

**DELAWARE AIR NATIONAL GUARD
NEW CASTLE AIRPORT
NEW CASTLE, DELAWARE**



**166th AIRLIFT WING
BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH)
PLAN 91-212**

August 2018

ACRONYMS AND ABBREVIATIONS

166 AW	166th Airlift Wing
AFB	Air Force Base
AFCESA	Air Force Civil Engineer Support Agency
AFCESA/CESM	AFCESA, Mechanical/Electrical Engineering Division, Pest Management
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFSAS	Air Force Safety Automated System
AFSC/SEFW	Air Force Safety Center, Flight Safety, Wildlife (BASH Team)
AGL	Above Ground Level
AHAS	Avian Hazard Advisory System
ANG	Air National Guard
AOA	Airport Operating Area
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
BAM	Bird Avoidance Model
BASH	Bird/Wildlife Aircraft Strike Hazard
BBS	Breeding Bird Survey
BHWG	Bird Hazard Working Group
BSC	Bird Strike Committee
BWC	Bird Watch Condition
CBC	Christmas Bird Count
DC	Deployment Commander
DE ANG	Delaware Air National Guard
DSN	Defense Switch Network
DZO	Drop Zone Officer
ERS	Environmental Resource Solutions, Inc.
FAA	Federal Aviation Administration
FCIF	Flight Crew Information File
IAW	In Accordance With
ILG	New Castle Airport, New Castle, DE
IPM	Integrated Pest Management
ISB	Interim Safety Board
LATNA	Low Altitude Tactical Navigation Area
MAJCOM	Major Command
MOA	Military Operations Area
NEXRAD	Next-Generation Radar
NGB/SE	National Guard Bureau, Safety
OGV	Standardization and Evaluation
OG/CC	Operations Group Commander
OG/OSF	Operations Group, Operational Support Flight
OPR	Office of Primary Responsibility
SE	Safety
SOF	Supervisor of Flying
TOT	Time on Target
USAF	United States Air Force
USDA/WS	United States Department of Agriculture-Wildlife Services
WHA	Wildlife Hazard Assessment



DELAWARE AIR NATIONAL GUARD

HEADQUARTERS, 166TH AIRLIFT WING
2600 SPRUANCE DRIVE
NEW CASTLE, DE 19720-1615



20 August 2018

MEMORANDUM FOR 166 AW

FROM: 166 AW/CC

SUBJECT: 166th AIRLIFT WING (166 AW) BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN 91-212

1. Attached is a BASH plan providing guidance for Bird/Wildlife Aircraft Strike Hazard reduction in areas where flying operations are conducted.
2. This plan is effective upon receipt.
3. Tasked organizations will develop checklists for implementation procedures and forward them to wing safety for review.
4. Tasked organizations must annually review the plan, update it as needed, and forward comments to wing safety as necessary.
5. The office of primary responsibility (OPR) for coordinating this plan is 166 AW Safety Office.
6. This document is UNCLASSIFIED; handle in accordance with AFI 33-364, *Records Disposition – Procedures and Responsibilities*.
7. See Distribution List (ANNEX F).

//SIGNED//

ROBERT E. CULCASI, Colonel, DE ANG
Commander, 166th Airlift Wing

166 AW BASH Plan 91-212

SECURITY INSTRUCTION/RECORD OF CHANGES/ANNUAL REVIEW

1. The long title of the plan is 166th Airlift Wing Bird/Wildlife Aircraft Strike Hazard (BASH) Plan 91-212. The short title is 166 AW BASH Plan.
2. This document is UNCLASSIFIED. Handle in accordance with Air Force Directives.
3. This document does not contain information affecting the national defense of the United States.

RECORD OF CHANGES

Change Number	Date of Change	Date Entered	Posted By
1	April 2018	August 2018	NGB BASH Team

RECORD OF ANNUAL REVIEW

Reviewed By	Date Reviewed	Remarks

166 AW BASH Plan 91-212

PLAN SUMMARY

1. **Purpose.** To provide an active program to minimize bird and other wildlife strikes to aircraft.
2. **Conditions for Execution.** This plan is based on hazards from both resident and seasonal bird populations as well as for other species of wildlife. Implementation of specific portions of the plan is continuous, while other portions will be implemented as required by bird or other wildlife activity.
3. **Operations to be Conducted:**
 - a. **Specific operations include:**
 - (1) Establishment of a Bird/Wildlife Hazard Working Group (BHWG).
 - (2) Procedures for reporting hazardous bird activity and altering or discontinuing flying operations.
 - (3) Provisions to disseminate information to all assigned and transient aircrews for specific bird hazards and procedures for avoidance.
 - (4) Procedures to eliminate or reduce environmental conditions that attract birds and other wildlife to the airfield.
 - (5) Procedures to disperse birds and other wildlife from the airfield.
 - b. **Tasked organizations:** As listed in ANNEX A.
 - c. **Supporting documents:** Functional areas will develop operational instructions or checklists as required to support this plan.
 - d. **Legal Considerations:** A case-by-case analysis of authority and impact will be conducted prior to engaging in depredation or habitat modification. Depredation is currently only conducted by Airport Authority or its agents. The 166 AW does not currently maintain depredation permits nor perform any depredation, but may be listed as sub-permittees on the Airport's permit and may participate and assist under the direction of the airport authority at their request, as necessary.

166 AW BASH Plan 91-212

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166 AW BASH Plan 91-212

BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN

- 1. References:** AFI 91-202/MAJCOM Supplements
AFI 91-204/MAJCOM Supplements
AFI 91-212
AFI 13-201
AFI 13-213
AFI 32-7064
AFMAN 91-223
FAR Part 139.337
FAA AC 150/5200.33
New Castle County Airport Wildlife Hazard Assessment

- 2. Introduction.** A bird/wildlife aircraft strike hazard exists at the Delaware Air National Guard (DE ANG) installation at New Castle Airport (ILG) and its vicinity, due to resident and migratory bird species and other wildlife. Daily and seasonal bird movements create various hazardous conditions. This plan establishes procedures to minimize the hazard to DE ANG aircraft at the installation and in their operating areas. This plan updates existing documents and is based on historical bird/wildlife strike records from the 166 AW and its operating areas and the March 2018 visit by National Guard Bureau Safety Directorate (NGB/SE). As part of that visit, an updated wildlife hazard assessment (WHA) and recommendations are included in APPENDIX 1. Moderate to high risk wildlife on or near the airport are listed in APPENDIX 2. Additional BASH references are attached as APPENDIX 3. No single solution exists to this BASH problem and a variety of techniques and organizations are required in the control program.

This plan is designed to:

- a.** Establish a Bird/Wildlife Hazard Working Group (BHWG) and designate responsibilities to its members.
- b.** Establish procedures to identify high hazard situations and to aid supervisors and aircrews in altering or discontinuing flying operations when required.
- c.** Establish aircraft and airfield operating procedures to avoid high-hazard situations.
- d.** Provide for disseminating information to all assigned and transient aircrews on bird hazards and procedures for bird avoidance.
- e.** Establish guidelines to decrease airfield attractiveness to birds.
- f.** Provide guidelines for dispersing birds when they are present on the airfield.

- g.** Provide guidelines for avoiding birds in operating areas away from the airfield.
- h.** Identify organizations/OPRs with authority to upgrade, initiate, or downgrade Bird Watch Conditions (BWC).
- i.** Provide guidelines to maintain the working relationship with ILG staff.

3. Summary of Recommendations:

- a.** Continue to conduct BHWG meetings at least twice each year. Encourage continued participation of the ILG staff and representative from ATC. Document meeting minutes and attendees.
- b.** Develop an updated BASH map to identify known wildlife hazards (e.g. landfill, agricultural areas, marsh areas, etc.).
- c.** Continue to motivate assigned ANG staff to engage in the BASH program with an emphasis on SNARGE collection and strike reporting.
- d.** Continue to support ILG staff in maintenance of airfield turf (7-14 inches AF, 6-12 inches FAA).
- e.** Work with ILG to explore options to improve the drainage ditches near the ANG Installation entrance.
- f.** Work with ILG to explore possibility of removing or excluding remaining forested areas within the airfield perimeter.
- g.** Continue coordination and support of ILG Operations staff in conduct of wildlife hazard management on the airport.
- h.** Support all ILG efforts to maintain training, permits, and FAA wildlife standards related to Part 139 certification.
- i.** Support efforts to work with off-airfield properties to reduce wildlife attractiveness (e.g. "Corporate Commons Pond" gridwire exclusion).
- j.** Continue current leasehold turf maintenance.
- k.** Consider trimming or removal of trees near flight line.
- l.** Periodically review and discuss the procedures for establishing BWC at BHWG meetings.

- m. Consider updating Phase II operating window. (This recommendation has been addressed in the June 2018 BASH update – Phase II changed from Oct-Mar to Mar-May and Sept-Nov).
- n. Do not base BWC advisories on information gathered solely by AHAS.
- o. Establish a dedicated computer/monitor for AHAS display in a prominently viewed area to ensure the most current conditions are available and ensure all aircrew check AHAS for activity on planned routes prior to departure.
- p. Continue to report all strikes. Explore innovative ways to encourage reporting and collection of strike remains using briefings, videos, and posters.
- q. Conduct on-site training with unit staff using the Smithsonian/USDA Video titled “Bird Strikes: How to Collect, Ship Remains, and Have Bird Remains Identified” to promote strike reporting (video available on YouTube).
- r. Consider sending at least one unit representative to participate in the military training session during the annual Bird Strike Committee-USA meeting.

4. **BASH Plan Execution:**

a. **Concept of Operations:**

- (1) Phases. Designate Phase I and Phase II periods of bird activity based on historical information. Phase II represents heavy bird activity, normally associated with migratory seasons. Historic records indicate migratory seasons as most likely periods of significantly increased local bird activity with the potential to cause damaging bird/wildlife aircraft strikes. Publish Phase I and II designations in the Flight Information Publication, Base Operations, and Flight Planning Room, as appropriate.

PHASE II: March-May and September-November

- (2) Coordination. Reducing the bird strike hazard at the 166 AW requires a cooperative effort between several DE ANG organizations and ILG. The OPR for coordinating this plan is the 166 AW Safety Office.
- (3) Bird/Wildlife Hazard Working Group (BHWG):
 - (a) Function. Collects, compiles, and reviews data on bird strikes. Identifies and recommends actions to reduce hazards. Recommends changes in operational procedures. Prepares informational programs for aircrews. Assists the installation Commander by acting as a point of contact for off-installation BASH issues.

- (b) Authority. The BHWG submits all recommendations to the installation commander for approval. Implementation is through the normal chain of command.
 - (c) Composition. The chairperson will be the Wing Commander or designee. As a minimum, the group will consist of a representative from flight safety, operations group, aircraft maintenance, civil engineering (pest management, natural resources, grounds maintenance, etc.), airfield management, and the air traffic control (ATC) representative. Other representatives may be added with the concurrence of the chairperson, such as environmental management and representatives from other tasked organizations (ANNEX A). Meeting minutes will be maintained and appropriate distribution made.
 - (d) Meeting Schedule. As requested by the chairman of the BHWG, but not less than semi-annually in accordance with AFI 91-202. The BHWG meeting may be conducted in conjunction with the Air Operations Board meeting which is held quarterly (March, June, September, and December).
 - (e) Airport Participation. Representatives from ILG Operations and an ATC representative should participate in BHWG meetings. Data on civil and military bird strikes and mitigating measures should be exchanged. Coordination of efforts on the airfield and particularly with the air traffic control tower is essential for minimizing bird hazards at the airfield and in the traffic patterns. Other tenant units such as the Army Aviation Support Facility and interested local businesses may also attend and invitation to these agencies is encouraged.
- b. Tasks:** ANNEX B outlines the general and continuing tasks and responsibilities for each organization and gives specific hazard reduction measures for varying bird hazard conditions.

ANNEXES:

- A — Tasked Organizations
- B — Operations
- C — Maps and Charts
- D — Bird Hazard Warning System: Operation Bird Watch
- E — Reports and Forms
- F — Distribution

ANNEX A TO 166 AW BASH Plan 91-212

TASKED/PARTICIPATING ORGANIZATIONS:

DELAWARE AIR NATIONAL GUARD:

166 AW/CC	Commander
166 AW/CV	Vice Commander
166 AW/XP	Wing Plans
166 AW/SE	Wing Safety
166 AW/CP	Command Post
166 AW/PA	Public Affairs
166 MSG/CC	Mission Support Group Commander
166 CES/CC	Civil Engineering Commander
166 CFT/CC	Communications Flight Commander
166 OG/CC	Operations Group Commander
166 OG/OGV	Standardization and Evaluation
166 OSS/CC	Operations Support Flight Commander
166 OSS/OSA	Base Operations
166 OSS/OSK	Tactics
142 AS/CC	Airlift Squadron Commander
142 AS/DO	Operations Officer
142 AS/DOLP	Scheduling
166 MXG/CC	Maintenance Group Commander
166 MXS/CC	Maintenance Squadron Commander
166 AMXS/CC	Aircraft Maintenance Squadron Commander

DELAWARE ARMY NATIONAL GUARD

238 AVN/Commander
238 AVN/Aviation Safety

NEW CASTLE AIRPORT:

Airport Operations Manager

NOTE: This list is representative only; other interested or required agencies may be tasked as needed.

ANNEX B to 166 AW BASH Plan 91-212

OPERATIONS:

1. Wing Commander or Designee (WG/CC):

- a. Chairs BHWG meetings.
- b. Approves recommendations of BHWG.
- c. Reviews the Semi-annual Air Operations Board & BHWG Meeting notes.
- d. Provides recommendations to the ILG Operations Manager.

2. Safety (SE):

- a. Monitors installation compliance with AFI 91-202 and reports all bird strikes and hazards per AFIs 91-204, 91-202 and ANNEX E of this plan.
- b. Reports on BASH and includes BHWG recommendations and actions in the agenda and minutes of the wing's quarterly safety meetings.
- c. Disseminates BASH data to BHWG and the 166th OG.
- d. Provides the BHWG with the current BASH guidance from higher headquarters and supplemental information from the US Fish and Wildlife Service or other agencies.
- e. Provides any additional information on migratory, local, and seasonal bird activities. Maintains liaison with the following agencies to stay abreast of local bird populations, movements, and control techniques:
 - (1) Bombay Hook National Wildlife Refuge (303) 653-9345
 - (2) Delaware Department of Natural Resources and Environmental Control, Fish and Wildlife Division (302) 739-9910
 - (3) USDA, Wildlife Services (410) 349-8055
 - (4) USAF BASH Team DSN 246-5679
- f. Monitors bird activity and strike statistics and advises the chairperson of the working group when a meeting is deemed necessary. Recommends implementation/termination of Phase II of the plan in response to significant changes in local bird populations of bird strike potential. Sources of information include agencies listed in the previous paragraph, radar and visual sightings, Avian Hazard Advisory System (AHAS), and historical data.
- g. Coordinates with aircrews and maintenance personnel in collecting of non-fleshy remains after strikes. Sends any salvaged bird strike remains (snarge, feathers, beaks, and feet only) to the Smithsonian Institution (ANNEX E).
- h. Establishes and maintains a continuity folder with any pertinent BASH data and information to assure continuity of knowledge with personnel turnover.
- i. Establishes a bird hazard awareness program, to educate crews on the bird strike potential, in conjunction with the 166 OG/OGV and squadron flying safety officers, to include films, posters, and information on local bird hazards, low level routes, Dover AFB conditions, and reporting procedures.

3. Operations Group Commander (OG/CC):

- a.** Declares, disseminates, and terminates BWC at the DE ANG installation, training areas, and deployed locations through the SOF (or DC when unit is deployed) (ANNEX D).
- b.** Issues specific guidance for aircrews, SOFs, and DCs on procedures to be followed under BWC (ANNEX D).
- c.** Issues specific guidance to the command post concerning actions required to implement this plan (ANNEX D).
- d.** Makes operational changes to avoid areas and times of known hazardous bird concentrations, mission and operations permitting. Considers the following, during periods of increased bird activity:
 - (1) Coordinate with ATC to raise pattern altitude or change pattern direction, if possible.
 - (2) Avoid takeoffs/landings at dawn/dusk \pm 1 hour.
 - (3) Reschedule local training or transition elsewhere.
 - (4) Raise altitude enroute to training areas.
 - (5) Limit time in low-altitude environments to minimum for training requirements.
 - (6) Select routes or training areas based on bird hazard data from AFSAS or the FAA Wildlife Strike Database, or by using the AHAS for low-level route and range analysis (APPENDIX 1).
 - (7) Restrict or delay takeoffs and direct full stop landings or diverts as required.
- e.** Ensures aircrew completes Form 853 if a bird strike occurs.

4. Supervisor of Flying (SOF):

- a.** Declares BWCs based on:
 - (1) Information relayed by airborne aircraft.
 - (2) Observations made by the air traffic control tower, transient personnel, or personal observation.
 - (3) Notifications from the ILG staff of increased bird activity.
- b.** Advises each aircrew of the bird watch condition. Ensures bird watch condition is posted on the Base Operations status board and informs crews of any changes. Use directives in ANNEX D to control 166 AW missions.
- c.** Monitors all Base Operations aircrew briefings to ensure existing BASH issues are briefed especially during BWC MODERATE and SEVERE.
- d.** Briefs aircrews to report all bird strikes and hazardous conditions promptly.
- e.** Ensures aircrew completes AF Form 853 if a bird strike occurs.
- f.** Will be the overall coordinating agent for delay, diversion, and release of aircraft based on radar, visual sightings, weather parameters, and other known bird data. All military aircraft arriving and departing ILG will be issued bird watch

advisories, and allowed to proceed at their own risk. Unit aircraft will use 166 OG/CC guidance.

5. **Airfield Manager (AM):** Per ANNEX D of this plan, the authority to declare Bird Watch Conditions is vested with the SOF during normal flight operations. During all other periods, the Airfield Manager, or his/her designated representative, is the declaring authority.
 - a. Notifies ILG staff to send a bird dispersal team and assists them as needed. When approved to perform dispersal activities on the airfield, this team will be used when birds create a hazardous condition. 166 AW members will only operate in direct concert and coordination with ILG and ATC staff. The ILG bird dispersal team has access to bioacoustic and pyrotechnic equipment for bird dispersal. 166 AW personnel will not operate pyrotechnic equipment.
 - (1) Bioacoustics. Bioacoustics are recorded distress or alarm call of actual birds. These call are effective for gulls, blackbirds, starlings, cowbirds, grackles, ravens, crows, and some shorebirds. Pyrotechnics should be used in conjunction with bioacoustics to enhance complete dispersal.
 - (2) Pyrotechnics. Pyrotechnics include 15mm or 12-gauge scare cartridges that produce a secondary explosion, or screamers that produce a loud whistle to scare birds from the area. The scare cartridges are launched from either a shotgun or a pyrotechnic pistol. Pyrotechnics are effective for dispersing most bird species and can also be used for coyotes, foxes, and deer.
 - (3) Other Devices. Ingenuity is encouraged in the bird scare program. Other devices may be used. Radio-controlled model aircraft, falconry, or dogs may be considered based on availability and problem bird species. Contact the BASH team at HQ AFSC/SEFW, Kirtland AFB, NM for advice in this area.
 - (4) Ineffective Methods. Ultrasound, rubber snakes, stuffed owls, rotating/flashing lights, loud music, and other such devices have not proven effective and should not be used.
 - b. Notifies security forces and ATC when significant bird scare activities will be necessary on the airfield.
 - c. Conducts daily airfield survey. Dead birds, possibly involved in strikes to ANG aircraft, should be removed and forwarded to wing safety for identification and shared with airport operations. Bird sighting surveys should be filled out and sent to wing safety as appropriate.
 - d. Coordinates with base Civil Engineering on bird control conditions such as grass height, drainage ditch vegetation, draining low areas of standing water, etc. Civil Engineering will meet with the Airport Authority to make recommendations on bird control conditions.
 - e. Tracks BWC and bird harassment actions and reports at all BHWG meetings.
 - f. Issues detailed advisories to all arriving and departing locally assigned and transient military aircraft. Ensure that the directives in ANNEX D of this plan are followed. Transient aircraft will proceed at their own risk.

- g. Brief all transient missions which process through Base Operations on ILG bird avoidance procedures and the current BWC.

6. Standardization and Evaluation (OGV):

- a. Reviews with OG/CC all proposed guidance for aircrew and the SOF on procedures to be followed under BWC.
- b. Reviews with OG/CC potential operational changes to avoid areas and times of known hazardous bird conditions.
- c. Post BASH Plan Phase I and Phase II in the Flight Crew Information File (FCIF) along with other pertinent data relating to BASH and BWC.

7. Operations Support Squadron (OSS):

- a. Schedules mission departures to avoid peak bird activity times to the maximum extent possible without conflicting with mission constraints, such as TOTs, downrange quiet hours, etc.
- b. Schedules local training and airlift mission takeoff/arrivals to avoid peak periods of bird activity to the maximum extent possible. This includes arrival and departures at downrange locations for cross-country missions.
- c. Analyzes low level routes using all available means, such as, AHAS, owning unit, terrain features, and historical data, to identify periods of increased bird hazards. The route will be identified as Phase II during periods of increased BWC. Phases may be applied for several months of the year or only a time of day. All routes will be analyzed by OSS Tactics and the safety office, and approved by the 166 OG/CC.
- e. Phase II Operations. The BHWG has risk assessed our routes using all historical knowledge and data and will use the following procedures for Phase II. Day low level routes will be flown at normal altitudes with increased awareness of bird activity. Night low level routes will be flown at 2,000 feet MSL until the IP. During Phase II, if additional deliberate RM is conducted, an Aircraft Commander can elect to fly night low level routes at MSAs (or NVG altitudes if available). An aircraft commander can also elect to fly certain segments of an NVG low level route at MSAs (or NVG altitudes if available) if additional deliberate RM is conducted. An aircraft commander and his or her crew must weigh if additional benefit from this training outweighs the additional risk. OSS/Tactics should avoid scheduling low level segments and routes with unacceptable bird hazards as defined by the AHAS for unfamiliar routes.

8. OSS Tactics Section:

- a. Reviews with OG/CC and OSS/CC all proposed new routes and training areas or changes to existing routes/areas for BASH potential.
- b. Incorporates AHAS information charts into tactical low level briefings.
- c. Provides Drop Zone Officers (DZO) with training and guidance on how to report bird conditions at local drop zones.

- 9. Base Civil Engineer (CES/CC) in conjunction with OSS/OSA and Environmental Management (EM): (Note that many of the below functions are the responsibility of the airport staff and thus should be coordinated and implemented as such):**
- a. Coordinates with airfield management staff on all civil engineering and habitat management issues as listed.
 - b. Provides representation to the BHWG to monitor and advise group of civil engineering procedures.
 - c. Develops procedures for removal or control of bird attractants on base leasehold property.
 - d. Initiates surveys and writes environmental impact assessments and statements as required.
 - e. Conducts BASH surveys.
 - f. Corrects environmental conditions to decrease BASH potential.
 - g. Uses land management practices that reduce BASH potential.
 - h. Modifies airfield habitat consistent with runway lateral and approach zone management criteria per AFI 32-1026 on base property. Habitat modification to reduce BASH beyond the 1000-foot distance criterion is desired and will further reduce BASH potential.
 - i. Incorporates the following practices into the installation Land Management Plan for base leasehold property IAW AFI 32-7064, if applicable:
 - (1) Managing Grass Height. Maintain a uniform grass height between 7 and 14 inches on the airfield. Determine mowing frequency as needed to maintain height requirements. Coordinate mowing with periods of low flight activity. Cut grass before it goes to seed to discourage seed eating birds from utilizing the airfield. As a rule, do not permit grass to exceed 14 inches, as taller grass will attract some bird species and rodents which, in turn, attract raptors (birds of prey) and mammalian predators. Airfields with a variety of grass species may have a fast-growing strain that reaches 14 inches sooner than the rest of the airfield. Mow when the average grass height reaches 14 inches. Growth inhibitors may be considered to reduce mowing requirements and prevent seed head formation.
 - (2) Controlling Broad-leaved Weeds. Keep broad-leaved weeds to a minimum on the airfield. Apply herbicides as necessary. Broad-leaved weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth.
 - (3) Planting Bare Areas. Note that bare areas are frequently used by birds as feeding and resting sites, or to obtain grit. Eliminate them on the airfield. Plant grass as necessary and appropriate on the airfield and maintain irrigation, if required.
 - (4) Reducing Edge Effect. Edge effect refers to the highly attractive transition zone between two distinct habitat types (e.g., brush to grassland). Maintain the airfield as uniformly as possible to reduce this effect.
 - (5) Removing Dead Birds and Animals. Remove dead birds or other animals from the field to avoid attracting vultures or other birds. Forward non-fleshy remains that may be caused by collision with aircraft to flight safety for identification.

- (6) Controlling Pests. Invertebrates and rodents provide important food sources for birds. Civil engineering pest management section, should periodically survey and reduce these pests when required. Control insects, earthworms, rodents, etc., by using integrated pest management (IPM) techniques under the supervision of the installation pest management office with Environmental Protection Agency-approved methods. Control should begin early in the spring.
- (7) Maintaining Drainage Ditches. Regularly inspect ditches and keep them clear and obstacle free. Maintain ditch sides as steeply as possible—minimum slope ratio of 3:1—to discourage wading birds and emergent vegetation. Remove vegetation as often as necessary to maintain flow and discourage use by birds.
- (8) Eliminating Standing Water. Eliminating standing water immediately is essential to avoid development of wetlands and attracting hazardous species, particularly waterfowl. Ensuring storm water management systems (ditches and ponds) have steep side slopes and remain free of vegetation will allow the airfield/base to drain quickly following a rain event and reduce standing water.
- (9) Fencing. Employ fencing in accordance with Federal Aviation Administration (FAA) and Air Force (AF) guidelines to deter large mammals and other wildlife from entering the airfield environment.
- (10) Eliminating Roosting Sites. Periodically monitor all hangars, structures, landscaping, and buildings for nesting/roosting activities. Nests and birds should be removed if their populations increase and/or if they persist in the hangars. Often, keeping hangar doors closed is the easiest way to prevent wildlife from using these spaces. United States Department of Agriculture-Wildlife Services (USDA/WS) can conduct or assist in roost dispersal operations.
- (11) Bird-proofing Buildings and Hangars. Pigeons, sparrows, and starlings frequently occur in buildings and hangars and should be excluded. Denying access by screening windows, closing doors, and blocking entry holes is most effective. When necessary, consider:
 - (a) Close Doors: The single most effective means of preventing birds from entering buildings is to ensure doors and any other openings are closed or sealed to deny access. This is particularly effective if doors are closed approximately one hour prior to sunset when roosting or nesting birds are seeking nighttime shelter. Doors can be re-opened one hour after sunset without attracting roosting birds.
 - (b) Pellet Guns. Shoot birds for a short-term solution. Permits from the US Fish and Wildlife Service and state wildlife agency are required to kill most birds. (Permits are not required for Rock Pigeons, European Starlings, or House Sparrows). Experience has shown that all birds cannot be removed using this technique. Proper safety equipment and skilled personnel are necessary..
 - (c) Netting. Install netting under building superstructure to exclude pest birds from roosting areas. Ensure no gaps or holes are present for birds to get through.

- (d) Trapping/Removal. Use large cages with food, water, and other birds to trap pest birds. Birds can either be released away from the hangar or killed.
 - (e) Design Features. Consider structures with the support features located on the outside of the building to greatly reduce bird numbers. Consider this design when planning new hangars or other structures.
 - (f) Door Coverings. Use netting or plastic strips suspended over the doors to exclude birds. Ensure no tears or holes are present that allow birds access to the hangar.
 - (g) Sharp Projections. Use in limited areas such as ledges, overhangs, or small places where birds cannot be allowed. Expense prohibits their use over the entire structure.
 - (h) Night Harassment. Use red or green lasers to make hangars an undesirable roosting site. The best approach is to harass roosting birds with the lasers approximately 10 minutes before dusk (twilight). Persistence is the key. Harassment is recommended every night for two weeks (or until birds no longer return to roost).
- (12) Preventing Other Animal Hazards to Aircraft. Use appropriate trapping methods for animals such as predators. Some species or individual animals, such as deer, foxes, or coyotes, may be removed by shooting.

10. Maintenance Group Commander (MXG/CC):

- a. Issues specific guidance to personnel for the reporting of all discovered bird strikes on aircraft to Quality Assurance and Wing Safety (ANNEX E).
- b. Issues procedures for the preservation of non-fleshy bird remains if discovered on aircraft. Even the smallest fragment of feather (down) should be forwarded to Wing Safety for identification (ANNEX E).
- c. Ensures all aircraft cavities and openings are inspected after even short periods on the ramp or after undergoing maintenance in hangars for birds or nesting materials before returning to operation.

11. Air Traffic Control (ATC): (Note that many of the below functions are the responsibility of the FAA staff and thus should be coordinated and implemented as such):

- a. When observed, reports bird or other wildlife activity on or near the airfield that could pose a wildlife hazard strike risk to the aircrew and, if possible, the SOF or Airfield Management.
- b. Issues bird activity advisories to aircrews as required by FAA Air Traffic Organization Policy, Order JO 7110.65W (2015). Uses very specific language to communicate locations, times, and behaviors of birds identified as possible hazards to aircraft (JO 7110.65W, paragraph 2-1-22).

- c. Issues traffic advisories such that pilots can make operational changes such as missed approaches or delayed takeoffs when possible bird hazards appear on ATC radar.
 - d. Updates bird hazard advisories on Automatic Terminal Information Service (ATIS) as required and if available.
 - e. Communicates with wildlife hazard management personnel when active dispersal is required or on-going within the airport operating area.
 - f. Attends the ANG BHWG meetings.
- 12. Public Affairs (PA):** 166 AW public affairs will participate as required and upon request will provide a public information program designed to inform base personnel, dependents, and the general public on the hazards and costs of uncontrolled bird activity and the measures being taken to minimize them.
- a. Provides photographic services to document bird strikes and related activities as required.
 - b. Provides graphic support to publicize bird hazards and actions taken to minimize them as required.
- 13. Training Areas/Ranges:** Use the Bird Hazard Warning System (ANNEX D) to report significant bird activity noted away from the base. Report sightings to the SOF or Safety Office and advise aircrews on hazardous conditions. Consult AHAS and together with Pilot Reports or visual observations, provide current BWC to aircrews entering range or low-level airspace. BWC SEVERE or MODERATE must be relayed to all aircrews; BWC LOW may be relayed at the discretion of the SOF or at the request of the aircrew.

ANNEX C to 166 AW BASH Plan 91-212

MAPS and CHARTS:

- 1. General.** This annex outlines the use and requirements of the maps and charts required to implement the BASH program. Wing Safety should maintain and update maps and charts as necessary.
- 2. DE ANG Installation at New Castle Airport and Surrounding Area Map:**
 - a.** Periodic habitat surveys should be conducted to identify major habitat types available to birds. Update maps based on these surveys as local land uses and habitat conditions change.
 - b.** When a specific hazard is identified and the location of the activity isolated, use the habitat map to determine if a specific attractant exists that can be altered within the scope of this Plan.
 - c.** Use the habitat map as a guide for the long range civil engineering program to reduce actual and potential hazardous environmental factors at and near ILG.
 - d.** The local flying unit should procure maps and navigational charts of the surrounding area to designate features for BASH potential and attach them as part of this annex.
 - e.** A sample aerial photo is included as Figure 1.
- 3. Training Areas/Transition Areas:**
 - a.** AHAS provides graphic output (maps and charts) that indicate bird strike risk on low-level routes, ranges, military operations areas (MOAs), low altitude tactical navigation areas (LATNAs), and other special use airspace. This is a web-based system (www.usahas.com) that primarily uses processed data from the nationwide system of weather radars (WSR 88-D or “NEXRAD”) located throughout the lower 48 states. AHAS also predicts bird strike risk in many areas based upon weather forecast data. Lastly, AHAS includes a low-resolution distribution map of potentially hazardous bird species known as the Bird Avoidance Model (BAM). BAM is an interpolated risk surface derived from over three decades of Christmas Bird Counts (CBC) and Breeding Bird Surveys (BBS), along with other data sets from various state and federal agencies. BAM is the default risk layer for queries that are not from the current time interval or within a 24-hour window. BAM can be used to Plan missions in the future; however, the data are in two-week intervals and often show very little change for several months. AHAS should be queried as late as possible prior to take-off and may be viewed through wireless systems with an internet browser (e.g. smart phones and tablets). It may be possible to contact command post or other en route sources for near real-time updates on bird activity in the training area.
 - b.** The 166 AW has an established Unit Page in AHAS that lists airfields and airspace currently used by the unit. Updates to this information can be completed by contacting the USAF BASH Team or their contract support office, DeTect Inc.,

1902 Wilson Ave, Panama City, FL 32444. See Figure 2 for a sample output of the AHAS display for 166 AW Unit Page.

- c. AHAS output can be printed or displayed in real time on a computer display screen in the flight Planning room or base operations. Figure 3 provides a sample Google Map output for 166 AW Unit Page.
- d. Analyze and disseminate these data to the flying unit according to procedures outlined in ANNEX D.

FIGURE 1. New Castle Airport Local Area Map/Aerial Photo.

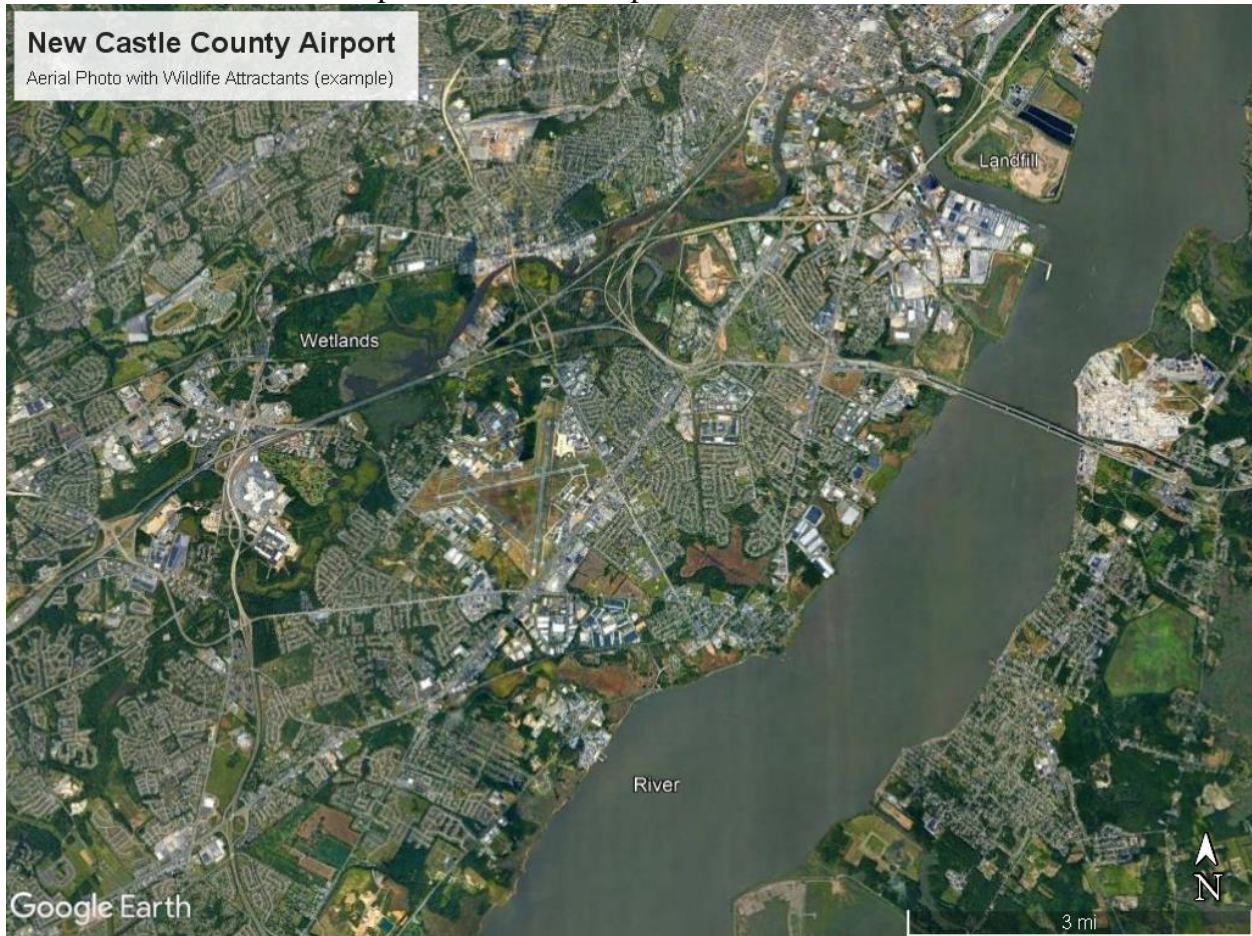



FIGURE 2. AHAS Unit Page – 166 AW.


AVIAN HAZARD ADVISORY SYSTEM

HOME AHAS ABOUT INSTRUCTIONS GALLERY CONTACT



SELECT AREA TYPE BELOW

- Visual Routes
- Instrument Routes
- Slow Routes
- Airfields
- ICAO
- MOAs
- Ranges
- Alert Areas
- Air Force Units
- Other Units



SELECT AREA AND DATE FORMAT

Select a Flying Area:

Select Month: Select Day: Select Z Hour:

SELECT CONTENT DISPLAY

Show Chart

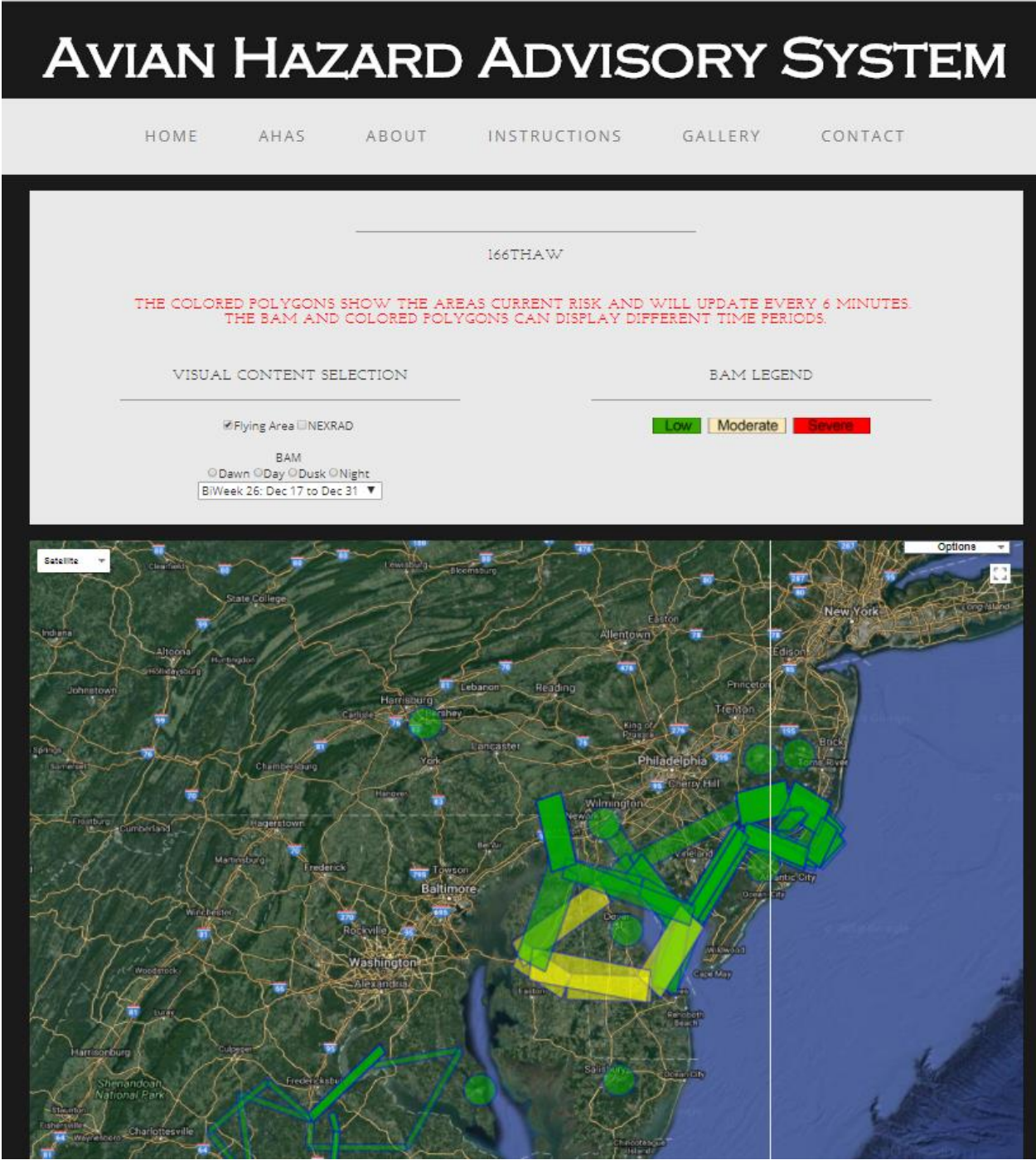
AHAS users online = 144

[Printer Friendly](#)

AHAS RISK FOR 166thAW
 AHAS SHALL NOT BE USED TO DETERMINE BWC ON THE AIRFIELD
 USE THE AHAS RISK FIELD TO DETERMINE RISK

166thAW						
SEGMENT	DateTime	NEXRAD	SOAR	BASED ON	HEIGHT (Ft AGL)	AHAS RISK
NEW CASTLE	2018/04/23 19Z	NO DATA	LOW	BAM	NA	moderate
DOVER AFB	2018/04/23 19Z	NO DATA	LOW	BAM	NA	moderate
PATUXENT RIVER NAS	2018/04/23 19Z	NO DATA	LOW	BAM	NA	moderate
MC GUIRE AFB	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
SALISBURY OCEAN CITY WICOMICO RGNL	2018/04/23 19Z	NO DATA	LOW	BAM	NA	moderate
ATLANTIC CITY INTL	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
HARRISBURG INTL	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
LAKEHURST NAES	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
R5002A	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
R5002B	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
R5002C	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
R5002D	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
R5002E	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
R5002F	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
SR800A-B	2018/04/23 19Z	NO DATA	LOW	BAM	NA	moderate
SR800B-C	2018/04/23 19Z	NO DATA	LOW	BAM	NA	moderate
SR800C-D	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW
SR800D-E	2018/04/23 19:00:0Z	LOW	LOW	NEXRAD	NA	LOW

FIGURE 3. AHAS Google Map – 166 AW.



ANNEX D to 166 AW BASH Plan 91-212

BIRD HAZARD WARNING SYSTEM:

OPERATION BIRD WATCH

1. **General.** This operation establishes procedures for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds that could pose a hazard to flight safety. If the 166 AW aircraft are flying a gained MAJCOM mission, they will adhere to that MAJCOM guidance if it differs from 166 AW policy. 166 AW aircraft supporting contingencies will operate according to procedures in that theater when different from 166 AW of ANG BASH policy. The restrictions to aircraft operations during BWC MODERATE and SEVERE listed below apply to local and off-station operations.
2. **Bird Watch Conditions.** Use the following terminology for rapid communications to disseminate bird activity information and implement unit operational procedures. Give bird locations with the condition code.
 - a. **BWC SEVERE.** Bird Activity on or immediately above the active runway or other specific location representing high potential for strikes. Aircrews must thoroughly evaluate mission need before operating in areas under condition SEVERE.
 - (1) Traffic Pattern. All 166 AW takeoffs or landings will be restricted to mission essential as determined by the 166 AW OG/CC. The SOF may consider changing runways, delaying takeoffs and landings, diverting aircraft, changing pattern altitude, etc.
 - (2) Training Areas. Identify specific areas and altitudes. Those areas will be avoided by all flights when possible.
 - (3) Low-level Routes. Low level missions are prohibited.
 - b. **BWC MODERATE.** Bird activity near the active runway or other specific location representing increased potential for strikes. This condition requires increased vigilance by all agencies and extreme caution by aircrews.
 - (1) Traffic Pattern. Approaches will be limited to the minimum number required for training. Formation takeoffs or landings are prohibited and low approaches are restricted to 500' AGL.
 - (2) Training Areas. Flight leads will make appropriate changes in mission profile to minimize bird strike risk. Such changes include avoidance of known/observed concentrations, raising flight altitudes, and reducing airspeed.
 - (3) Low-level Routes. Amendments to flight altitude will be made to minimize bird strike risk. Limit formation flying to a minimum for mission/training requirements. Minimum altitude is 1000' AGL.

- c. **BWC LOW.** Bird activity on and around the airfield representing low potential for strikes. No restrictions. Normal operations.
3. **Authority.** The SOF is the authority to declare a BWC during normal flight operations. The Airfield Manager, or his/her designated representative, is the declaring authority during all other periods. This person can declare conditions based on ground observations, pilot reports, radar observations, etc.
4. **Communications.** Disseminate BWC by the following means:
- a. During periods of flight operations, include BWC other than LOW at the 166 AW, low-level routes/training areas, etc. in the hourly ATIS information, if available, as specified in FAA Handbook 7110.65 and SW 5200.4B. Ensure common language is used to direct specific attention to bird concentrations that may be hazardous to flight operations. ANG personnel may need to translate these advisories into BWC terminology as described. When the SOF declares bird watch condition MODERATE or SEVERE, notify aircrew in flight via UHF 343.0, the tower, Command Post, Wing Safety, Base Operations, and the flying squadron. Base Operations personnel will post the BWC, change the airfield status display in Base Operations and notify the OG/CC.
 - b. During periods of non-flying operations, the Airfield Manager or his/her designee will declare the BWC. Upon declaration of a BWC other than LOW, Base Operations personnel will notify the tower, Command Post, and Wing Safety, and ensure bird watch information is posted in Base Operations.
 - c. Note that the primary means of transmitting BWC will be via Base Operations and the airfield status monitor. Under BWC SEVERE, the SOF will ensure that the pilot understands the condition and is provided the option to delay, divert, or continue the proposed operation into the hazardous area.
5. **Aircrew Responsibilities and Procedures:** If an aircrew observes or encounters any bird activity while in flight that could constitute a hazard, the aircrew should contact the SOF, ATC, command post, or range operator and request that the observed bird activity be passed on to the SOF and Wing Safety. The following information is necessary:
- (1) Call sign.
 - (2) Location.
 - (3) Altitude.
 - (4) Time of sighting.
 - (5) Type of bird (if known).
 - (6) Approximate number of birds.
 - (7) Behavior of birds (soaring, flying to or from a location, etc.).

ANNEX E to 166 AW BASH Plan 91-212

REPORTS AND FORMS:

1. **General.** This annex outlines the procedures and forms required to report bird strikes per AFI 91-204 to enhance the BASH program at the 166 AW.
2. **Reporting Bird/Wildlife Strikes (AFI 91-204 and AFMAN 91-223):**
 - a. All damaging and non-damaging bird/wildlife strikes shall be reported to the BASH Team through the Air Force Safety Automated System (AFSAS). Additional information may be obtained on the Air Force Safety Center web page (<http://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH/>). When bird/wildlife strikes occur to captive or live munitions (explosive/missiles), these are reported as if the bird/wildlife hit the aircraft. Reporting all bird/wildlife strikes is a necessary part of an effective BASH plan. An in-depth knowledge of the circumstances leading to a bird/wildlife strike is vital before realistic recommendations can be made.
 - b. Flight safety offices of the organization credited with the aircraft's flying hours will report all bird/wildlife strikes.
 - c. Report bird/wildlife strikes using AFSAS in accordance with AFMAN 91-223. AFSAS requires a user profile (username and password). MAJCOM safety offices have designated AFSAS administrators to create BASH AFSAS accounts for each unit. Aircrews and maintenance personnel documenting the necessary data for reporting wildlife strikes through AFSAS can use AF Form 853.
 - d. For every bird strike, send remains (if available) to the Smithsonian National Museum of Natural History for identification. Remains may include feet, beak, and/or feathers. If no remains are apparent, wipe blood smear with alcohol wipe or spray blood smear with alcohol and wipe with a towel. Allow to dry and then fold wipe or towel and place into labeled Ziploc bag. Send a copy of the corresponding AFSAS report with the strike evidence to the following appropriate address listed below:

U.S. Postal Service (routine / non-damaging cases)	Overnight Shipping (priority / damaging cases)
~~~	~~~
Feather Identification Lab Smithsonian Institution E600, MRC 116 P.O. Box 37012 Washington, DC 20013-7012	Feather Identification Lab Smithsonian Institution E600, MRC 116 10 th & Constitution Ave., NW Washington, DC 20560-0116

If you collect a whole bird carcass, pluck (do not cut) several types of feathers and send these materials to the Smithsonian. Remains found on the runway as the result of a suspected aircraft strike should also be recorded into AFSAS and sent to the Smithsonian for identification. Once the Smithsonian has entered the identification into the AFSAS report, AFSAS will automatically notify the reporting unit of the species identification through email. Bird remains recovered from a mishap site should be collected IAW instructions outlined in the paragraph above. The interim safety board (ISB) should not delay recovering and shipping remains to the Smithsonian Institution, as the sample could be compromised. If there are any questions, contact HQ AFSC/SEFW (DSN) 246-5679. The USAF Safety Center BASH website provides additional information regarding avian influenza guidelines (<http://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH>)

- e. For wildlife strikes other than birds, send samples of skin, fur, teeth or other non-fleshy remains, if possible, or a photograph of the remains along with the corresponding BASH AFSAS report to the Smithsonian for identification. Similarly, you can also wipe blood smear with alcohol and place in plastic bag as instructed for bird strikes above.
- 3. Technical Assistance (AFI 91-202):** *The U.S. Air Force Mishap Prevention Program*, outlines responsibilities for reducing bird/wildlife strike hazards. Obtain additional information on BASH management from AFI 91-212, *Bird/Wildlife Strike Hazard (BASH) Management Techniques*. Technical assistance is available through the USAF BASH Team, HQ AFSC/SEFW, 9700 AVE G SE, Building 24499, Kirtland AFB, NM 87117-5671. See the USAF Safety Center website for current contact information: <http://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH>
- 4. Bird Sighting Report:**
- a. The Safety Office will develop a bird sighting report for making quick observations of bird activity as it occurs.
  - b. Bird data collected in a sighting report may be kept in the Daily Events log for reference.
  - c. The sighting report will be distributed for use by flying squadrons, CE, base operations, or other applicable offices and can be used to target areas of concern.

**ANNEX F to 166 AW BASH Plan 91-212**

**DISTRIBUTION:**

**AIR FORCE SAFETY CENTER BASH TEAM**

HQ AFSC/SEFW                      BASH Team, Kirtland AFB NM 87117

**AIR NATIONAL GUARD:**

NGB/SE                              Air National Guard Safety

**HEAD QUARTERS AIR MOBILITY COMMAND:**

AMC/XPX                            AMC Plans  
AMC/IG                              AMC Inspector General  
AMC/SE                              AMC Safety

**DELAWARE AIR NATIONAL GUARD:**

166 AW/CC	Commander
166 AW/CV	Vice Commander
166 AW/XP	Wing Plans
166 AW/SE	Wing Safety
166 AW/CP	Command Post
166 AW/PA	Public Affairs
166 MSG/CC	Mission Support Group Commander
166 CES/CC	Civil Engineering Commander
166 CFT/CC	Communications Flight Commander
166 OG/CC	Operations Group Commander
166 OG/OGV	Standardization and Evaluation
166 OSS/CC	Operations Support Flight Commander
166 OSS/OSA	Base Operations
166 OSS/OSK	Tactics
142 AS/CC	Airlift Squadron Commander
142 AS/DO	Operations Officer
142 AS/DOLP	Scheduling
166 MXG/CC	Maintenance Group Commander
166 MXS/CC	Maintenance Squadron Commander
166 AMXS/CC	Aircraft Maintenance Squadron Commander

**NEW CASTLE AIRPORT:**

Airport Operations Manager  
FAA/ATC Tower Chief

**ARMY NATIONAL GUARD:**

DENG-AVS-DC                      Army Aviation Support Facility Commander

## APPENDIX 1. BIRD/WILDLIFE HAZARD ASSESSMENT AND RECOMMENDATIONS

### 1. Introduction

The Air National Guard Bureau (NGB) Directorate of Flight Safety's contract Bird Aircraft Strike Hazard (BASH) consulting team visited the 166th Airlift Wing (166 AW) New Castle, Delaware from 28-29 March 2018. The purpose of the Site Visit was to review the unit's BASH plan, conduct on-site evaluations of airport habitat, provide staff training, and develop recommendations to decrease potential wildlife strike risks to aircraft through coordinated management strategies with the host airport, New Castle Airport (ILG). During the visit, the Environmental Resource Solutions, Inc. (ERS) BASH Team met with 166 AW support staff, the commercial airport staff, and the ATC supervisor. The 166 AW is a tenant unit at ILG and has full access and authority to conduct wildlife hazard management (habitat management, harassment, removal, etc.) within the base leasehold boundaries, outside of the base leasehold, the commercial airport staff implement most of the wildlife control program for both the ANG and ILG. Prior to departing, the ERS BASH Team reviewed the draft recommendations that are provided in this Appendix with the 166 AW Safety Office. Previous NGB contractors conducted a BASH Site Visit in 2002 and 2008. Following each visit a comprehensive BASH Plan was provided. Efforts were made to coordinate and integrate the elements of the unit BASH Plan with the commercial airport Wildlife Hazard Management Plan (WHMP) and to facilitate information exchange between the two entities.

### 2. Regional Setting and Local Bird/Wildlife Hazards

Location and Regional Setting. New Castle is in the northernmost county of Delaware, approximately six miles south of Wilmington, DE and situated on the western shore of the Delaware River (Figure A1-1). The Delaware River, at this point, is an estuary with twice-daily high and low tides, providing sea-level access for ocean going ships. The climate of the area is temperate, characterized by hot and humid summers, cool to cold winters, and even precipitation throughout the year. The hottest month is July and summer thunderstorms are common. The coldest month is January and snowfall is variable, with some winters having little and others harboring several major snowstorms.

The DE ANG Installation and ILG are located within the main corridor of the Atlantic Flyway (Figure A1-2). As a result, migratory waterfowl will be present in the area at a minimum on a semi-annual basis, during spring and fall migration. The nearby Bombay Hook National Wildlife Refuge, located approximately 25 miles to the south, ensures that waterfowl are present throughout the winter.



**Figure A1-1. Location of New Castle, DE**



**Figure A1-2. North and Central American Migratory Flyways**

**Airport Setting.** The airfield covers 1,250 acres and has three paved runways, Runway 1/19 is 7,012 ft by 150 ft, Runway 9/27 is 7,275 ft by 150 ft, and Runway 14/32 is 4,602 ft by 150 ft. The airport has 180 aircraft based on the field and averages 114 operations each day with 50% transient general aviation, 25% local general aviation, 15% military, 10% air taxi, and <1% commercial ([www.airnav.com/airport/KILG](http://www.airnav.com/airport/KILG)). The airport is Part 139 compliant and is categorized as a non-hub primary commercial service facility in the National Plan of Integrated Airport Systems.

**Airfield.** The airfield turf is a mixture of grasses, composed primarily of fescue. Grass maintenance across the airfield varied, within the runway safety areas

grass height was appropriately maintained at a moderate height (Figure A1-3), the area around the newly installed stormwater detention basins appears to have been recently seeded, and around parked aircraft housed by an airfield tenant the grass was allowed to grow beyond recommended heights and produce seed. Turf was observed growing immediately adjacent to operating surfaces, as recommended, and airfield signs were surrounded by a concrete footer to reduce the need for cutting grass short.



**Figure A1-3. Airfield turf, well maintained.**

**Fencing.** Airfield fencing has been improved since the last NGB site visit and is adequate. White-tailed deer were observed in a forested area immediately outside the airport fence (Figure A1-4), but there were no reports of these deer entering the airfield. During the aerial tour of the airfield, a red fox was observed on the airfield near a forested area and the ARFF training simulation area. The fox quickly found refuge in an available ground-hog burrow.



**Figure A1-4. White-tailed deer in forested area outside security fence.**

Airfield Drainage. Airfield drainage appeared adequate. As a whole, the airfield was dry, no unintended standing water was observed, and newly constructed detention basins were designed to meet FAA standards for a 48 hour drawdown time (Figure A1-5). The new detention basins replaced an area of wetland vegetation identified in the previous NGB site visit, which may have been attractive to wildlife. Two drainage ditches near the DE ANG Installation entrance held a small amount of water, one within the airfield security fence and one immediately outside of the security fence (Figures A1-6). These may be attractive to waterfowl such as Canada geese and were identified as areas of concern by ANG personnel.



**Figure A1-5. Newly constructed stormwater detention basin.**



**Figure A1-6. Drainage ditch near ANG Installation entrance.**

Base Leasehold. The base leasehold is primarily developed with ANG buildings, parking lots, ramp area, and hangars. The facility has a relatively small footprint, and the extent of manageable habitat is even smaller. ANG staff should monitor the leasehold area for any wildlife concerns and work with CE, ILG, or contractors to mitigate any observed hazards. At the time of the site visit, no immediate issues were observed and the leasehold appeared to be well maintained to minimize wildlife attractiveness.

Wetlands and Ponds. Three ponds with permanent water exist on the airfield, two of which have linings with steep sloped sides, the third has a natural vegetation and rip-rap edge. None of these ponds were identified as an attractant by ANG or airfield staff.

Perching Sites. There were very few perching sites observed during the site visits as most unnecessary structures have been removed from the airfield. On the base leasehold, landscaping trees and hangars may provide perching sites and should be monitored. Woodland sites within and near the AOA may provide perching sites, these sites should be monitored and immediate action to should occur to discourage any observed perching. Blackbirds were observed perched on parked aircraft housed by one of the airfield tenants. The aircraft in combination with the previously mentioned tall grass provide cover and food for these birds (Figure A1-7).



**Figure A1-7. Parked aircraft as perching site with tall grass.**

Off-site Attractants. “Corporate Commons Pond” which was called out in the 2008 NGB site visit report as an attractant to Canada geese, with “over 250 [Canada geese] observed each afternoon,” still exists, but the airport has worked to have the pond fitted with a gridwire system to exclude waterfowl, specifically Canada geese. The gridwire appears to be effective in reducing the attractiveness to waterfowl, but may need to be evaluated for maintenance needs as several lines were down (Figure A1-8).



**Figure A1-8. “Corporate Commons Pond” with gridwire exclusion system.**

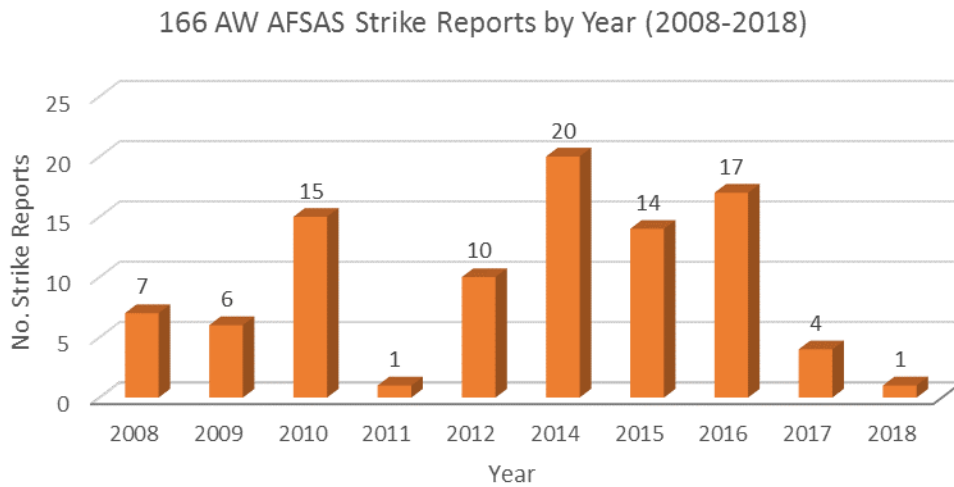
A landfill and a shipping port exist to the north of ILG. During the site visit gulls were called out as a common hazard during inclement weather, and during the aerial tour gulls were observed foraging at the landfill and loafing at the shipping port (Figure A1-9). Gulls are one of the most hazardous species to aviation due to their moderate size and tendency to flock.

Wildlife Strike Summary. Wildlife strike data can be a valuable source of information to determine species struck, type of damage, time of day, seasonal occurrence, and location (altitude, phase of flight, miles from the airport, etc.). The ERS BASH Team reviewed the 166 AW AFSAS wildlife strike records for a 10 year period (2008-2018). In total, there were 95 strike records in AFSAS for the 166 AW (Figure A1-10). No strikes with damages were reported during this time.



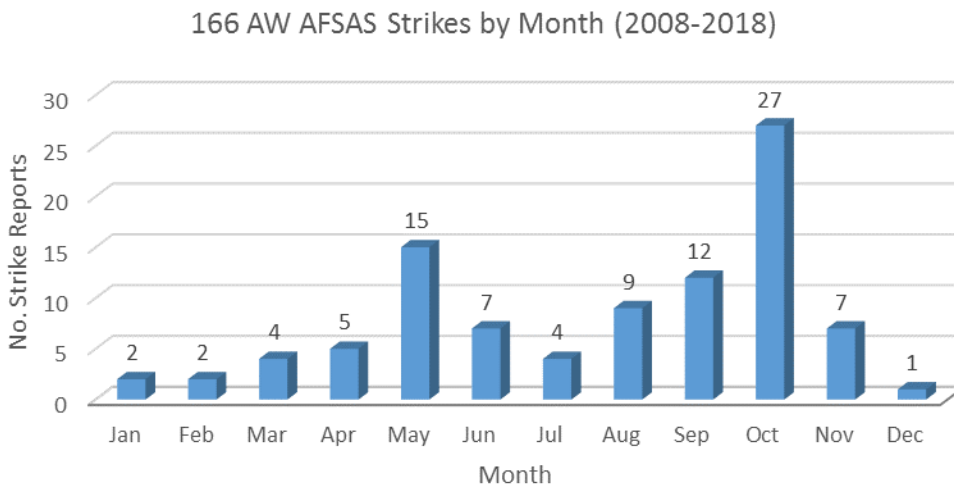
**Figure A1-9. Landfill with foraging gulls.**





**Figure A1-10. Strikes by year reported by 166 AW**

Sorting the strike records by month for the same 10 year period showed an increase in strikes in spring and fall (Figure A1-11). This increase is likely associated with spring and fall migrations and an increase in the number of birds in the air. October had the highest number of reported strikes (27 reports).



**Figure A1-11. Strikes by month reported by 166 AW**

From 2008-2018, American robins were the most frequently reported known species struck (4 reports). Numerous bat strikes were also reported (7 total) including the following species: red bat, big brown bat, and silver-haired bat. Higher risk species were struck by ANG aircraft, but did not result in damage and were not commonly struck. These higher risk species include: snow goose, Canada goose, bald eagle, red-tailed hawk, turkey vulture, and several gull species. Civilian aircraft at ILG have reported damaging strikes with geese and gulls during the same 10 year period.

### 3. Recommendations

The unit BASH Plan is properly implemented with support and coordination with civilian airport staff. The recommendations below are provided to encourage continued coordination among the entities and to support continued management and control efforts.

**a. Bird Hazard Working Group.** The Bird Hazard Working Group (BHWG) is currently meeting at least twice each year.

- (1) **Recommendation.** Continue to conduct BHWG meetings at least twice each year. Encourage continued participation of the airport operations staff and representative from ATC. Use this opportunity to provide and share information on military and non-military strike reports and observations.
- (2) **Recommendation.** Ensure that meeting minutes and attendees are documented and that attendees are included in all correspondence and action items.

**b. Unit Responsibilities.** Most BASH duties are properly assigned within the unit. ANG staff are trained and motivated to execute all aspects of the BASH Plan, more importantly, the ANG staff is familiar with and has a working relationship with the ILG Operations staff.

- (1) **Recommendation.** Develop an updated BASH map to identify known wildlife hazards (e.g. landfill, agricultural areas, marsh areas, etc.).
- (2) **Recommendation.** Continue to motivate assigned ANG staff to engage in the BASH program with an emphasis on SNARGE collection and strike reporting.

**c. Airfield Concerns.** The airfield is generally well maintained and is primarily the responsibility of ILG.

- (1) **Recommendation.** Continue to support ILG staff in maintenance of airfield turf (7-14 inches AF, 6-12 inches FAA)
- (2) **Recommendation.** Work with ILG to explore options to improve the drainage ditches near the ANG Installation entrance.
- (3) **Recommendation.** Work with ILG to explore possibility of removing or excluding remaining forested areas within the airfield perimeter.

**d. Wildlife Management.** Currently ILG Operations staff are responsible for implementation of wildlife management on the airfield. ANG staff can assist by recording and reporting known wildlife hazards.

- (1) **Recommendation.** Continue coordination and support of ILG Operations staff in conduct of wildlife hazard management on the airport.
- (2) **Recommendation.** Advise ILG Operations staff of observed hazardous wildlife on airport property (e.g. gulls, blackbirds, geese, or mammals).
- (3) **Recommendation.** Support all ILG efforts to maintain training, permits, and FAA wildlife standards related to Part 139 certification.

- (4) **Recommendation.** Support efforts to remove and exclude mammals from the airfield (e.g. deer, foxes, and ground hogs)
  - (5) **Recommendation.** Support efforts to work with off-airfield properties to reduce wildlife attractiveness (e.g. “Corporate Commons Pond” gridwire exclusion).
- e. Leasehold Property.** The 166 AW has full management authority over the land within the leasehold area. Efforts should continue to reduce the attractiveness of the base. The installation has a relatively small footprint compare to the commercial airport, but does have some areas of mowed grass around the hangars.
- (1) **Recommendation.** Continue current leasehold turf maintenance.
  - (2) **Recommendation.** Consider aggressive trimming or removal of trees near flight line.
- f. Bird Avoidance in the Airfield Environment.** Bird Watch Condition (BWC) advisories are properly established per ANNEX D.
- (1) **Recommendation.** Periodically review and discuss the procedures for establishing BWC at BHWG meetings.
  - (2) **Recommendation.** During the annual review of the BASH Plan, review military (AFSAS) and FAA strike data to determine which months have increased bird strike potential. This information can assist in identifying, and if necessary, updating Phase I and Phase II operating windows.
  - (3) **Recommendation.** Consider updating Phase II operating window. The current Phase II operating window is long (Oct-Mar), doesn’t coincide with strike records, and may cause aircrews to become complacent. It is recommended that Phase II at the 166 AW occurs at most from Mar-May and Aug-Oct.
  - (4) **Recommendation.** Do not base BWC advisories on information gathered solely by AHAS. Please keep in mind, AHAS may not be able to detect birds or other wildlife close to the ground. Officials declaring BWC advisories should only use AHAS as a secondary source for advisories.
- g. Low-level Bird Avoidance.** The 166 AW has developed and implemented a unit page within the Avian Hazard Advisory System (AHAS). AHAS was not designed to provide comprehensive airfield risk conditions, but instead to provide a general activity level and associated hazard in the area.
- (1) **Recommendation.** Establish a dedicated computer/monitor for AHAS display in a prominently viewed area to ensure the most current conditions are available.
  - (2) **Recommendation.** Ensure all aircrew check AHAS for activity on planned routes prior to departure.
- h. Strike Reporting and Promoting the BASH Program.** The 166 AW has a good strike reporting program. All responsible organizations are well trained and motivated to collect post-strike remains and complete all required forms.

- (1) **Recommendation.** Continue to report all strikes. Explore innovative ways to encourage reporting and collection of strike remains using briefings, videos, and posters.
- (2) **Recommendation.** Conduct on-site training with unit staff using the Smithsonian/USDA Video titled “Bird Strikes: How to Collect, Ship Remains, and Have Bird Remains Identified” to promote strike reporting (video available on YouTube).
- (3) **Recommendation.** Share strike reports with the civilian airport staff and ATC staff in an effort to develop a consolidated picture of bird strike risk periods.
- (4) **Recommendation.** Consider sending at least one unit representative to participate in the military training session during the annual Bird Strike Committee-USA meeting.

## APPENDIX 2. BIRDS OBSERVED IN THE VICINITY OF NEW CASTLE AIRPORT

This list is compiled as a combination of observations made by the ERS BASH Team on the most recent BASH Site Visit (28-29 March 2018) and previous NGB BASH Site Visits, strike records from AFSAS and the FAA Wildlife Strike Database. The list includes moderate to high risk hazardous wildlife species observed or documented in the vicinity of the airport. However, these do not represent a complete list of all observed wildlife or an exhaustive list of potentially hazardous species. Rare and low hazard bird species may have been eliminated from the following list for brevity.

Wildlife movements, patterns, and population numbers are dynamic and risk associated with currently observed or new species observed in the area will fluctuate. The lists may be supplemented with local observations and should be reviewed, at a minimum, during the annual review of the BASH Plan. Species with an asterisk (*) were observed during the 2018 NGB BASH Site Visit. **List 1** provides bird species and **List 2** provides non-avian species of concern..

### List 1. Aviation Species (Moderate to High Risk Species):

#### Anseriformes – Waterfowl

Canada Goose*	<i>Branta canadensis</i>
Snow Goose	<i>Anser caerulescens</i>
Mallard	<i>Anas platyrhynchos</i>
American Black Duck	<i>Anas rubripes</i>
Tundra Swan	<i>Cygnus columbianus</i>
Northern Pintail	<i>Anas acuta</i>
Gadwall	<i>Mareca strepera</i>
American Wigeon	<i>Mareca americana</i>
Northern Shoveler	<i>Spatula clypeata</i>
Blue-winged Teal	<i>Spatula discors</i>
Green-winged Teal	<i>Anas crecca</i>
Wood Duck	<i>Aix sponsa</i>
Redhead	<i>Aythya americana</i>
Ring-necked Duck	<i>Aythya collaris</i>
Greater Scaup	<i>Aythya marila</i>
Lesser Scaup	<i>Aythya affinis</i>
Common Goldeneye	<i>Bucephala clangula</i>
Bufflehead	<i>Bucephala albeola</i>
Red-breasted Merganser	<i>Mergus serrator</i>
Common Merganser	<i>Mergus merganser</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>

#### Ciconiiformes – Herons and Egrets

Great Egret *	<i>Ardea alba</i>
Great Blue Heron *	<i>Ardea herodias</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>

Glossy Ibis	<i>Plegadis falcinellus</i>
Snowy Egret	<i>Egretta thula</i>
Tri-colored Heron	<i>Egretta tricolor</i>
Little Blue Heron	<i>Egretta caerulea</i>
Cattle Egret	<i>Bubulcus ibis</i>

Charadriiformes – Shorebirds and Gulls

Herring Gull	<i>Larus argentatus</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Laughing Gull	<i>Leucophaeus atricilla</i>
Killdeer	<i>Charadrius vociferus</i>
Great Black-backed Gull	<i>Larus marinus</i>
Least Tern	<i>Sterna antillarum</i>
Forster's Tern	<i>Sterna forsteri</i>
Caspian Tern	<i>Hydroprogne caspia</i>

Columbiformes – Pigeons and Doves

Rock Pigeon*	<i>Columba livia</i>
Mourning Dove*	<i>Zenaida macroura</i>

Falconiformes – Vultures, Hawks, and Falcons

Turkey Vulture*	<i>Cathartes aura</i>
Black Vulture*	<i>Coragyps atratus</i>
Red-tailed Hawk*	<i>Buteo jamaicensis</i>
Bald Eagle*	<i>Haliaeetus leucocephalus</i>
American Kestrel*	<i>Falco sparverius</i>
Northern Harrier	<i>Circus hudsonius</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Peregrine Falcon	<i>Falco peregrinus</i>

Galliformes – Gallinaceous Birds

Wild Turkey	<i>Meleagris gallopavo</i>
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Gruiformes – Cranes and Allies

American Coot	<i>Fulica americana</i>
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Passeriformes – Perching Birds

Horned Lark*	<i>Eremophila alpestris</i>
American Crow*	<i>Corvus brachyrhynchos</i>
American Robin*	<i>Turdus migratorius</i>
European Starling*	<i>Sturnus vulgaris</i>
Eastern Meadowlark*	<i>Sturnella magna</i>
Red-winged Blackbird*	<i>Agelaius phoeniceus</i>
Dark-eyed Junco*	<i>Junco hyemalis</i>
Barn Swallow	<i>Hirundo rustica</i>
Purple Martin	<i>Progne subis</i>

Common Grackle	<i>Quiscalus quiscalus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Bank Swallow	<i>Riparia Riparia</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>

Pelicaniformes – Pelicans and Cormorants

Double-crested Cormorant	<i>Phalacrocorax auritus</i>
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Podicipediformes – Grebes

Horned Grebe	<i>Podiceps auritus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>

Strigiformes – Owls

Great Horned Owl	<i>Bubo virginianus</i>
Barn Owl	<i>Tyto alba</i>
Barred Owl	<i>Strix varia</i>

**List 2. Non-Avian Species with the potential to create a moderate to high wildlife hazard strike risk**

White-tailed deer	<i>Odocoileus virginianus</i>
Red fox	<i>Vulpes vulpes</i>
Groundhog (prey species and burrow)	<i>Marmota monax</i>

### APPENDIX 3. LIST OF BASH REFERENCES

1. **General.** This appendix includes sources of information and points of contact for BASH related issues.
2. **Technical Points of Contact.** The following are available to discuss specific bird and wildlife hazard issues:
  - a. **National Guard Bureau, Safety Office:**  
HQ NGB/SEF  
Lt. Col. David C. Sumwalt  
ANGRC, JB Andrews, MD 20762  
DSN: 612-7969  
Comm: (240) 612-7969  
[david.c.sumwalt.mil@mail.mil](mailto:david.c.sumwalt.mil@mail.mil)  
Org Inbox: [usaf.jbanafw.ngb-se.mbx.sef-flight-safety@mail.mil](mailto:usaf.jbanafw.ngb-se.mbx.sef-flight-safety@mail.mil)
  - b. **USAF BASH Team:**  
HQ AFSC/SEFW  
Mr. Daniel Sullivan  
9700 Ave G., SE  
Building 24499  
Kirtland AFB, NM 87117-5671  
DSN 246-5679  
(505) 846-5679  
[Daniel.Sullivan@kirtland.af.mil](mailto:Daniel.Sullivan@kirtland.af.mil)
  - c. **FAA:**  
FAA – Airports  
Mr. John Weller  
800 Independence Ave, SW, Rm 615  
Washington D.C. 20591  
(202) 267-3778  
[John.Weller@faa.gov](mailto:John.Weller@faa.gov)
  - d. **U.S. Department of Agriculture, Wildlife Services:**  
Delaware Wildlife Services  
State Director  
1568 Whitehall Road  
Annapolis, MD 21401  
Phone: (410) 349-8055 FAX: (410) 349-8258  
<https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage>



- e. **Consultant:**  
**Environmental Resource Solutions, Inc.**  
POC: Sarah Brammell  
8711 Perimeter Park Blvd, Suite 1  
Jacksonville, FL 32216  
Direct Line: (813) 404-3963  
Main Office: (904) 285-1397  
FAX: (904) 285-1929  
[sbrammell@ersenvironmental.com](mailto:sbrammell@ersenvironmental.com)  
[www.ersenvironmental.com](http://www.ersenvironmental.com)
- f. **AHAS Technical Assistance: DeTect Inc.**  
POC: Ron White  
DeTect, Incorporated  
1022 West 23rd Street, Suite 620  
Panama City, Florida 32401  
Main Office: (850) 763-7200  
Ron White email: [ahas@detect-inc.com](mailto:ahas@detect-inc.com)

3. **Resource Websites and Reports.** The following resources provide references for bird/wildlife hazards:

- a. **Air Force Safety Center website:** <http://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH/>  
This website provides USAF specific guidance, instructional videos, links to AFSAS for strike reporting, links to AHAS, BASH publications and forms, strike statistics, and other related information.
- b. **FAA Wildlife Hazard Mitigation Website:**  
[http://www.faa.gov/airports/airport_safety/wildlife](http://www.faa.gov/airports/airport_safety/wildlife)  
This website provides FAA specific guidance and links to the FAA National Wildlife Strike Database, wildlife strike resources, research and development, frequently asked questions, and list current “hot” items.
- c. Cleary, E.C. and R.A. Dolbeer. 2005. **Wildlife Hazard Management at Airports: A Manual for Airport Operators.** United States Department of Transportation, Federal Aviation Administration, Office of Safety and Standards. Washington DC. Available at: [http://www.faa.gov/airports/airport_safety/wildlife](http://www.faa.gov/airports/airport_safety/wildlife)
- d. **FAA/USDA Wildlife Strikes to Civil Aircraft in the United States 1990-2015** (or current version). Available at: [http://www.faa.gov/airports/airport_safety/wildlife](http://www.faa.gov/airports/airport_safety/wildlife)

4. **List of FAA Advisory Circulars and CertAlerts** related to wildlife hazard management. While not directly applicable to USAF requirements, these documents can provide resource information on specific topics and provide references for joint use facilities operating on a civilian airfield:

<b>FAA Advisory Circulars:</b>	
<a href="https://www.faa.gov/regulations_policies/advisory_circulars/">https://www.faa.gov/regulations_policies/advisory_circulars/</a>	
FAA AC 150/5200-18	Airport Safety Self-Inspection
FAA AC 150/5200-32	Reporting Wildlife Aircraft Strikes
FAA AC 150/5200-33	Hazardous Wildlife Attractions on or Near Airports
FAA AC 150/5200-34	Construction or Establishment of Landfills Near Public Airports
FAA AC 150/5200-36	Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculum for Airport Personnel Involved in Controlling Wildlife Hazards on Airports
FAA AC 150/5220-25	Airport Avian Radar Systems
FAA AC 70-1	Outdoor Laser Operations
<b>FAA Office of Safety and Standards CertAlerts:</b>	
<a href="https://www.faa.gov/airports/airport_safety/certalerts/">https://www.faa.gov/airports/airport_safety/certalerts/</a>	
CertAlert 98-05	Grasses Attractive to Hazardous Wildlife
CertAlert 04-09	Relationship Between FAA and WS
CertAlert 16-03	Recommended Wildlife Exclusion Fencing
CertAlert 06-07	Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State-listed Threatened and Endangered Species and Species of Special Concern on Airports
CertAlert SO-12-3	Documenting the Review of your Wildlife Hazard Management Plan (WHMP)
CertAlert 13-01	Federal and State Depredation Permit Assistance
CertAlert 14-01	Seasonal Mitigation of Hazardous Species at Airports: Attention to Snowy Owls

5. **Meetings.** Related Scientific and Professional Meetings:

a. **Bird Strike Committee – USA (BSC).**

This organization was formed in 1991 as a joint effort by the FAA, USAF, and USDA/WS. BSC facilitates the exchange of information, promotes the collection and analysis of accurate wildlife strike data, promotes the development of new technologies for reducing wildlife hazards, promotes professionalism in wildlife management programs on airports through training and advocacy of high standards of conduct for airport biologists and bird patrol personnel, and is a liaison to similar organizations in other countries. Bird Strike Committee – USA meets annually. For more information visit [www.birdstrike.org](http://www.birdstrike.org)

**6. Training Materials**

Additional videos and on-line source are available for a variety of topics. Contact the USAF BASH Team or the NGB for technical assistance.

**7. Technical Assistance:** The Air National Guard Environmental Division provides and coordinates technical assistance for wildlife hazards to aircraft operations in addition to the agencies listed below. **Please coordinate all requests for technical assistance through NGB.**

**a. National Guard Bureau, Safety Office:**

HQ NGB/SEF

ANGRC, JB Andrews, MD 20762

DSN: 612-7969

Comm: (240) 612-7969

Org Inbox: [usaf.jbanafw.ngb-se.mbx.sef-flight-safety@mail.mil](mailto:usaf.jbanafw.ngb-se.mbx.sef-flight-safety@mail.mil)

**b. USAF BASH Team:**

HQ AFSC/SEFW

Mr. Daniel Sullivan

9700 Ave G., SE

Building 24499

Kirtland AFB, NM 87117-5671

DSN 246-5679

(505) 846-5679

[Daniel.Sullivan@kirtland.af.mil](mailto:Daniel.Sullivan@kirtland.af.mil)

#### **APPENDIX 4. LIST OF PREPARERS**

This Plan was prepared for, and under the direction of, the Air National Guard Safety Office (HQ NGB/SE) by Environmental Resource Solutions, Inc. It updates the previous ANG BASH Plan as last updated and follows USAF and ANG Operational Plan guidelines. Members of the professional staff are listed below.

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*Retired USAF – Former USAF BASH*