildlife survey data provides information that wing/delta leadership need to evaluate their program's effectiveness and where to focus limited resources. Survey data upholds program continuity during periods of personnel transition.

2.4.2. Wildlife Hazard Assessment. Conduct a one-year Wildlife Hazard Assessment that quantifies the presence and general abundance of wildlife hazards within the airfield and the designated Wildlife Exclusion Zone. **(T-1)** The primary focus of this Assessment is to address wildlife issues and habitat that may be impacting airfield operations, outside of the normal bird concerns. The Wildlife Hazard Assessment provides baseline information for trend analysis using information collected during formal wildlife surveys, supporting data-driven wildlife mitigation recommendations. ANG units and other DAF BASH programs at civil or non-DAF military fields may lack jurisdiction and airfield authority to conduct a Wildlife Hazard Assessment. ANG units and tenant DAF BASH programs at non-DAF airfields (civil or military) are exempted from completing a Wildlife Hazard Assessment at these locations, consistent with [paragraph 2.2.1.8](#) of this instruction. Completion of a Wildlife Hazard Assessment is strongly encouraged at these locations to facilitate informed risk management decisions and support mishap investigations involving wildlife strikes.

2.4.2.1. The Wildlife Hazard Assessment will be completed or overseen by a Qualified Airport Wildlife Biologist, consistent with requirements identified in FAA AC 150/5200-36B. **(T-1)**

2.4.2.2. Wildlife point count surveys will be established within the airfield and Wildlife Exclusion Zone to identify the diversity and abundance of wildlife hazards present. Ensure point count survey stations allow observation along the runway(s) and within the approach/departure corridors. **(T-1)** Data collection for the Assessment will occur over 12 months and include (at a minimum): wildlife species, observed abundance, the observed behavior of each wildlife species, and the habitat type utilized or serving as an attractant. Utilize survey design criteria identified in this instruction and included in FAA AC

150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans* as guidance. Coordinate selection of airfield wildlife point count survey locations with the Airfield Manager in advance to ensure surveyor presence will not negatively impact airfield operations.

2.4.2.3. Point count surveys will consist of two survey days per month. One survey day includes visitation to each point at dawn, mid-day, and dusk. Record all wildlife observed from each point for three minutes. Conduct one survey day during the first two weeks of each month and one during the last two weeks of each month. The number of airfield survey point stations counts will ensure complete observation of the airfield (typically ½ mile apart) and sites within the designated Wildlife Exclusion Zone. **(T-1)**

2.4.2.4. As appropriate, implement off-airfield point count surveys at airfield infrastructure components, perimeter fence lines, and at attractive wildlife features within a 5-mile perimeter from any point of the runway centerline. **(T-1)**

2.4.2.5. The location of all survey points and routes shall remain consistent over time to the extent possible. Include locations that are attractive to wildlife on and off the airfield (e.g., such as ponds, drainage culverts, and nearby housing and billeting areas [no time limit at known attractants, record all wildlife present]). Visitation to each point count survey station shall be random between individual survey periods and days. **(T-1)**

2.4.2.6. Conduct a monthly night survey. Implement the night survey using a driving route on the airfield and installation. Utilize a forward looking infrared (FLIR) scopes, Night Vision Goggles, and/or spotlights to implement the survey. **(T-1)**

2.4.2.7. Wildlife Hazard Assessment reports will include, at a minimum: a description of survey protocols, survey results and analysis, wildlife strike trend analysis, discussion of species observed, and recommendations for reducing wildlife hazards. Forward completed Wildlife Hazard Assessments to AFSEC/SEF, 9700 G Avenue SE, Kirtland AFB NM 87117-5670 or to BASH2@us.af.mil. **(T-1)** AFSEC/SEF will generate a Memorandum for Record, acknowledging receipt and completion of with the Wildlife Hazard Assessment mandate.

2.4.2.8. BASH programs must complete a new Wildlife Hazard Assessment every 72 months. **(T-2)** Completion of a new Wildlife Hazard Assessment may be required in response to safety investigation recommendations and changes to the airfield environment that may negatively impact safe flying operations. Installations that have an AFSEC-approved Wildlife Hazard Assessment are exempted from completion of a new Wildlife Hazard Assessment if:

2.4.2.8.1. Formal wildlife surveys are actively implemented and ongoing, consistent with [paragraph 2.4.3](#). **(T-1)**

2.4.2.8.2. Wildlife monitoring surveys are performed by a Qualified Airport Wildlife Biologist, consistent with qualifications identified in FAA AC 150/5200-36B. **(T-1)**

2.4.2.9. DAF flight commands may adopt use of the host organization (civilian airport authority or other DoD Service) Wildlife Hazard Assessment, if that Assessment addresses requirements under [paragraph 2.4.2](#) and includes a supplement that addresses specific USAF operation elements. Adoption of host organization Wildlife Hazard Assessments must be approved by AFSEC/SEFW (certified in a Memorandum for Record, maintained by the local BASH program OPR). (T-2)

2.4.3. Formal wildlife survey requirements. DAF BASH programs will implement a formal wildlife survey program. (T-1) This continual data source provides BASH stakeholders with current hazard identification information which connects temporal (seasonal and diurnal) and spatial airfield use by wildlife, including behavior, abundance, and diversity of species. The survey forms in [Attachment 2](#) may be used as a guide for conducting formal wildlife surveys on and around the airfield. Wildlife surveys should be adapted to best fit the specific wildlife hazards of a particular airfield. The designated BASH Program Manager is responsible for ensuring implementation of a formal wildlife survey program throughout the year. (T-1) ANG units and other DAF BASH programs at civil or non-DAF military fields may lack jurisdiction and airfield authority to conduct formal wildlife surveys. ANG units and tenant DAF BASH programs at non-DAF airfields (civil or military) are exempted from completing formal wildlife surveys at these locations, consistent with [paragraph 2.2.1.8](#) of this instruction. Completion of a Wildlife Hazard Assessment is strongly encouraged at these locations to facilitate informed risk management decisions and support mishap investigations involving wildlife strikes. At a minimum, a formal wildlife survey program will include:

2.4.3.1. Diurnal (daytime) wildlife surveys. Conduct daytime wildlife survey point counts (three minutes at each survey point) at least twice monthly, consisting of three survey periods per day (dawn, midday, and dusk). (T-1) Airfield data parameters to compile include location on the installation, species, number, and behavior.

2.4.3.2. Mobile counts of incidental wildlife observations can be made while driving between survey points or during patrols of the airfield but must be delineated from the point count data for analysis. Incidental observations of wildlife activity can be made by any member of the Wildlife Dispersal Team. Report incidental observations to the BASH Program Manager.

2.4.3.3. The location of all survey point count stations and night survey routes shall remain consistent those used in the Wildlife Hazard Assessment over time. Include locations that are attractive to wildlife on and off the airfield such as ponds, drainage culverts, and nearby housing and billeting areas (no time limit at known attractants). Data parameters to include, at a minimum, are location on the installation, species, number, habitat, and behavior.

2.4.3.4. Nocturnal (night) wildlife surveys. Conduct nocturnal wildlife surveys using visual enhancement devices (such as spotlight, FLIR scopes, night vision goggles, or a combination thereof) at least once a month starting 30 minutes after sunset. (T-1) Nocturnal (night) surveys will not be constrained by a time limit.

2.4.3.5. Large mammal surveys shall include all areas within the Aircraft Movement Area and garrison areas outside the airfield security fence. **(T-1)** Large mammal surveys can be informal and can be separate from night surveys in [paragraph 2.4.3.4](#) Incidental surveys for mammal activity may be accomplished through observation of tracks, bedding, and scat. When necessary, utilize trail cameras to monitor mammal activity at strategic portions of the airfield (i.e., open airfield gates, dig outs under perimeter fence lines, or airfield cover).

2.4.3.6. Conduct small mammal surveys (voles, mice, and shrews) at least twice a year at a minimum in the spring and fall (consult with AFSEC/SEFW for additional guidance on survey protocol). **(T-1)** Small mammal survey methodology should be consistent with species present at each installation (including considerations for listed small mammal species). Utilize small mammal survey methodology from the United States Forest Service (USFS), *Multiple Species Inventory and Monitoring Technical Guide*, Version 1.0, Chapter 5 - *Small Mammal Monitoring*. This data provides a relative index of small mammal populations, aids in predicting trends, and helps determine proper rodenticide application. Utilize formal wildlife survey data to identify small mammal survey locations, focusing on portions of the airfield with the highest observed raptor activity.

2.4.4. The BASH Program Manager will maintain historical records of local wildlife hazards, including formal wildlife survey data and spatial information. **(T-2)** Evaluation and trend analysis of wildlife use on the airfield is paramount to develop a successful BASH program. Coordinate with Natural Resources personnel for compilation and analysis as necessary. **(T-2)**

2.4.5. Geospatial technologies. Map wildlife dispersal and removal efforts to evaluate program effectiveness. Establish grid locations to the airfield or utilize Global Positioning System (GPS)/Geographic Information System (GIS) technology in the field, as available. At minimum, record the date, location, species, number engaged, and outcome (i.e., number dispersed, depredated, trapped-killed, and trapped-relocated). Documenting wildlife control efforts (both lethal and non-lethal) is required for obtaining permits and prioritizing wildlife hazard management projects. Utilize spatial data collection technology to implement the formal wildlife survey program (i.e., Wildlife Hazard Assessments and formal wildlife surveys). In the absence of spatial data collection technology, define a spatial grid to document wildlife activity observed at point count survey stations. Coordinate with AFSEC/SEFW to forward all spatial wildlife survey data electronically or by an authorized transferable media. **(T-1)**

2.4.6. Consider photographing wildlife hazards on the installation to bring awareness to the problem in support of mitigation efforts. For example, pictures of gulls loafing on the airfield accompanied by observations showing the birds using a nearby sanitary landfill can provide a strong case against future expansion of the landfill. Ensure photographers have proper authorization to photograph on the airfield and other sensitive areas.

2.4.7. Develop control strategies to mitigate invertebrates and plants that negatively impact BASH. Document the relative size, species, and abundance of insects during entomology surveys and the density of weed species present in vegetation surveys, as both contribute to the presence of wildlife on airfield. Choose an appropriate sampling method to collect insect specimens for identification. Systematic sampling using a sweep net is a common method used to sample insect abundance and diversity on airfields. Reference AFMAN 32-1053,

Integrated Pest Management Program, for roles, responsibilities, and requirements of USAF Entomology for managing wildlife hazard attractants. Contact the AFCEC Pest Management Branch (COSP) using the AFCEC Reach-Back Center (AFCEC.RBC@us.af.mil) for survey design and protocol specific to the locally perceived attractant.

2.4.8. Radio control vehicles and sUAS with cameras have the potential to provide valuable wildlife diversity, abundance, habitat, behavior, and location information without dispersing or flushing the wildlife into the exclusion zone. With this information, the BASH Team can evaluate their program's effectiveness and where to focus limited resources. Refer to AFMAN 11-502, *Small Unmanned Aircraft Systems* or contact AFSEC/SEFW for additional USAF guidance on implementing unmanned aircraft systems into wildlife surveillance programs.

2.5. Wildlife Strike Reporting and Analysis.

2.5.1. Report all wildlife strikes within the AFSAS and submit wildlife remains to the Smithsonian Institution Feather Identification Laboratory. Proper wildlife species identification is an integral part of an effective BASH program. A thorough analysis of the circumstances leading to wildlife strikes, in conjunction with wildlife survey/mitigation documentation, is vital before actionable recommendations for management and mitigation may be proposed and executed. Apply proper mishap classification for wildlife strike events with a dollar cost according to current thresholds identified per DAFI 91-204.

2.5.1.1. Air Force Form 853, *Air Force Wildlife Strike Report*, is not required for use to report wildlife strikes, but is recommended for inclusion in BASH kits to capture initial strike event information with any recovered wildlife remains as a best management practice.

2.5.1.2. All wildlife strike events must be reported in the AFSAS, consistent with all applicable guidance in DAFMAN 91-223. **(T-1)**

2.5.1.3. DAF units and safety programs should consider developing a locally defined method for collecting strike remains at non-DAF airfields. Common best management practices include pocket-sized strike collection kits for carry in aircrew flight suits or storage of strike kits in an aircrew procedural packet on the aircraft. Immediate access to a strike collection kit will ensure independence from a non-DAF organization to collect remains and comply with requirements in DAFMAN 91-223 and [paragraph 2.5.1](#) of this instruction.

2.5.2. Collect all feathers/feather fragments, Deoxyribonucleic Acid (DNA) samples, or other wildlife remains for submission to the Smithsonian Institution Feather Identification Lab, in accordance with DAFMAN 91-223. When submitting multiple remains for a single event, identify all impact points on the mishap object and ensure each set of remains clearly indicates the respective impact point.

2.5.3. Photographs of whole carcasses may be submitted into AFSAS for identification of species in lieu of shipping remains. Retain all wildlife remains until after identification has been determined by AFSEC/SEFW or the Smithsonian Institution Feather Identification Lab. Feather remains must be submitted if identification cannot be determined from photographs taken. **(T-1)** Specimen photos can be uploaded to the AFSAS mishap report in addition to submitting physical samples to the Smithsonian.

2.5.4. Collect, submit, and file an AFSAS wildlife strike report for all wildlife remains, whether whole or in part, found on the airfield within 250 feet of a runway centerline, or within 1,000 feet of a runway end unless the animal's death may be definitively attributed to another source. **(T-1)** Identification of wildlife strike remains as described in [paragraph 2.5.2](#) supports federal and state depredation permits and may be used to defend against litigation. While utilizing locally employed professional wildlife damage control experts to assist with species identification process is recommended; it does not satisfy the above submission requirements. AFSEC has established a joint interagency agreement with the Smithsonian Institution Feather Identification Lab to identify all wildlife involved with a suspected aircraft strike.

2.5.5. Exercise caution when handling wildlife remains, especially in/from regions of the world that may have disease transmission concerns (such as Avian Flu). Refer to special handling and shipping instructions in T.O. 1-1-691.

2.5.6. If shipment of wildlife remains is delayed, submit a status message in AFSAS in accordance with DAFI 91-204. Contact AFSEC/SEFW or the Smithsonian Feather Identification Lab if shipment status cannot be verified https://www.faa.gov/airports/airport_safety/wildlife/smithsonian/.

Chapter 3

AIRFIELD AND INSTALLATION HAZARD MANAGEMENT

3.1. Airfield Wildlife Management Overview. Military airfields are artificially maintained environments designed specifically for the safe launch and recovery of aircraft. The Sikes Act (16 U.S.C. 670a) requires every installation that has natural resources to develop an INRMP to provide for the conservation and management of those resources. Sikes Act Section 101(b) requires that the INRMP preserve the installation's capability to support its military mission.

3.1.1. The installation Civil Engineering division and safety office work to minimize flight risks and ensure that the INRMP and the installation's BASH Plan are consistent. Minimize flight risks by making the airfield and Aircraft Movement Area unattractive to hazardous wildlife and employ depredation measures specified in those plans. Follow land use plans and the INRMP to ensure the airfield and Aircraft Movement Area are not used or designated as wildlife conservation easements, wetland, or grassland areas. **(T-1)**

3.1.2. Large Wildlife on Airfields. Maintain a zero tolerance of large, free-roaming animals (deer, canines, geese, etc.) on or adjacent to the Aircraft Movement Area and areas that have unimpeded access to the Aircraft Movement Area. **(T-1)**

3.2. Mitigation Practices. Proper passive and active mitigation practices on and surrounding the airfield will successfully reduce threats from hazardous wildlife. These practices vary in cost and effectiveness depending on the situation. Passive mitigation measures are long-term in nature and involve managing the local and surrounding airfield environments to eliminate or reduce conditions wildlife find attractive. Active control measures involve physical actions to disperse or remove wildlife from an airfield allowing short-term relief from an immediate safety hazard. As with any non-lethal control technique, wildlife may eventually habituate to the negative stimulus. Incorporate an integrated pest management strategy by utilizing legal wildlife damage management methods and document this approach in the installation BASH Plan.

3.2.1. Passive Mitigation Procedures. Habitat modification is the removal of attractive habitat features and is the most effective and best long-term strategy to decrease wildlife attraction to an airfield. Removing or decreasing the attractiveness of water bodies; eliminating nesting, perching, and roosting structures; and reducing food attractants/prey species on and surrounding the airfield are all crucial steps in decreasing the risk wildlife pose to flight safety. The following are best practices proven to successfully mitigate wildlife threats in many cases. For additional information on best mitigation practices, see FAA AC 150/5200-33C, *Hazardous Wildlife Attractants on or Near Airports*.

3.2.1.1. Airfield Vegetation Management. Targeted vegetation management is critical to reduce wildlife hazards. Vegetation management practices within or beneath the airfield clear zones, primary surface, lateral clearance zone, accident potential zones, and approach-departure clearance surface, as defined in Unified Facilities Criteria (UFC) 3-260-01 *Airfield and Heliport Planning and Design*, must be managed to prevent the development of habitat for wildlife that pose a threat to flight safety. **(T-1)** Vegetation on and adjacent to the airfield should provide as little food resources (e.g., seeds, weeds, and insects) as reasonably possible for hazardous species of birds and large mammals and minimize cover for small mammals (e.g., raptor food attractant).

3.2.1.2. A working knowledge of local plant species is paramount to develop plans to reduce risks associated with plants that are not compatible with aviation safety. Many non-endemic, invasive plant species attract hazardous wildlife species. Support Executive Order 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, regarding invasive species management on the airfield. **(T-0)**

3.2.1.3. Manage vegetation in the Wildlife Exclusion Zone to minimize wildlife hazards to flight safety. Existing, incompatible vegetation should be prioritized by attraction to hazardous wildlife and mitigated accordingly. **(T-3)** Civil Engineers will coordinate with the BASH Program Manager to ensure that all airfield vegetation projects, and other installation landscape designs are compatible with flight safety requirements and consistent with AFMAN 32-7003. **(T-3)** Consult with Civil Engineering to develop a comprehensive vegetation planting list that includes species compatible with the installation BASH program, restricting planting of non-compatible vegetation species on the installation. **(T-3)** Bird Hazard Working Group members should evaluate the risk of current vegetation on the installation and determine compatibility with flight safety. This includes plants that are already established within airfield and non-airfield portions of the installation.

3.2.1.4. Vegetative cover within Aircraft Movement Area must be maintained at a height between 7 to 14 inches and converted to a locally adapted vegetation species deemed unattractive to birds and other wildlife. **(T-1)** At a minimum, maintain the vegetative cover at the above prescribed height 500 feet beyond the Aircraft Movement Area boundary. **(T-1)** The 7-to-14-inch standard is designed to minimize mowing frequency and improve growing conditions while providing minimal wildlife attraction. Vegetative cover between 7 to 14 inches discourages flocking species from foraging on the airfield as reduced visibility disrupts bird inter-flock communication and flock integrity by reducing the ability to detect and respond to predators. Vegetative cover exceeding 14 inches may attract ground nesting birds and provide cover or food for rodents that may attract predatory birds and mammals. Vegetative cover exceeding 14 inches will also provide cover for larger animals (deer, coyotes, turkeys, etc.) making them difficult to detect and remove.

3.2.1.4.1. Military Readiness. Vegetation management within the airfield Clear Zones and Primary Surface, as defined in UFC 3-260-01 is a military readiness activity covered under Title 50 Code of Federal Regulation (CFR) § 21.15. In accordance with Section 315 of the Bob Stump National Defense Authorization Act of 2003 (P.L. 107-314), the Migratory Bird Treaty Act general prohibition against killing migratory birds codified at 16 U.S.C. § 703 does not apply to the incidental taking of a migratory bird by a member of the armed forces during a military readiness activity. Reference AFMAN 32-7003. Consult with AFSEC/SEFW or AFCEC/CZTQ, Environmental Quality Technical Support for additional guidance.

3.2.1.4.2. AFSEC is the waiver authority for airfield vegetative height. The intent of airfield vegetation height waivers must be to reduce the attractiveness of the airfield to all wildlife or to prevent violations of the Endangered Species Act. Installation safety offices may request an airfield vegetative height restriction waiver from AFSEC/SEFW after coordination with the installation's respective MAJCOM/FLDCOM. Wing/delta safety will provide Airfield Management with a copy of all issued airfield vegetation height waivers, consistent with AFMAN 13-204V2.

3.2.1.4.3. Although Bahia grass and many other grasses may produce prominent seed stalks, the height of these seed heads should not be the sole reason for mowing. As turf grass will eventually go to seed, mowing to eliminate seeding will increase mowing cycles.

3.2.1.4.4. Coordinate mowing with periods of low flight activity. Begin mowing adjacent to runways and finish in the infield or outer most vegetation areas, causing insects and other animals to move away from aircraft takeoff and landing areas. Alternate the directional pattern of mowing to prevent the development of ruts and subsequent ponding of water.

3.2.1.4.5. Vegetative cover is not to exceed 7 inches within 10 feet surrounding all airfield navigation aids or visual air navigation facilities (e.g., instrument landing system, tactical air navigation, lighting, signage, etc.) regardless of each object's location within the Aircraft Movement Area. **(T-1)**

3.2.1.4.6. Broad-leafed weeds shall be maintained to a minimum on the airfield. **(T-1)** Broad-leafed plants attract a variety of wildlife, may produce seeds or berries, and may limit grass growth while providing increased cover. Non-uniform plant species create an attractive mosaic of both lateral and vertical dimensions. Eliminating weeds and cultivating a uniform, dense monoculture of grasses may be more effective in discouraging seed-eating birds from feeding on the airfield than mowing grass seed stalks. Apply herbicides as practical to control weeds and comply with AFMAN 32-1053, *Integrated Pest Management Program*. Test growth retardants on small test plots before use on the entire airfield landscape. Primary focus shall be on vegetation height and weed seed heads. Some grass seeds found on the airfield are less desirable as food than available weed seeds.

3.2.1.4.7. Reduce bare areas within the Aircraft Movement Area. Such habitats expose grit (sand and small stones), seeds, and invertebrates that are easily exploited by birds. Birds ingest grit to aid in digestion of seeds. Several bird species with plumage and egg color patterns matching that of graveled bare ground also seek this habitat for loafing and nesting (e.g., killdeer). Lack of vegetative cover also allows flocking species to maintain visual communications and aids in predator detection, allowing them to feel safe on the airfield.

3.2.1.4.8. Prevent negative impacts to airfield vegetation conditions. Bare areas are often the result of soil disturbances (i.e., construction projects or jet wash) and/or poor soil conditions. Ensure all ground disturbances on the airfield are followed by efforts to vegetate exposed bare soil areas. Include airfield reseeded requirements and performance specifications into ground disturbing airfield construction projects. Plant grasses that are compatible with aviation safety and adapted to local soils. Bare areas may require additional soil amendments (e.g., on site composting, fertilizer, lime, or gypsum) and soil stabilization materials (e.g., hay mulch, erosion blankets) to produce an adequate stand of vegetation. If supplemental irrigation is available, irrigate only until new vegetation is established. Encourage off-road vehicle operators to rotate travel paths taken through airfield vegetation; this reduces the occurrence of dirt paths

created by tire compaction of soil or rutting. Avoid mowing saturated soils. Inattention to this will result in soil compaction and deteriorating vegetation density/health. Rutting will also result and lead to standing water, erosion, and problematic weeds. Rutting severely impacts existing vegetation on shallow soils, taking years to recover.

3.2.1.4.9. Fertilize established vegetation as necessary to stimulate growth and promote a uniform cover. Rate and frequency of application may vary from other semi-improved vegetation areas and should be based on soil test results.

3.2.1.4.10. Installations located in arid climates where conditions do not support turf growth may develop natural vegetation on the airfield to limit attractiveness to wildlife. The endemic vegetation should not supply attractive habitats for hazardous wildlife or obstruct views of the airfield from the tower. These situations require comprehensive vegetation/wildlife hazard management and must be reviewed on an individual basis by AFSEC/SEFW for vegetation waiver approval.

3.2.1.4.10.1. Another option for airfields in low-moisture environments is de-vegetation through blading. However, there may be unintended long-term risks associated with blading. Dust suppression agents should be evaluated prior to application so as not to create a Foreign Object Debris (FOD) hazard on the airfield.

3.2.1.4.10.2. For additional guidance, refer to UFC 3-260-17, *Dust Control for Roads, Airfields, and Adjacent Areas*, as well as Engineering Technical Letter (ETL) 09-3, *Chemical Dust Control for Contingency Roads, Base Camps, Helipads, and Airfields*. Consult and plan with MAJCOM/FLDCOM and AFCEC specialists prior to implementation.

3.2.1.4.11. Trees and brush on airfields create cover, food, and nesting for wildlife. This may increase the attractiveness of the airfield to species hazardous to safe flight operations. Formal wildlife monitoring surveys applied by a local BASH Program Manager will help prioritize trees and brush identified as most attractive to wildlife, substantiating what type of action is warranted (if any). Coordinate with Natural Resources to determine whether a permit or consultation with the United States Fish and Wildlife Service is required for compliance with the Migratory Bird Treaty Act (16 U.S.C. § 703-712), the Bald and Golden Eagle Protection Act, (16 U.S.C. 668-668d), or any other requirement as cited in AFMAN 32-7003. **(T-0)** Consult with AFSEC/SEFW for support when addressing Federal requirements constraining tree and brush management on airfields.

3.2.1.4.12. Increased wildlife activity is often found where vegetation types change from forests to brush, or brush to grass/weeds (edge effect). To reduce wildlife habitat, keep edge effects on the airfield to a minimum, or as far from the active runway/taxiways as possible. This eliminates the cover many birds and rodents require. Single trees or snags (dead standing trees) on an airfield provide perches for hawks, owls, or other bird species.

- 3.2.1.4.13. Insecticide Application. Vegetation cover type may attract large populations of insects and may pose an indirect threat to safe flight operations. Targeted airfield vegetation management, consistent with [paragraph 3.2.1.4](#) and in conjunction with insecticide spraying, is the best strategy to reduce the availability of insect attractants. Consider the benefits of airfield spraying for insect control to supplement grounds maintenance spraying by local pest management personnel. Prior to any airfield insecticide spraying operations, consult with AFCEC/COSP using the AFCEC Reach-Back Center (AFCEC.RBC@us.af.mil).
- 3.2.1.4.14. Biodiversity practices will not be implemented on the Wildlife Exclusion Zone when such practices are deemed hazardous to aviation. **(T-2)** The more diverse an airfield is in terms of vegetative species and structure, the more attractive it will be to a variety of wildlife.
- 3.2.1.5. Airfield Fencing. USAF and USSF airfields must include a complete perimeter fence with closing gates that exclude wildlife hazards threatening safe aviation operations. **(T-2)** Proper fencing reduces airfield incursions by terrestrial wildlife and is the best strategy for excluding large wildlife from the airfield, consistent with [paragraph 3.1.1](#). At a minimum, for excluding terrestrial wildlife, airfields must have an 8-foot chain link perimeter fence with 3-strand barbed outriggers, secured at the ground. **(T-2)** As a best management practice, a 4-foot skirt of chain link fence material, attached to the bottom of the fence and buried at a 45-degree angle on the outside of the fence will prevent animals from digging underneath, while reducing washouts.
- 3.2.1.5.1. Rebar offers a cost-effective solution when patching gaps under a fence to prevent wildlife from entering the airfield. Heavy gravel may be used to armor fence bottoms. Remove vegetation on and along the fence line. **(T-3)** Maintain a buffer zone free from brushy and woody vegetation on both sides of the security fence, allowing easier access for inspection and maintenance.
- 3.2.1.5.2. Inspect all gates to ensure proper function. Replace or repair all damaged gates or gates that do not close properly. **(T-3)** Install speed humps under gates to control erosion and reduce gaps at the bottom, if necessary. Post signs warning of wildlife hazards to flight operations to educate gate users if gates are routinely left unsecured. **(T-3)** Ensure fences do not violate the airfield clear zones and frangibility rules, in accordance with UFC 3-260-01. **(T-0)**
- 3.2.1.6. Airfield Drainage. Open water is one of the most attractive features to wildlife hazards on an airfield, especially in arid regions and near the seacoast. Standing water creates a direct and indirect hazard, including cover for wildlife, a breeding place for insects, amphibians, and other food sources for birds/wildlife. Dedicate funds for sufficient planning and management for proper drainage of all airfield areas within the confines of the Aircraft Movement Area. **(T-2)** For further mitigation strategies for airfield drainage, reference FAA AC 150/5320-5D, *Airport Drainage Design*.

3.2.1.6.1. 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 drainage conditions of the airfield and infrastructure, 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. Generally, non-tidal drainage ditches and irrigation ditches excavated on dry land are not “waters of the United States” (as defined at 33 CFR 328.3(a)) and may be modified or eliminated as needed. However, permanent water sources such as wetlands and waterways that are connected to “waters of the United States” may be protected by Clean Water Act Section 404 and require a permit from the United States Army Corps of Engineers before they are modified. Therefore, coordinate with Civil Engineering before modifying airfield drainage.

3.2.1.6.2. Maintain drainage ditches to exclude vegetation. **(T-2)** Aquatic vegetation, trees, and brush along and within drainage ditches provide excellent habitat for a variety of wildlife species in the form of perching, loafing, and nesting areas, along with providing food and cover. Vegetation impedes water flow through a drainage ditch, prolonging the water attractant and contributing to sediment buildup. Wading birds, such as herons, egrets, and shorebirds, are less likely to utilize deep and steep sloped drainage ditches. Grade drainage ditch banks to allow mowing to the ditch edge. Construct and maintain airfield drainage ditches as deep as possible to limit the surface area of the water while allowing proper drainage in accordance with Civil Engineering directives. **(T-2)** Design or alter open drainage ditches into enclosed and buried culvert systems, when possible.

3.2.1.7. Exclusionary Techniques. All structures on an airfield may potentially serve as perching, loafing, nesting, and roosting locations for bird hazards. Raptors especially favor structures that give them a height advantage when hunting. If formal wildlife surveys indicate that structures are being continually used as perching locations, install exclusionary devices.

3.2.1.7.1. Identify airfield structures used as perching sites. Remove all obsolete structures. **(T-3)** Determine which type of exclusionary device is best for the different structures found on an airfield. Procure and install exclusionary devices on high-use areas to include runway distance markers, ledges, rafters, signs, and other roosting and perching areas to mitigate bird utilization. Exclusionary devices are not 100 percent effective against all bird species but may significantly reduce the number and type of species that utilize airfield structures. Proper installation and routine maintenance of exclusionary devices will assure effectiveness and decrease possible FOD hazards.

3.2.1.7.2. Hangars and shade shelters provide an attractive environment for birds to nest and roost. Bird issues in hangars pose potential health risks due to unsanitary conditions generated by an accumulation of bird feces and bird mites. Hangars are easily accessible to birds since hangar doors are often left open for extended periods, particularly in the evenings when birds are roosting. Keeping hangar doors closed is the best preventative method but is sometimes impractical (closing doors one hour before sunset and then re-opening them after dark to reduce roosting/nesting behavior may be an option for some facilities). As a result, exclusionary devices, full-time bird control, or depredation are often necessary. Utilize brush weather seals on the edge of hangar doors to remove gaps and seal any open spaces, restricting entry points to birds. Strip plastic curtains, or vertical blinds, allows the hangar doors to remain open for ventilation while limiting access to birds.

3.2.1.7.2.1. Bird netting provides an excellent long-term defense against bird access to hangars and shade shelters. Netting will prevent birds from roosting inside a hangar while allowing the doors to be open during hangar operations. Netting an entire hangar may not be necessary or practical. “Spot” netting (i.e., targeted netting applied to attractive roosting areas or, areas above high value assets) may be a less expensive option.

3.2.1.7.2.2. Surveys, observation of fecal matter accumulations, and conversations with hangar personnel will help identify areas highly attractive to birds. Exclusionary netting should be programmed into hangar/shade shelter repair or new construction costs whenever possible that decreases the expense of this option. Lining hangar rafters with poly-vinyl Chloride pipes has proven successful in keeping birds from nesting or roosting. By reducing the amount of surface area available, birds are prone to look for other structures on which to build nests or roost.

3.2.1.8. Integrated approach for hangars. Use of multiple exclusion strategies, applied in conjunction with direct control (i.e., harassment and depredation) will result in the best, long term solution to bird issues in hangars. The use of lasers for harassment and air rifles for depredation has proven successful to complement exclusion or when other options are not available/ineffective. See [paragraph 3.2.2.4.3](#) for further information on air rifle use.

3.2.1.9. Agricultural Programs. Installation agricultural program must be compatible with the BASH program implementation and consistent with requirements in AFMAN 32-7003. While not generally recommended, a few installations have agricultural programs on or surrounding the respective airfield to reduce maintenance costs. These programs include crop and hay out leases to grazing and reforestation. Crop production and the agricultural practices may have significant effects on local bird populations.

3.2.1.9.1. Agricultural activities are not permitted inside the airfield fence. **(T-1)** Agricultural crops on the installation must not attract wildlife hazards to airfield environment. **(T-1)** Installations must coordinate proposals for agricultural outgrants with the installation Bird Hazard Working Group to ensure that proposed activities do not negatively impact flight safety.

- 3.2.1.9.2. Hay bales must not be stored on the airfield, as this may destroy underlying vegetative cover creating bare areas. **(T-1)** Invertebrates and small mammals will tend to congregate in the resulting excess cover and birds may use bales as perching locations.
- 3.2.1.9.3. Harvesting and planting schedules may affect wildlife activity on and surrounding an airfield. Cultivation may attract birds by exposing large numbers of insects and earthworms. For example, if an airfield hay crop is harvested before or after other hay crops in the local area; large numbers of invertebrates may be exposed on the airfield before being exposed in other fields. This may provide a more intense bird attractant than would normally exist.
- 3.2.1.9.4. The flying schedule should account for local agricultural activities. Planting, cultivating, harvesting, or burning may temporarily increase airfield bird attractants. Airfield Management, Safety, and Civil Engineering personnel should be aware of local agricultural methods and determine if they could negatively impact flight safety. Refer to AFMAN 32-7003 and consult with the local Civil Engineering Natural Resource Manager for further guidance regarding agricultural practices on and surrounding the airfield.
- 3.2.1.9.5. Grazing animals represent a serious hazard to flight operations. Do not allow livestock to graze on active airfields. **(T-1)** Fencing practices, consistent with [paragraph 3.2.1.5](#), must be implemented to separate livestock from the Aircraft Movement Area. **(T-1)**
- 3.2.1.10. Wastewater Facilities, Lagoons, and Ponds. Waterfowl and shorebirds are attracted to wastewater holding ponds and treatment facilities. Birds utilize water for resting as well as a food source. Wastewater lagoons are most attractive in arid climates. Installations must consider flight operations when designing and locating wastewater ponds and locate any new open water features or ponds as far from the runway and traffic patterns as possible. Consider pond placement to ensure transiting birds do not cross runways. For other necessary considerations involving the management of wastewater systems, consult DAFMAN 32-1067, *Water Fuel Systems*, Chapter 5, Wastewater Systems.
- 3.2.1.11. Ponds designed with steep sides, impervious liners, little surface area, and little to no vegetation will provide reduced bird attraction. If pond alteration or relocation is not feasible, consider installing aeration pumps, agitation equipment, fountains, plastic bird balls/discs, or grid wires (placed over the water body) to dissuade birds from utilizing holding ponds and lagoons. If spray fields are utilized, consider discharging sewage effluent during reduced flying operations. Consider constructing and utilizing Rapid Infiltration Basins to quickly remove water attractants where sandy soils occur. Refer to AFMAN 32-7003 and consult with local Civil Engineering for further guidance regarding placement of lagoons and ponds on the airfield.

3.2.1.12. Landfills. Solid waste landfills are a significant attractant to hazardous bird species. Operate disposal sites according to AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*; FAA AC 150/5200-34A, *Construction or Establishment of Landfills Near Public Airports*; FAA AC 150/5200-33C, *Hazardous Wildlife Attractants on or Near Airports*; Title 40 CFR 258, *Criteria for Municipal Solid Waste Landfills*; and state laws. Resolve, remediate or relocate landfills that do not meet regulatory guidelines/laws. **(T-0)** Ensure the landfill is as unattractive to wildlife as possible and effective mitigation practices are applied.

3.2.1.12.1. Reduce the attractiveness of landfills: maintain a small working face to minimize exposed wastes; cover waste material immediately (as a minimum, cover the working face daily with 6 to 8 inches of topsoil or other commercial cover); operate the landfill as a pit or trench to limit access to birds; dump waste at night or during non-flying periods; discourage gulls and other birds with overhead wire barriers; relocate putrescible/organic wastes to a more remote landfill; use bioacoustics and pyrotechnics to frighten birds away; finally, consider incinerating waste.

3.2.1.12.2. The DAF cannot control land use off base. However, before landfills may be opened or altered (e.g., increase in size or height), the landfill operator must obtain all mandated operations permits per applicable laws and ordinances. States or local governments normally convene a summit regarding the potential environmental impact of any proposed landfill site. Present DAF concerns about potential wildlife hazards at these summits. **(T-3)** Applicable personnel from the Bird Hazard Working Group should work jointly to represent DAF interests. **(T-3)** AFSEC/SEFW will assist by providing consultation and expert testimony as needed. If an off-installation landfill creates wildlife hazards, installation personnel should work with and assist landfill managers in ensuring wildlife are routinely dispersed. DAF personnel may enter landowner agreements with landfills or other private lands to directly mitigate wildlife hazards.

3.2.1.13. Photovoltaic power station. Commonly referred to as solar farms, these facilities are increasingly being developed as a green energy solution around airfields. Current research implies that solar farms, in general, yield little biodiversity, primarily serving as a perching and shade attractant for songbird species. Indirect effects of solar farmland use are probable but is dependent on site-specific levels of impact (e.g., the surrounding landscape and hazardous wildlife species present). Caution should be taken when adopting novel land uses around airfields, including solar arrays. Flight safety, Real Property, and other installation planning organizations should evaluate the increased wildlife attraction of individual solar farms for proposed on and off base.

3.2.1.14. Community outreach is necessary when new projects attractive to wildlife are considered in the local area. Projects off the installation must be considered when a potentially hazardous wildlife attractant is being proposed, utilizing guidance outlined in FAA AC 150/5200-33C, *Hazardous Wildlife Attractants on or Near Airports*. **(T-3)** Consistent with AFI 32-1015, *Integrated Installation Planning*, coordinate with the Installation Community Planner and Air Installations Compatibility Use Zone Manager, when needed.

3.2.2. Active Controls for Short-Term Relief of Wildlife Hazards. Birds and other hazardous wildlife on runways, taxiways, or infields create an immediate safety hazard and must be dispersed or removed to facilitate safe flying operations. **(T-1)** Utilizing a combination of different dispersal tools will provide the best mitigation for immediate wildlife hazards. Applying more than one control method, including pyrotechnics, bioacoustics, depredation, and other methods will reduce habituation and remain effective for dispersing wildlife from airfields.

3.2.2.1. A permit is not required for non-lethal harassment of migratory birds on the airfield, according to 50 CFR § 21.41, *Depredation Permits*. Consult with the United States Fish and Wildlife Services to prevent violation of the Endangered Species Act from wildlife harassment actions that may disturb Federally listed threatened/endangered species. **(T-0)** A federal permit is required to harass bald eagles, consistent with the Bald and Golden Eagle Protection Act, 50 CFR § 22.23. **(T-0)** Consult with AFSEC/SEFW or AFCEC/CZTQ, Environmental Quality Technical Support for additional support.

3.2.2.2. The agency storing and using pyrotechnics shall follow guidelines outlined in Department of the DAFMAN 21-201, *Munitions Management* and DESR 6055.09_AFMAN 91-201, *Explosives Safety Standards*. **(T-2)** Check for additional host nation storage requirements and instructions when assigned to overseas locations.

3.2.2.3. Pyrotechnics. Pyrotechnics are explosive noise-producing projectiles that under the appropriate situation will effectively disperse many species. Pyrotechnics are not effective against all species and use may be extremely limited under red flag fire advisories or when dry vegetation is abundant. Wildlife will often habituate to pyrotechnics over time if not reinforced with lethal control. Coordinate active control methods with appropriate agencies (e.g., the Tower Supervisor, Airfield Management, Command Post, Public Affairs, and Security Forces) prior to initiation. **(T-3)**

3.2.2.3.1. Three types of centrally managed pyrotechnics are authorized and available through supply. All three cartridges are relatively inexpensive and effective to a range of approximately 200 feet. Supervisors will ensure personnel using these cartridges are fully trained and aware of the manufactures operating procedures. **(T-3)** There are only two authorized types of 15mm scare cartridges: “bangers” and “screamers.” The 12-gauge scare cartridge and 15mm banger provide a loud report, whereas the 15-mm screamer creates a shrill whistle.

3.2.2.3.2. The only commercial-off-the-shelf (COTS) pyrotechnic authorized for use by DAF personnel is the Cartouche Anti Peril Aviaire (CAPA) cartridge. Operating procedures for the safe use of the cartridge may be found on the DAF BASH website or DAF BASH Portal page. Commercial-Off-The-Shelf items may be purchased using a Government Purchase Card. DAFI 64-117, *Air Force Government-wide Purchase Card Program* authorizes the purchase of BASH munitions with a Government Purchase Card. Coordinate purchase through the Munitions Accountable Systems Officer (MASO) referencing DAFMAN 21-201.

3.2.2.4. Acoustic Harassment. Acoustic harassment consists of broadcasted wildlife distress calls (bioacoustics), propane cannons, long range acoustic devices, and horns/clappers. Differing techniques may create various responses (both desirable and undesirable) depending on the species of bird being harassed. Some calls will attract, while others may repel. For this reason, the sound source must be properly placed to direct the species away from the runway. Coordination of acoustic harassment with current flying operations is critical. Coordinate with Airfield Management, Air Traffic Control, and Security Forces before using acoustics. **(T-3)** Depending on physical factors such as terrain, trees, and structures on the airfield, the effective distance from the problem species will vary. Consult with the United States Fish and Wildlife Services if the use of acoustics will have an impact on a Federally listed threatened/endangered species. **(T-0)**

3.2.2.4.1. Avian distress calls (bioacoustics) are normally broadcasted from a vehicle-mounted source for ease of mobility. Avian distress calls may be of limited use. A variety of calls may be attempted to determine the most effective selection for a particular species. Distress calls are typically the most effective. However, some bird species do not respond to distress calls at all. Only use bioacoustics when birds are present, as continuous use (automated settings) will lead to rapid habituation and ineffective results. The effectiveness of distress calls is dramatically increased when combined with other hazing techniques (pyrotechnics). Birds may react to calls by flying toward, circling, and gradually moving away from the source. Such behavior may induce a temporary hazard. Hazards to flying operations may be alleviated by utilizing techniques prior to commencing daily flying activities or during breaks in flight activities. Gulls, starlings, blackbirds, and crows are usually effectively dispersed with distress tapes. Occasionally, recorded distress calls of different bird species will frighten a variety of birds; however, species-specific distress calls are the most effective. Coordinate use with Air Traffic Control and Airfield Management to strategically position acoustic devices for operational use.

3.2.2.4.2. Propane cannons and other mobile long-range acoustic devices may be successful if used sparingly and randomly. These devices are not effective against all species and should be used with other harassment and depredation techniques. These devices may be very effective when moving roost sites of gregarious birds, such as egrets and blackbirds. For airfield applications, relocate mobile cannons or maintain an adequate constellation of fixed cannons to avoid habituation. Propane cannons shall be controlled remotely and not left to report automatically. Maintaining control of cannon discharge toward a targeted wildlife hazard will reduce the risk of inadvertently scaring birds into the flight path of aircraft and decreases habituation.

3.2.2.4.3. Employing air horns, vehicle horns, and clappers (hinged pieces of wood 2x4 boards with handles) are the most basic active harassment to disperse wildlife. The range and effectiveness of these instruments is severely limited but may be employed in areas that are not conducive to the use of pyrotechnics and firearms. These methods are ineffective if applied exclusively and should only be used if integrated with other harassment techniques.

3.2.2.5. Use avian lasers to conduct non-lethal harassment of wildlife. The effectiveness of laser harassment depends on the targeted species (pigeons, vultures, and geese) lighting conditions (low-level). Consult with the BASH team to identify which avian lasers are currently authorized for use.

3.2.2.5.1. The installation Laser Safety Officer (ILSO) must conduct a hazard evaluation IAW AFI 48-139, *Laser and Optical Radiation Protection Program* before allowing use of approved avian lasers. **(T-2)** This assessment will be documented accordingly and be kept on file by the installation laser owning agency and ILSO. **(T-3)**

3.2.2.5.2. All wildlife control personnel who operate within DAF facilities must comply with the current operating procedures when using approved avian lasers. **(T-3)** The most current operating procedures may be found on the DAF BASH Team's Portal site (USAF Portal/Safety/BASH) or by contacting AFSEC/SEFW.

3.2.2.5.3. Overseas airfields shall comply with host nation's aviation department regulations pertaining to the use of hand-held lasers for wildlife hazard mitigation prior to implementation of lasers. **(T-3)**

3.2.3. Depredation. Harassment may not provide adequate wildlife management for all species or situations. Some species will habituate to non-lethal control techniques, while others seem naturally immune to such techniques. When used judiciously, depredation may reinforce non-lethal techniques and increase efficacy of harassment. Depending on the species and scenario, depredation alone may be more effective than non-lethal techniques or vice versa.

3.2.3.1. All installations must maintain an organic capability to carry out depredation of wildlife for flight safety regardless if the installation has a service agreement with USDA Wildlife Services or a contractor for BASH control services. **(T-1)** Installations outside the continental United States may be restricted as to what wildlife control techniques and equipment are authorized by the host nation.

3.2.3.2. Obtain a federal depredation permit from the United States Fish and Wildlife Service prior to lethally controlling any federal migratory bird species within the United States and territories. **(T-0)** The application for the depredation permit is a United States Fish and Wildlife Services Form 3-200-13, *Federal Fish and Wildlife Permit Application Form*, in accordance with Title 50 CFR § 21.41. **(T-0)** The United States Department of Agriculture Wildlife Services Form 37 must be included with the depredation permit application. **(T-0)** Identify each Wildlife Dispersal Team organization as sub-permittees on the United States Fish and Wildlife Services issued depredation permit. **(T-1)** Ensure additional host nation restrictions, requirements, and instructions are complied with when assigned to overseas locations.

3.2.3.2.1. The flight safety office/Flight Safety Manager is the OPR for BASH programs and will hold the depredation permit(s) for the sub-permittees which may include the designated BASH Program Manager, USDA Wildlife Services, and Wildlife Dispersal Team, to conduct the depredation activity. **(T-3)**

3.2.3.2.2. Before initiating depredation operations, confer with federal, state, and local wildlife authorities, as applicable and in compliance with requirements in [paragraph 3.2.2.4.1](#) for regulatory compliance. Utilize AFMAN 32-7003 for USAF-specific requirements regarding wildlife control activities.

3.2.3.2.3. Multiple depredation permits may be acquired by an installation for varying functions (flight line safety, entomology, and natural resources). **(T-0)**

3.2.3.2.4. Implementation of depredation permits for migratory birds must include non-lethal control techniques, consistent with 50 CFR 21.41. **(T-0)** Utilize depredation permits to reinforce harassment techniques and uphold “zero tolerance” approaches to managing specific migratory bird hazards (e.g., resident Canada geese).

3.2.3.2.5. Unless otherwise directed, carcasses, nests, and eggs taken under permit authority shall be destroyed by burial or incineration. **(T-0)**

3.2.3.2.6. No federally listed threatened or endangered species, bald or golden eagles, or their nests and/or eggs may be taken. **(T-0)** Lethal control or intentional harassment of federally listed threatened or endangered species is not authorized. **(T-0)** When threatened or endangered species are present, consult with the United States Fish and Wildlife Service to identify mitigation strategies. **(T-0)** Accepted mitigation efforts should not increase conservation on the airfield or increase risk to flight safety.

3.2.3.2.7. European starlings, house sparrows, rock doves/domestic pigeons, Eurasian collared doves, and monk parakeets are not Federally protected in the United States and require no federal depredation permit. Other species may be removed from protection with changes to federal requirements (reference the *Migratory Bird Treaty Act*, as amended (16 U.S.C. §703 et. Seq). Some states may require additional permits for the take of state protected species (e.g., mute swans). While federal agencies are not required obtain state permits, installations may coordinate with the United States Fish and Wildlife Services and appropriate state conservation office to notify them of the need for depredation. **(T-0)** See also Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* and Executive Order 13751, *Safeguarding the Nation from the Impacts of Invasive Species*.

3.2.3.2.8. A permit is not needed to lethally control specific species of blackbirds, crows, and magpies if specific conditions are cited, warranting control (50 CFR § 21.43I(2), *Depredation Order for Blackbirds, Cowbirds, Grackles, Crows, and Magpies*). Exercise caution when identifying birds as other species within the family *Corvidae* protected under the Migratory Bird Treaty Act 16 U.S.C. 703-712 (such as the common raven, jays, and tamaulipas). Control of nests and eggs for species under this order must be completed under a depredation permit, consistent with 50 CFR § 21.41. Provide a count of each species taken in an annual report to the regional migratory bird permit Office. **(T-0)**

3.2.3.3. Use of air rifles and centrally managed/supplied shotguns to remove birds and small mammals has proven successful. The DAF does not classify air rifles as firearms. However, air rifles are controlled items that must be handled in accordance with DAFI 31-101, *Integrated Defense (ID)*. Air rifles have proven effective in controlling roosting populations of pigeons, starlings, and house sparrows within hangars and other infrastructure, as well as rabbits and prairie dog colonies within airfield environments. Shotguns are ideal for removal of airborne species or larger mammals.

3.2.3.3.1. The BASH M870 shotgun can discharge all centrally managed 12-gauge munitions (ammunition and pyrotechnics) as well as all pre-approved 12-gauge commercially available ammunition. Use caution when discharging Bird Bombs Shell Crackers (NSN 1370012041525) in the M870 shotgun. The Bird Bomb Shell Cracker produces excessive fouling in the shotgun barrel after limited use which could result in a barrel obstruction. Ensure the barrel is clear of any obstruction after discharging a Shell Cracker cartridge. Fouling may require more frequent cleaning than normal shotgun ammunition.

3.2.3.3.2. Each installation with a BASH program will procure two shotguns to support their BASH program and maintain internal capabilities. **(T-3)** Installations with additional need may obtain authorization for additional shotguns. Installations outside the continental United States may be prohibited from possessing shotguns, air rifles, and other wildlife control devices due to host nation restrictions.

3.2.3.3.3. Firearms storage facilities must be designated as controlled areas and approved by the installation commander or designee. **(T-2)** DAFI 31-101 addresses categorization and storage requirements of firearms, their major subassemblies, and associated ammunition. Refer to DESR 6055.09_AFMAN 91-201, *Explosives Safety Standards*, for storage site licensing requirements for munitions. Consult with AFSEC/SEFW for additional guidance on authorized weapons and munitions.

3.2.3.4. Train personnel in wildlife dispersal and depredation regardless of the severity of the hazards present. **(T-2)** The BASH Program Manager is the OPR for implementing wildlife dispersal and depredation training, consistent with [paragraph 1.3.10.17](#) Anyone participating in an installation depredation program shall attend and receive certification through the approved Combat Arms shotgun class, as required by AFI 36-2654. **(T-2)** Completion of additional training programs, including National Rifle Association Shotgun Safety, hunter safety, or gun handling safety are recommended as best management practices to enhance the skillset of installation Wildlife Dispersal Team and other BASH control agents. Ensure Wildlife Dispersal Team personnel are trained in additional legal restrictions or requirements (such as lead ammunition prohibition) as applicable.

3.2.3.5. Coordinate with Airfield Management, Air Traffic Control, Command Post, Public Affairs, fire control, Supervisor of Flying (where present) and installation Security Forces before utilizing firearms for BASH/pest management. **(T-3)**

3.2.3.5.1. When appropriate, wear identifying outerwear while conducting BASH operations (for example: blaze orange vest labeled “BASH”, “AIRFIELD MGT”, “Civil Engineering”, etc.).

3.2.4. Other wildlife Management Methods. Other wildlife management techniques are discussed below. This is not an all-inclusive list as wildlife management practices and techniques are constantly evolving.

3.2.4.1. Trapping and Relocation. If harassment techniques and depredation prove ineffective, consider trapping and relocating/depredating problem species providing mutual benefit to wildlife and safe aviation operations. Relocation is not always a biologically sound, effective, or legal. Pathways leading to the spread of wildlife diseases and invasive species have, in part, been due to relocation of wildlife. Personnel shall confer with all appropriate federal, state, and local agencies before trapping and relocating wildlife outside installation boundaries, ensuring compliance with all applicable regulations. **(T-0)**

3.2.4.2. Effigies. Bird effigies (either made of real carcass or synthetic/taxidermy materials) have proven effective in dispersing roosting locations of specific bird species (vultures, crows, or gulls) when applied with harassment and depredation (i.e., integrated pest management). Effigies must be relocated often to remain effective and discourage habituation. Collaborate with Public Affairs to educate the community about effigy use. Consult with federal authorities before considering displaying effigies, as possession of some carcasses may require permit authorization.

3.2.4.3. Birds of Prey/Avian Programs. A bird of prey program (or falconry) is not limited to the use of falcons only; several birds of prey species may be utilized. Birds of prey trained for airfield wildlife dispersal may be effective when used in combination with other hazing techniques. Deploying birds of prey usually disperses birds immediately from the airfield and these birds are likely to remain away from the airfield for longer periods. Birds of prey inherently scare other birds; as a result, there is little habituation to the threat. However, bird of prey programs may be labor intensive and costly. Moreover, the potential for bird strikes exists for working birds of prey themselves. Birds of prey may be flown only during daylight hours and cannot be flown in extreme weather conditions, after feeding, or while molting. Most birds of prey available for use in continental United States are ineffective in dispersing large waterfowl (particularly geese), and other birds of prey from an airfield. Ensure programs that include birds of prey incorporate all legal integrated pest management methods through delineation in the contract performance work statement and in the local BASH plan. **(T-2)**

3.2.4.4. Canine Programs. Use of trained, domestic dogs to disperse geese and other target wildlife hazards is effective under certain circumstances. A dog demands full-time attention making it more advantageous to contract the services of a dog and its handler rather than purchasing a dog. Canine programs may be limited at removing geese from bodies of water, or other avian hazards from the airfield (especially gulls and grassland birds). Ensure programs that include canines incorporate all legal integrated pest management methods through delineation in the contract performance work statement and in the installation BASH plan. **(T-2)**

3.2.4.5. Radio Controlled Vehicles. Use of radio-controlled aircraft, dune buggies, or boats may be effective tools to disperse wildlife have in unique situations. A radio-controlled vehicle may be maneuvered to guide birds away from the airfield. Radio controlled boats may harass birds on large ponds where pyrotechnics cannot reach the birds due to range considerations or human activities (e.g., golf courses). Radio controlled wheeled vehicles may effectively disperse wildlife from grassy areas, particularly office buildings or housing where the use of pyrotechnics or bioacoustics is undesirable. Radio controlled vehicles may require skilled operators and coordination with multiple base agencies prior to use.

3.2.4.6. All-terrain Vehicles (ATVs). Use of all-terrain vehicles has proven useful for accessing remote portions of airfields for control of wildlife hazards. Many airfields have areas that are difficult to navigate, even with 4x4 vehicles. An ATV may follow other birds/wildlife through terrain that one could not otherwise traverse. Use caution when approaching certain wildlife species that could threaten the health and safety of the ATV operator. Operating ATVs in areas saturated with water may cause airfield rutting and future ponding issues.

3.2.4.6.1. Ensure personnel are properly trained in specific local wildlife behavior before attempting to disperse via this method due to dangers associated with operating close to potentially aggressive wildlife and the possibility of moving wildlife into the path of aircraft. **(T-3)**

3.2.4.6.2. Before operating an ATV, ensure personnel complete an approved ATV rider safety course within the guidance of AFI 91-207, *The US Air Force Traffic Safety Program*, which requires ATV training to be conducted by a certified Specialty Vehicle Institute of America (SVIA) individual. **(T-3)**

3.2.5. Ineffective Methods of Wildlife Management. Ineffective methods of wildlife management are discussed below. These deterrents have proven to be ineffective. This list is not all-inclusive. If unsure about the effectiveness of a harassment strategy, contact AFSEC/SEFW for additional information:

3.2.5.1. Decoys. Plastic owls and rubber snakes have been advertised to disperse wildlife. These decoys have proven ineffective in practice. Use of effigies for target species (vultures, crows, or gulls) has proven effective (see [paragraph 3.2.4.1](#)).

3.2.5.2. Rotating Lights. Rotating lights are generally considered ineffective. Birds quickly habituate to these devices.

3.2.5.3. Eyespots on Aircraft and Balloons. Study results suggest the addition of eyespots does not significantly reduce BASH potential.

3.2.5.4. Ultra-sonic Devices. Ultra-sonic devices have proven unsuccessful in deterring wildlife from colliding with aircraft or inhabiting hangars. No birds, and very few wildlife species encountered in the typical airport environment are capable of detecting/hearing ultra-sonic sound.

3.2.5.5. Wild Predators. Wild predators (such as coyotes or resident raptors) are hazards to aviation. Airfields are an artificial environment and cannot support a natural predator-prey management approach to mitigating hazardous wildlife. Consistent with [paragraph 3.1.1](#), maintain a zero tolerance for wildlife on the airfield and Wildlife Exclusion Zone.

Chapter 4

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD AND FLIGHT OPERATIONS

4.1. Flight Operations Overview. When wildlife hazards to safe flight operations are detected in or near the local airfield environment, flight operations leadership must conduct an adequate risk-assessment with respect to operational requirements for implementation of avoidance procedures defined in the local Wildlife Hazard Warning System. **(T-3)** Developing flight restriction procedures and implementing risk management procedures mitigates bird hazards. From 1990 to 2020, all reported wildlife strikes to the FAA Wildlife Strike Database, 82 percent occurred below 1,500 feet above ground level (AGL) while 92 percent occurred at or below 3,500 feet AGL. This occurrence is comparable for reported bird strikes of known altitudes to USAF aircraft and should be considered for developing programmatic/local flight avoidance and risk management procedures.

4.1.1. Wildlife Hazard Warning System. Each DAF BASH program will develop and provide a Wildlife Hazard Warning System to inform aircrews of possible wildlife hazards to safe flight operations. **(T-1)**

4.1.1.1. Bird Watch Condition codes must be used to communicate local wildlife activity along with location, number, and type of wildlife observed. **(T-1)** Bird Watch Condition codes are a valuable proactive safety tool to implement operational changes for avoidance of wildlife hazards. These operational changes are dictated by the severity of the wildlife activity, the performance capability of the aircraft, and training or readiness requirements.

4.1.1.2. Specify aircrew notification procedures for Bird Watch Condition changes in the installation BASH plan. **(T-1)** Use the most expeditious means of communicating the Bird Watch Condition (e.g., Airfield Management, Air Traffic Control, Supervisor of Flying (SOF), Command Post, and Automated Terminal Information System (ATIS)). When communicating Bird Watch Conditions, avoid coded conditions to eliminate any confusion with color codes used during exercise, contingencies, and emergencies.

4.1.1.3. Use the following definitions to delineate Bird Watch Conditions and Phase designations for rapid communications of wildlife activity: **(T-1)**

4.1.1.3.1. Bird Watch Condition 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 (e.g., a vulture in the approach/departure corridor, or a large mammal or reptile on or near the runway).

4.1.1.3.1.1. 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. **(T-3)**

4.1.1.3.1.2. Do not conduct flight operations under Bird Watch Condition SEVERE without OG/CC approval except in an emergency. Organizations without an Operations Group commander (OG/CC) must designate the appropriate authority responsible for risk acceptance under Bird Watch Condition SEVERE. Arriving aircraft will either enter a holding pattern and await a lower Bird Watch Condition or divert. **(T-3)**

4.1.1.3.2. Bird Watch Condition MODERATE. Wildlife activity near the active runway or other specific location representing increased potential for strikes. Bird Watch Condition MODERATE requires increased vigilance by all agencies, supervisors, and aircrews, utilizing appropriate risk assessment methods and tools. Risk assessment is defined locally within each program, to include both real-time and deliberate risk assessment principles defined in AFI 90-802, *Risk Management*.

4.1.1.3.2.1. OG/CCs will consider the following options for reducing bird strike hazards during BWC Moderate: **(T-3)**

4.1.1.3.2.1.1. Restricting formation departures.

4.1.1.3.2.1.2. Prohibiting unrestricted climbs or descents on departure or approach.

4.1.1.3.2.1.3. Restricting pattern operations to straight-in approaches only (increasing the chances of seeing and avoiding birds).

4.1.1.3.2.1.4. Restricting pattern operations to one approach to a full stop.

4.1.1.3.2.1.5. Prohibiting the use of Vision Restriction Devices to allow for all crew members to visually scan for birds.

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

4.1.1.4. Bird Watch Condition codes are based on observations of local airfield wildlife activity and are independent of the Bird Avoidance Model (BAM) or AHAS risk hazard levels and the Bird Detection Radar.

4.1.1.5. Bird Watch Condition SEVERE or MODERATE requires action from the installation Wildlife Dispersal Team to reduce the Bird Watch Condition to LOW as soon as possible. **(T-3)** Consider wildlife concentrations within the Wildlife Exclusion Zone when determining the overall airfield Bird Watch Condition. **(T-3)**

4.1.1.6. Supervisors and aircrews must evaluate mission requirements under Bird Watch Condition MODERATE and SEVERE, utilizing all available risk mitigation methods and tools before conducting flight operations. **(T-3)**

4.1.1.7. Civil or Foreign Fields. For operations at an airfield that does not follow Bird Watch Condition procedures, utilize Bird Watch Condition MODERATE procedures for the owning aircraft's BASH Plan. **(T-3)** In the absence of MAJCOM/FLDCOM, Mission Design Series (MDS)-specific, or installation Bird Watch Condition guidance, refer to AFMAN 11-202 Volume 3 (V3), *Flight Operations*, for further direction. Minimize flight exposure below 2,000 feet AGL, maintaining situational awareness of the local wildlife activity. Civilian Air Traffic Control may provide hazard advisory information either directly to aircrews or through the ATIS broadcast. However, this notification will not convey bird risk or a severity determination to make an effective Bird Watch Condition declaration.

4.1.1.8. North Atlantic Treaty Organization (NATO) countries utilize a numerical system for issuance of Bird Watch Condition called BIRDTAM (NATO Standard AFSP-1.4, *Wildlife Strike Prevention*). Apply intensity conversion for interpreting BIRDTAM numerical values: 0-3 LOW, 4-6 MODERATE, and 7-8 SEVERE. Risk warning updates for NW Europe are available at <https://www.notams.jcs.mil/common/birdtam.html>.

4.1.1.9. During daytime operations, Bird Watch Conditions will be determined by personnel observing actual wildlife activity on and around the airfield. **(T-3)**

4.1.1.10. During night or Instrument Meteorological Conditions (IMC) operations, Bird Watch Conditions may be determined by observations supported by remote sensing technology (e.g., FLIR), Air Traffic Control Radar, or bird detection radar.

4.1.2. Phase I/II designation. Designate Phase I and Phase II periods of bird activity based on historical bird activity, current trend information, strike data, and local conditions. **(T-3)** If local land-use practices, favorable meteorological conditions, or migratory bird patterns warrant, Phase II will remain in effect until the conditions change, and the birds leave (e.g., spring/fall bird migration, crop harvest, or weather changes). For example, installations located in high northern latitudes may remain in Phase II during the summer breeding season and in Phase I during winter when most birds migrate south.

4.1.2.1. BAM data ([paragraph 4.1.3.1](#)) and observations by local natural resources personnel are helpful in determining Phase I/II at continental United States locations.

4.1.2.2. Phase II declarations may warrant increased wildlife dispersal activities, increased frequency of airfield checks, and/or changes to flight operations. The installation BASH plan must identify required changes to BASH responsibilities or flight operations during Phase II. **(T-3)** In Phase II, establish flight and scheduling procedures to minimize risks based on local wildlife hazards.

4.1.2.3. Wing/delta safety offices must ensure Phase I and II designations are made in the appropriate DoD FLIP. **(T-3)** Make critical, immediate updates through a Notice to Air Missions (NOTAM). **(T-3)**

4.1.3. Mission Planning. Consult AFMAN 11-202V3 or AFMAN 11-502 for mission planning requirements. For mission planning in the continental United States and Alaska, aircrews must obtain available bird hazard risk from the AHAS website (<https://usahas.com>) for deliberate risk management. **(T-2)**

4.1.3.1. BAM bird hazard risk predictions. This historically based predictive model uses GIS technology as a tool for analysis and correlation of bird habitat, migration, and breeding characteristics, combined with key environmental and man-made geospatial data. The BAM was primarily designed to provide schedulers and biologists with a long-range avian prediction model. BAM predictions can be accessed at the AHAS website. BAM is extremely useful in depicting favorable avian geographic locations/features and other secondary avian prediction aids (such as Next Generation Weather Radar (NEXRAD) and previous bird strike locations) along a planned flight route for risk assessment.

4.1.3.2. AHAS utilizes the BAM as a foundation supplemented by NEXRAD weather radar to provide a near real-time description of bird activity. AHAS does not make recommendations on restrictions to be imposed for any category of Bird Watch Condition (Low, Moderate, or Severe). These decisions will be made at the local level following a risk assessment, after careful consideration of the mission, design series, and priority. The AHAS website contains a tutorial explaining development, use, and limitations, as well as downloadable training slides.

4.1.3.3. Aircrew briefings on bird strikes and other wildlife hazards will include, as a minimum:

4.1.3.3.1. Bird hazards and attractants along the proposed flight route, to include but not limited to AHAS models, analysis of available wildlife strike data (civil and DAF), and wildlife survey reports. **(T-3)** If AHAS is unavailable, coordinate with the local Safety Office for support. Consult the local BASH Program Manager, evaluating seasonal impacts and the occurrence of wildlife hazards for avoidance guidance.

4.1.3.3.2. Mission abort options/requirements due to a wildlife activity or strike. **(T-3)**

4.1.3.3.3. Considerations for use of double helmet visors or sunglasses during daylight hours, or clear visors at night or during low-level operations to increase detection of birds in-flight.

4.1.4. Operational Modifications. The key to reducing wildlife strikes when modifying flight operations is to avoid known bird attractants, concentrations, or movements of wildlife. The following will help reduce wildlife hazards by modifying operational procedures:

4.1.4.1. Aircraft making formation departures increase the risk of damage from bird strikes when birds are feeding, loafing, or traversing near the runway. Formation and single-ship interval takeoffs often result in birds being scared up by the lead aircraft, causing the wingman to impact the birds. When the lead aircraft scares up large flocks of birds, the wingman will delay departure until the birds are clear of the runway. Pilots of lead aircraft are responsible for alerting wingmen of observed bird hazards during takeoff.

4.1.4.2. Aircrews will immediately report large concentrations of birds or wildlife on or near the airfield, consistent with requirements of AFMAN 11-202V3. **(T-2)** See pilot report (PIREP) procedures in the *Flight Information Handbook* (FIH).

4.1.4.3. When flocks of migratory birds are observed, formation takeoffs and single-ship interval takeoffs with minimum spacing and involving rejoins, increases the risk of serious bird strikes. The increased speed required to rejoin the lead aircraft after takeoff increases the risk of damage from bird strikes.

4.1.4.4. When birds are known to be flying in the area, departures under Visual Meteorological Conditions (VMC) will be modified to reduce risk. **(T-3)** Departures should be made in trail, with the rejoin beginning after the aircraft passes 2,000 to 3,000 feet AGL. **(T-3)** If aircraft are to enter a low-level route immediately or stay at an intermediate altitude for a prolonged period, tactical formation normally provides enough aircraft clearance to allow wingmen to stay clear of birds.

4.1.4.5. Aircrews experiencing enroute bird strikes should abort the mission when practicable. While some engine ingestions or a windscreen strike may be readily apparent from the flight deck, the damage from any engine, fuselage, wing, tail, or radome strikes cannot be adequately assessed inflight. Continuing a mission may cause greater structural or engine damage and lead to a serious emergency.

4.1.4.6. When sighting wildlife, aircrews must notify the controlling Air Traffic Control facility and other aircrews if mission requirements allow. **(T-3)**

4.1.4.7. Aircraft Operations in Low-Altitude Environments. Takeoff, landing, pattern operations, low-level routes, or low-level operations in special use airspace involves greater exposure within bird flight environments. Operations in this flying environment may increase the number of damaging bird strikes. Visually maintain an active scan of the local environment as much as possible during critical operations. **(T-3)**.

4.1.4.7.1. Avoid areas with known raptor (birds of prey) concentrations during summer, between 1000 and 1700 hours due to increased thermals for soaring birds. Generally, a maximum altitude of 3,000-4,000 feet AGL is reached by all raptor species, though soaring can occur at considerably higher altitudes. Areas with ideal terrain for creating thermals during summer months include ridgelines and rolling hills.

4.1.4.7.2. Unless mission essential, avoid flying one hour before and after sunrise/sunset to reduce potential hazards when there is a known increase in wildlife activity. A risk analysis and acceptance must be completed to determine the hazards to operations during these periods. **(T-3)** Missions scheduled within one hour before/after sunrise and sunset must be included in pre-mission risk management and analysis worksheets. **(T-3)**

4.1.4.7.3. Consider avoidance of altitudes with the most favorable wind speed and direction for migrating birds (particularly near shear altitudes) up to 48 hours prior to and 24 hours after frontal passage; especially during October and November. Prevailing weather is a prime stimulus for migratory bird movements.

4.1.4.7.4. Avoid flying near or over wildlife refuges, estuaries, parallel along shorelines, river corridors, landfills, stockyards, food processing plants or other known significant bird attractants below 3,000 feet' AGL.

4.2. Bird Hazard Identification. Bird populations must be monitored by local flight safety on the airfield, installation, and in both local flying and low-level flying areas. In addition to the AHAS, bird concentrations and movement information may be obtained from local universities, state/federal wildlife agencies, and private organizations (e.g., National Audubon Society). Utilize natural resources personnel or local BASH Program Managers to periodically survey low level routes for wildlife attractants, hazards, and populations. Consider coordinating with local units (i.e., rotary wings) to evaluate wildlife hazards during inspections of low-level route obstruction hazards (e.g., towers, overhead power lines).

4.3. Avian radars. Avian detection radars are systems specifically designed to detect hazardous bird activity in the vicinity of an airfield and other airspace critical for flight. Avian radars are approved for use on USAF or USSF airfields and ranges provided they are fielded in accordance with the UFC 3-260-01 and in coordination with the installation Radiation Safety Officer and Airfield Manager.

4.3.1. Applications of the avian radar may include bird movement monitoring, detection of attractive habitats through bird behavior, harassment and depredation, Bird Watch Condition determination (nighttime hours), and flying window alteration. Coordinate system installment and utilization methods for inclusion in the local airfield Operations Instruction and BASH plan.

4.3.2. During low visibility or darkness, avian radars may be used to determine Bird Watch Conditions in accordance with local BASH plan guidance. Observation of hazardous bird activity by airfield personnel must not be replaced by avian radar output. Dependence on avian radar detections alone during daylight or normal visual conditions is an ineffective strategy for airfield monitoring. Document avian radar operational procedures in the unit's BASH plan, Operations Instruction, or local supplement.

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Chief of Safety

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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Prescribed Forms

None

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Abbreviations and Acronyms

AC—Advisory Circular

ACRP—Airport Cooperative Research Program

AETC—Air Education and Training Command

AF/A3—Air Force Deputy Chief of Staff, Operations

AF/A4C—Director of Air Force Civil Engineers

AFI—Air Force Instruction

AFB—Air Force Base

AFCEC—Air Force Civil Engineer Center

AFMAN—Air Force Manual

AFMC—Air Force Material Command

AFPAM—Air Force Pamphlet
AFPD—Air Force Policy Directive
AFR—Air Force Reserve Command
AFSAS—Air Force Safety Automated System
AF/SE—Headquarters, United States Air Force, Chief of Safety
AFSEC—Air Force Safety Center
AGL—Above Ground Level
AHAS—Avian Hazard Advisory System
AICUZ—Air Installation Compatible Use Zone
ANG—Air National Guard
ATIS—Automated Terminal Information System
ATV—All-terrain Vehicles
BAM—Bird Avoidance Model
BASH—Bird/wildlife Aircraft Strike Hazard
CAPA—*Cartouche Anti Peril Aviaire*
CFR—Code of Federal Regulations
COTS—Commercial Off The Shelf
COSP—Pest Management Branch
CZT—Technical Support Division
CZTQ—Environmental Quality Technical Support
DAF—Department of the Air Force
DNA—Deoxyribonucleic Acid
DoD—Department of Defense
DRU—Direct Operating Unit
EO—Executive Order
FAA—Federal Aviation Administration
FIH—Flight Information Handbook
FLDCOM—Field Command
FLIP—Flight Information Publication
FLIR—Forward Looking Infrared
FOA—Field Operating Agency
FOD—Foreign Object Debris

FSNCO—Flight Safety Non-Commissioned Officer
FSO—Flight Safety Officer
GPC—Government Purchase Card
GPS—Global Positioning System
IAW—In accordance with
ILSO—Installation Laser Safety Officer
IMC—Instrument Meteorological Conditions
INRMP—Integrated Natural Resources Management Plan
LATN—Low-Altitude Tactical Navigation
MAJCOM—Major Command
MASO—Munitions Accountable Systems Officer
MDS—Mission Design Series
NATO—North Atlantic Treaty Organization
NGB—National Guard Bureau
NOTAM—Notice to Air Missions
OPR—Office of Primary Responsibility
PIREP—Pilot Report
RegAF—Regular Air Force
RPA—Remote Piloted Aircraft
SE—Safety
SEF—Flight Safety
SEFW—Bird/wildlife Aircraft Strike Hazard Team
SOF—Supervisor of Flying
sUAS—Small Unmanned Aircraft Systems
SVIA—Specialty Vehicle Institute of America
TICMS—Theater Integrated Combat Munitions System
T.O.—Technical Order
UFC—Unified Facilities Criteria
USAF—United States Air Force
USC—United States Code
USDA—United States Department of Agriculture – Wildlife Services
USSF—United States Space Force

VMC—Visual Meteorological Conditions

Office Symbols

AF/A3—Air Force Deputy Chief of Staff, Operations

AF/SE—Air Force Chief of Safety

AF/A30—Air Force Deputy Chief of Staff, Global Mobility and Homeland Operations Division

AF/A4C—Director of Air Force Civil Engineers

AFCEC/CZT—Air Force Civil Engineering Center, Technical Support Division

AFSEC/SEF—Air Force Safety Center Flight Safety Division

AFCEC/COSP—Air Force Civil Engineering Center, Pest Management Branch

AFCEC/CZTQ—Air Force Civil Engineering Center, Environmental Quality Technical Support Branch

AFSEC/SEFW—Air Force Safety Center Bird/wildlife Aircraft Strike Hazard Branch

MAJCOM/FLDCOM/SE—AF Major Command/US Space Force Field Command Safety Office

Terms

Aircraft—Term to include both manned and unmanned aircraft, remotely piloted aircraft, and small unmanned aircraft systems.

Aircraft Design—Engineering improvements that reduce aircraft damage when wildlife strikes occur (for example, improved windscreen design).

Aircraft Movement Area—The Aircraft Movement Area of the airfield encompassed the primary surface and the clear zones, as well as all apron areas and taxiways, regardless of their location, consistent with UFC 3-260-01.

Aircraft Operations—The airborne movement of aircraft in controlled or noncontrolled airport terminal areas and counts at en route fixes or others points where counts can be made, defined as either local or itinerant operations classified with definitions in the Code of Federal Regulations.

Airfield—The area comprised of runways, taxiways, aprons, and other adjacent land areas of an airport which are dedicated to aircraft operations. Military airfields are artificially designed environments, specifically intended for the launch and recovery of aircraft.

Bald and Golden Eagle Protection Act, 16 U.S.C. 668.—The federal statute that makes it a crime to knowingly kill, take or possess bald and golden eagles.

Bird/wildlife Aircraft Strike Hazard (BASH)—Wildlife, habitat, or conservation efforts that pose a risk to flight operations.

Bird/wildlife Aircraft Strike Hazard (BASH) Program Manager—Designated position, staffed to meet qualification in the Wildlife Biology Series (0486) or General Natural Resources and Biological Science Series (0401), under the United States Office of Personnel Management General Schedule Qualification Standards, and must meet the training and experience requirements for a Qualified Airport Wildlife Biologist, consistent with requirements defined in FAA AC 150/5200-36B. The BASH Program Manager reports to the installation Chief of Safety/Director and supports implementation of the host wing/delta or installation safety office BASH program, including mitigation and control of airfield wildlife hazards.

Bird/wildlife Aircraft Strike Hazard (BASH) Plan—A written document that addresses wildlife strike hazards and designates organizations responsible for implementing solutions.

Bird/wildlife Hazard Working Group—A team of organizations involved in airfield wildlife control chaired by the vice wing commander of DAF flight assets or appropriate designee. The Bird Hazard Working Group will evaluate and coordinate all installation improvement projects (such as grounds maintenance, wastewater treatment, and golf courses) for wildlife hazard-related issues. At a minimum, Bird Hazard Working Groups will be comprised of representatives from the following organizations: Safety, Operations (flying squadrons, Air Traffic Control, Airfield Management, and Operations Group Standardizations/Evaluations), Civil Engineering (natural resources, pest management, operations, wildlife biologist (if assigned) and infrastructure), Judge Advocate, Public Affairs, Security Forces, and flying tenant units.

Bird Species—A group of interbreeding birds with common characteristics such as size, shape, voice, and behavior.

BIRDTAM—A numerical value Bird Hazard Warning System implemented as a NATO Standard in European countries, issued as a specialized Notice to Airmen when increased bird risk is detected.

Bird/wildlife Watch Condition (Bird Watch Condition) Codes—Designated codes, used to inform aircrews of possible flight hazards due to bird/wildlife activity on the airfield and in local areas. These codes are used to communicate local bird/wildlife activity along with location, number, and type of wildlife.

Blading—Passive management technique by which a grader effectively removes all vegetative cover from an area for years by exposing the bare soil to environmental forces letting nature harden it over time. This technique is successful in desert environments where monotypic vegetative cover is difficult to grow.

Damaging Wildlife Strike—Any wildlife strike that causes reportable damage as defined in AFI 91-204.

Delta—USSF field organization equivalent to a USAF Wing with a specific mission type and/or combat capability. The term “delta” includes USSF garrisons who have responsibility for the installation safety program.

Depredation—The legal action of taking wildlife via lethal means (such as trapping, shooting, poisoning, and birds of prey).

Edge Effect—Edge effect is created where two habitat types are juxtaposed (such as grass to brush, brush to trees, or brush to water). Edge habitat is especially attractive to many species because the higher vegetation provides cover, food, and nesting locations while low vegetation provides quick access to water, additional food sources, and prey species.

Endangered Species Act, 16 U.S.C. 1531—The federal environmental statute that makes it a felony to "take" an endangered species. As used in the Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect an endangered species. Criminal liability under this Act may be imposed for indirect takings resulting from the destruction of an endangered species habitat.

Exclusionary Wildlife Mitigation—Proactive long-term implementation of management techniques to deny wildlife the ability to move freely in and around the aerodrome ultimately reducing the conditions wildlife find attractive.

Field Command (FLDCOM)—USSF intermediate, operational-level headquarters that is aligned with a specific mission focus. Field Commands provide overarching echelon command to subordinate deltas and squadrons. Three Space Force Field Commands are: Space Operations Command (SpOC), Space Systems Command (SSC), and Space Training and Readiness Command (STARCOM).

Habitat—The total environmental elements of food, water, shelter, nesting sites, and space that must be present for wildlife species to survive.

Migratory Bird Treaty Act, 16 U.S.C. 703—The federal statute that makes it a felony to kill, take or possess migratory birds without a permit.

Non—damaging Bird/wildlife Strike - Any wildlife strike that does not cause reportable damage to the aircraft IAW DAFI 91-204.

Supervisor of Flying—The Supervisor of Flying (SOF) is a group-level position and is the direct representative of the OG/CC. The SOF is the focal point for command and control of flight operations.

Vegetative Cover—Term to include all plant life, including but not limited to trees, shrubs, grass, cacti, moss, flowers, and weeds.

Wildlife Avoidance—Techniques (including radar detection, warning, and use of wildlife data) that reduce potential for wildlife strikes by allowing aircrews to schedule or maneuver to avoid wildlife concentrations.

Wildlife Control—Any biological, chemical, or physical procedure that discourages the presence of wildlife. These procedures include repellents, toxicants, harassment, trapping, shooting, grounds maintenance, and habitat modification.

Wildlife Data—Information about the ecology, anatomy, physiology, behavior, size, movement, and distribution of wildlife that may be helpful in wildlife control, wildlife avoidance, and aircraft design.

Wildlife Exclusion Zone—A locally defined, site-specific area where a zero-tolerance goal for wildlife is maintained. At a minimum, the Wildlife Exclusion Zone will include the airfield (encompassing the Aircraft Movement Area and clear zones) but may also include additional wildlife hazard attractants (such as water treatment facilities, golf courses, landfills, and athletic fields) within five nautical miles of the airfield and low-level flight corridors (such as final approach/departure paths).

Wildlife Hazard—Any wildlife species that presents a potential threat to a safe flying environment.

Wildlife Hazard Warning System—A set of procedures, implemented through adequate risk-assessment by leadership, providing a framework for avoidance of wildlife hazards to safe aviation operations. The Wildlife Hazard Warning System includes Bird Watch Condition, Phase I/II operations, and the AHAS.

Wildlife Mitigation (Passive)—Proactive long-term techniques of managing the aerodrome in ways to eliminate or reduce the conditions wildlife find attractive.

Wildlife Mitigation (Active)—Physical actions to disperse or remove wildlife from an airfield allowing short-term relief from an immediate safety hazard.

Wildlife Strike Event—Any collision between a bird or other species of wildlife and an aircraft.

Wildlife Threat (Seasonal and Diurnal)—Wildlife threats associated with seasonality and time of day changes.

Attachment 2

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) BIRD SURVEY DATA SHEETS

Figure A2.1. Bird Survey Data Sheet.

Page ____ of ____

BIRD SURVEY DATA SHEET

Date: _____ Time: _____ Weather/Temp: _____ Initials: _____
 BWC: _____ Wind speed /Direction: _____

Location _____

Species	Number	Behavior	Comments
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Location _____

Species	Number	Behavior	Comments
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_____	_____	_____	_____
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_____	_____	_____	_____

Location _____

Species	Number	Behavior	Comments
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Location _____

Species	Number	Behavior	Comments
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Behavior Codes:

1- Loafing on ground 2-Loafing on water 3-Perched on vegetation
 4- Perched on manmade structure 5- Feeding 6- Flying over observation area 7-Aerial hunting
 8-On ground in or adjacent to runway 9-Flying over runway

