

DEPARTMENT OF THE NAVY
NAVAL AIR STATION WHIDBEY ISLAND
OAK HARBOR, WASHINGTON 98278-5000

NASWHIDBEYINST 5090.10A
N33
4 Dec 2001

NASWHIDBEY INSTRUCTION 5090.10A

Subj: BIRD AIRCRAFT STRIKE HAZARD (BASH) PLAN

Ref: (a) OPNAVINST 5090.1B
(b) NAVFAC P-73, Vol II
(c) OPNAVINST 3750.6R
(d) OPNAVINST 3710.7R
(e) FAA Handbook 7110.65

Encl: (1) NAS Whidbey Island BASH Plan

1. Purpose. To issue enclosure (1), which provides a program per references (a) and (b), to reduce the potential for collisions between aircraft and birds or other animals. This instruction has been substantially revised and should be reviewed in its entirety.

2. Cancellation. NASWHIDBEYINST 5090.10

3. Background. No single solution exists to the BASH problem; a variety of techniques and organizations must be involved to ensure success of this program. The program encompasses all actions which may identify, reduce, or eliminate bird or other animal hazards to aviation, specifically, bird avoidance and bird control (including harassment, grounds maintenance, habitat modification, and depredation).

4. Objectives. BASH does exist at this installation and within the immediate vicinity due to resident and migratory bird species. Daily and seasonal bird movements create various hazardous conditions to aviation. This plan is designed to reduce the bird hazard in and around Naval Air Station (NAS) Whidbey Island.

5. Administration. This plan shall be reviewed and updated bi-annually. Recommended changes should be submitted to the Operations Officer (NAS N33).

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6. Forms. NASW 5090/6 is available from Forms Control,
Administration Department, Building 385, extension 7-2637.

/S/
L. G. SALTER

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NAS WHIDBEY ISLAND BASH PLAN

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CHAPTER 1

GENERAL

1.1 SITUATION

1.1.1 General. NAS Whidbey and Outlying Landing Field (OLF) Coupeville have a large and potentially dangerous bird population. Daily and seasonal bird movements in the vicinity of the airport create various hazards to aircraft. Accordingly, the BASH Program is designed to control birds and to provide increased levels of safety during the critical phases of flight. This plan establishes specific procedures to reduce known and future bird hazards. There is no single solution or agency that can solve the bird strike problem. Therefore, a variety of techniques and organizations must be involved in the overall program. This plan is designed to:

- a. Establish a Bird Hazard Working Group and designate responsibilities to its members.
- b. Establish training for all base members concerning responsibilities and actions.
- c. Establish procedures to identify high hazard situations and to aid supervisors and aircrews in alerting/discontinuing flying operations when required.
- d. Establish aircraft and airfield operating procedures to avoid high hazard situations.
- e. Provide a method for disseminating information to all tenant and transient aircrews on bird hazards and procedures for bird avoidance.
- f. Establish passive techniques to decrease airfield attractiveness to birds.
- g. Establish active/static techniques to disperse birds from the airfield.
- h. Establish local procedures for reporting of damaging/non-damaging bird strikes.
- i. Establish procedures for collecting bird strike remains.

1.1.2 Background

1. Bird strikes have plagued naval aviation since its early beginnings. The Navy's first loss of life due to a bird strike occurred in 1914, coincidentally the same year it obtained its first aircraft. From March 1995 to March 1997, naval aviators reported 1,420 bird strikes which resulted in 107 aircraft mishaps, 32 FOD engines and over 108 million dollars in damages. Fortunately, there were no fatalities. However, within that same period, the USAF had two major BASH-related mishaps with two aircraft totally destroyed and 24 fatalities. These incidents, and the recent destruction of two naval aircraft, have heightened the Navy/DOD's interest in BASH programs. The Navy Safety Center's review of recent USN bird-aircraft mishaps found that the lack of a BASH Plan was a consistent deficiency.

2. Naval Safety Center data shows that 65 percent of all bird strikes occur within the airfield environment. Their records indicate that NAS Whidbey Island ranks fourth among all NAS' worldwide for number of reported bird strikes. The Safety Center also estimates that only one of four bird strikes is reported, suggesting that an even larger hazard exists.

3. A bird-aircraft strike can cause major damage and loss of life. Because of aircraft design, mission, and airport environment, NAS Whidbey Island-based aircraft are very vulnerable to bird strikes. While severe aircraft mishaps by definition are rare events, it is difficult to estimate the absolute risk of a bird strike causing a crash. Instead, in aviation, it is customary to examine leading indicators that are correlated with mishap risk but occur much more often, i.e., bird populations, near-misses, engine damage and reported strikes. Increases in these factors are considered to show a deterioration in the margin of safety, even if no mishaps take place. Historically, rises in leading indicators were a prelude to major mishaps.

4. The greatest loss of life due to a bird strike occurred in 1960, when a Lockheed Electra (civilian version of the P-3) ingested starlings into three of its four engines on takeoff and crashed, killing 62 of the 73 aboard. Likewise, in 1995, an AWACS at Elmendorf AFB ingested geese into two engines, and crashed, killing all 24 aboard. Although these crashes occurred 25 years apart, they illustrate that the risk of having another major accident is still very much present. An effective BASH program can reduce the relative risk.

1.1.3 Airfield Installation Description

1. Ault Field (NAS Whidbey Island) is an active military airfield. The primary missions supported are maritime patrol and electronic warfare, with logistic and search and rescue operations in a secondary role. The primary aircraft types using the airfield runways include the assigned EA-6B, P-3, C-9, C-12, H-3, and extensive transient aircraft from various Navy and other military commands.

2. OLF Coupeville is an active military airfield used only by NAS Whidbey Island-based EA-6B tactical jet aircraft for Field Carrier Landing Practice (FCLP) operations. These consist of touch and go landings to a simulated carrier deck on the runway. Takeoffs and full stop landings are not authorized and the airfield is not used by other types of military or transient aircraft.

1.1.4 Local Area

1. NAS Whidbey is situated on a narrow island in Puget Sound between the Strait of Juan de Fuca and Saratoga Passage. The town of Oak Harbor borders to the southeast. There are 4,253 acres within Ault Field's boundaries. The airfield elevation is 47 feet above sea level.

2. OLF Coupeville is located ten miles southeast of NAS Whidbey and two miles southeast of the town of Coupeville. The airfield encompasses 677 acres and elevation is 199 feet above sea level.

1.1.5 General Topography. Ault Field has generally level topography. The coastal plain surface slopes very gently southward toward the Sound, ground elevation varies from sea level to approximately 55 feet above sea level along the northern installation boundary.

1.1.6 Developed Area. The Ault Field developed area (including the runways) is approximately 23 percent of the total installation.

1.1.7 Vegetation Cover Types. Fourteen different types of vegetation cover can be found in the Ault Field complex.

1.1.8 Landfills. There are no active landfills on the station.

1.1.9 Sewage Ponds. A 16-acre sewage pond is located on the northwest corner of the station along the shoreline between

Runway 7 and Runway 13. This area is attractive to many different species of birds and waterfowl.

1.1.10 Habitats. Systematic surveys of bird life on NAS Whidbey have tallied over 200 different bird species within the four major habitat types found on station. The four major habitats are wetlands, woodlands, grasslands, and coastal/open ocean. Additionally, standing water, perch sites, tall brush and short grass are all present on station and attract large numbers of individual and flocking birds. The combination of all these environments and attractors increases the potential for a serious bird strike incident.

1.2 SPECIES. Chapter 5 contains a comprehensive listing of birds/mammals which may be observed in the airfield area. There may be occasional sightings of other species during migration, but this list is considered thorough for BASH purposes.

1.3 EXPLANATION OF TERMS

1.3.1 WS. Wildlife Services. An office of the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service which may be under contract at installations to provide BASH assistance.

1.3.2 Active Bird Dispersal. Harassment techniques employed to disperse birds from airfield and surrounding areas. Methods may include chase, pyrotechnics, bioacoustics, and depredation.

1.3.3 BASH. Bird Aircraft Strike Hazard. General term to describe bird hazards and bird hazard programs.

1.3.4 BHWG. Bird Hazard Working Group. Local committee of base and unit offices concerned with bird hazards. Executes and makes recommendations to the BASH Program.

1.3.5 BHC. Bird Hazard Condition (BHC). A bird hazard alert condition used to warn aircrew of bird activity.

1.3.6 BHC Red. A severe BHC indicating heavy concentrations of birds on or immediately adjacent to the runway which presents an immediate hazard to flight operations; or any concentration of birds that presents a danger to aircraft.

1.3.7 BHC Yellow. A BHC which indicates that moderate concentrations of birds are in a location that represents a probable hazard to flight operations.

1.3.8 BHC Green. A Bird Watch Condition which indicates sparse bird activity on the airfield and a low probability of hazard.

1.3.9 BASH Window. Known periods of severe bird activity where restrictions to flight operations may be automatically imposed.

1.3.10 BASH Advisory. A radio transmission from Air Traffic Control (ATC) or aircrew reporting specific bird hazard information. May be real time or disseminated via Automated Terminal Information Service (ATIS) broadcasts.

1.3.11 BASH Detection and Dispersal Team (BDDT). Roving airport patrol that reports BHC and disperses problem birds via chase, pyrotechnic, bioacoustics, depredation and other methods.

1.3.12 Depredation. Technique used to remove problem birds permanently from the airfield and hangars when other scare tactics are ineffective. Permits for some species are required.

1.3.13 Pyrotechnics. Noise producing devices fired from pistol or shotgun. Used by BDDT to scare birds away from runways and airport areas. Pyrotechnics are Class 1.4 explosives.

1.3.14 Bioacoustics. Recorded tapes of bird distress and predator calls used by BDDT to disperse birds off runways and airport areas.

1.3.15 Propane Cannons. Stationary non-projectile sound producing device used to disperse birds from airport areas.

1.3.16 Models/Decoys. Various static devices used to disperse birds from airport areas. May include scarecrows, decoys, Mylar tape, and eye spots.

1.3.17 Falconry. Active dispersal of problem birds using trained Falcons.

1.3.18 Bird Strike. Any contact between a bird or other animal and an aircraft, whether or not damage occurred. All wildlife strikes, damaging or non-damaging, are required to be reported to the Navy Safety Center.

1.3.19 Bird Exclusion Zone. The designated area surrounding the airfield where bird habitation is discouraged.

1.3.20 Salvage. The act of collecting wildlife or wildlife remains from an aircraft or from the airfield environment. Birds covered by the Migratory Bird Treaty Act must be reported to the

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U.S. Fish and Wildlife Service via a Salvage Permit. Certain mammalian species are reported through State agency permitting requirements.

CHAPTER 2

ORGANIZATIONAL TASKS AND RESPONSIBILITIES

2.1 BIRD HAZARD WORKING GROUP (BHWG)

2.1.1 General. The Bird Hazard Working Group is organized to implement and monitor the BASH Plan. It allows base offices affected by bird problems the opportunity to meet and discuss possible solutions. The BHWG shall meet regularly with representatives from each organization concerned with bird hazards.

2.1.2 Composition. As a minimum, the group shall have a representative assigned from the following specialties:

- a. Aviation Safety (Chairman)
- b. Operations Department (Co-chairman)
- c. Environmental Affairs
- d. Air Traffic Control
- e. Public Works/ROICC
- f. Commander, Electronic Attack Wing, U.S. Pacific Fleet (COMVAQWINGPAC) Safety
- g. Commander, Patrol and Reconnaissance Wing TEN (COMPATRECONWING-10) Safety
- h. Weapons (as required)
- i. Security (as required)
- j. Naval Pacific Meteorology and Oceanography Facility (NPMOF) (as required)
- k. Tenant aviation units
- l. State Wildlife Services
- m. OLF Coupeville Leading Petty Officer

2.1.3 Authority. The Commanding Officer is responsible for the BASH Program and is approval authority for all BHWG recommendations. The BASH Program is a part of the Aviation

Safety Program, and as such, the Aviation Safety Officer shall monitor the effectiveness of the program. Active participation by the Operations and Environmental Departments is key to ensuring success of this program.

2.1.4 BHWG Meeting Schedule. BHWG meetings will follow the monthly Aviation Safety meeting. Additionally, the BHWG will meet as often as necessary to stay current on bird hazards and to discuss solutions, results, and effectiveness of the program. An important concept is that the BHWG address problems as they develop, before they create a serious safety hazard.

2.1.5 BHWG Function

1. Execute and update the BASH Plan.
2. Monitor base-wide compliance with reference (c).
3. Collect, compile, and review data on all bird strikes.
4. Identify and recommend actions to reduce bird hazards.
5. Recommend changes in operational procedures.
6. Prepare informational programs and safety briefings for aircrews.

2.2 NAS SAFETY OFFICER

1. Chair BHWG meetings.
2. Monitor the effectiveness of the BASH program.
3. Conduct periodic reviews of the BASH program using the self-inspection checklist contained in Appendix A.
4. Ensure BASH program is a part of safety reviews conducted by the Naval Safety Center.

2.3 WING COMMANDERS

1. Wing Commanders should publish operating instructions/ checklists and conduct training as appropriate to support this plan.
2. Ensure representatives are assigned to the BHWG.
3. Issue specific guidance for units on:

- a. Procedures and restrictions to be followed under each of the bird hazard conditions.
- b. Bird strike reporting.
- c. Bird remains collection and preservation.
- d. Ensure squadrons comply with reference (d) mandatory reporting of all bird strikes.

2.4 TENANT SQUADRONS

1. Publish operating instructions/checklists as appropriate to support this plan and Wing directives.
2. Provide representation on BHWG.
3. Ensure a bird hazard awareness program is established and briefings conducted to include films, posters, and information on seasonal bird hazards.
4. Ensure aircrew briefings are conducted on bird hazards and attendance documented. This briefing is mandatory for all aircrew and shall cover in-flight avoidance procedures and go/no-go criteria.
5. Monitor, on a regular basis, aircrew mission briefings to ensure existing BASH information is briefed.
6. Coordinate unit flying activities through Wing to minimize exposure to migratory birds.
7. During spring and fall migration seasons make BASH a special interest item.
8. Issue specific guidance to maintenance personnel for reporting observed hazardous bird activity to the Tower or Operations Duty Officer.
9. Issue specific guidance to maintenance personnel for reporting of all discovered bird strikes on aircraft to the Squadron Safety Officer.
10. Issue procedures for the preservation of bird remains if discovered on an aircraft. Even the smallest fragment of a feather should be preserved for identification.

11. Ensure aircrew comply with reference (d) mandatory reporting of all bird strikes, damaging and non-damaging.
12. Brief bird hazard awareness and the Whidbey BASH program to all hosted aviation units.

2.4.1 Squadron Safety Officers

1. Attend BHWG meetings.
2. Ensure bird strikes are reported per reference (d) and this instruction.
3. Ensure any applicable bird activity data is readily available to aircrews during mission planning.
4. Make seasonal bird hazards a regular topic at flying safety meetings. Use movies, articles, and other information, as appropriate, to maintain awareness.

2.5 OPERATIONS/AIRFIELD MANAGEMENT

1. Designate BASH Officer who will co-chair the BHWG and a facilities representative for the BHWG.
2. Maintain a file of all bird strikes occurring at NAS Whidbey Island.
3. Through the Aviation Safety and BASH Officer, provide liaison with all aviation activities at NAS Whidbey Island concerning BASH issues.
4. Develop passive, active, and static procedures to reduce BASH hazard.
5. Monitor grass height, drainage ditches, etc., and report problems to NAS Public Works.
6. Assist Wings in development of in-flight avoidance procedures.
7. In concert with NAS Environmental Affairs, establish and maintain a trained BDDT.
8. Develop a continuing information and education program to disseminate bird hazard information.
9. Report all bird strikes to NAS Environmental Affairs.

10. In conjunction with the NAS Safety Officer, conduct periodic exercises and inspections of the BASH program.
11. Provide animal remains to NAS Environmental Affairs.
12. Establish a BASH awareness training program for all airfield management, ATC, and airfield facilities personnel.

2.6 AIR TRAFFIC CONTROL TOWER

1. In the absence of BDDT, or at the discretion of the Tower Supervisor, declare BWC based on reported sightings or BHC criteria in Paragraphs 3.2. and 3.3.
2. Pass BHC information to Flight Planning.
3. Advise the Operations Duty Officer anytime BHC RED (Severe) condition is declared.
4. Alert BDDT of observed bird hazards.
5. Allow BDDT priority movement on the airfield to disperse birds on or near active runways.
6. Include BHC and bird advisory information in ATIS broadcasts. Update frequently.
7. Issue bird advisory information to aircraft over air traffic control frequencies per FAA Orders 7110.65 and 7210.3.
8. Establish a training program covering this instruction for all ATC personnel. This training will be documented in training jackets and reviewed annually.

2.7 ENVIRONMENTAL AFFAIRS

1. Request and maintain annual funding in support of the BASH Program.
2. Provide representative for BHWG.
3. Recommend changes to environmental conditions and management practices to reduce bird strike potential. These changes will be presented to the BHWG for consideration.
4. Initiate necessary environmental documentation for airfield modifications as required by law.
5. Conduct periodic avian/airfield surveys.

6. Maintain and review a file of all bird strikes occurring at NAS Whidbey Island.

7. Provide Natural Resources/WS support as outlined below:

a. Obtain and maintain Federal and State permits required for depredation, salvage, collection, and possession of all protected avian species.

b. Train BDDT. This training will focus on the use and techniques of active scare methods, as well as placement of static deterrent devices.

c. Alert airfield management of migration seasons and unusual bird activity.

d. Coordinate wildlife studies as necessary to improve wildlife hazard control, assess the potential impacts of control activities on wildlife populations and distribution, and evaluate the potential effects of wildlife displacement.

2.8 PUBLIC WORKS

1. Provide representative for BHWG.

2. Based upon the direction of the BHWG, maintain runway lateral and approach zones in a manner that is least attractive to birds.

3. Ensure training is conducted for all PW and base support personnel (sweepers, etc) covering responsibilities, actions, and techniques applied under this instruction.

4. Manufacture and maintain movable signs outlining the Bird Exclusion Zone (Illustration (2)). The signs will have a graphic representation of "no birds" along with the BASH Desk phone number (7-BASH).

5. Manufacture signs to discourage wildlife feeding. Signs should be placed in sensitive areas to educate the public to the hazard posed by feeding any wildlife, particularly waterfowl and seagulls.

6. Ensure all trash receptacles in Bird Exclusion Zone have covers which prevent bird access and are emptied on a timely basis to prevent overflowing. Trash is a bird attractor.

7. Provide vehicle(s) for BDDT.

8. Incorporate practices described in Chapter 3 into the base land management plan.
9. When available, provide recycled propane gas for BASH cannons.

2.9 SECURITY DEPARTMENT

1. Provide representative for BHWG when required.
2. Develop firearm check-in/out procedures.
3. Ensure training is conducted for all security and gate personnel concerning BDDT weapons procedures as applied under this instruction.
4. Enforce base regulations that prohibit the feeding of wildlife in BASH sensitive areas.
5. Report any overflowing trash receptacles in Bird Exclusion Zone (Illustration (2)) to the Base Operating Support Contractor at extension 7-3133 (Transportation Dispatcher).

2.10 WEAPONS DEPARTMENT

1. Provide representative for the BHWG when required.
2. Provide Ready Storage Lockers (RSL) for BASH Class 1.4 pyrotechnics and small arms ammunition.
3. Provide Class 1.4 weapons storage safety training to BDDT.
4. Provide 12 gauge shotguns and bird shot ammunition for BDDT.
5. Provide firearms safety training to BDDT members.
6. Provide cleaning supplies for BDDT firearms.
7. Develop and maintain Standard Operating Procedures (SOP) for BDDT members for the use and handling of pyrotechnics and firearms (NAVSEA Op 5 Vol. 1, Rev 6).

2.11 ADMINISTRATIVE DEPARTMENT

1. Include provision for the assignment of TAD personnel to staff BDDT in NASWHIDBEYINST 1306.5A. Due to the training required for this position, a minimum 6-month assignment is required.

2. Provide reprographic support for BASH awareness posters, cards, etc.
3. Publish BASH Plan of the Week notes.

2.12 PUBLIC AFFAIRS. Public Affairs will provide a public information program designed to inform base personnel, dependents and the general public on the hazards of uncontrolled bird activity and the measures being taken to minimize the danger.

2.13 BIRD DETECTION AND DISPERSAL TEAM

1. Responsibility for bird detection and dispersal is an airport management function and as such falls under the control of the NAS Operations Officer. The Operations Officer will establish a trained team to carry out detection and dispersal activities. The Environmental Department will provide training and funding for BDDT equipment.
2. The BDDT will be staffed by military TAD personnel who will rotate at a minimum 6-month interval. State Wildlife Services (WS) agents and military augmenters may also be required during the spring and fall migratory seasons.
3. BDDT will be active on the airfield Monday-Friday and will patrol the flight line from sunrise to sunset. During other periods, the BDDT may be on call, or its functions performed by trained Crash, Facilities, or Transient Line personnel. The BDDT will have immediate access to bioacoustic and pyrotechnic equipment for bird dispersal. Proper training by the Weapons Department and WS Animal Damage Control will be accomplished prior to BDDT duty.

2.14 NAVAL PACIFIC METEOROLOGY AND OCEANOGRAPHY FACILITY

1. When required, provide representative for BHWG meetings.
2. Upon request, provide weather information such as frontal movements that may indicate a change in bird activity levels.
3. Assist in BHC reporting.

2.15 WHIDBEY ISLAND NAVY FLYING CLUB. Ensure club members are briefed on the BASH program.

CHAPTER 3

CONCEPT OF OPERATIONS

3.1 GENERAL. The BASH program is an ongoing process including both information dissemination and active/passive bird control techniques. Of these processes, the most critical is the aircrew notification and warning system. This system establishes procedures for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds that pose a hazard to flight safety. Additionally, a cautionary advisory is published in the DOD Flight Information Publication AP/1 under Supplementary Airdrome Remarks.

3.2 BIRD HAZARD WARNING SYSTEM. The following standardized BHC will be used at NAS Whidbey/OLF Coupeville to warn aircrew and support personnel of the current bird threat to operations. These codes are identical to the USAF codes in section B of the DOD FLIP (Flight Information Handbook). Bird locations should be given with the condition code.

3.2.1 BHC Red (Severe)

1. Generally defined as heavy concentrations of birds (more than 15 large or 30 small) on or immediately adjacent to the active runway or other specific locations that present an immediate hazard to flight operations. Active dispersal will be initiated during this BHC and BDDT personnel shall remain on the airfield actively involved in dispersal techniques until this BHC is downgraded. Aircrews should apply applicable Go/No-Go criteria.

Note: RED may also be declared when birds of any size or quantity present an immediate hazard.

3.2.2 BHC Yellow (Moderate). Generally defined as moderate (concentrations of 5-15 large or 15-30 small) birds observable in locations that represent a probable hazard to flying operations. Positive actions should be taken to disperse the concentrations of birds that are causing the hazard.

3.2.3 BHC Green (Low). Sparse bird activity on and above the airfield (less than described in Yellow) with a low probability of hazard.

Note: Personnel making BHC reports may not necessarily follow the numerical numbers in Table 1. These are just a guide. If, in the judgement of the observer, the number of birds is less

than those indicated for a specific BHC, but a hazard is believed to exist, a higher BHC may be declared. Example: Condition Red may be declared if one Snowy Owl is immediately adjacent to the active runway.

NASWI BIRD HAZARD CONDITIONS

BHC	MODIFIER	BIRD ACTIVITY
RED	SEVERE	15+ large birds, or 30+ small birds
YELLOW	MODERATE	5-15 large, or 15-30 small
GREEN	LOW	Sparse bird activity

Table 1

Note: The Tower may determine if bird activity away from the primary runway constitutes a threat to flying operations. If it does not, the Tower may lower the BHC for the primary runway while keeping the higher BHC for the other area.

Note: BHC descriptions will be reported using the colors (Red) vice modifiers (Severe). Until DOD standardizes this system, either of these terms may be encountered at other military airfields. While each base may have a slightly different definition for its hazard conditions, an associated level of danger can reasonably be ascertained from either reporting standard. Requests for clarification from ATC or airport management are recommended when confusion or doubt exists.

3.2.4 Bird Watch Alert. A general warning that indicates when weather, time of day, and seasonal conditions make an influx of birds onto the airfield likely. Upon receipt of special conditions, airfield management (ODO) will set the alert and the Tower will include a general statement in ATIS broadcasts.

3.2.5 BASH Window. BASH windows are based on historical bird survey data that show specific times when a hazard is known to exist, i.e., dawn seagull movements, etc. When BASH windows are set, aircraft operations during these time frames are not recommended. The ODO will post BASH windows on the rolling NOTAMS display. Squadron flight schedulers should avoid scheduling operations during BASH windows. Guidance for aircraft operations is contained in Chapter 4.

3.3 BIRD HAZARD CONDITION REPORTS

3.3.1 Bird Hazard Reporting. The NAS Operations Officer, ODO, or designated representative ensures hazardous conditions are reported. Declaration of a BHC will be based on the following:

a. Visual observation of bird activity on or near the airfield by Tower or BDDT personnel.

b. Information relayed by ATC Radar, airborne and taxiing aircraft.

c. Observations relayed to the Tower by any of the following personnel: airfield facilities, weather observers, LSO, ground electronics maintenance, airfield lighting technicians, crash crews, arresting gear maintenance, sweepers, mowers, security police, transient line personnel, and any other personnel driving on the airfield.

d. ATC or weather radar observation.

3.3.2 BASH Detection/Dispersal Team BHC Reporting

1. The most accurate and real-time reporting of bird hazard information is obtained from the BDDT. This roving patrol is present on the airfield (Monday-Friday, sunrise to sunset) and is in the best position to make accurate BHC reports.

2. When the BDDT is patrolling the airfield, they will have the primary responsibility to make BHC reports to the control tower. At a minimum, reports will be made hourly for inclusion in tower ATIS broadcasts. The BDDT will continue to make real-time reports and update BHC as hazard conditions change.

3. Once BHC RED (Severe) has been declared, the condition will be updated, at a minimum, every five minutes until downgraded. When aircraft are holding for BHC RED, the BDDT will report to the Tower immediately if initial attempts to disperse the birds have failed. During BHC RED, the BDDT shall remain on the airfield and be actively involved in dispersal techniques until BHC RED is downgraded.

3.3.3 OLF Coupeville Reporting

1. Prior to scheduled FCLP operations, OLF personnel will make a BASH sweep of the runway and pass BHC reports to the ODO and LSO.

2. OLF personnel will make periodic sweeps of the runway when breaks in flight operations allow, and report BHC to the ODO and LSO as necessary.

3. The LSO shall also report BHC to the ODO and issue radio advisories to inbound and pattern aircraft.

3.3.4 BHC Declarations by Maintenance Personnel, Sweepers, Grass Mowers, and Others

1. If a bird hazard exists, other personnel may notify the BDDT, Tower or ODO as applicable. This notification can be made on a radio net or by telephone. Telephone reports can be passed to the ODO at extension 7-2681. Reports should include:

a. Identity of caller (agency for ground personnel, call sign for aircrews.)

(1) Location.

(2) Altitude.

(3) Time of sighting.

(4) Approximate number of birds.

(5) Type of birds (if known).

(6) Behavior of birds (soaring, flying to or from a location, etc.)

3.3.5 Aircrew Reporting. Aircrews should report significant activity as follows:

a. Notify Tower (or LSO for OLF).

b. On a low level route/range area, notify ATC and NAS Whidbey Island Schedules after landing.

3.4 DOWNGRADING BHC. Once a BHC has been declared, it shall be downgraded commensurate with updated information. The Control Tower will make the final determination on BHC. For OLF Coupeville, the LSO will change BHC as required.

3.5 BIRD HAZARD COMMUNICATION. Disseminating BHC is critical to BASH effectiveness. The agencies below will disseminate the BHC by the following means:

3.5.1 Control Tower Communications

1. Include BHC on ATIS Broadcasts.

2. Notify inbound/departing aircraft of BHC if aircraft has received ATIS and the BHC has changed.

3. Provide additional bird advisories per reference (e).
4. The Tower Supervisor will direct the BDDT to the location where the wildlife is posing a problem.
5. Pass BHC to ODO/Flight Planning.
6. For rapidly changing BHC place a statement on ATIS advising aircrews to contact Ground, Tower, or Final Controller for the latest BHC.
7. Pass OLF BHC to aircraft outbound to OLF.
8. Notify other area airfields via ATC direct lines of all sightings of large flocks or migratory movements.
9. If BHC RED is declared for extended periods of time and will impact flying operations, Tower will notify Whidbey Approach.

3.5.2 ODO Communications

1. Notify the Operations Officer and Wing Operations when the BHC is changed to Condition Red.
2. Notify NPMOF of BHC reports for inclusion on Weathervision.
3. Pass OLF BHC to Tower.

3.5.3 NPMOF Office Communications

1. NPMOF Whidbey Island will post BHC in the remarks section of the Weathervision display.
2. Notify ODO and tower of birds detected by radar.

3.5.4 Flight Planning Communications

1. Flight Planning Office will, upon receiving the BHC from the Tower; activate the appropriate warning light color display in Base Operations.
2. Provide BASH information and warnings to local and transient aircrews.

3.6 BIRD DISPERSAL TEAM PROCEDURES. BDDT will actively patrol Ault Field Monday-Friday, sunrise to sunset, operating in two shifts. At other times, they will be activated on an as-needed basis. BDDT SOP procedures are contained in Appendix A.

a. Prior to initiation of dispersal actions the BDDT leader will coordinate the location and methods with the Tower Supervisor and ensure that BHC RED has been declared prior to dispersal activities on the duty runway.

b. Horns and bioacoustic distress calls should be used before pyrotechnics are used.

c. Pyrotechnics should be used in conjunction with distress tapes. These consist of screamer, whistle banger and cracker shells.

d. Propane sound cannons will be placed around the airfield and moved periodically (once a day) to prevent habituation.

e. If the methods above do not work or the birds become accustomed to the hazing, it may become necessary to remove several birds via lethal methods to reinforce the dispersal methods.

f. When the target flock or problem birds are dispersed, Tower shall be notified so the BHC can be lowered.

Note: Lethal control shall be within depredation permit guidelines.

3.7 BASH DISPERSAL EQUIPMENT

3.7.1 General. There are a variety of methods for dispersing birds using static, pyrotechnic, bioacoustics, and depredation equipment. Any or all of these may be used at NAS Whidbey Island/OLF Coupeville to control bird locations. The BDDT (and OLF personnel) are specially trained in use of this equipment.

3.7.2 Static Deterrent Devices. Static deterrents include, but are not limited to: propane cannons, scarecrows, silhouettes, and effigies. They are often very effective in bird deterrence. Static devices are designed to augment the activities of the bird dispersal teams. At no time should static deterrents be considered a replacement for dispersal teams. Static devices should be moved by the BDDT 50-100 feet from their existing locations at least once daily. This activity will inhibit the decline in their deterrent effect occurring as wildlife become accustomed to the device.

3.7.3 Propane Cannons. The BDDT will position and operate propane sound cannons based on active runway, bird locations, and

air traffic density. Locations will be changed daily to avoid habituation by the birds. At a minimum, one cannon each will be placed in the approach end, midfield and departure end.

3.7.4 Bioacoustics. Bioacoustics are audio taped distress or predator calls of actual birds. Special care must be taken to play the tape in short intervals to prevent habituation by the birds. The special playback equipment is located in the BDDT Vehicle (BASH 1). BDDT will play the tape 20-30 seconds, then pause briefly. Repeat as required. Birds should respond by taking flight or becoming alert. These calls are effective for waterfowl, gulls, songbirds and shorebirds. Pyrotechnics should be used in conjunction with bioacoustics to enhance complete dispersal. Bioacoustics will be the first option employed to control airfield bird habitation.

3.7.5 Pyrotechnics. Pyrotechnics are effective for dispersing most bird species and should also be used for coyotes, deer and other animals. Pyrotechnics are fired from modified pistols and 12 gauge shotguns. Pyrotechnics may include a variety of devices similar to commercial fireworks, including bangers, whistlers, screamers, and salutes. These small but very loud firecrackers are shot from the pistol/shotgun into flocks or near individual animals to frighten them away when they are discharged. Proper procedures for using Pyrotechnics are as follows:

a. Liaison with the Tower prior to discharging pyrotechnics and coordinate the location. If aircraft operations are imminent, ensure the BHC is raised prior to initiating dispersal operations.

b. Inform Security Police prior to discharging pyrotechnics on the flight line.

c. Use ear and eye protection, and gloves.

d. If applicable, play the distress call 20-30 seconds to get the birds to respond by taking flight or becoming alert. Do not be surprised if they gather around the vehicle that is playing the distress tape. They are responding to one of their own who they believe is "hurt" or "in distress."

e. **DO NOT LOAD THE GUN IN THE VEHICLE!** Step outside, cock the gun, load the cap then load the explosive in the barrel of the gun.

f. Point the gun at 45 degrees or higher into the air, preferably toward the flock of birds. Turn AWAY from the gun and pull the trigger.

3.7.6 Lethal Control (Depredation). Occasional depredation of birds reinforces the other methods. Shooting one or two from a flock then following with a volley of pyrotechnics is generally a very effective strategy for deterrence. Domestic Pigeons, European Starlings, and House Sparrows may be removed without permit. All birds (with the exception of the Domestic Pigeon, European Starling, and the House Sparrow) that are removed using lethal methods must be reported to the U.S. Fish and Wildlife Service under the Depredation permit process. Any mammals removed may require a state equivalent permit.

3.7.7 Record Keeping. BDDT will maintain daily activity logs. These logs will document all bird dispersal operations to include species, location, methods, and number of birds dispersed. These will be forwarded on a weekly basis to the BASH Officer. Monthly data will be summarized at BHWG, Aviation Safety and FOD Council Meetings.

3.8 CRASH CREW PROCEDURES. If fire-fighting crews detect the presence of birds in the bird exclusion zone outlined in Illustration (1), they will pass the information to the BDDT or Tower. When BDDT is not manned, crash vehicles may be used to disperse birds as required.

3.9 LAND MANAGEMENT PROCEDURES. One of the most effective and permanent methods of discouraging birds from using the airfield is the removal of attractive habitat features. Passive control methods are described below. Although effective, budget restrictions may preclude incorporating all of these measures. Implement land management procedures when funding and manpower resources are available.

3.9.1 Managing Grass Height

1. Mow to maintain a uniform grass height between 7 and 14 inches. Long grass discourages flocking species because reduced visibility disrupts interflock communication and prevents predator detection. When grasses do not naturally achieve at least 10 inches in height they should be encouraged to do so. Grass heights in excess of 14 inches may attract rodents and will also result in the grass laying flat (lodging) thus reducing its deterrent effect to flocking species.

2. Grass heights below 7 inches are of equal concern, as they are generally more attractive to birds which feed on the easily accessible worms and insects. Begin mowing adjacent to runways and finish in the infield or outer-most grass areas. This will cause insects and other animals to move away from aircraft take-off and landing areas.

3. Cut grass before it goes to seed to discourage seed eating birds.

3.9.2 Controlling Broad-leafed Weeds. Keep broad-leafed weeds to a minimum on the airfield. Apply herbicides as necessary for control. Broad-leafed weeds attract a variety of birds, may produce seeds or berries, and may limit grass growth. Obtain assistance in herbicide selection for weed control, appropriate grass seed selection, fertilization, and erosion control vegetation from BASH team recommendations, U.S. Soil Conservation Service, or the Agricultural Extension Service.

3.9.3 Planting Bare Areas. Eliminate bare areas on the airfield. Plant grass as necessary and appropriate to maintain ground cover at 7 inches to 14 inches in height.

3.9.4 Fertilizing. Selectively stimulate grass growth to promote a uniform cover at 7 inches to 14 inches in height. Irrigation may be required to support turf growth.

3.9.5 Removing Edge Effect. Maintain the airfield as uniformly as possible to reduce the transition zone between two distinct habitat types (e.g., brush to grassland).

3.9.6 Leveling of Airfield. Level or fill high or low spots to reduce attractiveness to birds and prevent standing water.

3.9.7 Removing Dead Vegetation. As soon as possible, remove dead vegetation such as brush piles, and the cover it affords.

3.9.8 Removing Bird and Animal Carcasses from the Airfield. This is to avoid attracting scavengers that feed on them. Forward remains, which may have been caused by collision with aircraft, to Environmental Affairs for identification.

3.9.9 Pest Control. Invertebrates and rodents are key food sources for many birds. Periodically survey and reduce these pests when required. Pesticides and traps can reduce pest populations. Only EPA approved pesticides are authorized, and they must be used strictly according to label instructions. Inspection and control should begin early in the spring after

coordination is made with the animal control section of the Natural Resources Management Plan.

3.9.10 Maintaining Drainage Ditches. Regularly inspect ditches to keep them clear. Maintain ditch sides as steeply as possible (minimum slope ratio of 5 to 1) to discourage wading birds and emergent vegetation. Improve drainage as necessary to inhibit even temporary ponds or puddles. When able, cover ditches with netting/plastic fencing.

3.9.11 Employing Erosion Control Vegetation. Use vegetation that is appropriate for the region and does not produce seeds at heights below 14 to 18 inches.

3.9.12 Eliminate Roosting Sites. Control roosts by vegetation management of roost sites where possible. Prune trees to reduce the number of perches if necessary.

3.9.13 Bird Proof Buildings and Hangars. Often, bird proofing of buildings and hangars is required to exclude Pigeons, Sparrows, and Swallows. Excluding birds from a structure they currently utilize will often displace them to an adjacent structure. Existing birds should be destroyed (in accordance with the depredation) prior to the exclusion effort whenever possible. Denying access by screening windows, closing doors, and blocking entry holes is most effective. When necessary consider:

a. Toxic perches. Install where maximum numbers of birds will contact them. Ensure perches are maintained with avicides to remain effective.

b. Pellet guns. A short term solution only. Proper safety equipment and skilled personnel are required.

c. Netting. Install under superstructure to exclude birds from roosting areas.

d. Avitrol. Pest Management should place in or near hangar to remove birds or create a distressed response that scares other birds.

e. Trapping and removal. Use a large cage with food and water to trap birds. Release birds away from buildings or depredate if permitted by law. Permits will be coordinated through Environmental Affairs.

f. Design features. If designing a new hangar, consider locating supports on the exterior.

g. 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.

h. Sharp projections. Use in limited areas such as ledges and overhangs, or small places where birds cannot be allowed. Too expensive for large areas.

i. Night harassment. Use high-pressure air or water to make hangars an undesirable roosting site. Persistence is the key.

3.10 MANAGING OFF-BASE LAND USE. The Navy cannot control off-base land use, however, when a proposed land use may increase or alter bird populations and habits (i.e., landfills, new crops, etc.), the Navy concerns should be addressed at public hearings and zoning meetings. Environmental Affairs, the NAS Whidbey Island Community Liaison Office and Public Works shall monitor off-base land use and report findings to the BHWG.

3.11 AGRICULTURAL OUTLEASES. Public Works and Environmental Affairs shall consider BASH when renewing agricultural lease contracts within the established exclusion zone. Planting agricultural leases to attract birds away from the bird exclusion zone should be considered.

CHAPTER 4

AIRCREW PROCEDURES

4.1 PLANNING THE FLIGHT

1. Check FLIP AP/1 (Supplementary Aerodrome Remarks) and NOTAMs for information about permanent and seasonal bird problems at both departure and destination airports and on route of flight.
2. Check Weathervision, rolling local NOTAMs and flight planning displays for BHC and BASH Windows in effect.
3. Consult with the Squadron Safety Officer or Squadron Duty Officer for additional BASH information.
4. Brief all crewmembers on potential bird problems and a strong lookout doctrine.
5. Discuss emergency procedures before departure, including aborts following a strike and engine failure. Note: 75% of all multi-engine strikes occur to engines on same side.
6. Discuss procedures for cockpit lost communications, including change of aircraft control.
7. Consider using combination sunglasses and visor during daylight hours and the clear visor at night during all low-level phases of flight.

4.2 AT THE AERODROME

1. Prior to taxi, listen to ATIS for current BHC. Ask Tower for specific bird locations or additional information.
2. When taxiing, watch for birds on the airport. The most frequently struck birds (gulls) have a gray or black coloring on their back making them hard to see on the tarmac or concrete. Flocking birds may be partially hidden in grass areas. Look for raptors circling overhead, perched in trees, tall bushes and on airfield structures. Report bird sightings to the Tower.
3. Birds on the ground face into the wind and may not see or hear you coming. They may take flight just prior to you reaching them.

4. If birds are observed, notify the Tower and request that BASH personnel disperse them before takeoff if they are in a location that presents a likely danger to your or another aircraft.
5. Increase interval on section departures to 20 seconds during condition Yellow. The lead aircraft in flight can cause birds to lift and circle behind causing a strike to the wingman.
6. Use landing lights during takeoff, climb, descent, approach and landing. Although there is no conclusive evidence that birds see and avoid aircraft lights, they **will** make the aircraft more visible.
7. Travel as much as possible above the bird layer. More than 50% of all strikes occur below 100' and 88% of all strikes occur below 2000 feet. In practice, this means to climb to 100 feet AGL as rapidly and safely as possible and continue to climb without delay to 2000 feet.
8. If you see birds ahead, attempt to pass above them, as birds usually break away downward when threatened.
9. If dense bird concentrations are expected, avoid high-speed descent and approach. Reducing speed can significantly reduce impact energy. The force of impact is roughly proportional to the square of the aircraft speed.
10. If flocks are encountered during approach, go around for a second attempt, the approach area may then be clear.
11. When able, descend and climb-out in a straight line. This makes it easier for the birds to anticipate your flight path and thus get out of your way.
12. Avoid flying one hour before and after dawn and dusk to the maximum extent practical.

4.3 LOW LEVEL ROUTES. Guidance for aircrew actions on routes or segments with severe bird activity is contained in amplifying COMVAQWINGPAC instructions. All flights must avoid those segments that are under BHC RED (Severe) based on migration patterns or Weather Radar reports. Additional low-level hazard guidance will be obtained from Bird Hazard Avoidance data provided by the United States Air Force BASH Team. Each squadron safety office should maintain a copy of this data. The following are some general operational changes to reduce threats from bird strikes, mission permitting:

a. When practical, reduce low-level flight time. Ninety-nine percent of all bird strikes occur below 2300 feet AGL.

b. Reduce formation flying. The first aircraft can redirect birds into trailing aircraft.

c. Reduced airspeeds will allow birds to be seen sooner and lessen damage in event of a strike.

d. Avoid areas with known raptor concentrations during summer, especially during 1000-1700 time frame due to increased thermals.

4.4 ACTIONS FOLLOWING A BIRD STRIKE

1. If airborne, complete the damaged aircraft checklist per specific NATOPS procedures.

2. During a takeoff or planned touch and go, the aircraft commander should assess the option of aborting if a bird strike occurs, and if enough runway remains to stop. Bird strike damage cannot be accurately assessed in flight and may result in a complex airborne emergency. Only maintenance personnel on the ground can make damage assessments. Several bird strikes that appeared to cause minor damage have proven to be much more substantial and, had aircrews continued the mission, a serious emergency could have resulted. Structural damage, such as a dent in the wing, has led to fuel and hydraulic system failures. Birds lodged in landing gear have prevented gear extension.

3. Aircrew experiencing en route bird strikes should abort the mission when possible.

4. After landing, if you suspect or have had a strike, check the aircraft for damage.

4.5 BIRD STRIKE REPORTING

1. Post flight follow-up and reporting of bird strikes are an essential and important part of the BASH program. After a strike:

a. If airborne, inform Control Tower and complete emergency landing, if required.

b. After post-flight inspection, preserve any remains (however slight) and notify BASH Team immediately on the BASH line at 7-BASH (7-2274). A member of the BASH Team/Environmental

Affairs will come to the hangar/ramp to collect remains, take pictures and assist aircrews in completing NAS Whidbey Island Bird Strike Form (5090/6). After-hours strike reports may be called into the ODO at 7-2681.

c. Report strikes even if no bird remains are found on the aircraft. BASH Team and airfield facilities personnel may be able to retrieve the bird on the airfield.

d. Follow up local reporting by completing the standardized "Bird/Animal Strike Hazard Report" form found in Annex N of reference (d) or via the Navy Safety Center web site www.safetycenter.navy.mil. Both damaging and non-damaging strikes are required to be reported. Forward a copy to Environmental Affairs, NAS N44.

e. All wildlife remains collected for identification must be reported to the appropriate Federal and State agencies. All collected avian species covered under the Migratory Bird Treaty Act must be reported through the Station's U.S. Fish and Wildlife Service Salvage permit. All station permitting requirements will be performed by the Environmental Department (N44).

2. The BASH team also encourages aircrew to report near misses that involve evasive action or whenever the proximity of the miss is "too close for comfort." These may be called in on the BASH Hot Line, 7-BASH. No forms required.

4.6 BIRD IDENTIFICATION. All strike data is entered into both local and Navy Safety Center databases to help track and identify bird hazards. Therefore, it is necessary to know which species are causing bird strike problems so appropriate measures can be taken. Identification of bird remains is essential. If bird remains are found on the aircraft, the following preservation procedures shall be followed:

a. During normal working hours, leave the remains on the aircraft and call the BASH Hot Line at 7-BASH. They will send a representative to remove the pieces.

b. After hours or on weekends, notify ODO at 7-2681. If a BASH/Environmental representative is unavailable, remove remains from aircraft, and place in zip lock plastic bag. It does not take much (remains) to identify the bird species. Even if just a small part, feather or bloody smear with down, the species can be identified through microscopic techniques. The next workday, call the BASH Line or Environmental Affairs, extension 7-1009 or 7-4330 for pickup of remains along with a completed NAS Whidbey Island Bird Strike Form.

NASWHIDBEYINST 5090.10A
4 Dec 2001

4.7 OPERATIONAL LIMITS AND GO/NO-GO CRITERIA

1. BHC RED

a. BASH dispersal efforts will be initiated immediately after BHC Red is set. Normally, the hazard can be removed within five minutes. However, if initial dispersal efforts have failed, the Control Tower will update delay information in five minute intervals to allow aircrew ample time to calculate fuel/divert/mission planning.

b. Guidance for aircrew actions during BHC RED is contained in amplifying COMVAQWINGPAC and COMPATRECONWING TEN instructions. In lieu of specific guidance, the following aircrew actions are recommended:

(1) Fuel and weather permitting, inbound aircraft will hold until BDDT actions or natural movements have lowered the hazard condition, otherwise proceed to alternate.

(2) Departing aircraft will hold on deck until BDDT actions or natural movements have lowered the hazard condition.

(3) Wind and weather permitting, request an off-duty runway from ATC if that runway hazard/BHC is lower

Note: If the bird/animal hazard is fouling the runway, the Control Tower will close the runway per FAA directives. Tower clearance will not be issued; accordingly, all operations will be at the discretion and risk of the pilot in command.

2. BHC YELLOW. Guidance for aircrew actions during BHC YELLOW is contained in amplifying COMVAQWINGPAC and COMPATRECONWING TEN instructions. In lieu of specific guidance, the following aircrew actions are recommended:

a. Delay or terminate practice approaches.

b. Modify altitude above the hazard (restricted low approach to 500 feet AGL, etc.)

c. Initial takeoffs and full stop landings are at the aircraft commander discretion.

d. Increase interval on section departures to 20 seconds minimum.

e. Increase spacing to a minimum 6000 feet between landing aircraft.

CHAPTER 5

LOCAL BIRD SPECIES

5.1 GENERAL. The following is a summary of birds within the airfield environment. Associated with each is a brief description of how they can be controlled or avoided. Each control measure will require action by one or more tasked organizations as described in Chapter 2. It is very important to know which avian species or airfield attractants are present before control techniques can be effectively applied.

5.2 AULT FIELD ANIMAL HAZARDS

5.2.1 Avian Species

5.2.1.1 Gulls. These birds represent the most significant hazard to aircraft at airports worldwide. Due to their omnivorous feeding habits and preference for flat, open areas to rest, they are commonly found on this airfield. Gulls are most active just after sunrise and before sunset as they move to and from feeding areas. Maintenance of grass height between 7 and 14 inches is critical in reduction of gull numbers. Even with this in effect, gulls may inhabit the airfield, particularly during inclement weather. Persistent harassment using pyrotechnics and bioacoustics is necessary to discourage these birds. Other techniques such as gas cannons, model gulls, radio-controlled model aircraft and even falconry should be considered if available and cost-effective. Poisoning of earthworms and insects (especially grasshoppers) may be accomplished if these invertebrates are found to attract gulls. Do not allow these birds to establish a habit of using the airfield to feed, breed, or rest.

5.2.1.2 Waterfowl (ducks, geese, swans). A distinction must be made between resident and migrating populations. Resident waterfowl are attracted to an area to breed or feed. Ponds, lakes, drainage ditches, etc., may attract these birds, particularly if these areas contain emergent or submerged vegetation for feeding, nesting, or shelter. Steepening ditch and pond banks and removing vegetation will reduce waterfowl numbers. When possible, drainage of water sources should be accomplished. Grain fields may also attract waterfowl in large numbers and should be eliminated. Pyrotechnics, gas cannons, and effigies are all excellent control techniques. Use of live ammunition or opening base areas to waterfowl hunting may also be used for control. Resident birds are most active at dawn and dusk, moving at low altitudes to and from feeding areas. Avoid

flying near wildlife refuges, or any ponds, lakes or rivers with known waterfowl concentrations during these times. Migrating waterfowl are particularly dangerous to flight safety due to the large numbers and generally higher altitude of the birds. Large flocks of waterfowl travel along traditional flyways to their breeding and wintering grounds during spring and fall. Huge flocks may stop along the route awaiting favorable weather conditions to continue. Migrating birds are most active from sunset through midnight, with numbers decreasing in the early morning hours. September through February is most hazardous. Avoidance of flying during the evening hours is generally safest. Wintering concentration areas should be avoided.

5.2.1.3 Loon, Grebes, Cormorants, Mergansers. These are fish eating birds. Control is best accomplished by removing fish-producing ponds near the airfield. Removal of the food source is not always possible, though pyrotechnics can be used to effectively frighten the birds from the area. Avoid flying at sunrise and sunset when large flocks, often in formation, can be found flying to and from feeding areas.

5.2.1.4 Long-legged Waders (Hérons and Egrets). Most of these species are attracted to water where they feed on fish, amphibians, reptiles, and arthropods. Control is best accomplished by eliminating the food sources. Steepening the sides of ditches and ponds and removing emergent vegetation will drastically reduce accessibility to food sources. Pyrotechnics should be used to disperse any birds that do not disperse after habitat modification.

5.2.1.5 Raptors (Hawks, Falcons, Kites, Eagles, Vultures). These birds can be particularly hazardous to aircraft because of their size and widespread distribution over bases and low-level areas. Raptors (particularly vultures) use thermals to their advantage to search for prey. These birds become active during mid-morning and remain aloft until late afternoon. Avoid areas with thermal-generating terrain such as ridgelines, rolling hills, water. Landfills are particularly attractive to soaring vultures. In the fall, raptors migrate by day to areas of heavy winter concentrations in the southern states. These birds can be controlled by removal of dead animals and removal of dead trees and other perching sites on the airfield. Pyrotechnics may be used to frighten raptors from the airfield.

5.2.1.6 Grouse, Quail, and Pheasants. These game birds are most effectively controlled through proper grass-height management. Do not allow grass to exceed 18 inches and eliminate all weeds and brush patches on the fields, particularly if the plants are

seed producing. Pyrotechnics, gas cannons, live ammunition or periodic hunts can effectively disperse these birds. The destroying of these birds outside the normal hunting season requires special permits from the U.S. Fish and Wildlife Service and the state wildlife agency.

5.2.1.7 Sandpipers/Shorebirds. The most significant hazard from these birds occurs when large numbers flock in tight groups, particularly during migration and along coastlines. Many of these species such as Sanderlings and Dunlins may nest on airfields in the fall and winter. To control these birds, proper grass height management must be observed. Water in puddles should be eliminated and ditch banks steepened to limit access to these birds. Other species such as Killdeer are quite adept at avoiding aircraft. Pyrotechnics and bioacoustics can be used for all species and some respond well to falconry.

5.2.1.8 Terns. These are fish eating, gull-like birds in coastal areas and on some major river systems and lakes. Avoid flying near areas where these birds may be active, such as nesting colonies or piers in coastal areas. Remove the food source if these birds pose a significant hazard.

5.2.1.9 Owls. Most owls are nocturnal and attracted to rodents as a food source. Rodent control may be necessary on the airfield. Limit the number of perch sites by removing perch sites such as unnecessary fence posts and dead trees. Avoid over flying landfills at night to reduce hazards from owls.

5.2.1.10 Goatsuckers (Nighthawks), Whippoorwills, etc. These birds are active particularly at sunset when insects are abundant. Little can be done to limit their number other than insect control. Avoid flying at times when these birds are abundant, particularly near lakes, streams, or other areas with large insect populations.

5.2.1.11 Woodpeckers. Woodpecker strikes should be extremely rare. These birds are common in forested areas, but generally remain below canopy level. On the airfield, elimination of trees should eliminate strikes with these birds. Migratory birds may be encountered, but are rarely struck.

5.2.1.12 Flycatchers. These birds are present on airfields to feed on insects. Strikes are infrequent, but should not be overlooked. Control is best accomplished by control of insects and removal of perch sites such as fence posts, tree limbs, bushes, high spots on the field, etc.

5.2.1.13 Horned Larks. These birds are very difficult to control. They are attracted by bare spots such as along runway sides, where they eat weed seeds and insects. The best defense against these birds is a thick, uniform grass with no bare spots. Consider coating bare spots, particularly along runways, with oil-base or asphalt cover. Pyrotechnics can be used, but these birds will tend to fly only short distances and settle down. Persistence is the key to success.

5.2.1.14 Swallows and Swifts. These birds eat insects in flight and are commonly found above airfields. Insect control will reduce Swallow numbers and discouragement of nesting will further decrease numbers. Remove mud nest from hangars, etc., with a hose as the birds begin nesting and when nesting is complete. Nesting in hangars can be discouraged by harassing the birds as they work on building. If Swallows are noted resting on runways or taxiways, use pyrotechnics to disperse them. Nest removal from hangars shall be coordinated with the Environmental Affairs Department. Nest removal is covered by a permit with the U.S. Fish and Wildlife Service.

5.2.1.15 Crows and Ravens. These omnivorous birds are common in open areas and around landfills and solid waste transfer stations. These birds may occur in large flocks particularly at sunset as they return to roost sites. Proper grass-height management will reduce population numbers. Remove any known roost sites or thin individual roost trees. Landfills and transfer stations must be operated in a manner to discourage these birds. Bioacoustics, pyrotechnics, and lethal methods can be used to frighten and remove these birds if they occur on the field.

5.2.1.16 Blackbirds, Grackles, Cowbirds, and Starlings. These birds can be particularly hazardous because they frequently occur in huge flocks, sometimes in the millions. Blackbirds and Starlings are attracted to flat, open areas to feed, rest, or stage/pre-roost. Maintenance of grass height between 7 and 14 inches is the best method of reducing airfield Blackbird and Starling numbers. Blackbirds and Starlings respond well to an intense frightening program using bioacoustics and pyrotechnics. Other methods should be used to supplement this program as necessary. Starlings are not federally protected and may be removed without permits. Permits are required for other species. Occasional shooting of birds will reinforce other frightening techniques. Poisoning or trapping may also be considered with U.S. Fish and Wildlife Service and USDA Wildlife Service assistance. If these birds occur in hangars, toxic bird perches are recommended to eliminate the problem. Avoid at all costs

flying near known Blackbird and Starling roosts, especially at sunrise and sunset and during spring and fall migration.

5.2.1.17 Meadowlarks. These birds occur on nearly every airfield and are attracted to grasslands and low weeds. Eliminate broad-leaved weeds and maintain grass height at 7-14 inches. Elimination of suitable perching sites, such as fence posts and brush will also aid in reduction. Pyrotechnics can be used, but Meadowlarks usually only fly a short distance before settling down again. Persistence is the key to success.

5.2.1.18 House Sparrows. These birds are not frequently struck by aircraft, but are common pests around structures. House Sparrows often nest in hangars and dense shrubs and trees. These birds are not protected by law and may be destroyed without permit. Toxic bird perches may be used to remove house sparrow from hangars or other structures. Frightening techniques are usually ineffective against these birds.

5.3 MAMMALIAN SPECIES. While concern is mostly centered on birds, several mammalian species also pose threats to flight operations and must be considered. Close coordination with the station Integrated Natural Resources Management Plan is necessary to reduce this type of hazard.

5.3.1 Coyotes. These animals are attracted to airfields by rodents, rabbits and other food sources. Dens may be found in banks, culverts, or other suitable areas. Rodent control will reduce the numbers of these animals. Pyrotechnics can be used to frighten these species and occasional shooting and trapping of individual animals or recurrent pests will also reduce the hazard. Permits may be required.

5.3.2 Rabbits. In addition to direct hazards to aircraft these animals often attract raptors. Proper grass management will reduce the numbers of these animals on airfields. Poisoning can also be effective for reduction of populations. Permits may be required.

5.3.3 Rodents. These animals attract raptors. Control by maintaining a uniform turf at the proper heights. Rodenticides may be used in some cases.

5.3.4 Deer. This mammalian species poses the greatest threat to aircraft due to its size and preferred nocturnal activities. Control techniques include modifying perimeter fences to become deer proof and selected shooting of problem individuals.

5.4. OLF COUPEVILLE

5.4.1 Avian Species

5.4.1.1 Pheasant and Quail

1. These game birds are most effectively controlled through proper grass height management. Do not allow grass to exceed 14 inches and eliminate all bush and weed patches on the field, particularly if the plants are seed producing. Pyrotechnics, gas cannons, live ammunition or periodic hunts can effectively disperse these birds. The shooting of these birds outside the normal hunting season requires special permits from the Washington Department of Fish and Wildlife.

2. Artificial introduction or release of these birds on the airport environment is discouraged.

5.4.1.2 Gulls. These birds represent the most significant hazard to aircraft worldwide. Due to their omnivorous feeding habits and preference for flat, open areas to rest, they are commonly found on airfields. Gulls are most active just after sunrise and before sunset as they move to and from feeding areas. Improperly operated landfills are a significant source of attraction for gulls and should not be allowed in the airfield vicinity. Maintenance of grass height between 7 and 14 inches is critical in reduction of gull numbers. Even with this in effect, gulls may inhabit the airfield, particularly during inclement weather. Persistent harassment using pyrotechnics and bioacoustics is necessary to discourage these birds. Other techniques such as gas cannons, model gulls, radio-controlled model aircraft and even falconry should be considered if available and cost-effective. Poisoning of earthworms and insects (especially grasshoppers) may be accomplished if these invertebrates are found to attract gulls. Do not allow these birds to establish a habit of using the airfield to feed, breed, or rest.

5.4.1.3 Sandpipers/Shorebirds. The most significant hazard from these birds occurs when large numbers flock in tight groups, particularly during migration and along coastlines. Many of these species such as Sanderlings and Dunlins may rest on airfields during fall and winter months. To control these birds, proper grass height management must be observed. Water in puddles should be eliminated and ditch banks steepened to limit access to these birds. Other species such as killdeer are quite adept at avoiding aircraft. Pyrotechnics, bioacoustics can be used for all species and some respond well to falconry.

5.5 OLF COUPEVILLE MAMMALIAN SPECIES. While concern is mostly centered on birds, several mammalian species also pose threats to flight operations and must be considered. Close coordination with the station Integrated Natural Resources Management Plan is necessary to reduce this type of hazard.

5.5.1 Coyotes. These animals are attracted to airfields by rodents, rabbits and other food sources. Dens may be found in banks, culverts, or other suitable areas. Rodent control will reduce the numbers of these animals. Pyrotechnics can be used to frighten these species and occasional shooting and trapping of individual animals or recurrent pests will also reduce the hazard. Permits may be required.

5.5.2 Rabbits. In addition to direct hazards to aircraft these animals often attract raptors. Proper grass management will reduce the numbers of these animals on airfields. Occasional extensive rabbit hunts on the field can reduce populations for several subsequent years. Poisoning can also be effective for reduction of populations. Permits may be required.

5.5.3 Rodents. These animals attract raptors. Control by maintaining a uniform turf at the proper heights. Rodenticides may be used in some cases.

5.5.4 Deer. This mammalian species poses the greatest threat to aircraft due to its size and preferred nocturnal activities. Control techniques include modifying perimeter fences to become deer proof and selected shooting of problem individuals.