Wildlife Hazard Management Plan
Seattle-Tacoma International Airport

Port of Seattle

August 2000

SEATTLE-TACOMA INTERNATIONAL AIRPORT (SEA)
WILDLIFE HAZARD MANAGEMENT PLAN

Developed by:

Seattle-Tacoma International Airport
P.O. Box 68727
Seattle, WA 98168-0727

In Cooperation with:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services
720 O'Leary St., NW
Olympia, WA 98502

August 2000

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EXECUTIVE SUMMARY

Pursuant to CFR Title 14 FAR part 139.337(e), the Port of Seattle's Seattle-Tacoma International Airport (SEA) developed this Wildlife Hazard Management Plan (WHMP) in cooperation with the U.S. Department of Agriculture's Wildlife Services program to replace the Port's earlier Wildlife Hazard Management Plan, which is already in place and approved by the FAA. This plan will be reviewed periodically by the Wildlife Hazard Working Group and will be updated if changing circumstances merit. All changes made to the WHMP will be sent to the FAA for approval.

The plan places a particular emphasis on identification and abatement of wildlife hazards within the airfield environment. Additional wildlife attractants (e.g., lakes, ponds, landfills, etc.) within 5 miles of the airfield are also addressed as they could potentially attract wildlife in a manner that could jeopardize safety of air traffic operating into and out of SEA.

SEA will take immediate measures to identify and mitigate wildlife hazards whenever they are detected or whenever airport management has been advised that hazardous conditions exist. The plan outlines steps for monitoring, documenting, and reporting potential wildlife hazards and strikes at SEA. Protocols for responding to hazardous wildlife situations are presented, including roles and responsibilities of airport personnel. Wildlife control procedures for birds and mammals are also discussed.

Habitat on and around the airfield will be managed in a manner that is non-conducive to hazardous wildlife, and the plan outlines priorities for habitat management, including target dates for completion.

Most wildlife is afforded some type of protection under state or federal regulations, therefore, special permits may be required for their control. The plan outlines laws and regulations governing the harassment or take of various types of wildlife. SEA's permit status for each type of wildlife is presented in tabular format, and a copy of the federal migratory bird depredation permit is included as an appendix to the plan.

SEA will maintain an adequate supply of resources for dispersing and controlling wildlife, including frightening devices (e.g., pyrotechnics, propane exploders, Mylar flash tape), wildlife restraint equipment (e.g., traps, catch poles), and firearms. SEA personnel will be trained to properly identify wildlife and apply wildlife deterrent equipment in a safe and efficient manner, as outlined in this plan.

A site-specific monitoring plan was developed to detect and respond to wildlife hazards that may unexpectedly occur at any of the three proposed mitigation sites associated with the Master Plan Update Projects, including the new third runway. A decision model (graphically displayed as a flow chart) was developed to accurately assess the level of wildlife hazards associated with these sites and to augment implementation of the appropriate control response under various circumstances. If the hazards can not be mitigated to an acceptable level with traditional methods, the sites may have to be altered. Significant alteration of these sites may require agency consultation and/or certain environmental permits and replacement mitigation.

SIGNATORIES

The following Wildlife Hazard Management Plan for Seattle-Tacoma International Airport has been reviewed and accepted by the FAA. It will be become effective with the following signatures:

Mark Coates, SEA Airfield Line of Business, Manager Airfield	Date
Lynn Deardorff, FAA Airport Certification Inspector	Date
Mike Linnell, USDA-Wildlife Services, Staff Wildlife Biologist	Date

PREFACE

This Wildlife Hazard Management Plan Manual was written to fulfill the requirements of CFR Title 14 FAR part 139.337(e) for Seattle-Tacoma International Airport (SEA). This manual is intended specifically for the Airport's use to monitor and reduce wildlife hazards.

DISTRIBUTION OF WILDLIFE HAZARD MANAGEMENT PLAN

NAME / POSITION / PHONE	AGENCY / ADDRESS
CHARLES BLOOD General Manager, Airfield Line of Business (206) 433-4664	Seattle-Tacoma International Airport P.O. Box 68727 Seattle, WA 98168-0727
MARK COATES Airfield Line of Business, Manager Airfield (206) 248-6864	Seattle-Tacoma International Airport P.O. Box 68727 Seattle, WA 98168-0727
STEVEN OSMEK SEA Biologist (206) 431-4453	Seattle-Tacoma International Airport P.O. Box 68727 Seattle, WA 98168-0727
ELIZABETH LEAVITT Senior Environmental Program Manager	Seattle-Tacoma International Airport 17900 International Blvd., Suite 301 Seattle, WA 98188
LYNN DEARDORFF Airport Certification Safety Inspector Intermountain NW Region (425) 227-1621	Federal Aviation Administration Airports Division 1601 Lind Avenue S.W., Suite 315 Renton WA 98055-4056
CAYLA MORGAN Seattle Airports District Office Environmentalist - Washington Section	Federal Aviation Administration Seattle Airports District Office 1601 Lind Avenue S.W., Suite 250 Renton WA 98055-4056
MIKE LINNELL Staff Wildlife Biologist - WA/AK (360) 753-9884	U.S. Department of Agriculture - Wildlife Services 720 O'Leary St. N.W. Olympia, WA 98502
JASON GIBBONS Wildlife Specialist	U.S. Department of Agriculture - Wildlife Services 720 O'Leary St. N.W. Olympia, WA 98502
JONATHON FREEDMAN Regulatory Section, Seattle District 206 764 6905	U.S. Army Corps of Engineers P.O. Box 3755 Seattle, WA 98124-2255

NAME / POSITION / PHONE	AGENCY / ADDRESS
TOM LUSTER Permit Coordination Unit 360 407 6918	Washington Department of Ecology P.O. Box 47600 Olympia, WA 98504-7001
JAMES KELLEY Wetland Biologist (425) 822-8880	Parametrix, Inc. 5808 Lake Washington Blvd. N.E., Suite 200 Kirkland, WA 98033-7350
PAUL FENDT Hydrologic Engineer (425) 822-8880	Parametrix, Inc. 5808 Lake Washington Blvd. N.E., Suite 200 Kirkland, WA 98033-7350
SEA Airport Supervisors (9)	
SEA Senior Ramp Controller (12)	
SEA Landscape Committee (10)	

TABLE OF REVISIONS

This Wildlife Hazard Management Plan is incorporated into the Seattle-Tacoma International Airport Master Plan. The bottom of each page contains a date in the footer, which is the date that the particular page was printed. The latest dated page will be the most current for the policy. The master document is contained in the offices of the Seattle-Tacoma Airport Operations Manager. Revisions to this plan will be recorded on the revisions page below.

DATE	PAGE	REVISION

LIST OF ACRONYMS

ADO	Airports District Office
AGL	Above Ground Level
AMA	Aircraft Movement Area
ATCT	Air Traffic Control Tower
ATIS	Automated Terminal Information Service
CFR	Code of Federal Regulations
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
NOTAM	Notice to Airmen
SEA	Seattle-Tacoma International Airport
SIDA	Security Identification Display Area
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WHMIS	Wildlife Hazard Management Information System
WHMP	Wildlife Hazard Management Plan
WHWG	Wildlife Hazard Working Group
WS	Wildlife Services

1.0 - INTRODUCTION

1.1 - OVERVIEW

Wildlife hazard management plans (WHMPs) address the responsibilities, policies, and procedures necessary to reduce wildlife hazards at airports. Recognizing the potential hazards wildlife pose to aircraft and human lives, the Federal Aviation Administration (FAA) requires airports that incur bird-aircraft strikes implement a WHMP according to Code of Federal Regulations (CFR) Title 14 FAR part 139.337(e)(a complete copy of Part 139.337 is attached as Appendix A). The WHMP must include 7 required components according to CFR Title 14 FAR part 139.337(e). Each of these components is sequentially represented as a separate chapter in this document. These required categories are as follows:

1. *The persons who have the authority and responsibility for implementing the plan.*

2. *Priorities for needed habitat modification and changes in land use identified in the ecological study, with target dates for completion.*

3. *Requirements for and, where applicable, copies of local, state, and Federal wildlife control permits.*

4. *Identification of resources to be provided by the certificate holder for implementation of the plan.*

5. *Procedures to be followed during air carrier operations, including at least-*
   (i) Assignment of personnel responsibilities for implementing the procedures;
   (ii) Conduct of physical inspections of the movement area and other areas critical to wildlife hazard management sufficiently in advance of air carrier operations to allow time for wildlife controls to be effective;
   (iii) Wildlife control measures; and
   (iv) Communication between the wildlife control personnel and any air traffic control tower in operation at the airport.

6. *Periodic evaluation and review of the wildlife hazard management plan for-*
   (i) Effectiveness in dealing with the wildlife hazard; and
   (ii) Indications that the existence of the wildlife hazard, as previously described in the ecological study, should be reevaluated.

7. *A training program to provide airport personnel with the knowledge and skills needed to carry out the wildlife hazard management plan required by (d) of this section*

In addition to the requirements stated above, CFR Title 14 FAR part 139.337(f) outlines procedures and personnel responsibilities for notification regarding new or immediate hazards, and describes the rapid response procedures for addressing new or immediate wildlife hazards. Section (f) is extremely important because it allows the WHMP to be promptly modified and updated to address new situations or changing circumstances. To augment compliance with CFR Title 14 FAR part 139.337(e), the FAA issued a Certalert (No. 97-09 [see Appendix B]) to

provide guidance to airports in developing their plans. This Certalert contains a sample outline that was followed in the development of this plan.

1.2 - PROBLEM SPECIES

The species generally considered to present the greatest threats to aviation at Seattle-Tacoma International Airport (SEA) are birds with flocking tendencies or of relatively large size, such as waterfowl, gulls, pigeons, starlings, and raptors. Large mammals such as deer, bear, and coyotes may also present an extreme hazard, although they are not as common at SEA as birds because the airport has a well maintained perimeter fence. Juvenile animals and migratory species may also pose higher risks for aviation because of their general unfamiliarity with the airport environment.

1.3 - PURPOSE AND SCOPE

Enhancing safe air carrier operations is a primary objective of the Port of Seattle. Accomplishing this objective entails careful monitoring of all aspects of arriving and departing aircraft in the vicinity of SEA, including potential wildlife hazards on and around the airport. As part of its safety efforts, SEA intends to implement and maintain a WHMP according to CFR Title 14 FAR part 139.337(e) to address potential wildlife hazards at SEA and surrounding areas, with a particular emphasis on hazards within approximately 2 miles of the airfield (see Appendix G). In addition to addressing general wildlife hazards, this plan will present specific protocols for monitoring and responding to potential wildlife hazards that may arise at any of three wetland mitigation projects (Miller Creek Buffer, Tyee Valley Golf Course (Des Moines Creek), and Vacca Farm) associated with Master Plan Update development projects (Appendix I).

It is important to note that Part 139.337(f) underscores the need for a flexible plan that can be quickly adapted to changing circumstances. In some rare cases, however, immediate actions may be necessary that are not addressed in this plan to ensure the safety of airport patrons. This plan provides SEA with the discretion and capability to respond to these situations, while providing guidance for compliance with applicable Federal, state, and municipal laws or regulations. The latitude afforded SEA management when administering this plan is discussed in CFR 14 - Part 139.113, which states that:

> ***"In emergency conditions requiring immediate action for the protection of life or property, involving the transportation of persons by air carriers, the certificate holder may deviate from any requirement of Subpart D of this part to the extent required to meet that emergency. Each certificate holder who deviates from a requirement under this paragraph shall, as soon as practicable, but no later than 14 days after the emergency, report in writing to the Regional Airports Division Manger stating the nature, extent, and duration of the deviation."***

This plan will be valid until SEA management or FAA determines that the plan should be updated due to changed conditions or new needs for action. The plan will be reviewed at least annually to ensure it still pertains to conditions at the time of review, but it may also be revisited more often if situations arise or hazards exist that merit evaluation.

2.0 - AUTHORITY

FAR 139.337(e)(1) The persons who have authority and responsibility for implementing the plan.

SEA's Airfield Manager has the authority and responsibility of designating a Wildlife Coordinator to implement the WHMP. Each department and associated agencies have responsibilities outlined in the WHMP and must incorporate them into their programs. Clear communication among airport personnel is essential for the WHMP to succeed. Personnel working at the airport will communicate resource needs, recommendations, and progress to the designated Wildlife Coordinator. The Airfield Manager will ensure that the WHMP is approved by the FAA and that the WHMP and amendments comply with Federal, state and local laws and regulations.

2.1 - WILDLIFE HAZARD WORKING GROUP (WHWG)

The Wildlife Hazard Working Group is responsible for reviewing the WHMP, as it relates to each member's respective departmental duties on an annual basis. In addition, the group will monitor activities, status, and make recommendations to the Wildlife Coordinator, who will in-turn review and grant approval if satisfied with the progress of the WHMP. The working group will meet once a year, with intermittent meetings when necessary.

The Wildlife Hazard Working Group will be represented by:

- Airfield Manager (Wildlife Coordinator)
- SEA Airfield Biologist
- Planning and Engineering
- Operations - Portable 21 Supervisor
- Operations - one Senior Ramp Controller
- Airfield Maintenance Supervisor
- FAA Airport Certification Safety Inspector
- Wildlife Services Biologist (USDA)

2.2 - PERSONS RESPONSIBLE FOR IMPLEMENTING THE PLAN

AIRFIELD MANAGER (WILDLIFE COORDINATOR)

- Establish a Wildlife Hazard Working Group for SEA.
- Supervise, coordinate, and monitor wildlife control activities as outlined in the WHMP.
- Update the WHMP as necessary.
- Disseminate information and assignments through the Wildlife Hazard Working Group.
- Pre-approve and coordinate landscape changes beforehand with the Wildlife Coordinator and/or Biologist to ensure wildlife attractants are prevented.
- Provide public relations support for wildlife control activities as necessary.

AIRFIELD BIOLOGIST

- Alleviate all attractants deemed an imminent hazard and, if necessary, coordinate a runway closure to remedy wildlife hazards.
- Coordinate the issuance of Notices to Airmen (NOTAM). In addition, have the Air Traffic Control Tower (ATCT) advise pilots on ATIS.
- Insure only properly trained and badged wildlife control personnel operate on the AOA in accordance with FAA regulations (e.g., SIDA). Such training includes radio communications, driving on the AOA, and safe use of firearms and pyrotechnics.
- Provide public relations support for wildlife control activities as necessary
- Monitor facilities and tenant concerns for wildlife problems.
- Keep a log of all wildlife strikes and control actions and forward reports to FAA as necessary. Control actions will be documented and are available for the airport environmental staff on request.
- Make wildlife strike report forms (FAA form 5200-7 [Appendix E]) readily available to airfield operations and pilots, and encourage submission of the forms to the appropriate governmental agencies and wildlife control personnel.
- Ensure wildlife attractants are reduced through habitat modifications. Coordinate with airport environmental staff of all modifications planned in wetlands, streams, or

on-site mitigation areas. Work with airport maintenance to alter wildlife habitat as needed.

- Review all plans involving changes in land use or new airport structures/facilities to avoid inadvertently attracting wildlife to the area, and consult with a wildlife damage biologist if necessary.
- Conduct frequent physical inspections of areas critical to wildlife hazard management.
- Obtain depredation permits to control migratory birds, and if necessary, mammals, from Federal or state wildlife agencies.

AIRFIELD LINE OF BUSINESS, AIRPORT OPERATIONS (AIRPORT SUPERVISORS, SENIOR RAMP CONTROLLERS, MAINTENANCE AND ENGINEERING)

- Log all known wildlife strikes on form FAA 5200-7 (Appendix E) and forward the forms to the Wildlife Coordinator and/or Biologist.
- Warn the air traffic control tower and pilots of known wildlife hazards.
- Insure wildlife-attracting refuse does not accumulate in fields and ditches on the airport.
- Inspect critical areas for wildlife activity and strikes and maintain a record of the action, even if no wildlife was present.
- Haze wildlife from critical areas when appropriate as outlined in Chapter 6.
- Record all wildlife activity or animals dispersed or shot on the "Daily Wildlife Activity Report" (Appendix F), and report to the Wildlife Coordinator and/or Biologist.
- Maintain ditches and fields to ensure that water flows (see Section 3.3.3), thereby avoiding pooling and accumulation of refuse on the airport.
- Assist with, or contract out habitat modifications addressed in the WHMP, such as vegetation maintenance along ditches, brush removal, and tree pruning. Coordination with airport environmental staff is required before work in wetlands or on-site mitigation areas is completed.
- Install and maintain netting, wire grids, or other exclusion devices, over ponds, ditches, and other water areas as determined necessary by the Wildlife Coordinator and after coordination with airport environmental staff.
- Maintain the perimeter fence to exclude mammals such as deer, bear, and coyotes.

- Pick up all trash and debris on the airfield.
- Minimize pooling formed by rain on tarmac and infield areas, grading if necessary.
- Assist with wildlife control activities involving field rodents, rabbits, and bird abatement, and other programs.
- Inform Wildlife Coordinator of rodents and other wildlife found in and around buildings.
- Rodent-proof buildings, dumpsters, and other refuse containers to the extent feasible.

PORT PLANNING/ENGINEERING/ENVIRONMENTAL

- Review designs of new structures, facilities, and plant species used for landscaping with the Biologist during the planning stages for input on alternatives that are unattractive to wildlife.
- Involve the Biologist with land use planning and mitigation efforts.
- Assist the Biologist in evaluating permit requirements and agency coordination for activities in wetlands, streams, or on mitigation sites.

FEDERAL AVIATION ADMINISTRATION (FAA)

- Assist SEA in reviewing proposed land use changes, construction plans, and mitigation projects for potential wildlife hazards to aircraft.
- Review changes or edits to the WHMP.

WILDLIFE SERVICES (USDA)

- Assist SEA personnel in monitoring the airport environment for wildlife hazards, taking corrective action, if necessary, and record and submit all findings to the Wildlife Coordinator or Wildlife Biologist.
- Inform and advise the Wildlife Coordinator or Wildlife Biologist of wildlife management activities, habitat modification needs, and imminent wildlife hazards that require the issuance of a NOTAM or runway closure.
- Assist with training airport personnel in the safe handling and proper use of wildlife dispersal methods and equipment.
- Coordinate wildlife control activities with state and Federal wildlife agencies and municipal law enforcement.

- Assist SEA in reviewing proposed land use changes, construction plans, and mitigation projects for potential wildlife hazards to aircraft.

- Provide operational assistance to SEA to control starlings, pigeons, geese, or other wildlife deemed hazardous by SEA and WS.

3.0 - HABITAT MANAGEMENT

FAR 139.337(e)(2) ***Priorities for needed habitat modification and changes in land use identified in the ecological study with target dates for completion.***

3.1 - OVERVIEW

Habitat management provides the most effective long term remedial measure for reducing wildlife hazards on, or near, airports. Habitat management includes the physical removal, exclusion, or manipulation of areas that are attractive to wildlife. The ultimate goal is to make the environment fairly uniform and unattractive to the species that are considered the greatest hazard to aviation. Habitat modifications will be monitored carefully to ensure that they reduce wildlife hazards and do not create new attractions for different wildlife. Table 1 lists a series of both habitat and non-habitat based action items/priorities, with target dates for completion.

Table 1. Management priorities for projects to reduce wildlife hazards at Seattle-Tacoma International Airport are listed, along with the target dates for completion and date that each project was completed. Note that some of the projects may have already been implemented or completed, but because they require a continued effort (e.g., brush removal from drainage ditches), they are listed as "ongoing".

SEA WILDLIFE MANAGEMENT PROJECTS	TARGET DATE	DATE COMPLETED
Exclude all current and potential bird perching areas, (i.e. terminals, walkways, parking garage)		Ongoing
Move starling roost at south end of terminal by hazing and thinning tree canopy	September 1999	September 1999
Plant scrub/shrub habitat on golf course fairway and Vacca Farm	Fall 2001	
Remove Scotch broom/ blackberry shrubs within 200 yards of all aircraft movement areas		Ongoing
Clear and maintain ditches throughout airfield to enhance drainage		Ongoing
Evaluate potential wildlife hazards associated with new construction		Ongoing
Remove fruit and nut bearing trees on SEA property (N. runway protection)	Summer 2001	
Net, grade, or fill tire ruts on infield caused by construction equipment	Every Fall	
Maintain wildlife-proof fencing around airfield		Ongoing

SEA WILDLIFE MANAGEMENT PROJECTS	TARGET DATE	DATE COMPLETED
Evaluate potential ground covers that are unattractive to wildlife	Fall 1999-2003	
Maintain updated migratory bird depredation permits and other permits as needed.		ongoing
Stock and maintain wildlife control supplies		ongoing
Develop a computerized record keeping system for wildlife strikes and hazing efforts	Summer 2001	
Maintain a zero-tolerance wildlife control program on airfield for hazardous species and events		ongoing
Maintain starling and pigeon trapping program		ongoing
Designate a Wildlife Coordinator		Fall 2000
Develop and maintain a Wildlife Hazard Management Plan		2000 - ongoing
Evaluate potential wildlife hazards associated with new construction		ongoing
Train employees in the safe and effective application wildlife dispersal and incident reporting procedures.	Fall 1999	Annually

3.2 - ATTRACTANTS

3.2.1 - General Zone and Critical Zone

The *General Zone* for SEA Airport is defined as the area within a five-mile radius of the runway centerline. Wildlife attractants in this area could potentially impact air traffic safety operating out of SEA, particularly those attractants that lie within the approach and departure patterns. The objective of this plan is to actively reduce attractive wildlife habitat on property under the control of the Port of Seattle, while working cooperatively with adjacent property owners to discourage land-use practices that might increase wildlife hazards

The area within a 10,000-foot radius of the runway centerline is delineated as the *Critical Zone* (see aerial in Appendix G) Control efforts will be primarily concentrated within this area because within 10,000 feet of the runway centerline is the area where arriving and departing aircraft are typically operating at or below 500 feet AGL (above ground level), an altitude that also corresponds with the most bird activity. Approximately 75% of all civil bird-aircraft strikes occur within 10,000 feet of the airfield from which they depart or arrive. Some of the most prominent attractants on Port of Seattle property include the industrial wastewater lagoons, Tyee golf course, Lora Lake, and the Reba detention facility. Off-site attractants include Angle Lake, Bow Lake and Vacca Farms.

3.2.2 - Edge Removal

Edges are the places where different habitats meet and are often most attractive to wildlife because the animal's biological needs can be met in a relatively small area. Much of the "edge" at SEA consists of a forest-grassland transition that has been pushed back at least 400 feet from the runway by SEA maintenance, this policy will continue. Monotypic plant communities on and around the airfield should be encouraged.

3.2.3 - Airport Building Projects

The Wildlife Coordinator and/or Biologist should participate in the initial phases of all airport building projects to avoid and inadvertent increase in wildlife hazards resulting from architectural or landscape changes. The participation will be especially important during construction of the third runway, when the SEA airfield environment will be extremely dynamic. Thus, additional effort will be required to ensure that new projects and construction activities are designed in a manner that minimizes wildlife attractants. The FAA's Seattle Airports District Office (ADO) reviews proposed construction activities for potential wildlife attractions when the FAA Form 7460-1 application is submitted, and may also solicit input from Wildlife Services.

3.2.4 - Non-airport Land-use Projects

Whenever possible, the Airfield Manager or Biologist will actively participate in land-use decisions and landscape changes to avoid inadvertent wildlife hazards to aircraft. The FAA's Seattle Airports District Office and Safety and Standards Branch of the FAA Northwest Mountain Region (refer to directory in Chapter 9) will provide technical guidance to SEA in addressing land-use compatibility issues. If SEA or the FAA requests assistance from Wildlife Services (as per a Memorandum of Understanding between FAA and Wildlife Services [Appendix H]), then Wildlife Services will provide technical and/or operational assistance in addressing issues or concerns associated with the proposed project or land-use change. Proposed projects that will likely increase bird numbers within flight zones will adamantly be discouraged, or mitigated to a safe level. Incompatible land uses may include developments such as water reservoirs, parks with artificial ponds, wetlands, and wildlife refuges/sanctuaries. These types of land-use changes will be monitored for compatibility by working with the local planning authorities.

3.3 - WATER MANAGEMENT

3.3.1 - Overview

SEA has several small lakes, retention facilities, and wetlands on and around airport property. In addition, small drainage ditches can be found on the airfield that attract a moderate number of birds and mammals throughout the year, especially during winter when migratory waterfowl pass though the area. Open water on SEA property will be netted, covered, and/or planted wherever possible and monitored closely to ensure hazardous species do not acclimate to these sites. Temporary open water areas will be monitored by the SEA biologist and/or Wildlife Services and covered or removed if deemed necessary[1]. Water sources outside of SEA property, but within the critical area of SEA, will be monitored, and SEA will work with local agencies and landowners to help deter hazardous wildlife.

3.3.2 - Wetlands

Several small streams and wetlands naturally occur on or in the vicinity of the airport, and are attractive to wildlife. Wetland mitigation for impacts resulting from the Master Plan Update construction projects, including mitigation at Des Moines Creek, Vacca Farms, and Miller Creek will be implemented according to the Natural Resources Mitigation Plan and pertinent Section 404 (Appendix I) and Section 401 (Appendix J) permit conditions. Modification of vegetation in mitigation areas could be subject to agency review as discussed in Section 4.10.

[1] Temporary open water may be covered with nets or obscured by vegetation. For example, nylon mesh nets, suspended one to several feet above stormwater management ponds, have been installed over sedimentation ponds associated with stormwater treatment facilities. The proposed mitigation on the golf course and Vacca farm will use vegetation to obscure floodwaters from birds.

Mitigation for other future projects, if required, will occur as far away from the airfield as possible, unless it can be demonstrated with reasonable certainty that the mitigation would not likely increase wildlife hazards and will comply with criteria described in FAA Advisory Circular 150/5200-33 (Appendix C). The golf course fairway adjacent to the Northwest Ponds/Industrial Wastewater Lagoon near the approach end of the runways will be planted with a shrub/scrub plant association to deter waterfowl. Other wetland mitigation will be reviewed by the Wildlife Coordinator.

Lora Lake will lie directly in line with the new third runway when it is constructed and abuts the Vacca Farm mitigation site. SEA will closely monitor wildlife activity at Lora Lake as part of the Vacca Farms mitigation project (see Chapter 10), and if necessary, the Wildlife Coordinator will take the appropriate steps to alleviate any wildlife hazards. The Reba detention facility will also be monitored because of its proximity relative to Lora Lake and the runways. Bow Lake and Angle Lake will be monitored because both are situated within SEA's critical area, and wildlife interactions between these sites and SEA have been observed in the past. If wildlife associated with any of these lakes becomes hazardous to airport operations, SEA's Wildlife Biologist will work cooperatively with the adjacent property owners to deter and/or remove the problem animals that threaten aircraft safety.

3.3.3 - Temporary Pools and Ditches

During the wetter Winter and Spring months, small depressions (tire ruts) created by vehicles operating within the infield areas fill up with water for short periods of time and can attract dabbling ducks. This situation may become particularly problematic during periods of heavy construction activity associated with the new runway. SEA should discourage driving on the infield during periods of high precipitation (typically Winter and Spring months) to avoid ruts in the soil. Where ruts are found, SEA maintenance should fill and/or grade the damaged area. In areas where there are larger pools, the land should be filled or graded such that water consistently drains into ditches. Ditches[2] should be appropriately sloped so that water does not pool and leaves the airfield in a reasonably short amount of time. Ditches that pool and attract hazardous wildlife may be covered, in whole or part, using a wire grid system or other barrier (e.g., polyester netting).

Because site conditions, wetland regulations, and jurisdictional determinations change over time, the regulatory status and distinctions between ditches and Waters of the U.S. must be considered on a case by case basis. Wetlands and other Waters of the U.S. are identified on the wetland delineation maps completed for the Master Plan Update projects, however on-site conditions must be evaluated for all areas prior to management actions that may require permit approval.

Temporary open water that ponds in non-wetland locations and out side of mitigation sites may be removed by improving drainage (through excavation or maintenance of ditches, trenches,

[2] Some ditches adjacent to runways, roads, and taxiways are designed as biofiltration swales to treat stormwater runoff. Modification of these ditches must be made using accepted engineering designs for water quality treatment, or alternative treatment measures.

French drains etc.) or filling of shallow depressions. In Waters of the U.S., the above activities require careful review by Port Environmental staff to determine regulatory requirements as they could be subject to review and approval by federal and/or state agencies.

3.4 - VEGETATION MANAGEMENT

3.4.1 - Overview

SEA contains diverse vegetation types, some of which are highly attractive to wildlife. The most effective approach to reducing this attraction in the critical zone is to remove all unnecessary trees, shrubs, weeds and plants, and establish non-seeding or small-seeded grass, especially within 200 feet of the runway. The SEA Biologist should review all plantings on SEA property and exclude those species that produce edible fruits, nuts or berries if these plants create an attraction to hazardous wildlife. SEA is working with Wildlife Services to develop a list of acceptable plant species. When completed, this list will be given to contractors for reference. Species of particular concern include blackberries (*Rubus spp.)* and Scot's broom (*Cytisus scoparius*) because of their invasive characteristics or wildlife-attracting qualities. SEA's airfield generally has an abrupt transition between the infield grass and forested areas, thus minimizing the amount of attractive shrubs and herbaceous cover available to wildlife. SEA maintenance will continue to monitor and maintain these transition zones.

3.4.2 - Grass Management

Other than paved areas, grass will be the primary cover inside the perimeter security fence. FAA Certalert No. 98-05 advises that "airport operators should ensure that grass species and other varieties of plants attractive to hazardous wildlife are not used on the airport". In addition, grasses that produce large seeds and are known to be attractive to wildlife will be avoided when planting new areas.

3.4.2.1 - Grass Type

The type of grass used within the perimeter fence and between the runways should produce small or no seeds, but still be able to generate new growth or re-seed itself to provide a thick, monotypic stand and prevent erosion. The selected ground cover should withstand drought, flooding, and other normal climatic conditions, and be somewhat unpalatable to grazers such as geese, wild ducks, and deer. The grasses should also harbor relatively few insects and rodents that may attract hawks, owls, starlings, and other hazardous wildlife species. Several varieties of tall fescue (*Festuca arundinacea*), if allowed to grow to a height of 8-14 inches, have been found to be unattractive to Canada geese because of a fungus harbored by the plant, and the fescue will generally preclude other more attractive grass species from invading the airfield. Whenever possible, grass mixtures indigenous to the Pacific Northwest will be used at SEA when replanting as part of a construction or mitigation project, provided it can be demonstrated the seed mixture poses no significant wildlife attraction. SEA will work with the Washington

Department of Ecology (Ecology) to ensure selected grasses meet erosion control standards and objectives.[*Note:* SEA is one of a few select airports currently participating in a national study funded by the FAA to develop an airport ground cover that is unattractive to wildlife. This study will consist of a series of test plantings that will be monitored for wildlife use, as well as potential secondary attractants including seed production, insect populations, rodent abundance, and nesting habitat.]

3.4.2.2 - Grass Height

Grass height throughout the airfield will be maintained at a height of 8-14 inches, except around runway and taxiway marker lights where it will be cut to 3 inches for purposes of visibility. Grass height will be maintained throughout the year, with the first mowing activities beginning when the infield is firm enough to allow equipment access and the grass is sufficiently long to merit cutting.

3.4.2.3 - Mowing

When possible, grass will be mowed at night when birds are the most inactive and air traffic is reduced. Mowing is quite attractive to several species of birds and mammals because it exposes food sources such as rodents, insects, and seeds. If cutting is being conducted during the day and birds are attracted to activity, the mowing will stop until the birds have been successfully hazed from the area. Mowing activities will be coordinated with the wildlife dispersal team (contact the Airport Supervisor).

3.4.3 - Streamside Vegetation

Herbaceous vegetation growing on the edge of a stream or other wetland may provide preferred habitat for species considered most hazardous to aircraft. The vegetation that grows alongside ditches[3] on SEA property may be removed or maintained so that habitat is not provided for waterfowl, herons, blackbirds, rabbits, and other wildlife that could present a direct or indirect hazard to aviation. Rock (e.g., quarry spauls, rip-rap), and in some instances, trees, shrubs or grass, can be used to replace undesirable plants, slow erosion, and conceal water from wildlife. Each situation will need to be examined on a case-by-case basis to avoid worsening the hazards.

SEA should identify where existing streamside conditions attract wildlife and develop an appropriate plan to reduce the hazard. Modification of streamside vegetation in mitigation areas should be consistent with mitigation plans and Section 404 and 401 permit conditions (see Appendix I and J). Modification of streamside vegetation outside of mitigation areas may be subject to other environmental regulations (see Section 4.10).

[3] Some ditches may be jurisdictional wetlands under Section 404 of the Clean Water Act and require review by the Army Corps of Engineers prior to modification. Placement of riprap along streams must be consistent with environmental regulations, the Natural Resource Management Plan for the Master Plan Update (including associated Section 404 and 401 conditions (see Appendix I and J, respectively).

3.4.4 - Ornamental Landscaping

Landscaping at the airport can affect tourism, business, and the overall impression of the SEA vicinity to visitors, therefore, landscaping needs to be aesthetically pleasing. It must, however, coincide with the airport's greater responsibility of air safety. Trees and bushes offer hunting perches, roosting and loafing sites, nesting cover, and food for birds and other wildlife will be removed. Ornamental trees and bushes used to enhance airport aesthetics will be kept to a minimum, and varieties that are unattractive to wildlife will be selected. Species which produce edible fruits, nuts, or berries will not be used on SEA property if they might attract hazardous wildlife. SEA Landscaping Committee, with the assistance of Wildlife Services is developing a list of acceptable plant species that may be available for use on the airport. SEA will monitor ornamental trees to prevent communal roosting by starlings and crows, and the trees will be thinned, topped, or removed if necessary. Refer to SEA landscaping standards in Appendix I) for a current listing of plants that are acceptable for use on airport grounds.

3.5 - STRUCTURE MANAGEMENT

3.5.1 - Overview

Structures provide cover and hunting perches for wildlife. If wildlife is considered when a building is being designed, costly control measures can be avoided. Buildings should not provide nesting, perching, or roosting sites for birds and should inhibit access by mammals such as rodents and cats.

3.5.2 - Airfield Structures

Airfield structures such as runway lights, ramp and taxiway signs, ILS towers, and light poles are used as hunting and loafing perches for birds such as hawks and gulls. Lights attract insects at night, and in turn, bats and nighthawks. Structures found to routinely attract birds in a hazardous manner may be fitted with wire coils or porcupine wire (e.g., Nixalite).

3.5.3 - Abandoned Structures

Structures not pertinent to air operations and no longer in use, should be removed, including abandoned houses, sheds, machinery, and light poles. Such structures are attractive to rodents, small birds, and rabbits and, in turn, attract hawks, owls, and other predators that can become a significant air hazard. Structures used for crash-fire training are considered to be pertinent to air operations and are generally compatible with safe air operations.

3.6 - FOOD/PREY-BASE MANAGEMENT

3.6.1 - Overview

Fish, rodents, rabbits, insects, earthworms, and other invertebrates are highly attractive to many species of birds and mammals and should be controlled where feasible. Handouts, trash, and scattered debris also provide food for wildlife. The modification or management of a wide variety of habitats such as wildlife-attracting vegetation and removal of abandoned structures will reduce populations of potentially hazardous wildlife by limiting shelter, food, and prey availability.

3.6.2 - Fish

Several fish species occur at SEA and attract some avian species to the area that are commonly associated with bird strikes. One species, the Great-blue Heron, frequent the wetland and riparian habitats adjacent to the airfield.

It is important that future activities at SEA preserve and enhance riparian and wetland functions associated with water quality. It is also important to avoid unnecessary enhancement of fish habitat that will increase the attractiveness of this high-energy food source to wildlife. Access to fish by avian predators might be reduced somewhat by decreasing the amount of open water (foraging) area. Problematic wildlife might be effectively excluded by increasing the amount of vegetative cover over open water. Alternatively, exclusion may require the use of a more costly and maintenance-intensive approach by netting these open-water reaches. The carcasses of spawned-out salmon should always be viewed as a major wildlife attractant even if some species of wildlife can be physically excluded from this resource with the creative employment of vegetation and netting.

3.6.3 - Rodents

Mice and voles at SEA appear to be the primary attractants of hawks and coyotes, but will occasionally attract herons and other predators. Historically, rodent populations at SEA have been relatively low, but SEA will continue to monitor populations and will conduct a control program if rodent abundance increases to a level where they wildlife is attracted.

3.6.4 - Insects and Other Invertebrates

Insects and other invertebrates (e.g., earthworms, spiders, etc.) may attract many species of wildlife at SEA, particularly starlings and crows. Insect populations will be monitored periodically by SEA to determine if they are present in sufficient numbers to attract wildlife. If control is deemed necessary, the Washington State University Cooperative Extension agent (see Chapter 9) can help select the best pesticide or control method. Habitat management will keep much of the prey population in check, but the airport will continue to monitor these populations for outbreaks.

3.6.5 - Trash, Debris, and Handouts

Trash and debris are often responsible for attracting species such as gulls and crows. SEA maintenance will continue to conduct trash and FOD (foreign object debris/damage) collection sweeps on the airfield, especially after high winds. The public or airport employees should not be allowed to feed birds or mammals around the airport. Of particular concern is the feeding of ducks and geese at the golf course near the south end of the airport. When people are observed feeding birds, SEA will discuss with them the problems caused by feeding wildlife, and if necessary, signs will be posted to educate the general public.

4.0 - LAWS AND REGULATIONS

FAR 139.337(e)(3) ***Requirements for and, where applicable, copies of local, state, and Federal wildlife control permits.***

4.1 - OVERVIEW

Federal, state and local governments administer laws and regulations that protect wildlife and their habitat. A number of laws affect wildlife control at airports and SEA, and wildlife control personnel should be educated about these regulations to ensure compliance. In general, harassing and/or taking most types of wildlife is regulated through a permit process, overseen by Federal or state agencies. Permits are necessary for a successful control program and will be obtained on a regular basis, or as required, by the wildlife coordinator.

4.2 - WASHINGTON WILDLIFE REGULATIONS

Several Washington State government agencies have regulations that affect wildlife control at airports. Pertinent regulations can be found in the Washington Administrative Code (WAC) and the Revised Code of Washington (RCW). King County and municipality regulations can also affect SEA's wildlife management efforts. State wildlife laws involving resident birds, mammals, reptiles, and amphibians, as well as state threatened and endangered species generally are administered by Washington Department of Fish and Wildlife (WDFW).

4.3 - FEDERAL WILDLIFE REGULATIONS

Several Federal regulations, including the Migratory Bird Treaty Act, the Lacey Act, the Endangered Species Act, Eagle Protection Act, the Clean Water Act, the National Environmental Policy Act, and the Federal Insecticide, Fungicide, and Rodenticide Act regulate various aspects of SEA's wildlife management activities. Additional regulations that may affect wildlife control activities at SEA are found in the Code of Federal Regulations (CFR), and several Federal agencies may be responsible for their implementation. Federal wildlife laws are typically administered by the U.S. Fish and Wildlife Service (USFWS) and involve primarily migratory birds and threatened and endangered species.

4.4 - WILDLIFE CATEGORIES

CFR Title 50, RCW Chapter 77, and WAC Chapter 232-12 define the categories of wildlife and regulations for them. For the purposes of this document, feral and free roaming dogs, cats and other domestic animals are considered "wildlife" because of the hazards the may pose to aircraft, but they are mostly regulated under other municipal laws. Wildlife categories (Table 2) include migratory and resident, game and non-game, and threatened and endangered species. Wildlife control personnel should know the category for the species that they intend to control, so that they can determine the relevant laws and necessary permits.

Table 2. Wildlife Categories in King County, and permits necessary for lethal control as required by Federal and state wildlife agencies. The table also shows whether SEA has current Federal or state permits for each category. It should be noted that RCW 77.36.030 (trapping or killing of wildlife causing damage - emergency situations) provides for the trapping or killing of wildlife (with exception of threatened, endangered, and federally protected species) by property owners without state permits, if the wildlife are damaging property or posing a threat to human life.

Category	Species	State Permit Required[1]	State Permit Obtained	Federal Permit Required	Federal Permit Obtained
Resident Game Birds	Quail, ring-necked pheasant, grouse, partridge, and turkey	Yes	No	No	N/A
Resident Nongame Birds	Starlings, house sparrows	No	N/A	No	N/A
Migratory Game Birds	Ducks, geese, coots, gallinules, snipe, and mourning doves	No	N/A	Yes	Yes
Migratory Nongame Birds	All species except game birds, resident nongame birds, and domestic and exotic birds	No	N/A	Yes	Yes
Depredation Order Birds[2]	Crows, magpies, blackbirds, and cowbirds	No	N/A	No	N/A
Domestic Birds	Rock doves (feral pigeons) and domestic poultry	No	N/A	No	N/A
Game Mammals	Mule deer, white and black-tailed deer, elk, white and black-tailed jackrabbits, other rabbits	Yes	No	No	N/A
Furbearers	Mink, river otter, fox, raccoon, beaver, badger, muskrat	Yes	No	No	N/A
Nongame Mammals	All species of mammals, including coyotes, except game, furbearers, domestic mammals, and fully protected wildlife listed in Table 3	No	N/A	No	N/A
Feral Domestic Mammals	Dogs, cats, livestock	No - Call local animal control	N/A	No	N/A

Category	Species	State Permit Required[1]	State Permit Obtained	Federal Permit Required	Federal Permit Obtained
Reptiles And Amphibians	All reptiles and amphibians except those listed as threatened or endangered in Table 3	Yes	No	No	N/A
Fully Protected Wildlife	Threatened and Endangered species listed in Table3	Yes	No	Yes	No

[1] Control actions requiring a state permit should be coordinated through the Regional Biologist with the Washington Department of Fish and Wildlife.

[2] May be taken without permits "when concentrated in such numbers and manner as to constitute a health hazard or other nuisance" (50 CFR §21.43).

4.5 - GENERAL REGULATIONS FOR WILDLIFE CONTROL

Several regulations and permits apply to wildlife management activities at airports in King County. Many of these regulations relate to safety, methods, and special considerations or restrictions which are usually specified on the depredation permits.

4.6 - BIRDS

4.6.1 - Resident Nongame Birds

Starlings, pigeons, and house sparrows are non-game birds that are classified as non-migratory and no permit is required to take them. All other non-game birds in King County are classified as migratory. A USFWS depredation permit (Appendix D) allows control of migratory non-game birds, provided that the species are not listed as Federal or state threatened or endangered and are listed on the depredation permit.

4.6.2 - Feral Birds

Feral pigeons (rock doves) are typically the only species of concern in this category. Currently State and Federal laws do not regulate this species and no permit is required to take them. Domestic waterfowl may become a problem if they are abandoned on airport property. Taking these species should only be done by wildlife personnel trained to distinguish the differences between domestic and wild waterfowl with similar appearances. If other species of feral poultry or exotic birds are observed at SEA, the Wildlife Biologist should be contacted for assistance with control methods.

4.6.3 - Migratory Birds

Migratory birds are regulated under Federal law by USFWS. These regulations permit hazing of migratory birds when the birds are damaging property, but a permit is required for lethal take. Migratory bird permits are not valid for eagles, and threatened and endangered species, which require separate permits for lethal take and harassment. Although states can impose more restrictive regulation than Federal law on migratory birds, Washington currently does not require additional permits for non-protected migratory birds that are already regulated under Federal law.

4.6.3.1 - Migratory Bird Depredation Permit for SEA (CFR 50, Part 13)

A depredation permit to take federally protected migratory birds can be obtained by completing a Federal Fish and Wildlife License/Permit Application and submitting it to the U.S. Fish and Wildlife Service, Permits - Law Enforcement Division, 911 NE 11th Ave., Portland, OR 97232-4181. The USFWS may also require that a Migratory Bird Damage Project Report completed by Wildlife Services accompany the permit application. SEA has a current Federal permit (Appendix D) to take all migratory birds except eagles and threatened or endangered species. Washington Department of Fish and Wildlife allows the take of these species under the Federal permit without obtaining an additional state permit. Migratory birds that occur in King County include all birds except house sparrows, starlings, feral pigeons (rock doves), pheasant, quail, and domestic ducks, geese and other exotic birds. The Wildlife Coordinator will be responsible for the required annual renewal of the depredation permit, and will submit a report to the USFWS within 10 days of the expiration date detailing the species and number of animals taken under the permit. Details for the permit uses are given below. Federally listed threatened and endangered migratory birds include bald eagles, marbled murrelets, and northern spotted owls (see Table 3 of this chapter). Peregrine falcons were removed from the federal list in 1999, but are still listed as state endangered.

4.6.3.2 - Reporting Control Actions to USFWS

SEA should submit a report of the animals taken and hazed each calendar year to the USFWS to fulfill the requirements of this section. The report could be generated from a computerized database containing all control actions on SEA.

CFR 50 Part 21.41
Part 21.43
CONTROL OF DEPREDATING BIRDS - Depredation permits

(a) ***Permit requirement.*** Except as provided in 21.42 through 21.46, a depredation permit is required before any person may take, possess, or transport migratory birds for depredation control purposes. No permit is required merely to scare or herd depredating migratory birds other than endangered or threatened species or bald or golden eagles.

(b) ***Application procedures.*** Applications for depredation permits shall be submitted to the appropriate Special Agent in Charge (see 13.11 (b) of this Subchapter). Each such application must contain the general information and certification by 13.12 (a) of this Subchapter plus the following additional information:

(1) A description of the area depredations are occurring;

(2) The nature of the crops or other interests being injured;

(3) The extent of such injury; and

(4) The particular species of migratory birds committing the injury.

(c) ***Additional permit conditions.*** In addition to the general conditions set forth in Part 13 of this Subchapter B, depredation permits shall be subject to the following conditions:

(1) Permittees may not kill migratory birds unless specifically authorized on the permit.

(2) Unless otherwise specifically authorized, when permittees are authorized to kill migratory birds they may do so only with a shotgun not larger than No. 10 gauge fired from the shoulder, and only on or over the threatened area or area described on the permit.

(3) Permittees may not use blinds, pits, or other means of concealment, decoys, duck calls, or other devices to lure or entice birds within gun range.

(4) All migratory birds killed shall be retrieved by the permittee and turned over to a Bureau representative or his designee for disposition to charitable or worthy institutions for use as food, or otherwise disposed of as provided by law.

(5) Only persons named on the permit are authorized to act as agents of the permittee under authority of the permit.

(d) ***Tenure of permits.*** The tenure of depredation permits shall be limited to the dates which appear on its face, but in no case shall be longer than one year.

Depredation order for blackbirds, cowbirds, grackles, crows and magpies

A Federal permit shall not be required to control yellow-headed, red-winged, ... and Brewer's blackbirds, cowbirds, ... crows, and magpies, ... when concentrated in such numbers and manner as to constitute a health hazard or other nuisance: ***Provided***

(a) That none of the birds killed pursuant to this section, nor their plumage, shall be sold or offered for sale, but may be possessed, transported, and otherwise disposed of or utilized.

(b) That any person exercising any of the privileges granted by this section shall permit at all reasonable times including during actual operations, any Federal or State game or deputy game agent, warden, protector, or other game law enforcement officer free and unrestricted access over the premises on which such operations have been or are being conducted; and shall furnish promptly to such officer whatever information he may require, concerning said operations.

(c) That nothing in this section shall be construed to authorize the killing of such birds contrary to any State laws or regulations; and that none of the privileges granted under this section shall be exercised unless the person possesses whatever permits as may be required for such activities by the State concerned.

4.7 - MAMMALS

4.7.1 - Game Mammals

Game mammals are defined primarily as those species that are hunted by man for sport, recreation, or meat. Deer have historically frequented the edge of the airfield, and may require control if they enter the airfield. Normally a state permit is required to control deer and elk, but RCW 77.36.030 provides for the trapping or killing of wildlife by properties owners, without licenses or permits, if the wildlife are damaging property or posing a threat to human life. Threatened or endangered animals are not covered under this provision, and birds protected under the Migratory Bird Treaty Act require a Federal depredation permit (see Section 4.6.3 of this plan).

4.7.2 - Furbearers

It is unlikely that furbearers will ever need to be controlled at SEA. However, if these animals (e.g., red fox, beaver) ever do pose a hazard that warrants direct control, a permit is required from the Washington Department of Fish and Wildlife.

4.7.3 - Non-game Mammals

Several species of non-game mammals are present at SEA and may need to be controlled. Of these, coyotes present the greatest threat to aviation. Permits are not required to take these species when they damage or could damage property.

4.8 - REPTILES & AMPHIBIANS

Non-protected reptiles and amphibians can be taken with a permit or appropriate fishing license. At their current abundance, these species do not present a major attractants to more hazardous wildlife.

4.9 - PROTECTED WILDLIFE

4.9.1 - Federal And State Threatened And Endangered Species

The Federal Endangered Species Act (Sec. 2 [16 U.S.C. 1531]) and Washington Endangered Species Act (RCW 77.12.020; WAC 232-12-297) both protects animal and plant species potentially threatened with extinction. These acts classify species as endangered or threatened. An "Endangered Species" is defined as "any species or subspecies which is in danger of extinction throughout all or a significant portion of its range." A "Threatened Species" is defined as "any species or subspecies which is in danger of becoming an endangered species within the foreseeable future throughout or over a significant portion of its range." Once listed, a threatened or endangered species cannot be taken or harassed without a special permit. Eagles are also

afforded protection under the U.S. Eagle Protection Act. In Washington, several additional species are given special protection by being listed as state threatened or endangered species. If a significant hazard exists with a listed species that jeopardizes air safety, either the USFWS or WDFW, depending on the species involved, should be contacted for assistance. Only personnel from these agencies or their agents (e.g., Wildlife Services) may obtain a permit to take individuals of a specially protected species. Table 3 lists the protected species for King County.

4.9.2 - Eagle Permits

Eagles are protected under the Eagle Protection Act and require their own permit, and are therefore, not included under the Migratory Bird Permit. Washington has designated bald eagles as fully protected in King County, but they are scheduled to be removed from the Federal list in July 2000.

CFR 50 PART 22.23

EAGLE PERMITS - Permits to take depredating eagles.
The Director may, upon receipt of an application and in accordance with the issuance criteria of this section, issue a permit authorizing the taking of depredating bald or golden eagles.

(a) ***Application procedure.*** Applications for permits to take depredating bald or golden eagles shall be submitted to the appropriate Special Agent in Charge (See: Part 13). Each application must contain the general information and certification required by Part 13.12(a) plus the following additional information:

(1) Species and number of eagles proposed to be taken;
(2) Location and description of property where taking is proposed;
(3) Inclusive dates for which permit is requested;
(4) Method of taking proposed;
(5) Kind and number of livestock or domestic animals owned by the applicant;
(6) Kind and amount of alleged damaged; and
(7) Name, address, age, and business relationship with applicant of any person the applicant proposes to act for him as his agent in the taking of such eagles.

(b) ***Additional permit conditions.*** In addition to the general permits set forth in Part 13, permits to take depredating bald and golden eagles shall be subject to the following conditions:

(1) Bald and golden eagles may be taken under permit by firearms, traps, or other suitable means except by poison or from aircraft;
(2) The taking of eagles under permit may be done only by the permittee or his agents named in the permit;
(3) Any eagle taken under authority of such permit will be promptly turned over to a Service agent or other game law enforcement officer designated in the permit; and
(4) In addition to any reporting requirement set forth in the permit, the permittee shall submit a report of activities conducted under the permit to the Special Agent in Charge within 10 days following the completion of the taking operations or the expiration of the permit whichever occurs first.

(c) ***Issuance criteria.*** The Director shall conduct an investigation and not issue a permit to take depredating bald or golden eagles unless he has determined that such taking is compatible with the preservation of the bald or golden eagle. In making such determination the Director shall consider the following:

(1) The direct or indirect effect which issuing such permit would be likely to have upon the wild population of bald or golden eagles;

(2) Whether there is evidence to show that bald or golden eagles have in fact become seriously injurious to wildlife or to agriculture or other interests in the particular locality to be covered by the permit, and the injury complained of is substantial; and

(3) Whether the only way to abate the damage caused by the bald or golden eagle is to take some or all of the offending birds.

(d) ***Tenure of permits.*** The tenure of any permit to take bald or golden eagles for depredation control purposes shall be that shown on the face thereof, and shall in no case be longer than 90 days from date of issue.

4.9.3 - Habitat Conservation

USFWS and WDFW are responsible for species conservation and recovery plans. These plans require the identification of critical habitat when it is associated with the decline of a species. Habitat alterations and developments may be prohibited in areas where critical habitat has been designated or where such changes could result in the inadvertent take of an endangered species. Consultation with USFWS or WDFW biologists will help determine on a case-by-case basis whether critical habitat is affected by airport projects, and if so, the necessary mitigation.

4.9.4 - Wetland Mitigation

Wetland modifications may require permits from various agencies, including the USFWS, U.S. Army Corps of Engineers (USCOE), Ecology, City of SeaTac, and/or City of Des Moines. Pre-development mitigation may be required for issuance of a permit. The FAA has outlined a series of procedures (refer to the publication on wetland mitigation banking in the FAA's wildlife section homepage [***http://www.faa.gov/arp/hazard.htm***]) for mitigating wetland impacts resulting from project development. See 40 CFR 1505.3.

Modification of wetland mitigation sites developed for Master Plan Update Projects should be consistent with Section 404 (Appendix I) and Section 401 (Appendix J) conditions.

4.9.5 - Endangered Species List

USFWS and WDFW maintain updated lists of endangered and threatened species. WDFW's current listing of state and Federally endangered, threatened, and sensitive species can be accessed on the Internet at ***http://www.wa.gov/wdfw/wlm/diversty/soc/soc.htm***. Wildlife control personnel at SEA should familiarize themselves with these listed species and their potential occurrence at the airport (Table 3). Some of these species, particularly bald eagles may present hazards to air traffic at SEA, and permits are required to harass them. In most cases, permits will not be granted to lethally remove members of a threatened and endangered species. SEA wildlife control personnel should learn to identify these species and understand the regulatory permitting processes required for their effective management. Habitat critical to listed species is regulated by the USFWS or WDFW and these regulations should be reviewed to determine their potential effect on SEA's habitat modification plans to reduce wildlife hazards.

Recent listings of endangered salmon species may affect the design of current and future construction projects at SEA. The Airfield Biologist should work closely with Federal, state, and local agencies to ensure that protected salmon species are not adversely affected and that salmon enhancement projects do not inadvertently result in increased wildlife hazards to aircraft. Salmon habitat improvement and/or mitigation projects will be carefully reviewed by the Airfield Biologist, and if necessary, Wildlife Services and the FAA, to ensure the project does not result in hazardous wildlife attractions. SEA should keep an updated listing of Threatened and Endangered species in the WHMP and should review this list prior to implementing construction projects that may adversely affect listed species.

4.9.6 - Avoiding Impacts to Threatened and Endangered Species

The WHMP examines resolutions to detect and alleviate wildlife hazards that threaten human health and safety or aircraft operations operating out of SEA. Birds are generally considered the most hazardous form of wildlife at SEA, particularly waterfowl, starlings, raptors, gulls, and crows. Coyotes and domestic dogs occasionally gain access to the airfield where they pose a strike hazard to aircraft, but this is a relatively infrequent occurrence.

The bald eagle, marbled murrelet, and northern spotted owl may occur in King County, but only the bald eagle is likely to occur in the project area.

The proposed actions outlined in the WHMP would involve application of the most appropriate, effective, and biologically sound wildlife control methods available. This approach is known as Integrated Wildlife Damage Management, and includes both habitat management and direct control.

Habitat management provides the most long term remedial measure for reducing wildlife attractions on an airfield. Habitat management measures are discussed in Chapter 3 of the WHMP, and includes elimination of standing water (see Section 3.3), planting alternative ground covers on the airfield, removal of fruit and berry producing vegetation, thinning roost trees, structural exclusion (e.g., netting), and incorporating wildlife considerations in the early planning stages of new construction projects. Direct control efforts generally provide a more immediate response to hazardous situations, but the desired effects are often not as long lasting. Wildlife control and dispersal procedures employed at SEA are discussed in Chapter 6 of the WHMP, and include, pyrotechnic hazing, mylar flash tape, recorded distress calls, vehicular harassment, nest removal, selective trapping, and shooting with air rifles or shotguns.

Control methods at SEA would not have an effect on listed endangered or threatened species because capture and removal methods that are used at SEA are selective and would allow for positive identification of target animals. The bald eagle is the only federally threatened or endangered species that has been observed on or near the airport, but its presence is rare. The bald eagle would not be affected because airport personnel are routinely trained in bird species identification, with a special emphasis placed on threatened, endangered, and sensitive species, particularly bald eagles and peregrine falcons (although peregrines are no longer federally listed).

Hazing and lethal control methods such as shooting and live-trapping are selectively directed at target individuals, thus avoiding impact to eagles. No toxicants are currently used to control wildlife at SEA, thus eliminating the probability of nontarget exposure. Habitat alteration such as tree thinning or removal would not effect bald eagle nests because no eagles are known to nest within the airfield property.

Collisions between birds and aircraft nearly always result in the death of the bird, in addition to threatening human safety. Consequently, potential nesting habitat on and around the airfield will be eliminated to the extent possible, thus preventing eagles from being drawn to the area where they may be struck.

Table 3. Endangered, Threatened and Protected Species in Washington.[1]

COMMON NAME	SCIENTIFIC NAME	STATE STATUS[2]	FEDERAL STATUS[2]	SEA[3]
MAMMALS				
Destruction Island shrew	*Sorex trowbridgii destructioni*		SC	
Merriam's shrew	*Sorex merriami*	C		
Pygmy shrew	*Sorex hoyi*	C		
Pacific Townsend's big-eared bat	*Plecotus townsendii*	C	SC	M
Long-eared myotis	*Myotis evotis*		SC	M
Long-legged myotis	*Myotis volans*		SC	M
Yuma myotis	*Myotis yumanensis*		SC	
Pygmy rabbit	*Brachylagus idahoensis*	E	SC	
Washington ground squirrel	*Spermophilus washingtoni*	C	SC	
Western gray squirrel	*Sciurus griseus*	T		
Brush prairie pocket gopher	*Thomomys talpoides douglasi*	C		
Western pocket gopher	*Thomomys mazama*	C		
Gray-tailed vole	*Microtus canicaudus*	C		
Shaw Island Townsend's vole	*Microtus townsendii pugeti*		C	
Gray wolf	*Canis lupus*	E	E	M
Grizzly bear	*Ursus arctos*	E	T	M
Steller sea lion	*Eumetopias jubatus*	T	T	
Pacific Fisher	*Martes pennanti pacifica*	C	SC	M
California Wolverine	*Gulo gulo luteus*		SC	M
Sea otter	*Enhydra lutris*	E		
Lynx	*Lynx canadensis*	T	PT	
Gray whale	*Eschrichtius robustus*	S		
Sei whale	*Balaenoptera borealis*	E	E	
Fin whale	*Baleonoptera physalus*	E	E	
Blue whale	*Balaenoptera musculus*	E	E	
Humpback whale	*Megaptera novaeangliae*	E	E	
Black right whale	*Balaena glacialis*	E	E	
Pacific harbor porpoise	*Phocoena phocoena*	C		
Sperm whale	*Physeter macrocephalus*	E	E	

COMMON NAME	SCIENTIFIC NAME	STATE STATUS[2]	FEDERAL STATUS[2]	SEA[3]
Columbian white-tailed deer	*Odocoileus virginianus leucurus*	E	E	
Woodland caribou	*Rangifer tarandus*	E	E	
California bighorn sheep	*Ovis canadensis californiana*		SC	
BIRDS				
Short-tailed albatross	*Phoebastria albatrus*	C	PE	
Cassin's auklet	*Ptychoramphus aleuticus*	C		
Common loon	*Gavia immer*	C		
American white pelican	*Pelecanus erythrorhynchos*	E		
Brown pelican	*Pelecanus occidentalis*	E	E	
Brandt's cormorant	*Phalacrocorax penicillatus*	C		
Aleutian Canada goose	*Branta canadensis leucopareia*	T	T	
Harlequin duck	*Histrionicus histrionicus*		SC	
Bald eagle	*Haliaeetus leucocephalus*	T	T	O
Northern goshawk	*Accipiter gentilis*	C	SC	M
Ferruginous hawk	*Buteo regalis*	T	SC	
Golden eagle	*Aquila chrysaetos*	C		
Merlin	*Falco columbarius*	C		
Peregrine falcon	*Falco peregrinus*	E		M
Sage grouse	*Centrocercus urophasianus*	T	SC	
Sharp-tailed grouse	*Tympanuchus phasianellus*	T	SC	
Sandhill crane	*Grus canadensis*	E		
Snowy plover	*Charadrius alexandrinus*	E	T	
Upland sandpiper	*Bartramia longicauda*	E		
Common murre	*Uria aalge*	C		
Marbled murrelet	*Brachyramphus marmoratus*	T	T	M
Tufted Puffin	*Fratercula cirrhata*	C		
Yellow-billed cuckoo	*Coccyzus americanus*	C		
Flammulated owl	*Otus flammeolus*	C		
Burrowing owl	*Athene cunicularia*	C	SC	
Spotted owl	*Strix occidentalis*	E	T	M
Vaux's swift	*Chaetura vauxi*	C		
Lewis' woodpecker	*Melanerpes lewis*	C		
White-headed woodpecker	*Picoides albolarvatus*	C		
Black-backed woodpecker	*Picoides arcticus*	C		
Pileated woodpecker	*Dryocopus pileatus*	C		
Purple martin	*Progne subis*	C		
Slender-billed white breasted nuthactch	*Sitta carolinensis aculeata*	C		
Sage thrasher	*Oreoscoptes montanus*	C		
Olive-sided flycatcher	*Contopus borealis*		SC	M
Willow flycatcher	*Empidonax traillii*		SC	
Streaked horned lark	*Eremophila alpestris strigata*		SC	
Loggerhead shrike	*Lanius ludovicianus*	C	SC	
Oregon vesper sparrow	*Pooecetes gramineus affinis*	C		
Sage sparrow	*Amphispiza belli*	C		

COMMON NAME	SCIENTIFIC NAME	STATE STATUS[2]	FEDERAL STATUS[2]	SEA[3]
REPTILES				
Northwestern pond turtle	*Clemmys marmorata*	E	SC	M
Leatherback sea turtle	*Dermochelys coriacea*	E	E	
Green sea turtle	*Chelonia mydas*	T	T	
Loggerhead sea turtle	*Caretta caretta*	T	T	
Olive ridley sea turtle	*Lepidochelys olivacea*		T	
Sagebrush lizard	*Sceloporus graciosus*		SC	
Sharptail snake	*Contia tenuis*	C		
California mountain kingsnake	*Lampropeltis zonata*	C		
Striped whipsnake	*Masticophis taeniatus*	C		
AMPHIBIANS				
Columbia torrent salamander	*Rhyacotriton kezeri*	C		
Cascade torrent salamander	*Rhyacotriton cascadae*	C		
Dunn's salamander	*Plethodon dunni*	C		
Larch mountain salamander	*Plethodon larselli*	S	SC	
Van dyke's salamander	*Plethodon vandykei*	C		
Red-legged frog	*Rana aurora*		SC	
Cascades frog	*Rana cascadae*		SC	M
Northern leopard frog	*Rana pipiens*	C		
Oregon spotted frog	*Rana pretiosa*	E	C	M
Columbia spotted frog	*Rana luteiventris*	C	SC	
Western toad	*Bufo boreas*	C		
FISH				
Pacific herring (Cherry Point)	*Clupea pallasi*	C		
Pacific herring (Discovery Bay)	*Clupea pallasi*	C		
Sockeye salmon (Snake R.)	*Oncorhynchus nerka*	C	E	
Sockeye salmon (Lake Ozette)	*Oncorhynchus nerka*	C	T	
Chum salmon (Hood Canal Su) summ.)))	*Oncorhynchus keta*	C	T	
Chum salmon (Lower Col. R.)	*Oncorhynchus keta*	C	T	
Chinook salmon (Snake R. Sp/Su)	*Oncorhynchus tshawytscha*	C	T	
Chinook salmon (Snake R. Fall)	*Oncorhynchus tshawytscha*	C	T	
Chinook salmon (Puget Sound)	*Oncorhynchus tshawytscha*	C	T	
Chinook salmon (Upper Col. R.)	*Oncorhynchus tshawytscha*	C	E	
Chinook salmon (Lower Col. R.)	*Oncorhynchus tshawytscha*	C	T	
Pygmy whitefish	*Prosopium coulteri*	S		
Upper Columbia R. Steelhead	*Oncorhynchus mykiss*	C	E	
Lower Columbia R. Steelhead	*Oncorhynchus mykiss*	C	T	
Middle Columbia R. Steelhead	*Oncorhynchus mykiss*	C	T	
Snake River Steelhead	*Oncorhynchus mykiss tshawytscha*	C	T	
Westlope cutthroat	*Oncorhynchus clarki lewisi*		SC	
Bull trout (Columbia Basin)	*Salvelinus confluentus*	C	T	
Bull trout	*Salvelinus confluentus*		C	M
Eulachon	*Thaleichthys pacificus*	C		
Olympic mudminnow	*Novumbra hubbsi*	C		

COMMON NAME	SCIENTIFIC NAME	STATE STATUS[2]	FEDERAL STATUS[2]	SEA[3]
Lake chub	*Couesius plumbeus*	C		
Leopard dace		C		
Umatilla dace		C		
Mountain sucker		C		
Pacific cod (S&C Puget Sound)		C		
Pacific hake (C. Puget Sound)		C		
Walleye pollock (So. Puget Sound)		C		
Brown rockfish		C		
Copper rockfish		C		
Greenstripped rockfish		C		
Widow rockfish		C		
Yellowtail rockfish		C		
Quillback rockfish		C		
Black rockfish		C		
China rockfish		C		
Tiger rockfish		C		
Bocaccio rockfish		C		
Canary rockfish		C		
Redstripe rockfish		C		
Yelloweye rockfish		C		
Fender's soliperlan stonefly	*Soliperla fenderi*		SC	
Margined sculpin	*Cottus marginatus*	S	SC	
River lamprey	*Entosphenus tridentatis*	C	SC	M
Pacific lamprey	*Lampetra tridentata*		SC	M
MOLLUSKS				
Northern abalone	*Haliotis kamtschatkana*	C		
Olympia oyster	*Ostrea lurida*	C		
Newcomb's littorine snail	*Algamorda subrotundata*	C	SC	
California floater	*Anodonta californiensis*	C	SC	
Giant Columbia River limpet	*Fisherola nuttalli*	C		
Great Columbia River spire snail	*Fluminicola columbiana*	C	SC	M
INSECTS				
Beller's ground beetle	*Agonum belleri*	C	SC	
Long-horned leaf beetle	*Donacia idola*	C		
Columbia River tiger beetle	*Cicindela columbica*	C		
Hatch's click beetle	*Eanus hatchii*	C	SC	M
Mardon skipper	*Polites mardon*	C		
Yuma skipper	*Ochlodes yuma*	C		
Shepard's parnassian	*Parnassius clodius shepardi*	C		
Makah (Queen Charlotte) Copper	*Lycaena mariposa charlottensis*	C		
Chinquapin (Golden) hairstreak	*Habrodais grunus herri*	C		
Johnson's (mistletoe) hairstreak	*Mitoura johnsoni*	C		
Juniper hairstreak	*Mitoura grynea barryi*	C		

COMMON NAME	SCIENTIFIC NAME	STATE STATUS[2]	FEDERAL STATUS[2]	SEA[3]
Puget blue	*Plebejus icarioides erymus*	C		
Oregon silverspot butterfly	*Speyeria zerene hippolyta*	E	T	
Valley silverspot	*Speyeria zerene bremnerii*	C		
Silver-bordered bog fritillary	*Boloria selene atrocostalis*	C		
Whulge checkerspot	*Euphydryas editha taylori*	C		
Great arctic	*Oeneis nevadensis gigas*	C		

[1] There are many species of animals in Washington that are listed as Threatened, Endangered, Candidate, or Sensitive by the Federal and/or state Government. This table lists animals species, their status as of 8/25/1999, and potential for occurrence at SEA. This list is dynamic with new species being added or removed periodically, therefore, it should be reviewed and updated at least once per year to ensure compliance with Federal and state wildlife regulations.

[2] ***State and Federal Status***

E - Endangered
T - Threatened
C - Candidate
S - Sensitive
SC - Species of Concern
PT - Proposed Threatened
PE - Proposed Endangered

[3] ***Occurrence at SEA***

M - May occur in King County
O - Observed on Airfield

4.10 - PESTICIDE APPLICATOR LICENSE

Authorization to use restricted-use pesticides for the removal of hazardous wildlife or prey-base (e.g., blackbirds, starlings, rodents, rabbits, insects, earthworms, and weeds) should be limited to Certified Pesticide Operators or persons under their direct supervision. To obtain the necessary license to apply restricted-use pesticides, a person must pass an exam administered by the Washington State Department of Agriculture (see directory in Chapter 9). All SEA personnel that use restricted-use chemicals must first obtain a pesticide applicator's license or be under the direct supervision of an applicator. Use of all pesticides will strictly adhere to the pesticide label and will follow U.S. EPA, Ecology, and King County guidelines.

4.11 - FAA REGULATIONS, ADVISORY CIRCULARS, AND CERTALERTS

The FAA is the federal agency responsible for developing and enforcing air transportation safety regulations. Many of these regulations are codified in the Federal Aviation Regulations (FARs). The FAA also publishes a series of guidelines for airport operators to follow called Advisory Circulars (ACs). Advisory Circulars in the 150 series deal with airport safety issues, including wildlife hazards. In addition to FARs and ACs, the FAA periodically issues Certalerts for internal distribution and to provide recommendations on specific issues for inspectors and airport personnel. All of the above-mentioned regulations, Advisory Circulars, and Certalerts are frequently changed or updated, and their current status should be verified on a regular basis. This may be accomplished by contacting the FAA directly (see directory in Chapter 9) or by visiting their website at ***www.faa.gov/arp/hazard.htm*** or ***www.faa.gov/faadocs.htm*** for the most current revision.

4.12 - Wetland Regulations

Table 4 lists federal, state, and local laws protecting wetlands or streams. Additional summary information for these permits is available in the *Wetland Regulations Guidebook* (Washington Department of Ecology 1994)). The detailed regulatory requirements can be obtained from the responsible agency. These laws may be applicable to some wildlife management actions taken at SEA.

Wetlands identified as part of natural resource mitigation for Master Plan Update projects should be managed in accordance with the Natural Resource Mitigation Plan and Section 404 and Section 401 permit conditions (Appendix I and J).

Table 4. Wetland regulations potentially applicable to wildlife hazard management in wetlands at Seattle-Tacoma International Airport.

Law	Implementation	Jurisdiction	Implementing Agency
Clean Water Act Section 404	Permit required for placement of dredge or fill materials in Waters of the U.S.	Wetlands and other Waters of the U.S.	*Army Corps of Engineers/ Environmental Protection Agency*
Clean Water Act Section 401	Certification that the proposed project will meet state water quality standards is a condition of federal permit approvals	Federal permits affecting Waters of the U.S., including wetlands	*Washington Department of Ecology*
Coastal Zone Management Act	A notice of consistency with the state coastal zone management plan is a condition of federal activities, federal license and permit approval, and federal support of local activities		*Washington Department of Ecology*
State Hydraulic Code	Permit (Hydraulic Project Approval) required for work that affects the natural flow or bed of Waters of the State	Activities affecting Waters of the state, including wetlands that are important to fish life	*Washington Department of Fish & Wildlife*
Forest Practices Act	Permit required for tree harvest	Restricts harvest activities in and around wetlands	*Washington Department of Natural Resources*
City of SeaTac Critical Areas Ordinance	Approval for placement of fill material into wetlands and other activities affecting critical areas (subject to Interlocal Agreement between Port of Seattle and City)	Critical areas are defined in the City's ordinance	*City of SeaTac*
Endangered Species Act	Consultation triggered by federal actions, including permit, planning, or funding decisions.	Activities that directly or indirectly affect federally listed endangered or threatened species and their critical habitat.	*National Marine Fisheries Service* (for marine and anadromous fish). *U.S. Fish and Wildlife Service* for other species.

Pursuant to these laws, permits and approvals have been and will be issued to the Port for various development activities at SEA. These permits and approvals include certain mitigation projects to avoid, reduce, or compensate for the impacts of the development activities on wetlands and streams. Wildlife hazard management at SEA should be designed and implemented in a manner that is consistent with the goals of these mitigation projects.

These goals include the restoration of wetlands and stream buffers to improve aquatic habitat, floodplain, and water quality functions. Enhancement and restoration of these functions will improve ecological conditions in Miller Creek and Des Moines Creek for aquatic organisms. The

on-site mitigation areas are not planned as mitigation for impacts to avian species[4] that pose aircraft safety concerns. A critical need of the mitigation projects is to restore wetland and stream buffer functions in a manner that avoids creating new avian wildlife hazards and reduces existing avian wildlife hazards.

As discussed in this plan, airport property is subject to a variety of potential wildlife management actions (regulations affecting wildlife management are explained in Sections 4.5 to 4.9, and wildlife management control is discussed in Section 6). In nearly all cases, these management actions can be successfully implemented without interfering with the ability of the on-site mitigation projects to provide the planned ecological functions. In nearly all cases, management actions at the on-site mitigation will involve the hazing or removal of wildlife and minor habitat modification. These actions are consistent with the planned mitigation, and require no wetland-related permits or approvals.

The wildlife management control actions presented in this Plan attempt to balance the Port's, FAA's, and USDA Wildlife Service's role in protecting aviation safety with the goal of non-wildlife wetland mitigation and enhancement. Although the Port must retain ultimate authority to identify and respond to wildlife threats to aviation safety, the Plan requires that: (a) the Port secure permits and approvals for any control actions that would result in a significant reduction in mitigation functions, except where immediate action is required to ensure air safety; and (b) any control action that results in a significant reduction in mitigation functions must be compensated for and mitigation functions must be restored as soon as practicable.

Regarding the mitigation sites, the Plan contemplates two levels of wildlife management actions: those that may have a de minimus reduction in mitigation function, and those that may cause a significant reduction in mitigation functions.

Minor Vegetation Management Activities

This level includes vegetation management activities in mitigation sites that would not result in a significant reduction of mitigation functions, would not require a permit, and would not require a change to an existing permit condition. As a rule of thumb, this would generally include actions that do not alter the ability of a mitigation site to meet performance standards for vegetation, as identified in the mitigation plan. These actions would be exempt from pre-consultation with the permitting agencies. Examples of such management actions include:

[4] As discussed in the *Natural Resources Mitigation Plan* for the Master Plan Update projects, avian habitat functions will be replaced by creating and restoring wetland habitats at an off-site location in Auburn. Non-avian wildlife using mitigation sites are not a hazard to aircraft safety unless they attract avian predators, or move onto active runways.

- **Selective trimming of vegetation**. If selective trimming of vegetation within mitigation sites is required, it can occur without disruption of the desired functions of the mitigation. Removal of small quantities of vegetation can also occur when mitigation functions are not significantly altered.

- **Increase vegetation density**. Adding new non-attractive native plants to mitigation sites would increase plant density and reduce open/poorly vegetated areas. This action would reduce wildlife use of more open areas and increase the rate of canopy closure over periodically flooded floodplain areas.

- **Replant or replace one type of vegetation with another native plant species**. If one vegetation type is observed to be a wildlife attractant, it shall be replaced with another type. Replacement could occur through physical removal (cutting, up rooting, etc.) or by replanting areas with faster growing species that may out-compete the undesirable plant. Generally, replacement can occur without significant soil disturbance and without affecting the planned wetland functions.

- **Removal of channel obstructions**. Various debris blockages (including beaver dams) could increase the presence of standing water at the mitigation sites. To reduce standing water areas and habitat for waterfowl, it will be necessary to remove these obstructions. (The laws listed in Table 4 above generally include exemptions and/or expedited review procedures for emergency actions and for maintenance activities.)

The above vegetation management actions, if performed, will be reported in the mitigation monitoring reports, required for the Master Plan Update Section 404/401 permit. Reporting will include a description of the action taken, an explanation of why the action was taken, an analysis of the effect of the action on the mitigation site properties, performance standards, and ecological functions. Photographs of the mitigation site prior to and following the management action should will be included. An analysis of the effectiveness of the management action in eliminating or reducing the wildlife hazard will also be reported.

4.12.1.1 - Potentially Significant Management Activities

This level includes wildlife management activities that require permits from agencies regarding Clean Water Act Section 404 and Section 401 compliance, Endangered Species Act review, Hydraulic Project Approval review, and other applicable laws, or changes to conditions of existing permits and approvals. In the unlikely event that wildlife management activities result in significant modifications to non-habitat wetland functions, the Port would apply for the required permits or permit changes prior to conducting these activities, unless immediate action was required to ensure air safety.

If the Port determine that immediate action was required to ensure air safety, the Port would notify the Department of Ecology and other agencies with permitting jurisdiction at the earliest practicable date to consult with them on the actions taken and to be taken and to determine the appropriate mitigation to restore the lost or impaired mitigation functions. Recognizing that activities that would

result in a significant reduction in mitigation functions should be employed only as a last resort, the Port will be required to restore the lost or impaired mitigation functions at a ratio of at least 1.5 to 1.0 and to secure any required permits for the mitigation.

Examples of such management activities include:

- **Netting of habitat**. A potential management strategy to reduce bird use is to use a pole-supported net system that would reduce bird access to habitat. Placement of physical structures in wetlands, such as support posts, cable anchors, etc. could be subject to HPA and Section 404 permitting.

- **Drainage of wetlands**. Alteration of soil saturation or the extent of jurisdictional wetlands on mitigation sites through excavation of drainage channels, grading, or other hydrologic modification.

- **Significant removal/replacement of vegetation** such that planned mitigation functions could be altered. This could occur if larger scale removal/replanting affected riparian conditions, reduced shading of creeks, or changed other factors important to the mitigation function. As a rule of thumb, significant removal/replacement of vegetation would generally include actions that result in removal of vegetation cover in a mitigation area such that the vegetation performance standards for the mitigation site cannot be met.

5.0 - RESOURCES

FAR 139.337(e)(4) ***Identification of resources to be provided by the certificate holder for implementation of the plan.***

5.1 - OVERVIEW

Habitat Management and wildlife control supplies can be purchased from several companies. An adequate supply of equipment will be kept on hand at SEA for use by trained personnel.

5.2 - AIRPORT SUPPLIES

Supplies that will normally be stocked at the airport include:

Copies of the recent WHMP
Pyrotechnic ammunition and launchers
Bird bombs/bangers, screamers, and whistlers
12 gauge break action shotgun and ammunition
Cleaning kits for all firearms
Field guide for local bird identification
Mylar tape
Snare/catch pole
Cage trap for dogs (e.g., Tomahawk 110B)
Cage trap for cats/opossums/raccoons (e.g., Tomahawk 108)
Rat/mouse traps snap traps
Binoculars
Pellet rifle and pellets
Latex gloves
Garbage bags
Gallon-size re-sealable sandwich bags
"Prevention and Control of Wildlife Damage" reference manual
Freezer to preserve bird carcasses found on runways
24 Hour Airfield Inspection Report Sheets
Necropsy laboratory supplies

5.3 - AIRPORT SUPERVISORS AND SENIOR RAMP CONTROLLER (SRC) VEHICLES

The SRCs' and Airport Supervisors' vehicles should be stocked with the supplies listed below to facilitate an immediate response to wildlife hazards. They will be responsible for responding to emergency calls from the SEA tower or Airport Operations to disperse animals from the runways. They should maintain radio communications with the tower if there is a situation

within the AOA, and the patrols must operate within the air movement areas according to FAA guidelines. At a minimum, supplies to be maintained in their vehicles should include at least:

Pyrotechnic launchers
An adequate supply of pyrotechnics ammunition (e.g., bangers, whistlers, etc.)
Bird identification field guide
Binoculars
Latex gloves
Garbage bags
Gallon-size re-sealable sandwich bags
Several daily wildlife control log sheets
24 Hour Airfield Inspection Report Sheets

5.4 - USDA-WILDLIFE SERVICES ASSISTANCE

Some supplies such as starling traps, vertebrate pesticides and chemical capturing agents may be available through Wildlife Services for conducting specific control operations. Some control methods, such as alpha chloralose for waterfowl, are restricted to certified Wildlife Services personnel only, but Wildlife Services can provide assistance if a unique situation arises. The Port of Seattle currently has a Cooperative Service Agreement with Wildlife Services to assist SEA personnel in deterring or removing starlings and pigeons from the airfield, but WS may also provide assistance in dispersing other hazardous wildlife from the airfield and adjacent areas if hazards are identified.

6.0 - WILDLIFE CONTROL PROCEDURES

FAR 139.337(e)(5) ***Procedures to be followed during air carrier operations including at least ...***

139.337(e)(5)(i) ***Assignment of personnel responsibilities for implementing the procedures;***

Personnel responsibilities are described and delineated in Chapter 2.

139.337(e)(5)(ii) ***Conduct of Physical inspections of the movement areas and other areas critical to wildlife hazard management sufficiently in advance of air carrier operations to allow time for wildlife controls to be effective;***

The Airfield Line of Business should frequently conduct physical inspections of movement areas and other areas critical to wildlife hazard management as part of the daily protocol. The SRCs should document all observed wildlife and record the data on a Daily Wildlife Activity Report (Appendix F). In cases where no animals are seen, a record indicating that an inspection was conducted and that no animals were observed should be made on the 24 Hour Airfield Inspection Report Sheets (Appendix F). A copy of the Daily Wildlife Activity Report for each day should be submitted to the SEA Biologist. The SEA Biologist should also conduct physical inspections of critical areas and report wildlife activity on the Daily Wildlife Activity Report. During periods of exceptionally heavy wildlife activity (e.g., migratory periods, outbreaks of insects etc.), the Airport Supervisors should work with the Airfield Biologist to issue a Notice to Airmen (NOTAM).

139.337(e)(5)(iii) ***Wildlife control measures;***

6.1 - OVERVIEW

Wildlife that is identified as hazardous during and after the completion of the recommended habitat modifications should be controlled using accepted direct control techniques. Wildlife hazards at airports are extremely variable and complex, therefore, it is essential to adopt a flexible, innovative, and adaptive approach to managing such hazards. Wildlife identification guides and handbooks will be available for use by wildlife control personnel at SEA. Of particular note is wildlife damage techniques manual jointly produced by the University of Nebraska, Wildlife Services, and the Great Plains Agricultural Council titled "Prevention and Control of Wildlife Damage". This 2-volume set details species-specific damage assessment, and includes an in-depth discussion of methods of dispersal for each species and is available via the internet at ***http://www.ces.ncsu.edu/NREOS/wild/wildlife/prevent.html***. In addition, Transport Canada (Canada's governmental agency responsible for reducing wildlife hazards) has also produced a valuable reference manual on wildlife control procedures at airports. This

manual is available via internet at ***http://www.tc.gc.ca/aviation/aerodrme/birdstke/manual/index.htm***. Airport personnel should be trained to identify hazardous wildlife at SEA (refer to Chapter 8), and should select dispersal methods that are appropriate to the type of animal causing the hazard.

6.2 - WILDLIFE PATROL

6.2.1 - Port Of Seattle

SEA's wildlife patrol crew should consist of the Airfield Biologist, Airport Supervisors, SRC's, and all airfield personnel. The patrol should monitor and respond to wildlife hazards on the airfield and should coordinate their activities through the SEA Biologist. The crew should be trained in wildlife identification, proper control techniques, and safe operations as outlined in Chapter 8. The crew should have a radio-equipped vehicle and adequate wildlife control supplies (Chapter 5). The patrol should maintain clear communications with Airport Supervisors and tower, in accordance with FAA radio protocols. The crew should also report all observations of wildlife activity on the Daily Wildlife Activity Report and indicate the airfield condition on the 24 Hr. Airfield Inspection Report (Appendix F). Completed forms should be forwarded to SEA Biologist for frequent review. Routine runway sweeps should be conducted at least once per day, and the presence of any dead animals found from strikes or suspected strikes should be recorded on Form 5200-7 (Appendix E), as well as POS Form 98-667 (Wildlife Incident Report [Appendix F]). In cases where no wildlife hazards were seen, it should be indicated that an inspection was conducted and that no hazards were observed on the 24 Hour Airfield Inspection Report Sheet (Appendix K). Other wildlife-related activities (e.g., notable hazards, animals killed or dispersed, unusual wildlife behavior, etc.) should be documented on the Daily Wildlife Activity Report. All dead birds found on runways will be considered the result of a strike unless the death was obviously due to some other cause. Any bird remains that are found should be bagged, labeled (e.g., time and date found, location on runway, prevailing wind conditions, person who found remains, etc.), and placed in a freezer for later inspection and identification. Wildlife strikes may be reported directly to the FAA via Internet at ***http://www.faa.gov/arp/hazard.htm***, but a printout of the report must also be immediately submitted to the Wildlife Coordinator and/or the Airfield Manager and Wildlife Biologist so that the situation can be assessed.

6.2.2 - USDA-Wildlife Services Assistance

Wildlife Services provides a Specialist that currently assists SEA with starling, goose, and pigeon control activities on the airport. This Specialist can also assist with other wildlife control activities including those involving coyote, deer, bear, raccoon, and beaver. Many of the control techniques for mammalian species differ from traditional bird hazard control techniques, and require specialized experience and permits. Wildlife Services can be contacted at (360) 753-9884 for problems involving mammalian species or other unique wildlife hazards.

6.2.3 - County Animal Control Assistance

King County Animal Control is also available to help with free-roaming dogs and cats. If their assistance is needed on the airfield, call (206) 296-PETS (see also Chapter 9). If the animal poses an immediate threat to aviation, wildlife control personnel should attempt to catch, disperse, or lethally remove it.

6.3 - GENERAL WILDLIFE CONTROL MEASURES

Pursuant to *CFR 14 – Part 139.337 (f), ...each certificate holder shall take immediate measures to alleviate wildlife hazards whenever they are detected.* Consequently, each wildlife hazard that is observed at SEA will be analyzed by wildlife control personnel to determine a practical solution that will be employed in a timely manner, commensurate with the perceived risk(s). The initial response for most species will be to haze them with frightening devices, followed by direct control methods, including lethal removal, when necessary

As a wildlife population near the airfield increases in abundance, so does likelihood that individual members of the population will enter critical airspace used by arriving and departing aircraft. However, wildlife abundance is not the sole indicator for assessing the strike hazards, rather the entire dynamic of the animals' abundance, body size, and behavioral attributes must be evaluated in combination. Notable attributes of wildlife behavior that should be examined to properly assess the risk to aircraft include direction and altitude of wildlife movements in relation to aircraft, flocking characteristics, frequency of visits to a given site, duration of visit, and activity while on site (e.g., nesting, loafing, feeding, soaring, etc.), to name a few.

A properly formulated wildlife management plan should be based upon a comprehensive biological evaluation of the situation. A primary key to successful wildlife control is persistence, innovation, and a clear understanding of the risks associated with certain species, that either by their location, size, behavior and/or number create a hazardous situation for the current state of the airfield. Most control techniques retain their effectiveness when used judiciously and in conjunction with other methods. Some methods such as pesticides or leg-hold traps are only effective and legal for certain species and situations. Therefore, the methods chosen will depend largely on the situation and the species involved. Finally, personnel involved in direct control should be aware of the potential diseases that wildlife can carry and should take appropriate precautions.

6.3.1 - Bird Control

Several species of birds are present at SEA and represent the most significant potential for causing damaging strikes. Although starlings are of primary concern, migratory species, especially geese and other species of flocking waterfowl, are also a great concern. Juvenile birds may also constitute an unusual wildlife hazard because of their general unfamiliarity with the airport environment at SEA. The "Prevention and Control of Wildlife Damage" manual discusses a number of methods that may be used to haze birds from the airport, but as previously stated, an integration of multiple methods should be employed for maximum effectiveness. If

properly applied, the techniques discussed in this reference manual should reduce most hazards involving species of concern at SEA.

6.3.2 - Mammal Control

Potential hazards from the majority of mammalian species at SEA have been reduced through habitat modifications and the construction of fencing and other exclusionary devices. With the exception of a few coyotes, large mammals such as deer have already been excluded from using the airfield by the perimeter fence. However, smaller mammals still exist on the airfield in low to moderate densities, and can provide an attraction to larger predators and raptors. These rodent and rabbit populations will be monitored by the SEA Biologist.

6.4 - APPROACH FOR IMPLEMENTING CONTROL MEASURES

To facilitate SEA's effort in assessing and responding to hazards, a flow chart for assessing the wildlife hazard and implementing control methods was developed (Figure 1). Given the extremely variables and complex nature of wildlife hazards at airports, it is essential to adopt a flexible, innovative, and adaptive approach to managing unexpected hazards that may result from the airfield environment, especially the mitigation sites.

If it is determined that an actual wildlife hazard exists due to one or more of the risk factors (species, location, behavior, number, and/or airfield conditions) that were identified through monitoring, then the observer takes direct action immediately to resolve the situation. The methods used to reduce the hazard(s) will become increasingly more aggressive and used in combination with one another until the wildlife responds favorable or the hazard is abated. In extreme cases where the animals are non-respondent or situation is becoming increasing more hazardous, lethal removal will be necessary.

Concurrent with the immediate action required to resolve a given situation at a given moment is the long-term management approach required to resolve reoccurring problems that have been observed with frequency. This long-term approach is comprised primarily of managing people (e.g., training, public education, reviewing proposed construction plans) and managing habitat/prey (e.g., modify vegetation, exclude/remove attractants). If the frequency of these hazardous situations and/or the risks to aviation increase, more aggressive actions must be proposed, planned, reviewed and implemented. For example, the Port may first start with selective thinning of vegetation, and increasing the intensity of the modifications as needed to include replanting new species and/or removing certain undesirable ones. The most extreme scenario would include reducing or eliminating larger areas of vegetation where conditions are deemed necessary based on the proactive management approach (Figure 1). Proactive management includes evaluating Port data and records of communication to develop creative, effective, cost-efficient solutions to reduce the degree to which direct control actions are needed in the future. The amount of effort and planning required to implement more aggressive project plans is expected to increase with the environmental significance of the proposed action. Therefore, dramatic changes to the habitats near the airfield, such as significantly altering

hydrology at the mitigation sites, is highly unlikely. SEA will consult with the appropriate regulatory agency to identify alternative means to rectify recurring problems well before modifying the hydrology of wetlands or riparian areas is considered.

139.337(e)(5)(iv) ***Communication between wildlife control personnel and any air traffic control tower in operation at the airport;***

All wildlife control personnel should be equipped with radios and have proper training to contact the air traffic control tower. If an immediate hazard exists that might compromise the safety of air traffic at SEA, the Airport Supervisor should coordinate with the air traffic control tower, and if necessary, detain arriving or departing air traffic until the hazard is eliminated. In extreme cases, the runway may need to be closed temporarily at the discretion of the Airfield Manager, Airport Supervisor, or tower. Although the air traffic control tower can not be expected to monitor all wildlife hazards on the airfield and still direct air traffic, tower personnel should notify the Airport Supervisor immediately if pilots report hazards or any such hazards are observed from the tower.

7.0 - EVALUATION

7.1 - OVERVIEW

The WHMP will be evaluated at least annually. The Wildlife Hazard Group will evaluate the effectiveness of the WHMP at reducing wildlife strikes at SEA and monitor the status of hazard reduction projects, including their completion dates.

7.2 - MEETINGS

The Wildlife Hazard Working Group will meet at least once per year, but the group may convene more regularly if situations warrant, as determined by the Wildlife Coordinator.

7.3 - WILDLIFE STRIKE DATABASE

The Wildlife Coordinator will maintain a database of wildlife strikes and populations on the airfield and surrounding areas. Information from this database will be used to identify trends and to monitor any increases in wildlife hazards on the airfield. If unacceptable increases in wildlife populations are observed, the cause should be determined and the WHMP modified to address the problem. The records should be entered weekly into a computerized database by the SEA Biologist. Wildlife Services has developed a Wildlife Hazard Information System (WHMIS) program specifically for tracking wildlife control activities at airports, and can assist the airport in setting up the computerized record system. Wildlife Services provides the WHMIS system at no charge, but the program requires Microsoft Access 97 to operate.

7.4 - AIRPORT EXPANSION

Airport expansion plans will be reviewed by the SEA Biologist to ensure that new developments will not inadvertently result in increased wildlife hazards to aircraft operations. If appropriate, they will coordinate designs with the FAA and Wildlife Services.

7.5 - FAA INVOLVEMENT

FAA Regional Certification Inspectors and personnel from the Seattle Airports District Office (ADO) should be invited to make comments on the WHMP and to attend annual meetings on plan modifications.

8.0 - TRAINING

8.1 - OVERVIEW

Training is essential for those personnel involved in the WHMP. The Wildlife Coordinator should ensure that all personnel that might be working in a wildlife deterrence capacity are trained in the proper selection and application of control methods, including species identification and reporting procedures. Training will also include a description of special procedures for wildlife control management actions in wetland mitigation sites, wetlands, streams, and ditches.

8.2 - STANDARD TRAINING

Wildlife control personnel should receive training in mitigating wildlife hazards at airports, including an overview of laws associated with wildlife control (including Section 404 of the Clean Water Act, State Hydraulics Code, Endangered Species Act, and Local Sensitive Areas Codes). Training should also include techniques used for prey-base reductions, firearm and pyrotechnic safety including hands-on training, and wildlife identification and dispersal techniques. Airport communications and driving should also be provided to all employees involved in wildlife control operations that may require them to operate on the AMA.

8.3 - USDA-WILDLIFE SERVICES TRAINING

Wildlife Services has instructors that teach a course for wildlife patrol personnel. The purpose of the course is to familiarize personnel involved with airport operations in basic bird and mammal identification and dispersal techniques. The course also involves hands-on training using pyrotechnics, and other deterrent equipment, with an emphasis on safety. This training should be offered to all personnel responsible for dispersing wildlife at SEA in whole or part. The training can be customized to fit the needs of individual recipients or situations.

9.0 - AGENCY DIRECTORY

REGULATORY AND ENFORCEMENT

U.S. Fish and Wildlife Service (Wildlife Permitting)
Migratory Bird Permits
911 NE 11th Ave.
Portland, OR 97232-4181
(503) 872-2715

U.S. Fish and Wildlife Service (T&E Species)
North Pacific Coast Ecoregion
Western Washington Office
510 Desmond Drive SE, Suite 102
Lacey, WA 98503
(360) 753-9440

U.S. Fish and Wildlife Service (Law Enforcement)
(425) 883-8122

Washington State Department of Fish and Wildlife (Law enforcement and Permitting - Seattle area)
Law Enforcement - Region 4
16018 Mill Creek Blvd.
Mill Creek, WA 98012
(425) 775-1311 ext. 115

Washington State Department of Fish and Wildlife (T&E Species)
600 Capitol Way North
Olympia, WA 98501-1091
(360) 902-2515 - Main Switchboard
(360) 902-2694 - T&E Section, NRB Office - 5th floor

Federal Aviation Administration (FAA)
1601 Lind Ave., SW, Ste. 250
Renton, WA 98055-4056
Safety and Standards Branch
(425) 227-1621 - Certification Officer
(425) 227-2607 - Certification Officer
Seattle Airports District Office (ADO)
(425) 227-2657 - Supervisor
(425) 227-2653 - Environmental Specialist

Federal Aviation Administration (FAA)
Staff Wildlife Biologist
FAA Airport Safety and Compliance
FAA-AA5-317
800 Independence Ave., SW
Washington, DC 20591
(202) 267-3389

MUNICIPAL AGENCIES

King County Animal Control Office
21615 64th S.
Kent, WA 98
(206) 296-PETS

City of SeaTac
17900 International Blvd. S.
Suite 401
SeaTac, WA. 98188
(206) 241-9100

Port of Seattle Police Department
P.O. Box 68727
Seattle, WA. 98168
(206) 431-3490

King County Sheriff's Department
SE 22300 231st
Maple Valley, WA 98038
(206) 296-3883

Seattle-Tacoma International Airport
Port of Seattle
P.O. Box 68727
Seattle, WA 98168-0727
Airport Operations Manager
(206) 248-6864
Airport Biologist
(206) 431-4453

TECHNICAL ASSISTANCE

U.S. Department of Agriculture, Wildlife Services
720 O'Leary St., NW
Olympia, WA 98502
(360) 753-9884 - Olympia
(253) 852-4785 - Renton

Washington State University Cooperative Extension of King County
700 5th Ave. Swt. 3700
Seattle, WA 98104-5037
(206) 296-3900

Washington State Department of Agriculture (Pesticides Management)
P.O. Box 42589
Olympia, WA 98584
(360) 902-2010

Washington Poison Control Center
1-800-732-6985

INTERNET SITES OF INTEREST

9.1.1.1.1 Prevention and Control of Wildlife Damage
http://www.ces.ncsu.edu/NREOS/wild/wildlife/prevent.html

Federal Aviation Administration (FAA)
http://www.faa.gov/arp/hazard.htm
http://www.faa.gov/faadocs.htm

U.S. Department of Agriculture-Wildlife Services
http://www.aphis.usda.gov/ws

Washington State Department of Fish and Wildlife
http://www.wa.gov/wdfw/wlm/diversty/soc/soc.htm

Washington State Department of Ecology
http://www.wa.gov/ecology/

Transport Canada - Wildlife Control Techniques
http://www.tc.gc.ca/aviation/aerodrme/birdstke/manual/index.htm

10.0 - MONITORING HAZARDS AT MITIGATION SITES

10.1 - NEED AND OBJECTIVES FOR MONITORING MITIGATION SITES

Construction activities at SEA require compensatory mitigation for unavoidable construction-related loss of wetlands. The current mitigation plan allows the Port of Seattle to split wetland functions by creating new wetlands for wildlife at an off-site location, while restoring wetlands for hydrologic functions on SEA property. There are three mitigation sites that are located on or very near airport property: Vacca Farms, Miller Creek, and Tyee Golf Course. These projects were planned in response to public and agency requests to protect Miller and Des Moines Creek watersheds. Although the on-site mitigation projects are actually expected to result in decreased wildlife use of the sites, Wildlife Services and the FAA recognize the potential for unexpected wildlife hazards associated with projects. The monitoring and control program discussed in this chapter was designed to detect and respond to any unforeseen wildlife hazards at the on-site mitigation sites.

Vacca Farm and a portion of the Des Moines Creek flood plain on the Tyee Valley Golf Course are slated for conversion to scrub/shrub wetland habitat as part of SEA's third runway expansion.

Although it is impossible to accurately predict exactly how wildlife dynamics will be altered by the modifications to existing on-site wetland habitat, some changes should be anticipated and ongoing monitoring will be necessary to ensure that a hazardous situation does not develop. One objective of the mitigation projects is to eliminate habitat already known to be attractive to geese, therefore, acceptable hazard levels will not be based on existing wildlife populations, rather the surveys are intended to monitor wildlife population trends over time.

10.2 - FACTORS TO BE ASSESSED

Several factors will be used to assess wildlife hazards associated with the mitigation sites within the Miller Creek and Des Moines Creek watersheds, all of which will attempt to place wildlife abundance in the context of hazards to arriving and departing aircraft. The most hazardous types of wildlife that might be attracted to mitigation projects were identified, and monitoring designs were selected to most accurately sample these target species, therefore, some of the smaller, solitary species may be underestimated. This was considered an acceptable bias because smaller, solitary birds typically present a lower hazard to aircraft. Factors that will be assessed for each species at each mitigation site within a 10,000-foot radius of SEA are as follows:

- Abundance of animals throughout the day and year (seasonal)
- Distance, direction and altitude of wildlife movements through natural immigration and emigration into the area

- Direction (relative to the airfield) and altitude of wildlife movements in response to a control action
- Nesting activity on the sites
- Correlation between wildlife use at each site and depth, surface area, and duration of water inundation
- Correlation between wildlife use and vegetative cover, and to the extent possible, composition at each site

10.3 - MONITORING METHODS

10.3.1 - Target Species

The surveys are designed to focus primarily on large, flocking birds because of their mobility and potential threat to aircraft safety. The surveys will identify trends and will not provide an absolute estimate of population sizes. Waterfowl (geese and dabbling ducks), raptors (hawks, owls, etc.), starlings, blackbirds, crows/ravens, shorebirds, and wading birds (herons) are the primary types of hazardous wildlife that may be attracted to the mitigation sites. Mammal activity will also be recorded through incidental observations, but due to sampling design, mammals will likely be underestimated by the systematic surveys. Beaver is the mammalian species of greatest concern because of it propensity to build dams, thereby, altering the hydrologic and vegetative regimes on site.

10.3.2 - Systematic Surveys

Systematic surveys will be conducted for the first five years after construction of the sites is completed. The wildlife hazard potential of the sites will be reassessed at the end of the third year to determine if the monitoring should be changed, a decision that will depend in large part on the growth status (percent cover) of the plant community. Surveys will be conducted at least once per week using a "point count" survey method, wherein all wildlife within the plot that are seen or heard from a fixed point during a 10-minute sampling period will be recorded. A longer than normal sampling period was selected to provide a better assessment of localized flight patterns of birds at the sites. The animal's activities will be noted whenever possible to assess why they are attracted to the site, and the direction and altitude of the animal's ingress or egress to the site will be recorded. The start time of each survey will be categorically varied by morning, midday, and evening to identify potential peak use periods. An index of abundance over time for each species will be developed from these data.

In addition to time-area counts, a flyway count will be conducted 2 times per month for a 60-minute period, wherein all birds flying into or over the sites will be recorded, along with their

altitude and direction of travel. Their movements will be noted in relation to aircraft arrival and departure patterns because this will enable a more accurate assessment of the relative hazards posed by wildlife at each site.

The goal of this monitoring program is to detect and immediately abate wildlife hazards associated with the mitigation projects. In the event wildlife is observed that poses a threat to air safety, appropriate control methods will be immediately implemented, although it might bias the survey data. This approach helps ensure aviation safety and yet still provides valuable data, because the behavioral response exhibited by each species to a given control method will be recorded.

10.3.3 - Habitat Use

A map of each of the 3 mitigation sites will be overlaid with an alpha-numeric grid so that precise locations of individual animals can be plotted. The surface area and configuration of standing water during each survey will be estimated to the extent possible (the watered edges may be visually obscured by the vegetative canopy) by sketching the water boundaries on a map grid, and the water depth recorded. Estimates of vegetative cover will be provided by the entity responsible for doing the annual evaluations of plant growth. Wildlife use (e.g., abundance, behavioral activities) will be correlated with the plant cover estimates to determine if the vegetation is achieving the desired effect of precluding hazardous wildlife, and if not, steps will be taken to determine what can be done to alleviate the wildlife attraction to the site.

10.3.4 - Incidental Observations

The SEA Biologist and a Wildlife Services Specialist are currently working on the airfield to reduce hazards unrelated to the mitigation projects. However, due to the proximity of the mitigation sites to the airfield, frequent incidental observations of the mitigation sites will be made, and any wildlife activity at the sites recorded. Many unique hazards may be observed outside of the relatively brief systematic survey periods, and these incidental observations will likely provide some of the most valuable information of wildlife use of the sites. In these situations, immediate action will be taken to reduce the hazard and the animals' responses to the action will be documented.

10.4 - CONTROL METHODS

It is anticipated that wildlife hazards associated with the mitigation sites can be effectively reduced using known control methods described in Section 6.1 (Wildlife Control Procedures), without compromising the objectives for which the mitigation project was intended. However, it is conceivable that some habitat alterations such as adding or clearing vegetation or altering hydrologic regimes on a site may become necessary. Alteration of hydrology or vegetative habitat would only be used as a last resort if all other methods fail to abate wildlife hazards to a safe level (Figure 1, Section 6).

10.5 - DECISION MODEL FOR IMPLEMENTING CONTROL METHODS

To facilitate SEA's effort in assessing and responding to hazards, a flow chart for assessing the wildlife hazard and implementing control methods was developed (Figure 1, Section 6). Given the extremely variables and complex nature of wildlife hazards at airports, it is essential to adopt a flexible, innovative, and adaptive approach to managing unexpected hazards that may result from the airfield environment, especially the mitigation sites.

If it is determined that an actual wildlife hazard exists due to one or more of the risk factors (species, location, behavior, number, and/or airfield conditions) that were identified through monitoring, then the observer takes direct action immediately to resolve the situation. The methods used to reduce the hazard(s) will become increasingly more aggressive and used in combination with one another until the wildlife responds favorable or the hazard is abated. In extreme cases where the animals are non-respondent or situation is becoming increasing more hazardous, lethal removal will be necessary.

Concurrent with the immediate action required to resolve a given situation at a given moment is the long-term management approach required to resolve reoccurring problems that have been observed with frequency. This long-term approach is comprised primarily of managing people (e.g., training, public education, reviewing proposed construction plans) and managing habitat/prey (e.g., modify vegetation, exclude/remove attractants). If the frequency of these hazardous situations and/or the risks to aviation increase, more aggressive actions must be proposed, planned, reviewed and implemented. For example, the Port may first start with selective thinning of vegetation, and increasing the intensity of the modifications as needed to include replanting new species and/or removing certain undesirable ones. The most extreme scenario would include reducing or eliminating larger areas of vegetation where conditions are deemed necessary based on the proactive management approach (Figure 1). Proactive management includes evaluating Port data and records of communication to develop creative, effective, cost-efficient solutions to reduce the degree to which direct control actions are needed in the future. The amount of effort and planning required to implement more aggressive project plans is expected to increase with the environmental significance of the proposed action. Therefore, dramatic changes to the habitats near the airfield, such as significantly altering hydrology at the mitigation sites, is highly unlikely.

In the most extreme scenario, the water level may have to be reduced or eliminated, or the wildlife-attracting vegetation removed and replaced with another type. The model outlined in Figure 1 provides a systematic and incremental approach for determining whether this scenario is necessary to ensure air traffic safety. Prior to altering hydrology at these sites, SEA will consult with all appropriate regulatory agencies to identify alternative forms of vegetation that meet wildlife abatement efforts without compromising the mitigation objectives.

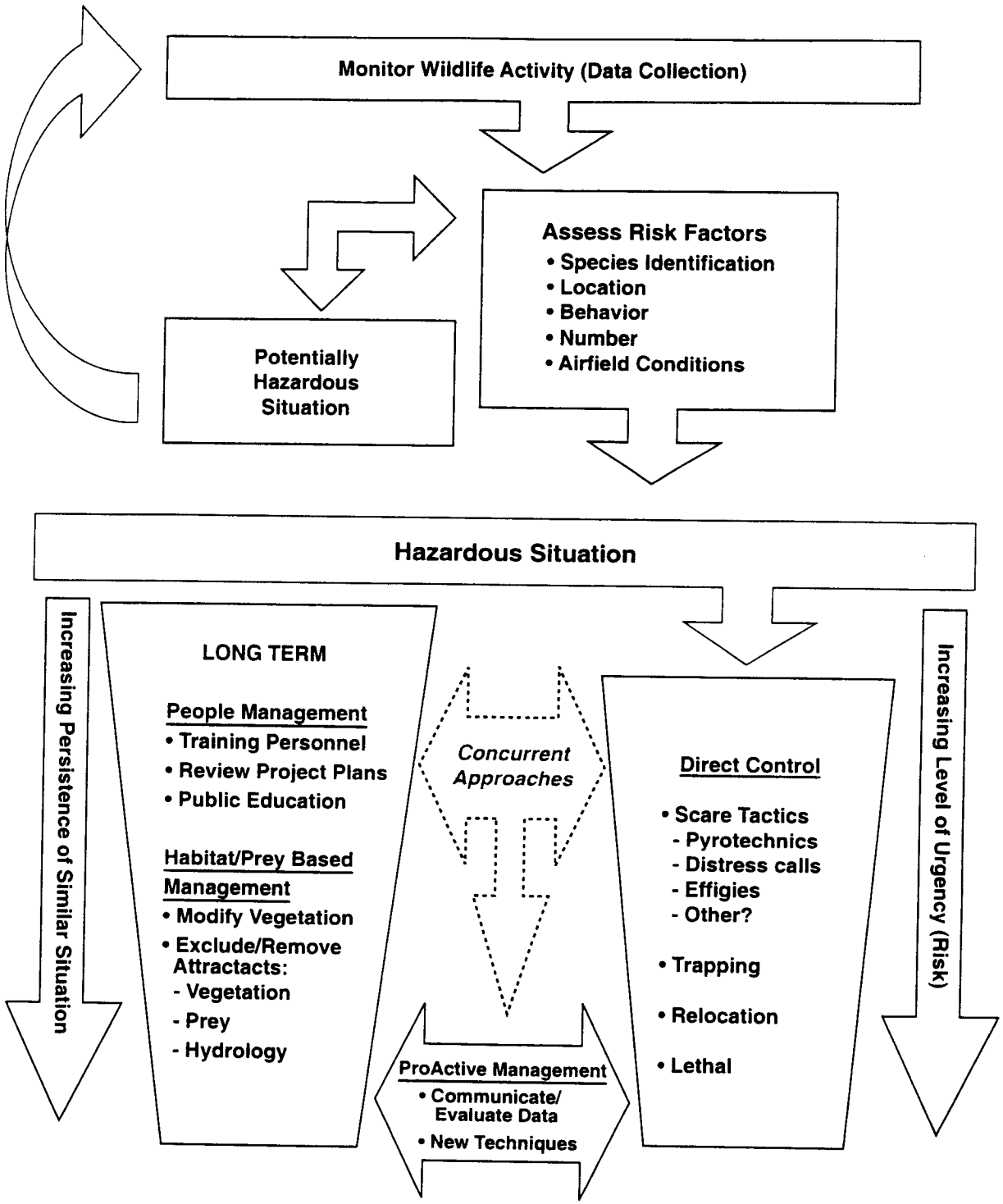


Figure 1
Flow Chart for Resolving Wildlife Hazards Near Seattle-Tacoma International Airport

APPENDIX A ***Code of Federal Aviation Regulations CFR Title 14 FAR part 139.337 (1 Page)***

APPENDIX B *Certalert No. 97-09 - Wildlife Hazard Management Plan Outline (6 Pages)*

Note: Certalerts, Advisory Circulars, and regulations are frequently changed or updated, always verify that the version attached herein is the most current. Contact FAA or Wildlife Services (see directory in Chapter 9) or consult the FAA website at ***http://www.faa.gov/arp/hazard.htm*** *for the latest version.*

CFR 14 - Sec. 139.337 Wildlife Hazard Management.

(a) Each certificate holder shall provide for the conduct of an ecological study, acceptable to the Administrator, when any of the following events occurs on or near the airport:

(1) An air carrier aircraft experiences a multiple bird strike or engine ingestion.

(2) An air carrier aircraft experiences a damaging collision with wildlife other than birds.

(3) Wildlife of a size or in numbers capable of causing an event described in paragraph (a)(1) or (2) of this section is observed to have access to any airport flight pattern or movement area.

(b) The study required in paragraph (a) of this section shall contain at least the following:

(1) Analysis of the event whi prompted the study.

(2) Identification of the species, numbers, locations, local movements, and daily and seasonal occurrences of wildlife observed.

(3) Identification and location of features on and near the airport that attract wildlife.

(4) Description of the wildlife hazard to air carrier operations.

(c) The study required by paragraph (a) of this section shall be submitted to the Administrator, who determines whether or not there is a need for a wildlife hazard management plan. In reaching this determination, the Administrator considers--

(1) The ecological study;

(2) The aeronautical activity at the airport;

(3) The views of the certificate holder;

(4) The views of the airport users; and

(5) Any other factors bearing on the matter of which the Administrator is aware.

(d) When the Administrator determines that a wildlife hazard management plan is needed, the certificate holder shall formulate and implement a plan using the ecological study as a basis. The plan shall--

(1) Be submitted to, and approved by, the Administrator prior to implementation; and

(2) Provide measures to alleviate or eliminate wildlife hazards to air carrier operations.

(e) The plan shall include at least the following:

(1) The persons who have authority and responsibility for implementing the plan.

(2) Priorities for needed habitat modification and changes in land use identified in the ecological study, with target dates for completion.

(3) Requirements for and, where applicable, copies of local, state, and Federal wildlife control permits.

(4) Identification of resources to be provided by the certificate holder for implementation of the plan.

(5) Procedures to be followed during air carrier operations, including at least--

(i) Assignment of personnel responsibilities for implementing the procedures;

(ii) Conduct of physical inspections of the movement area and other areas critical to wildlife hazard management sufficiently in advance of air carrier operations to allow time for wildlife controls to be effective;

(iii) Wildlife control measures; and

(iv) Communication between the wildlife control personnel and any air traffic control tower in operation at the airport.

(6) Periodic evaluation and review of the wildlife hazard management plan for--

(i) Effectiveness in dealing with the wildlife hazard; and

(ii) Indications that the existence of the wildlife hazard, as previously described in the ecological study, should be reevaluated.

(7) A training program to provide airport personnel with the knowledge and skills needed to carry out the wildlife hazard management plan required by paragraph (d) of this section.

(f) Notwithstanding the other requirements of this section, each certificate holder shall take immediate measures to alleviate wildlife hazards whenever they are detected.

(g) FAA Advisory Circulars in the 150 series contain standards and procedures for wildlife hazard management at airports which are acceptable to the Administrator.

APPENDIX B

CERTALERT

ADVISORY * CAUTIONARY * NON-DIRECTIVE

FOR INFORMATION, CONTACT AIRPORT WILDLIFE SPECIALIST, AAS-317 (202) 267.3389

DATE:	**17 November, 1997**	**No. 97-09**
TO:	**AIRPORT CERTIFICATION SAFETY INSPECTORS**	
TOPIC:	**WILDLIFE HAZARD MANAGEMENT PLAN OUTLINE**	

An increasing number of questions are being received concerning the preparation and content of a FAA approved airport wildlife hazard management plan. Title 14 Code of Federal Regulations, part 139.337, *Wildlife Hazard Management,* prescribes the specific issues that a wildlife hazard management plan must address for FAA approval and inclusion in the ACM.

A wildlife hazard assessment, defined as an ecological study in part 139.337 (a), conducted by a wildlife damage management biologist, provides the scientific basis for the development , implementation, and refinement of a wildlife hazard management plan. Though parts of the wildlife hazard assessment may be incorporated directly in the wildlife hazard management plan, they are two separate documents. Part of the wildlife hazard management plan can be prepared by the biologist(s) who conducts the wildlife hazard assessment. However, some parts can be prepared only by the airport. For example, airport management assigns airport personnel responsibilities, commits airport funds, and purchases equipment and supplies. Airport management may request the wildlife biologist to review the finished plan.

The wildlife damage management biologist's primary responsibilities are:

- to provide information on the wildlife attractants that have been identified on or near the airport,
- to identify wildlife management techniques,
- to prioritize appropriate mitigation measures,
- to recommend necessary equipment and supplies, and
- to identify training requirements for the airport personnel who will implement the wildlife hazard management plan.

It is often helpful for the airport manager to appoint a Wildlife Hazard Management Group that has responsibility for the airport's wildlife management program. The biologist should assist the Wildlife Hazard Management Group with periodic evaluations of the plan and make recommendations for further refinements or modifications.

The following details the requirements of part 139.337 (e) and (f) and how those requirements should be addressed in a FAA approved wildlife hazard management plan.

FAR 139.337 REQUIREMENTS	WILDLIFE HAZARD MANAGEMENT PLAN CONTENTS
139.337(e). The (wildlife hazard management) plan shall include at least the following :	The wildlife hazard management plan must include, and/or identify the responsibility of, and/or actions to be taken, –
139.337(e)(1). The persons who have authority and responsibility for implementing the plan.	Specific responsibilities for various sections of the wildlife hazard management plan must be assigned or delegated to various airport departments such as: Airport Director Operations Dept. Maintenance Dept. Security Dept. Planning Dept. Finance Dept. Wildlife Coordinator Wildlife Hazard Group Local law enforcement authorities that provide wildlife law enforcement and other support also have a role to play: State Fish and Game U. S. Fish and Wildlife Service City police County Sheriff
139.337(e)(2). Priorities for needed habitat modification and changes in land use identified in the ecological study with target dates for completion.	Attractants (food, cover, and water) identified in wildlife hazard assessment, with priorities for mitigation and completion dates. Attractants can be grouped by areas and ownership. (A list of completed habitat modification or other projects designed to reduce the wildlife/aircraft strike potential can be included, and provides a history of work already accomplished.) Airport property: Aircraft Operations Area (AOA). Within 2 miles of aircraft movement areas. Within 5 miles of aircraft movement areas. Airport structures Non-airport property Within 2 miles of aircraft movement areas. Within 5 miles of aircraft movement areas. Structures

APPENDIX B

FAR 139.337 REQUIREMENTS	WILDLIFE HAZARD MANAGEMENT PLAN CONTENTS
Habitat/population management recommendations	Management plans for specific areas, attractants, species, or situations, as identified in ecological study (wildlife hazard assessment). This section may include any or all of the following: Food/Prey-base Management Rodents Earthworms Insects Other prey Trash and debris - handling, storage. Handouts Species specific population management i.e. deer, gulls, geese, coyotes Repelling Exclusion Removal Habitat Management Vegetation Management AOA vegetation Drainage ditch(s) vegetation Landscaping Agriculture Water Management Permanent Water Wetlands Canals/drainage ditches Detention/retention ponds Sewage (glycol) treatment ponds Other water areas Ephemeral water Runways, taxiways, & aprons. Other wet areas Airport Buildings Airfield structures Abandoned structures Terminal Airport construction Resource Protection Exclusion Repelling Chemical Auditory Visual

FAR 139.337 REQUIREMENTS	WILDLIFE HAZARD MANAGEMENT PLAN CONTENTS
139.337(e)(3). Requirements for and, where applicable, copies of local, state and Federal wildlife control permits.	Wildlife can be protected at all levels of government – city, county, state, federal, or may not be protected at all, depending on location and species. Therefore the section should address the specific species involved and their legal status. Wildlife management permitting requirements and procedures (spelled out) Federal - 50 CFR parts 1 to 199. State - Fish and Game Code (or equivalent) City, county - ordinances If pesticides are to be used, then the following are also needed. Pesticide use regulations Federal- [Federal Insecticide, Fungicide, and Rodenticide Act, as amended (FIFRA)] State (varies by state) City/county (if applicable) Pesticide use licensing requirements State regulations
139.337(e)(4). Identification of resources to be provided by the certificate holder for implementation of the plan.	Lists identifying what the airport will supply in terms of: Personnel Time Equipment, (i.e. radios, vehicle(s), guns, traps). Supplies (i.e. shellcrackers, mylar tape) Wildlife Patrol Personnel Vehicle(s) Equipment Supplies Pesticides Restricted/non-restricted Application equipment Sources of Supply
139.337(e)(5). Procedures to be followed during air carries operations, including at least...	
139.337(e)(5)(i). Assignment of personnel responsibilities for implementing the procedures;	Who, when, what circumstances Wildlife Patrol Wildlife Coordinator Operations Dept. Maintenance Dept. Security Dept. Air Traffic Control
139.337(e)(5)(ii). Conduct of physical inspections of the movement areas and other areas critical to wildlife hazard management sufficiently in advance of air carrier operations to allow time for wildlife controls to be effective;	Who, when, how, what circumstances -- Runway(s), taxiway(s), and ramp(s) sweeps, AOA monitoring Un-mitigated attractants

APPENDIX B

FAR 139.337 REQUIREMENTS	WILDLIFE HAZARD MANAGEMENT PLAN CONTENTS
139.337(e)(5(iii). Wildlife control measures;	Who, what circumstances, when, how is the Wildlife Patrol contacted. Wildlife Patrol Bird Control repel capture kill Mammal control repel capture kill
139.337(e)(5)(iv). Communication between wildlife control personnel and any air traffic control tower in operation at the airport.	Communication procedures Training in communication procedures Equipment needed Radios, mobile phones, etc. Lights
139.337(e)(6). Periodic evaluation and review of the wildlife hazard management plan for:	At a minimum the airport operator should hold annual meetings, or after an event described in 139.337(a)(1 to 3), with representatives from all airport departments involved in the airport's wildlife hazard management efforts and the wildlife damage management biologist who did the original ecological study (wildlife hazard assessment).
139.337(e)(6)(i). Effectiveness in dealing with the wildlife hazard;	Input from all airport departments, ATC, wildlife biologist, as to effectiveness of plan. Good records are a must for evaluating the effectiveness of a program. Therefore need to know what records are kept, by whom, how, where, and when.
139.337(e)(6(ii). Indications that the existence of the wildlife hazard, as previously described in the ecological study, should be reevaluated.	Wildlife seen on AOA Request for wildlife dispersal from Tower, pilots, or others Wildlife strike database and other records. Good records are a must.
139.337(e)(7). A training program to provide airport personnel with the knowledge and skills needed to carry out the wildlife hazard management plan required by paragraph (d) of this section.	Wildlife Patrol personnel training All airport personnel - wildlife hazard awareness training Pesticide use training and certification

FAR 139.337 REQUIREMENTS	WILDLIFE HAZARD MANAGEMENT PLAN CONTENTS
139.337(f). Notwithstanding the other requirements of this section, each certificate holder shall take immediate measures to alleviate wildlife hazards whenever they are detected.	Although not required as part of wildlife hazard management plan, this information should be included to fulfill part 139 requirements. Procedures and personnel responsibilities for notification regarding new or immediate hazards by and to: Wildlife Patrol Operations NOTAM issuance/cancellation criteria and procedures Maintenance Security Air Traffic Control Others Rapid response procedures for new or immediate hazards by: Wildlife Patrol Operations Maintenance Security Air Traffic Control Others
139.337(g). FAA Advisory Circulars in the 150 series contain standards and procedures for wildlife hazard management at airports which are acceptable to the Administrator.	AC 150/5200--33 Hazardous Wildlife Attractants on or Near Airports.

OSB

Benedict D. Castellano, Manager
Airport Safety and Compliance Branch

APPENDIX C *Advisory Circular No. 150/5200-33*
Hazardous Wildlife Attractants on or near Airports (12 Pages)

Note: Certalerts, Advisory Circulars, and regulations are frequently changed or updated, always verify that the version attached herein is the most current. Contact FAA or Wildlife Services (see directory in Chapter 9) or consult the FAA website at ***http://www.faa.gov/arp/hazard.htm*** *for the latest version.*

APPENDIX C

U.S. Department of Transportation

Federal Aviation Administration

Advisory Circular

Subject: HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

Date: 5/1/97
Initiated by: AAS-310 and APP-600

AC No: 150/5200-33
Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance on locating certain land uses having the potential to attract hazardous wildlife to or in the vicinity of public-use airports. It also provides guidance concerning the placement of new airport development projects (including airport construction, expansion, and renovation) pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. **APPLICATION.** The standards, practices, and suggestions contained in this AC are recommended by the Federal Aviation Administration (FAA) for use by the operators and sponsors of all public-use airports. In addition, the standards, practices, and suggestions contained in this AC are recommended by the FAA as guidance for land use planners, operators, and developers of projects, facilities, and activities on or near airports.

3. **BACKGROUND.** Populations of many species of wildlife have increased markedly in the last few years. Some of these species are able to adapt to human-made environments, such as exist on and around airports. The increase in wildlife populations, the use of larger turbine engines, the increased use of twin-engine aircraft, and the increase in air-traffic, all combine to increase the risk, frequency, and potential severity of wildlife-aircraft collisions.

Most public-use airports have large tracts of open, unimproved land that are desirable for added margins of safety and noise mitigation. These areas can present potential hazards to aviation because they often attract hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives world-wide, as well as billions of dollars worth of aircraft damage. Hazardous wildlife attractants near airports could jeopardize future airport expansion because of safety considerations.

DAVID L. BENNETT
Director, Office of Airport Safety and Standards

SECTION 1. HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.

1-1. TYPES OF HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS. Human-made or natural areas, such as poorly-drained areas, retention ponds, roosting habitats on buildings, landscaping, putrescible-waste disposal operations, wastewater treatment plants, agricultural or aquacultural activities, surface mining, or wetlands, may be used by wildlife for escape, feeding, loafing, or reproduction. Wildlife use of areas within an airport's approach or departure airspace, aircraft movement areas, loading ramps, or aircraft parking areas may cause conditions hazardous to aircraft safety.

All species of wildlife can pose a threat to aircraft safety. However, some species are more commonly involved in aircraft strikes than others. Table 1 lists the wildlife groups commonly reported as being involved in damaging strikes to U.S. aircraft from 1993 to 1995.

Table 1. Wildlife Groups Involved in Damaging Strikes to Civilian Aircraft, USA, 1993-1995.

Wildlife Groups	Percent involvement in reported damaging strikes
Gulls	28
Waterfowl	28
Raptors	11
Doves	6
Vultures	5
Blackbirds-Starlings	5
Corvids	3
Wading birds	3
Deer	11
Canids	1

1-2. LAND USE PRACTICES. Land use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife-aircraft collisions. FAA recommends against land use practices, within the siting criteria stated in 1-3, that attract or sustain populations of hazardous wildlife within the vicinity of airports or cause movement of hazardous wildlife onto, into, or across the approach or departure airspace, aircraft movement area, loading ramps, or aircraft parking area of airports.

Airport operators, sponsors, planners, and land use developers should consider whether proposed land uses, including new airport development projects, would increase the wildlife hazard. Caution should be exercised to ensure that land use practices on or near airports do not enhance the attractiveness of the area to hazardous wildlife.

1-3. SITING CRITERIA. FAA recommends separations when siting any of the wildlife attractants mentioned in Section 2 or when planning new airport development projects to accommodate aircraft movement. The distance between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant should be as follows:

a. Airports serving piston-powered aircraft. A distance of 5,000 feet is recommended.

b. Airports serving turbine-powered aircraft. A distance of 10,000 feet is recommended.

c. Approach or Departure airspace. A distance of 5 statute miles is recommended, if the wildlife attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

SECTION 2. LAND USES THAT ARE INCOMPATIBLE WITH SAFE AIRPORT OPERATIONS.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment are highly variable and may depend on several factors, including land-use practices on or near the airport. It is important to identify those land use practices in the airport area that attract hazardous wildlife. This section discusses land use practices known to threaten aviation safety.

2-2. PUTRESCIBLE-WASTE DISPOSAL OPERATIONS. Putrescible-waste disposal operations are known to attract large numbers of wildlife that are hazardous to aircraft. Because of this, these operations, when located within the separations identified in the siting criteria in 1-3 are considered incompatible with safe airport operations.

FAA recommends against locating putrescible-waste disposal operations inside the separations identified in the siting criteria mentioned above. FAA also recommends against new airport development projects that would increase the number of aircraft operations or that would accommodate larger or faster aircraft, near putrescible-waste disposal operations located within the separations identified in the siting criteria in 1-3.

2-3. WASTEWATER TREATMENT FACILITIES. Wastewater treatment facilities and associated settling ponds often attract large numbers of wildlife that can pose a threat to aircraft safety when they are located on or near an airport.

a. New wastewater treatment facilities. FAA recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in the siting criteria in 1-3. During the siting analysis for wastewater treatment facilities, the potential to attract hazardous wildlife should be considered if an airport is in the vicinity of a proposed site. Airport operators should voice their opposition to such sitings. In addition, they should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

b. Existing wastewater treatment facilities. FAA recommends correcting any wildlife hazards arising from existing wastewater treatment facilities located on or near airports without delay, using appropriate wildlife hazard mitigation techniques. Accordingly, measures to minimize hazardous wildlife attraction should be developed in consultation with a wildlife damage management biologist. FAA recommends that wastewater treatment facility operators incorporate appropriate wildlife hazard mitigation techniques into their operating practices. Airport operators also should encourage those operators to incorporate these mitigation techniques in their operating practices.

c. Artificial marshes. Waste-water treatment facilities may create artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. FAA recommends against establishing artificial marshes within the separations identified in the siting criteria stated in 1-3.

d. Wastewater discharge and sludge disposal. FAA recommends against the discharge of wastewater or sludge on airport property. Regular spraying of wastewater or sludge disposal on unpaved areas may improve soil moisture and quality. The resultant turf growth requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw. The maimed or flushed organisms and the straw can attract hazardous wildlife and jeopardize aviation safety. In addition, the improved turf may attract grazing wildlife such as deer and geese.

Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

e. Underwater waste discharges. The underwater discharge of any food waste, e.g., fish processing offal, that could attract scavenging wildlife is not recommended within the separations identified in the siting criteria in 1-3.

2-4. WETLANDS.

a. Wetlands on or near Airports.

(1) Existing Airports. Normally, wetlands are attractive to many wildlife species. Airport operators with wetlands located on or nearby airport property should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations.

(2) Airport Development. When practicable, the FAA recommends siting new airports using the separations identified in the siting criteria in 1-3. Where alternative sites are not practicable or when expanding existing airports in or near wetlands, the wildlife hazards should be evaluated and minimized through a wildlife management plan prepared by a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (COE).

NOTE: If questions exist as to whether or not an area would qualify as a wetland, contact the U.S. Army COE, the Natural Resource Conservation Service, or a wetland consultant certified to delineate wetlands.

b. Wetland mitigation. Mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects. Wetland mitigation should be designed so it does not create a wildlife hazard.

(1) FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in the siting criteria in 1-3. Wetland mitigation banks meeting these siting criteria offer an ecologically sound approach to mitigation in these situations.

(2) Exceptions to locating mitigation activities outside the separations identified in the siting criteria in 1-3 may be considered if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge. Such mitigation must be compatible with safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife should be avoided. On-site mitigation plans may be reviewed by the FAA to determine compatibility with safe airport operations.

(3) Wetland mitigation projects that are needed to protect unique wetland functions (see 2-4.b.(2)), and that must be located in the siting criteria in 1-3 should be identified and evaluated by a wildlife damage management biologist before implementing the mitigation. A wildlife damage management plan should be developed to reduce the wildlife hazards.

NOTE: AC 150/5000-3, *Address List for Regional Airports Division and Airports District/Field Offices*, provides information on the location of these offices.

2-5. DREDGE SPOIL CONTAINMENT AREAS. FAA recommends against locating dredge spoil containment areas within the separations identified in the siting criteria in 1-3, if the spoil contains material that would attract hazardous wildlife.

SECTION 3. LAND USES THAT MAY BE COMPATIBLE WITH SAFE AIRPORT OPERATIONS.

3-1. GENERAL. Even though they may, under certain circumstances, attract hazardous wildlife, the land use practices discussed in this section have flexibility regarding their location or operation and may even be under the airport operator's or sponsor's control. In general, the FAA does not consider the activities discussed below as hazardous to aviation if there is no apparent attraction to hazardous wildlife, or wildlife hazard mitigation techniques are implemented to deal effectively with any wildlife hazard that may arise.

3-2. ENCLOSED WASTE FACILITIES. Enclosed trash transfer stations or enclosed waste handling facilities that receive garbage indoors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles, generally would be compatible, from a wildlife perspective, with safe airport operations, provided they are not located on airport property or within the runway protection zone (RPZ). No putrescible-waste should be handled or stored outside at any time, for any reason, or in a partially enclosed structure accessible to hazardous wildlife.

Partially enclosed operations that accept putrescible-waste are considered to be incompatible with safe airport operations. FAA recommends these operations occur outside the separations identified in the siting criteria in 1-3.

3-3. RECYCLING CENTERS. Recycling centers that accept previously sorted, non-food items such as glass, newspaper, cardboard, or aluminum are, in most cases, not attractive to hazardous wildlife.

3-4. COMPOSTING OPERATIONS ON AIRPORTS. FAA recommends against locating composting operations on airports. However, when they are located on an airport, composting operations should not be located closer than the greater of the following distances: 1,200 feet from any aircraft movement area, loading ramp, or aircraft parking space; or the distance called for by airport design requirements. This spacing is intended to prevent material, personnel, or equipment from penetrating any Obstacle Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway (see AC 150/5300-13, *Airport Design*). On-airport disposal of compost by-products is not recommended for the reasons stated in 2-3.d.

a. Composition of material handled. Components of the compost should never include any municipal solid waste. Non-food waste such as leaves, lawn clippings, branches, and twigs generally are not considered a wildlife attractant. Sewage sludge, wood-chips, and similar material are not municipal solid wastes and may be used as compost bulking agents.

b. Monitoring on-airport composting operations. If composting operations are to be located on airport property, FAA recommends that the airport operator monitor composting operations to ensure that steam or thermal rise does not affect air traffic in any way. Discarded leaf disposal bags or other debris must not be allowed to blow onto any active airport area. Also, the airport operator should reserve the right to stop any operation that creates unsafe, undesirable, or incompatible conditions at the airport.

3-5. ASH DISPOSAL. Fly ash from resource recovery facilities that are fired by municipal solid waste, coal, or wood, is generally considered not to be a wildlife attractant because it contains no putrescible matter. FAA generally does not consider landfills accepting only fly ash to be wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

Since varying degrees of waste consumption are associated with general incineration, FAA classifies the ash from general incinerators as a regular waste disposal by-product and, therefore, a hazardous wildlife attractant.

3-6. CONSTRUCTION AND DEMOLITION (C&D) DEBRIS LANDFILLS. C&D debris (Class IV) landfills have visual and operational characteristics similar to putrescible-waste disposal sites. When co-located with putrescible-waste disposal operations, the probability of hazardous wildlife attraction to C&D landfills increases because of the similarities between these disposal activities.

FAA generally does not consider C&D landfills to be hazardous wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

3-7. WATER DETENTION OR RETENTION PONDS. The movement of storm water away from runways, taxiways, and aprons is a normal function on most airports and is necessary for safe aircraft operations. Detention ponds hold storm water for short periods, while retention ponds hold water indefinitely. Both types of ponds control runoff, protect water quality, and can attract hazardous wildlife. Retention ponds are more attractive to hazardous wildlife than detention ponds because they provide a more reliable water source.

To facilitate hazardous wildlife control, FAA recommends using steep-sided, narrow, linearly-shaped, rip-rap lined, water detention basins rather than retention basins. When possible, these ponds should be placed away from aircraft movement areas to minimize aircraft-wildlife interactions. All vegetation in or around detention or retention basins that provide food or cover for hazardous wildlife should be eliminated.

If soil conditions and other requirements allow, FAA encourages the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

3-8. LANDSCAPING. Wildlife attraction to landscaping may vary by geographic location. FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. All landscaping plans should be reviewed by a wildlife damage management biologist. Landscaped areas should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-9. GOLF COURSES. Golf courses may be beneficial to airports because they provide open space that can be used for noise mitigation or by aircraft during an emergency. On-airport golf courses may also be a concurrent use that provides income to the airport.

Because of operational and monetary benefits, golf courses are often deemed compatible land uses on or near airports. However, waterfowl (especially Canada geese) and some species of gulls are attracted to the large, grassy areas and open water found on most golf courses. Because waterfowl and gulls occur throughout the U.S., FAA recommends that airport operators exercise caution and consult with a wildlife damage management biologist when considering proposals for golf course construction or expansion on or near airports. Golf courses should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-10. AGRICULTURAL CROPS. As noted above, airport operators often promote revenue-generating activities to supplement an airport's financial viability. A common concurrent use is agricultural crop production. Such use may create potential hazards to aircraft by attracting wildlife. Any proposed on-airport agricultural operations should be reviewed by a wildlife damage management biologist. FAA generally does not object to agricultural crop production on airports when: wildlife hazards are not predicted; the guidelines for the airport areas specified in 3-10.a-f. are observed; and the agricultural operation is closely monitored by the airport operator or sponsor to ensure that hazardous wildlife are not attracted.

NOTE: If wildlife becomes a problem due to on-airport agricultural operations, FAA recommends undertaking the remedial actions described in 3-10.f.

a. Agricultural activities adjacent to runways. To ensure safe, efficient aircraft operations, FAA recommends that no agricultural activities be conducted in the Runway Safety Area (RSA), OFA, and the OFZ (see AC 150/5300-13).

b. Agricultural activities in areas requiring minimum object clearances. Restricting agricultural operations to areas outside the RSA, OFA, OFZ, and Runway Visibility Zone (RVZ) (see AC 150/5300-13) will normally provide the minimum object clearances required by FAA's airport design standards. FAA recommends that farming operations not be permitted within areas critical to the proper operation of localizers, glide slope indicators, or other visual or electronic navigational aids. Determinations of minimal areas that must be kept free of farming operations should be made on a case-by-case basis. If navigational aids are present, farm leases for on-airport agricultural activities should be coordinated with FAA's Airway Facilities Division, in accordance with FAA Order 6750.16, *Siting Criteria for Instrument Landing Systems.*

NOTE: Crop restriction lines conforming to the dimensions set forth in Table 2 will normally provide the minimum object clearance required by

FAA airport design standards. The presence of navigational aids may require expansion of the restricted area.

c. Agricultural activities within an airport's approach areas. The RSA, OFA, and OFZ all extend beyond the runway shoulder and into the approach area by varying distances. The OFA normally extends the farthest and is usually the controlling surface. However, for some runways, the TSS (see AC 150/5300-13, Appendix 2) may be more controlling than the OFA. The TSS may not be penetrated by any object. The minimum distances shown in Table 2 are intended to prevent penetration of the OFA, OFZ, or TSS by crops or farm machinery.

NOTE: Threshold Siting standards should not be confused with the approach areas described in Title 14, Code of Federal Regulations, Part 77, (14 CFR 77), *Objects Affecting Navigable Airspace*.

d. Agricultural activities between intersecting runways. FAA recommends that no agricultural activities be permitted within the RVZ. If the terrain is sufficiently below the runway elevation, some types of crops and equipment may be acceptable. Specific determinations of what is permissible in this area requires topographical data. For example, if the terrain within the RVZ is level with the runway ends, farm machinery or crops may interfere with a pilot's line-of-sight in the RVZ.

e. Agricultural activities in areas adjacent to taxiways and aprons. Farming activities should not be permitted within a taxiway's OFA. The outer portions of aprons are frequently used as a taxilane and farming operations should not be permitted within the OFA. Farming operations should not be permitted between runways and parallel taxiways.

f. Remedial actions for problematic agricultural activities. If a problem with hazardous wildlife develops, FAA recommends that a professional wildlife damage management biologist be contacted and an on-site inspection be conducted. The biologist should be requested to determine the source of the hazardous wildlife attraction and suggest remedial action. Regardless of the source of the attraction, prompt remedial actions to protect aviation safety are recommended. The remedial actions may range from choosing another crop or farming technique to complete termination of the agricultural operation.

Whenever on-airport agricultural operations are stopped due to wildlife hazards or annual harvest, FAA recommends plowing under all crop residue and harrowing the surface area smooth. This will reduce or eliminate the area's attractiveness to foraging wildlife. FAA recommends that this requirement be written into all on-airport farm use contracts and clearly understood by the lessee.

Table 2. Minimum Distances Between Certain Airport Features And Any On-Airport Agriculture Crops.

Aircraft Approach Category And Design Group [1]	Distance In Feet From Runway Centerline To Crop		Distance In Feet From Runway End To Crop		Distance In Feet From Centerline Of Taxiway To Crop	Distance In Feet From Edge Of Apron To Crop
	Visual & ≥ ¾ mile	< ¾ mile	Visual & ≥ ¾ mile	< ¾ mile		
Category A & B Aircraft						
Group I	200 [2]	400	300 [3]	600	45	40
Group II	250	400	400 [3]	600	66	58
Group III	400	400	600	800	93	81
Group IV	400	400	1,000	1,000	130	113
Category C, D & E Aircraft						
Group I	530 [3]	575 [3]	1,000	1,000	45	40
Group II	530 [3]	575 [3]	1,000	1,000	66	58
Group III	530 [3]	575 [3]	1,000	1,000	93	81
Group IV	530 [3]	575 [3]	1,000	1,000	130	113
Group V	530 [3]	575 [3]	1,000	1,000	160	138
Group VI	530 [3]	575 [3]	1,000	1,000	193	167

1. Design Groups are based on wing span, and Category depends on approach speed of the aircraft.

Group I: Wing span up to 49 ft.
Group II: Wing span 49ft. up to 78 ft.
Group III: Wing span 79 ft. up to 117 ft.
Group IV: Wing span 118 ft. up to 170 ft.
Group V: Wing span 171 ft. up to 213 ft.
Group VI: Wing span 214 ft. up to 261 ft.

Category A: Speed less than 91 knots
Category B: Speed 91 knots up to 120 knots
Category C: Speed 121 knots up to 140 knots
Category D: Speed 141 knots up to 165 knots
Category E: Speed 166 knots or more

2. If the runway will only serve small airplanes (12,500 lb. And under) in Design Group I, this dimension may be reduced to 125 feet; however, this dimension should be increased where necessary to accommodate visual navigational aids that may be installed. For example farming operations should not be allowed within 25 feet of a Precision Approach Path Indicator (PAPI) light box.

3. These dimensions reflect the TSS as defined in AC 150/5300-13, Appendix 2. The TSS cannot be penetrated by any object. Under these conditions, the TSS is more restrictive than the OFA, and the dimensions shown here are to prevent penetration of the TSS by crops and farm machinery.

APPENDIX C

SECTION 4. NOTIFICATION OF FAA ABOUT HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AN AIRPORT.

4-1. GENERAL. Airport operators, land developers, and owners should notify the FAA in writing of known or reasonably foreseeable land use practices on or near airports that either attract or may attract hazardous wildlife. This section discusses those notification procedures.

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

a. Timing of Notification. When new or expanded MSWLFs are being proposed near airports, MSWLF operators should notify the airport operator and the FAA of this as early as possible pursuant to 40 CFR Part 258. Airport operators should encourage the MSWLF operators to provide notification as early as possible.

NOTE: AC 150/5000-3 provides information on these FAA offices.

b. Putrescible-Waste Facilities. In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, the ability to sustain a reduction in the numbers of hazardous wildlife to levels that existed before a putrescible-waste landfill began operating has not been successfully demonstrated. For this reason, demonstrations of experimental wildlife control measures should not be conducted in active aircraft operations areas.

c. Other Waste Facilities. To claim successfully that a waste handling facility sited within the separations identified in the siting criteria in 1-3 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 3-2. FAA requests that waste site developers provide a copy of an official permit request verifying that the facility will not handle putrescible material other than that as outlined in 3-2. FAA will use this information to determine if the facility will be a hazard to aviation.

4-3. NOTIFYING FAA ABOUT OTHER WILDLIFE ATTRACTANTS. While U. S. EPA regulations require landfill owners to provide notification, no similar regulations require notifying FAA about changes in other land use practices that can create hazardous wildlife attractants. Although it is not required by regulation, FAA requests those proposing land use changes such as those discussed in 2-3, 2-4, and 2-5 to provide similar notice to the FAA as early in the development process as possible. Airport operators that become aware of such proposed development in the vicinity of their airports should also notify the FAA. The notification process gives the FAA an opportunity to evaluate the effect of a particular land use change on aviation safety.

The land use operator or project proponent may use FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, or other suitable documents to notify the appropriate FAA Regional Airports Division Office.

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

4-5. FAA REVIEW OF PROPOSED LAND USE CHANGES.

a. The FAA discourages the development of facilities discussed in section 2 that will be located within the 5,000/10,000-foot criteria in 1-3.

b. For projects which are located outside the 5,000/10,000-foot criteria, but within 5 statute miles of the airport's aircraft movement areas, loading ramps, or aircraft parking areas, FAA may review development plans, proposed land use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. Sensitive airport areas will be identified as those that lie under or next to approach or departure airspace. This brief examination should be sufficient to determine if further investigation is warranted.

c. Where further study has been conducted by a wildlife damage management biologist to evaluate a site's compatibility with airport operations, the FAA will use the study results to make its determination.

d. FAA will discourage the development of any excepted sites (see Section 3) within the criteria specified in 1-3 if a study shows that the area supports hazardous wildlife species.

4-6. AIRPORT OPERATORS. Airport operators should be aware of proposed land use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in the siting criteria in 1-3. Particular attention should be given to proposed land uses involving creation or expansion of waste water treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas.

a. AIP-funded airports. FAA recommends that operators of AIP-funded airports, to the extent practicable, oppose off-airport land use changes or practices (within the separations identified in the siting criteria in 1-3) that may attract hazardous wildlife. Failure to do so could place the airport operator or sponsor in noncompliance with applicable grant assurances. FAA recommends against the placement of airport development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Airport operators, sponsors, and planners should identify wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

b. Additional coordination. If, after the initial review by FAA, questions remain about the existence of a wildlife hazard near an airport, the airport operator or sponsor should consult a wildlife damage management biologist. Such questions may be triggered by a history of wildlife strikes at the airport or the proximity of the airport to a wildlife refuge, body of water, or similar feature known to attract wildlife.

c. Specialized assistance. If the services of a wildlife damage management biologist are required, FAA recommends that land use developers or the airport operator contact the appropriate state director of the United States Department of Agriculture/Animal Damage Control (USDA/ADC), or a consultant specializing in wildlife damage management. Telephone numbers for the respective USDA/ADC state offices may be obtained by contacting USDA/ADC's Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD, 20737-1234, Telephone (301) 734-7921, Fax (301) 734-5157. The ADC biologist or consultant should be requested to identify and quantify wildlife common to the area and evaluate the potential wildlife hazards.

d. Notifying airmen. If an existing land use practice creates a wildlife hazard, and the land use practice or wildlife hazard cannot be immediately eliminated, the airport operator should issue a Notice to Airmen (NOTAM) and encourage the land owner or manager to take steps to control the wildlife hazard and minimize further attraction.

APPENDIX C

APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR.

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

a. Aircraft movement area. The runways, taxiways, and other areas of an airport which are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft exclusive of loading ramps and aircraft parking areas.

b. Airport operator. The operator (private or public) or sponsor of a public use airport.

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

d. Concurrent use. Aeronautical property used for compatible non-aviation purposes while at the same time serving the primary purpose for which it was acquired; and the use is clearly beneficial to the airport. The concurrent use should generate revenue to be used for airport purposes (see Order 5190.6A, *Airport Compliance Requirements*, sect. 5h).

e. Fly ash. The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.

f. Hazardous wildlife. Wildlife species that are commonly associated with wildlife-aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a wildlife-aircraft strike hazard.

g. Piston-use airport. Any airport that would primarily serve FIXED-WING, piston-powered aircraft. Incidental use of the airport by turbine-powered, FIXED-WING aircraft would not affect this designation. However, such aircraft should not be based at the airport.

h. Public-use airport. Any publicly owned airport or a privately-owned airport used or intended to be used for public purposes.

i. Putrescible material. Rotting organic material.

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

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

l. Sewage sludge. The de-watered effluent resulting from secondary or tertiary treatment of municipal sewage and/or industrial wastes, including sewage sludge as referenced in U.S. EPA's *Effluent Guidelines and Standards*, 40 C.F.R. Part 401.

m. Shoulder. An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface, support for aircraft running off the pavement, enhanced drainage, and blast protection (see AC 150/5300-13).

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

o. Turbine-use airport. Any airport that ROUTINELY serves FIXED-WING turbine-powered aircraft.

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

q. Wildlife. Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring there of (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, WILDLIFE includes feral animals and domestic animals while out of the control of their owners (14 CFR 139.3, *Certification and Operations: Land Airports Serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters)*).

r. Wildlife attractants. Any human-made structure, land use practice, or human-made or natural geographic feature, that can attract or sustain hazardous wildlife within the landing or departure airspace, aircraft movement area, loading ramps, or aircraft parking areas of an airport. These attractants can include but are not limited to architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquacultural activities, surface mining, or wetlands.

s. Wildlife hazard. A potential for a damaging aircraft collision with wildlife on or near an airport (14 CFR 139.3).

2. RESERVED.

APPENDIX D ***Federal Depredation Permit (2 Pages)***

APPENDIX D

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(1/87)

FEDERAL FISH AND WILDLIFE PERMIT

MIGRATORY BIRD PERMIT OFFICE
911 NE 11th AVENUE
PORTLAND, OR 97232-4181

2. AUTHORITY-STATUTES
16 USC 703-712

REGULATIONS (Attached)
50 CFR Part 13
50 CFR 21.41

1. PERMITTEE

SEA-TAC INTERNATIONAL AIRPORT
PORT OF SEATTLE
AIRFIELD LOB
PO BOX 68727
SEATTLE, WA 98168-0727

3. NUMBER
MB673470-0

4. RENEWABLE
[X] YES
[ ] NO

5. MAY COPY
[X] YES
[ ] NO

6. EFFECTIVE
06/09/2000

7. EXPIRES
05/31/2001

8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)
STEVEN D. OSMEK
BIOLOGIST

9. TYPE OF PERMIT
DEPREDATION

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
SEA-TAC INTERNATIONAL AIRPORT
17801 PACIFIC HWY SOUTH
SEATTLE, WASHINGTON

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Authorized to kill migratory birds for the purpose of assuring safe aircraft operations. The killing of birds must not be the principle control measure and is only to be employed in concert with an active scare and deterrent program. Killing must be held to the minimum number of birds necessary to accomplish the purpose of this permit.

E. The killing of eagles and endangered species is NOT authorized.

F. Authorized to trap/release migratory birds which get caught in side SEA-TAC terminal building. All birds must be released immediately, unharmed. The species/number of birds must be reported on annual report form.

G. Authorized to trap/release raptors on or near runways to assure safe aircraft operations.

H. You must report to the issuing office in Portland within 7 days the killing of any peregrine falcon. Report the date taken, number, sex and age of birds taken. If bird is banded, provide the band number. Be prepared to provide carcass upon request. You will not need to report the taking again in your annual report.

I. Must also comply with all attached STANDARD CONDITIONS.

SUBPERMITTEE - Wildlife Services personnel as subpermittees, authorized to conduct activities above.

[X] ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
ANNUAL REPORT DUE: 6/10
REPORT NUMBER AND SPECIES OF BIRDS KILLED ON FORMS PROVIDED EACH FALL.

ISSUED BY
Pamela E. Tate-Hall

TITLE
PERMIT ADMINISTRATOR - FWS REGION 1

DATE
06/09/2000

AR 045579

Standard Conditions

Depredation - Lethal
50 CFR 21.41

1. Permittee, and subpermittees, shall carry and display, upon request, a copy of this permit whenever exercising its authority.

2. Failure to comply with **ANY** of these conditions listed may result in the immediate suspension of this permit.

3. Authorization granted herein shall not be exercised contrary to the laws of the appropriate State, County, Municipal, Tribal, Foreign or any other applicable laws.

4. Permittee shall maintain records as required in 50 CFR 13.46 and 50 CFR 21.41.

5. All required records relating to permitted activities shall be kept at the location as indicated in writing by permittee to the issuing office.

6. No species may be taken which is on the United States List of Threatened and Endangered Species.

7. If take is by shotgun, it can be no larger than number 10 gauge and must be fired from the shoulder and must use nontoxic shot unless otherwise authorized in Condition D of this permit. Nonlethal methods must be used alternately with lethal control for optimum results.

8. No blinds, pits, or other means of concealment, decoys, duck calls, or other devices can be used to lure or entice birds within gun or trap range.

9. Birds taken under this permit must be (1) turned over to the U.S. Department of Agriculture for official purposes, (2) donated to a public educational or scientific institution as defined in 50 CFR 10, (3) completely destroy by burial or incineration, or (4) as directed by the issuing office.

10. Any killing of birds during the open hunting season must be in accordance with all State and Federal hunting regulations unless authorized on the face of this permit.

11. Acceptance of this permit authorized inspection in accordance with 50 CFR 13.47.

US FISH & WILDLIFE SERVICE
MIGRATORY BIRD PERMIT OFFICE
911 NE 11TH AVE
PORTLAND OR 97232-4181
(503) 872-2715 FAX: (503) 231-2364

APPENDIX E *FAA Form 5200-7 - Wildlife Strike Incident Report (2 Pages)*

Note: Bird strike forms can be obtained or filed electronically over the internet by visiting the FAA's website at ***http://www.faa.gov/arp/hazard.htm***.

APPENDIX E

Form Approved OMB NO. 2120-0045

U.S. Department of Transportation
Federal Aviation Administration

BIRD/OTHER WILDLIFE STRIKE REPORT

1. Name of Operator	2. Aircraft Make/Model	3. Engine Make/Model
4. Aircraft Registration	5. Date of Incident ____/____/____ Month Day Year	6. Local Time of Incident ☐ Dawn ☐ Dusk — HR — MIN ☐ Day ☐ Night ☐ AM ☐ PM
7. Airport Name	8. Runway Used	9. Location If En Route (Nearest Town/Reference & State)
10. Height (AGL)	11. Speed (IAS)	

12. Phase of Flight

- ☐ A. Parked
- ☐ B. Taxi
- ☐ C. Take-off Run
- ☐ D. Climb
- ☐ E. En Route
- ☐ F. Descent
- ☐ G. Approach
- ☐ H. Landing Roll

13. Part(s) of Aircraft Struck or Damaged

	Struck	Damaged		Struck	Damaged
A. Radome	☐	☐	H. Propeller	☐	☐
B. Windshield	☐	☐	I. Wing/Rotor	☐	☐
C. Nose	☐	☐	J. Fuselage	☐	☐
D. Engine No. 1	☐	☐	K. Landing Gear	☐	☐
E. Engine No. 2	☐	☐	L. Tail	☐	☐
F. Engine No. 3	☐	☐	M. Lights	☐	☐
G. Engine No. 4	☐	☐	N. Other:	☐	☐

(Specify, if "N. Other" is checked)

14. Effect on Flight

- ☐ None
- ☐ Aborted Take-Off
- ☐ Precautionary Landing
- ☐ Engines Shut Down
- ☐ Other: (Specify)

15. Sky Condition

- ☐ No Cloud
- ☐ Some Cloud
- ☐ Overcast

16. Precipitation

- ☐ Fog
- ☐ Rain
- ☐ Snow
- ☐ None

17. Bird/Other Wildlife Species

18. Number of birds seen and/or struck

Number of Birds	Seen	Struck
1	☐	☐
2-10	☐	☐
11-100	☐	☐
more than 100	☐	☐

19. Size of Bird(s)

- ☐ Small
- ☐ Medium
- ☐ Large

20. Pilot Warned of Birds ☐ Yes ☐ No

21. Remarks (Describe damage, injuries and other pertinent information)

DAMAGE / COST INFORMATION

22. Aircraft time out of service:	23. Estimated cost of repairs or replacement (U.S. $):	24. Estimated other cost (U.S. $) (e.g. loss of revenue, fuel, towing):
_____ hours	$	$

Reported by (Optional)	Title	Date

Paperwork Reduction Act Statement: The information collected on this form is necessary to allow the Federal Aviation Administration to assess the magnitude and severity of the wildlife-aircraft strike problem in the U.S. The information is used in determining the best management practices for reducing the hazard to aviation safety caused by wildlife-aircraft strikes. We estimate that it will take approximately 5 minutes to complete the form. If you wish to make any comments concerning the accuracy of this burden estimate and any suggestions for reducing this burden, send those comments to the Federal Aviation Administration, Management Staff, ARP-10, 800 Independence Avenue, SW, Washington, DC 20591. The information collected is voluntary. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0045.

FAA Form 5200-7 (3-97) Supersedes Previous Edition ★ U.S. GPO: 1997-418-684/64203 NSN:0052-00-681-6006

Directions for FAA Form 5200-7
Bird/Other Wildlife Strike Report

1. Name of Operator - This can be an airline (abbreviations okay - UAL, AAL, etc.), business (Coca Cola), government agency (Police Dept., FAA) or if a private pilot, his or her name.
2. Aircraft Make/Model - Abbreviations are okay, but try to include the model (e.g., B737-200).
3. Engine Make/Model - Abbreviations are allowed (e.g., PW 4060, GECT7, LYC 580).
4. Aircraft Registration - This means the N# (for USA registered aircraft).
5. Date of Incident - Give the local date, not the ZULU or GMT date.
6. Local Time of Incident - Check the appropriate light conditions and fill in the hour and minute local time and check AM or PM or use the 24 clock and skip AM/PM.
7. Airport Name - Use the airport name or 3 letter code if a US airport. If a foreign airport, use the full name or 3 letter code and location (city/country).
8. Runway used - Self explanatory.
9. Location if En Route - Put the name of the nearest city and state.
10. Height AGL - Put the feet above ground level at the time of the strike (if you don't know, use MSL and indicate this). For take-off run and landing roll, it must be 0.
11. Speed (IAS) - Speed at which the aircraft was traveling when the strike occurred.
12. Phase of Flight - Phase of flight during which the strike occurred. Take-off run and landing roll should both be 0 AGL.
13. Part(s) of Aircraft Struck or Damaged - Check which parts were struck and damaged. If a part was damaged but not struck, indicate this with a check on the damaged column only and indicate in comments (#21) why this happened (e.g., the landing gear might be damaged by deer strike, causing the aircraft to flip over and damage parts not struck by deer).
14. Effect on Flight - You can check more than one and if you check "Other", please explain in Comments (#21).
15. Sky Condition - Check the one that applies.
16. Precipitation - You may check more than one.
17. Bird/Other Wildlife Species - Try to be accurate. If you don't know, put unknown and some description. Collect feathers or remains for identification for damaging strikes.
18. Number of birds seen and/or struck - Check the box in the Seen column with the correct number if you saw the birds/other wildlife before the strike and check the box in the Struck column to show how many were hit. The exact number, can be written next to the box.
19. Size of Bird(s)- Check what you think is the correct size (e.g. sparrow = small, gulls = medium and geese = large).
20. Pilot Warned of Birds - Check the correct box (even if it was an ATIS warning or NOTAM).
21. Remarks - Be as specific as you can. Include information about the extent of the damage, injuries, anything you think would be helpful to know. (e.g., number of birds ingested).
22. Aircraft time out of service - Record how many hours the aircraft was out of service.
23. Estimated cost of repairs or replacement - This may not be known immediately, but the data can be sent at a later date or put down a contact name and number for this data.
24. Estimated other cost - Include loss of revenue, fuel, hotels, etc. (see directions for #23).
25. Reported by - Although this is optional, it is helpful if questions arise about the information on the form (a phone number could also be included).
26. Title - This can be Pilot, Tower, Airport Operations, Airline Operations, Flight Safety, etc.
27. Date - Date the form was filled out.

APPENDIX F ***Daily Wildlife Activity Report (2 Pages), Wildlife Incident Report (2 Pages), and 24 Hour Airport-Inspection Report (2 Pages)***

APPENDIX F

DAILY WILDLIFE ACTIVITY REPORT

DATE

OBSERVER'S NAME | TELEPHONE NO. | SHIFT ☐ DAY ☐ SWING ☐ GRAVEYARD

WEATHER CONDITIONS — CLOUD COVER % | TEMPERATURE F | PRECIPITATION ☐ NONE ☐ SLIGHT ☐ MODERATE ☐ HEAVY | WIND DIRECTION N E W S

WIND VELOCITY (ESTIMATED IN M.P.H.) — CALM — LIGHT — MODERATE — STRONG

MARK LOCATION OF SIGHTINGS ON MAP ON OTHER SIDE IN WHICH THEY OCCURRED.

SIGHTING NUMBER	CREATURE OBSERVED	SPECIES IF KNOWN & LOCATION	SUBSTRATE	BEHAVIOR	AIRCRAFT TRAFFIC PATTERN N. FLOW	AIRCRAFT TRAFFIC PATTERN S. FLOW	TIME	EST. COUNT
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ______		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ______	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ______				

Amendment approved
Date: APR 13 1995
[signature]

AR 045585

Port of Seattle

WILDLIFE INCIDENT REPORT

DATE | TIME OF INCIDENT

TYPE OF REPORT (Circle One)

WILDLIFE STRIKE | NEAR MISS | SIGHTING | OTHER (Explain Below)

NAME OF PERSON RENDERING REPORT | TELEPHONE NUMBER

JOB TITLE | COMPANY NAME

LOCATION OF INCIDENT Describe, also indicate on back (See Map)

N. Flow
S. Flow

AIRCRAFT DAMAGE (If Applicable)

AIRCRAFT OWNER | AIRCRAFT TYPE | AIRCRAFT NUMBER

ESTIMATED NUMBER OF ANIMALS | SPECIES (If Known)

ACTION TAKEN (Check Boxes)

- ☐ DISPATCHED SENIOR RAMP CONTROL TO SCATTER BIRDS.
- ☐ ISSUED NOTAM TO FLIGHT SERVICE STATION AND CALLED AIRLINE OPERATIONS OFFICES ON HOT LINE.
- ☐ POSTED INCIDENT ON BIRD WATCH MAP.
- ☐ NOTIFIED FAA DUTY OFFICER OR FAA CERTIFICATION SAFETY OFFICER (Wildlife strike or near miss only) and TRACON SUPERVISOR. NAME OF PERSON(S) INFORMED _____
- ☐ COMPLETED ALL AVAILABLE ELEMENTS OF FAA FORM 5200-7 IF EVIDENCE OF A BIRD STRIKE IS DISCOVERED ON THE GROUND BUT NOT REPORTED BY AN AIRLINE.
- ☐ OTHER (Explain Below)

TIME NOTAM ISSUED (IF APPLICABLE) | TIME NOTAM CANCELLED

COMMENTS, EXPLANATIONS, RECOMMENDATIONS

Amendment approved
Date: APR 2 1995

REPORT COMPLETED BY

AR 045586

APPENDIX F

Seattle-Tacoma International Airport

TWENTY- FOUR HOUR AIRFIELD INSPECTION REPORT

Date: MM/DD/YY:
Time:
Reviewed By: Airport Supervisor
Name / Initials
Mid
Day
Swing

Senior Ramp Controller
Name / Initials
Mid
Day
Swing

	MID	DAY	SWG
139.305-307 Paved/Unpaved Areas			
Pavement Lips			
Hole 5 Inch Diameter 3 Inches Deep			
Cracks/Spalling/Bumps			
FOD/Gravel/Debris/Etc.			
Rubber Deposits			
Ponding/Edge Dams			
Vegetation Growth			
139.309 Safety Areas			
Ruts/Bumps/Erosion			
Drainage/Construction			
Objects/Frangible Bases			
Vegetation			
139.311 Marking And Lighting			
Runway Marking			
Taxiway Marking			
Holdlines/Signs			
Frangible Connectors			
Directional Signals			
Identification Marking/Signs			
Obscured/Dirty/Faded			
Damaged/Missing			
Inoperative			
Faulty Aim/Adjustment			
Rotating Beacon			
Runway Lighting			
Taxiway Lighting			
Obstruction Lighting			
Approach Lighting-Type			
VASI System			
Low Visibility Markings			
139.313 Snow And Ice			
Surface Conditions			
Snowbank Clearance			
Lights And Signs Obscured			
Navaids/Fire Access			

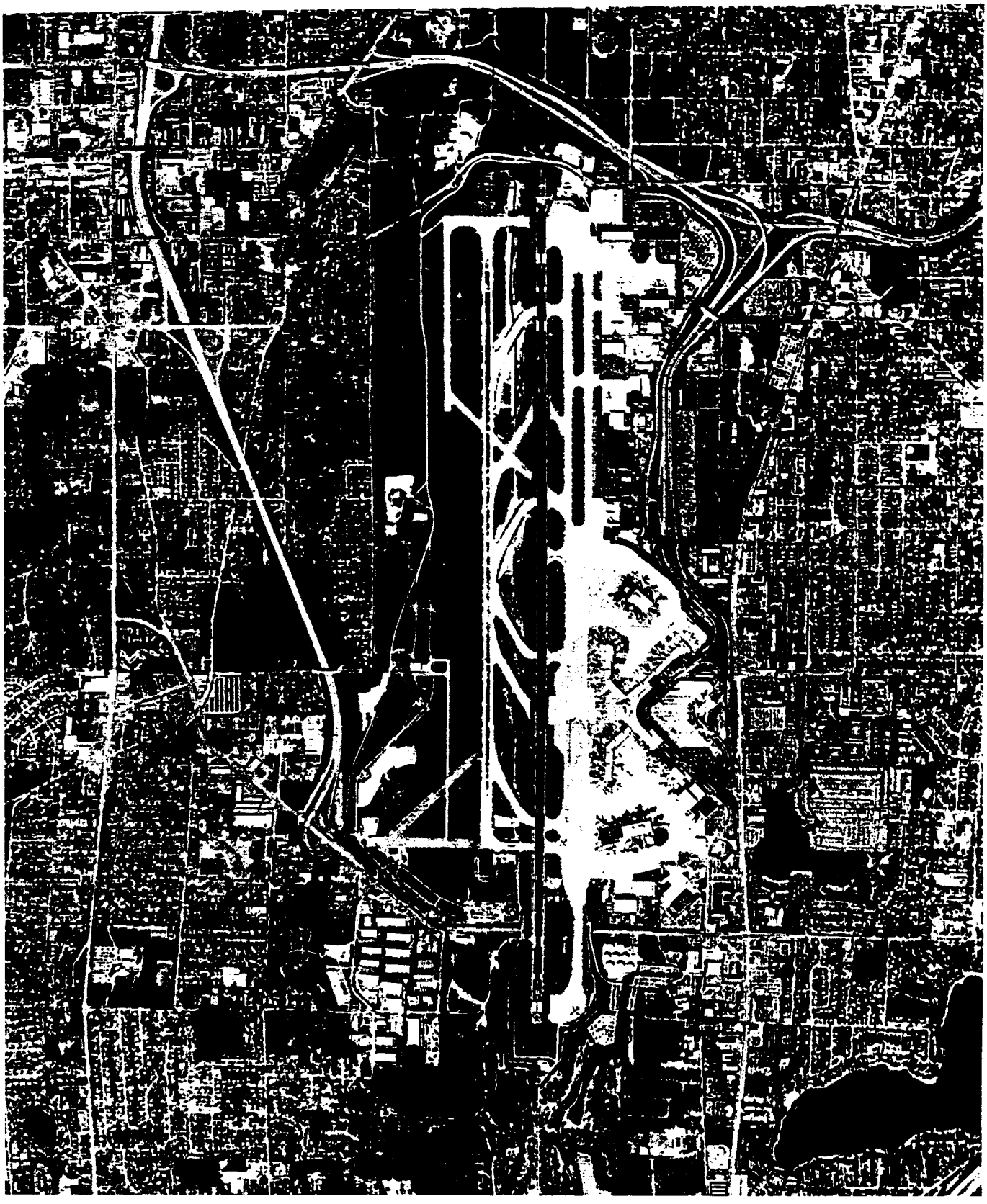
	MID	DAY	SWG
139.321 Fueling Operations			
Fencing/Gates/Signs			
Grounding Clips			
Fuel Leaks			
Fire/Explosion Hazards			
No Smoking			
139.323 Lighted Wind Indicators			
Windcones			
Lights			
Structure/Mast			
139.329 Ground Vehicles			
Procedures/Rules Followed			
139.335/107.13 Public Protection/Security			
Unauthorized Persons			
Unauthorized Vehicles			
Gates Clear			
Fencing/Gates			
Signing			
Pedestrians			
Passenger Load/Unload			
139.337 Wildlife Hazards			
Dead Birds			
Flocks of Birds/Animals			
Strike Type:			
139.341 Construction			
Barricades/Lights			
Equipment/Parking			

S = Satisfactory U = Unsatisfactory P = Previously Reported Unsatisfactory Condition
N/A = Not Applicable NI = Not Inspected ✓ = Re-Inspected (No Change)

AR 045587

98-665

APPENDIX G *Aerial Photo of Seattle-Tacoma International Airport (1 Page)*



NO SCALE

N

Aerial Photo of Seattle-Tacoma International Airport

AR 045589

APPENDIX H ***Memorandum of Understanding (MOU) and Certalert 97-02 - Relationship Between FAA and Wildlife Services (2 Pages each)***

Note: *USDA-Wildlife Services recently changed their name from Animal Damage Control (ADC) to Wildlife Services (WS) in the Summer of 1997. The MOU and Certalert 97-02 are currently being updated to reflect the name change.*

APPENDIX H

CERTALERT

ADVISORY * CAUTIONARY * NON-DIRECTIVE

FOR INFORMATION, CONTACT CERTIFICATION BRANCH, AAS-317 (202) 267.3389

DATE: APRIL 25, 1997 **NO. 97-02**

TO: AIRPORT CERTIFICATION PROGRAM INSPECTORS.

TOPIC: RELATIONSHIP BETWEEN FAA AND ADC.

The attached Certalert clarifies the roles of, and relationship between the Federal Aviation Administration (FAA) and the United States Department of Agriculture/ Animal and Plant Health Inspection Service/Animal Damage Control (ADC) with regards to wildlife hazards on or near airports.

Robert E. David

Manager, Airport Safety and Compliance Date: April 25, 1997

CERTALERT DISTRIBUTION LIST

RELATIONSHIP BETWEEN FAA AND ADC.

PURPOSE

This Certalert clarifies the roles of, and relationship between the Federal Aviation Administration (FAA) and the United States Department of Agriculture/ Animal and Plant Health Inspection Service/Animal Damage Control (ADC) with regards to wildlife hazards on or near airports.

Federal Aviation Administration

The FAA issues airport operating certificates for airports serving certain air carrier aircraft under Title 14, Code of Federal Regulations, part 139. Section 139.337 requires certificated airports having a wildlife hazard problem to develop and implement a wildlife hazard management plan to manage and control wildlife which present a risk to public safety caused by aircraft collisions with wildlife. The FAA relies heavily on the assistance of ADC to review and contribute to such plans.

Animal Damage Control

The Animal Damage Control Act of March 2, 1931, (7USC 426-426c, as amended), charges the Secretary of Agriculture with management of wildlife injurious to agricultural interests, other wildlife, or human health and safety. Further, the Secretary is authorized to cooperate with States, individuals, public and private agencies, organizations, and institutions in the control of nuisance mammals and birds, including wildlife hazards to aviation. Because of the experience, training, and background of its personnel, ADC is recognized throughout the world as an expert in dealing with wildlife damage management issues. ADC has an active presence in all U. S. states and territories.

MEMORANDUM OF UNDERSTANDING

A Memorandum of Understanding (MOU) between the FAA and ADC (No. 12-4-71-0003-MOU) establishes a cooperative relationship between these agencies for resolving wildlife hazards to aviation.

AGENCY FUNDING

Both agencies are funded by congressional appropriations. The majority of funding for the FAA comes from the Aviation Trust Fund with the remainder coming from the general funds of the U. S. Treasury. Any revenues generated by the FAA are returned to the U. S. Treasury. ADC receives a limited amount of funds from the general fund of the U.S. Treasury that allows it to perform some services for the public good. However, ADC's funding is also based upon its ability to enter into contracts to provide services and receive reimbursement for the cost of the services. Legislation allows ADC to collect this money and return it to the program rather than the general funds of the U. S. Treasury. Consequently, ADC may enter into a cooperative service agreement with an airport operator for reimbursement of services to perform an ecological study[1] on an airport.

---

[1] ADC uses the term "wildlife hazard assessment" rather than "ecological study" as is used in 14 CFR part 139.337. The two terms should be considered synonymous.

APPENDIX H

No. 12-34-71-0003-MOU

MEMORANDUM OF UNDERSTANDING
BETWEEN
UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION (FAA)
and
UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
ANIMAL DAMAGE CONTROL (ADC)

ARTICLE 1

This Memorandum of Understanding (MOU) establishes a cooperative relationship between FAA and ADC for resolving animal hazards to aviation that benefits public safety.

ARTICLE 2

This MOU is reached pursuant to the Animal Damage Control Act of March 2, 1931, (7USC 426-426b), and The Rural Development, Agriculture, and Related Agencies Appropriations Act, 1988 (P.L. 100-202), which established the authority of the Secretary of Agriculture to cooperate with States, individuals, public and private agencies, organizations, and institutions in the control of nuisance mammals and birds deemed injurious to the public.

The Administrator of the FAA is empowered to issue airport operating certificates for airports serving air carrier aircraft and certifies that such airports are properly and adequately equipped, and able to conduct safe operations, pursuant to the Federal Aviation Act of 1958, (49USC 1432), as amended. Federal Aviation Regulation (14 CFR Part 139) requires certificated airports having a wildlife hazard problem to develop and implement a wildlife hazard management plan to manage and control wildlife which present a risk to public safety caused by aircraft collisions with wildlife. "Wildlife hazard" has been defined as a potential for a damaging aircraft collision with wildlife, on or near an airport.

ARTICLE 3

FAA and ADC agrees:

a. That ADC has the expertise to provide technical and operational assistance needed to reduce wildlife hazards to aviation on and near airports.

b. That most airports lack the technical expertise to identify underlying causes of wildlife hazard problems, but do have the capability to control their own wildlife, following proper instruction in control techniques.

c. That situations arise where nuisance wildlife control is necessary off airport property (roost relocations, reductions in nesting populations, etc.) requiring specialized technical assistance of ADC personnel.

d. That FAA or the certificated airport may request technical and operational assistance from ADC to reduce wildlife hazards. This assistance includes, but is not limited to, site visits to identify wildlife and their movement patterns and habitats which increase the risk of animal and aviation conflicts. ADC personnel may also provide, (1) recommendations on control and habitat management to minimize the hazards, (2) training in the use of control devices, and (3) recommendations on the scope of further studies necessary to identify and minimize wildlife hazards.

e. ADC shall not be liable or responsible for development, approval, or implementation of wildlife hazard management plans required under FAR Part 139.337, this being the responsibility of the airport operator. Information provided by ADC as a result of site visits or consultation shall be used by the airport operator in developing the wildlife hazard management plan.

f. To meet at least annually to review this agreement, identify problems, exchange information on new control methodologies, identify research needs, and prioritize program needs.

ARTICLE 4

All animal damage control activities will be conducted in accordance with applicable Federal, State, and local laws and regulations. ADC personnel shall advise airport operators of their responsibilities to secure necessary permits and/or licenses for control of wildlife.

ARTICLE 5

This MOU defines in general terms, the basis on which the parties will cooperate, and does not constitute a financial obligation to serve as a basis for expenditures. Request for technical, operational, or research assistance which require cooperative or reimbursable funding will be completed under a separate agreement.

ARTICLE 6

This MOU shall supersede all existing MOU's, supplements, and amendments relating to the conduct of animal damage control programs between ADC and FAA.

ARTICLE 7

Pursuant to Section 22, title 41, United States Code, no member of or delegate to Congress shall be admitted to any share or part of this MOU, or to any benefit to arise therefrom.

ARTICLE 8

This MOU shall become effective upon the date of final signature and shall continue indefinitely. This Memorandum may be amended at any time by mutual agreement of the parties in writing. It may be terminated by either party upon 60 days advance written notice to the other party.

APR 13, 1989
Date

Administrator
U.S. Department of Transportation
Federal Aviation Administration

MAR 21, 1989
Date

Acting Administrator
U.S. Department of Agriculture
Animal and Plant Health Inspection

APPENDIX H

WILDLIFE HAZARD MANAGEMENT

14 CFR part 139.337 requires the certificate holder conduct an ecological study, acceptable to the FAA Administrator, when any of the following events occur on or near the airport:

1. An air carrier aircraft experiences a multiple bird strike or engine ingestion, or
2. An air carrier aircraft experiences a damaging collision with wildlife other than birds, or
3. Wildlife of a size or in numbers capable of causing an event described in paragraph (1) or (2) is observed to have access to any airport flight pattern or movement area.

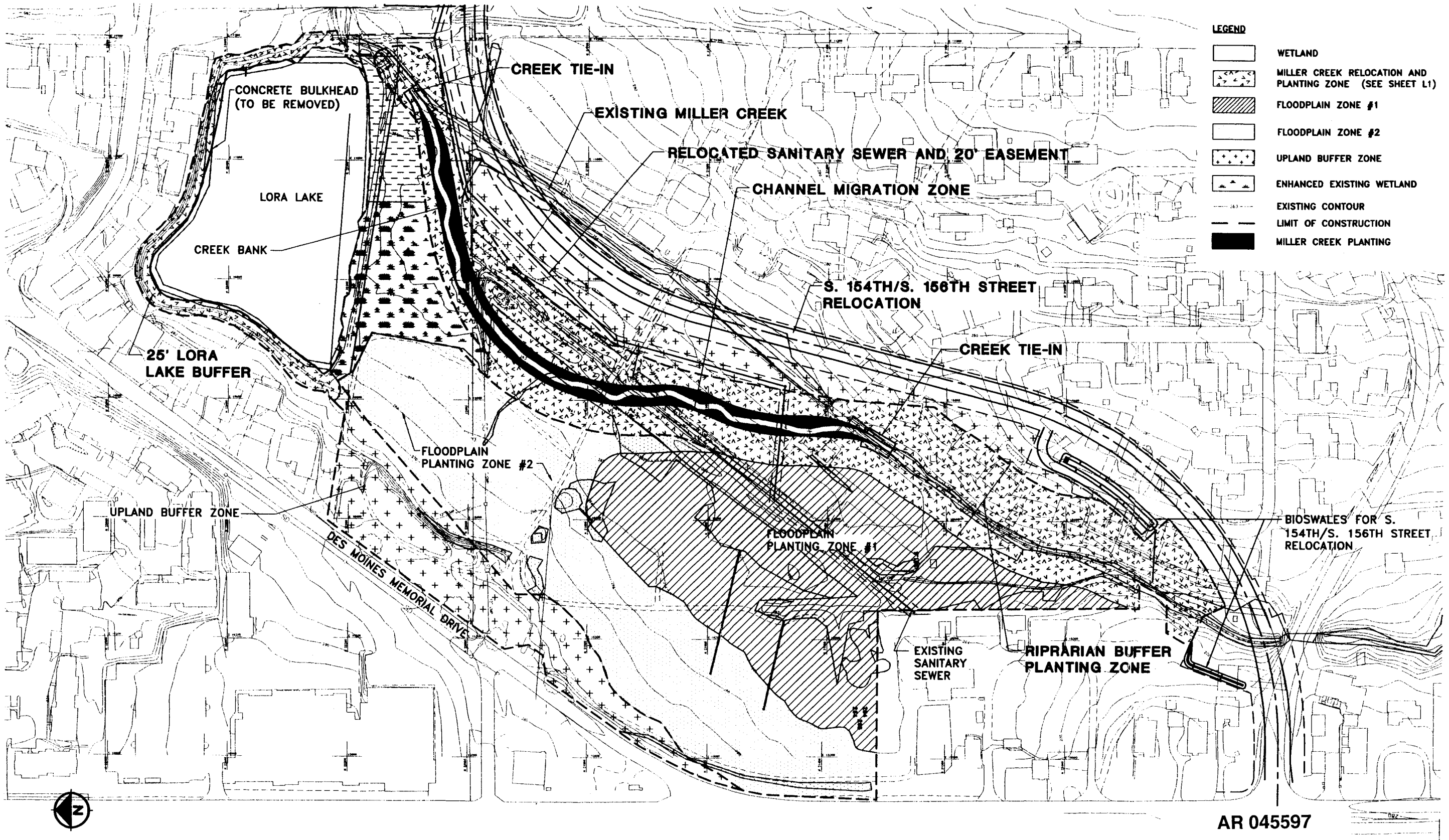
The ecological study shall contain at least the following:

1. Analysis of the event which prompted the study.
2. Identification of the species, numbers, locations, local movements, and daily and seasonal occurrences of wildlife observed.
3. Identification and location of features on and near the airport that attract wildlife.
4. Description of the wildlife hazard to air carrier operations.

The certificate holder may look to ADC or to private consultants to conduct the required ecological study. However, because the ecological study is used by the FAA to determine if a wildlife hazard management plan is needed for the airport, it should be conducted by persons having the education, training, and experience necessary to adequately assess any wildlife hazards.

ADC may conduct preliminary wildlife hazard assessments at no charge to the certificate holder, as ADC's funding and personnel limitations permit. More detailed assessments may require the certificate holder to enter into a cooperative service agreement with ADC.

APPENDIX I ***Map of On-Site Mitigation Areas***



AR 045597

AGENCY REVIEW
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5808 Lk. Washington Blvd. NE
Kirkland, WA 98033
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"Quality Service Through Employee Ownership"

PROJECT MGR./ARCH.: P. FENDT
DESIGNED BY: M. LOUTHER
DRAWN BY: C. COX/P. TOGHER
SCALE: 1"=80'
DATE: AUGUST 2000
CHECKED BY: —
APPROVED BY: —

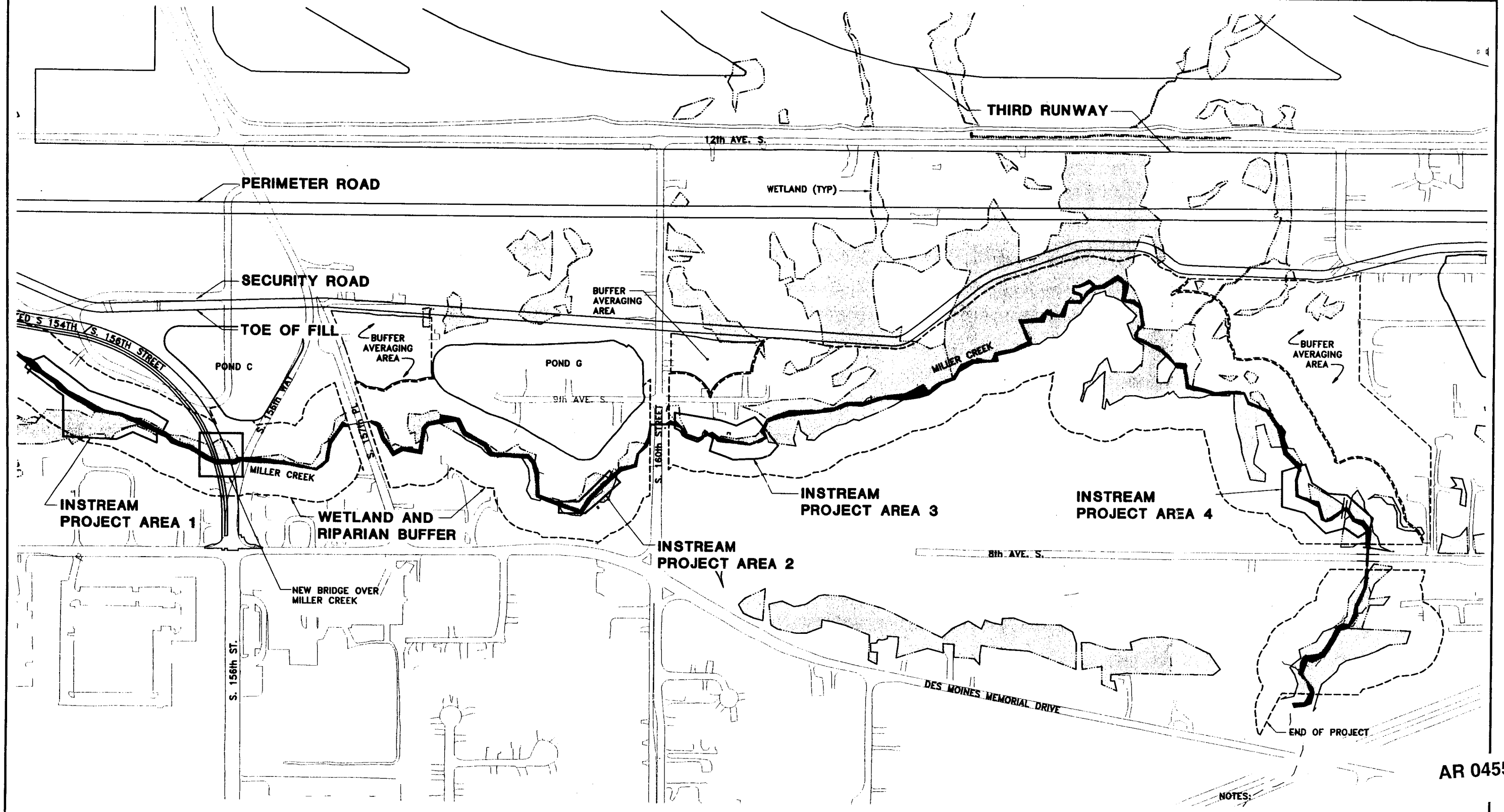
REVISIONS									
NO.	DATE	BY	DESCRIPTION	APP'D	NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT ENGINEER:
DESIGNED BY:
DRAWN BY:
SCALED:
DATE:
CHECKED BY:
APPROVED BY:

Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
PROJECT: MILLER CREEK RELOCATION WHMP
SHEET TITLE: MILLER CREEK RELOCATION AND FLOODPLAIN ENHANCEMENT

WORK ORDER NO.: 100051
CONSULTANT'S NO.: WHMP
PORT OF SEATTLE NO.: STIA-9805-C1.1A

156.DWG 291217BA.DWG



AR 045598

NOTES:

1. ACCESS TO PROJECT SITES BY APPROVAL OF ENGINEER.
2. WETLAND AREAS NOT TO BE DISTURBED BY EQUIPMENT. WETLAND AREAS WILL BE STAKED AND MARKED IN THE FIELD BY THE ENGINEER OR BIOLOGIST.

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DESIGNED BY J. LEAVITT/K. LUDWA
DRAWN BY C. COX/P. TOGHER
SCALE 1"=150'
DATE AUGUST 2000
CHECKED BY -
APPROVED BY P. FENDT

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D	NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT ENGINEER
DESIGNED
DRAWN BY
SCALE
DATE
CHECKED BY
APPROVED BY

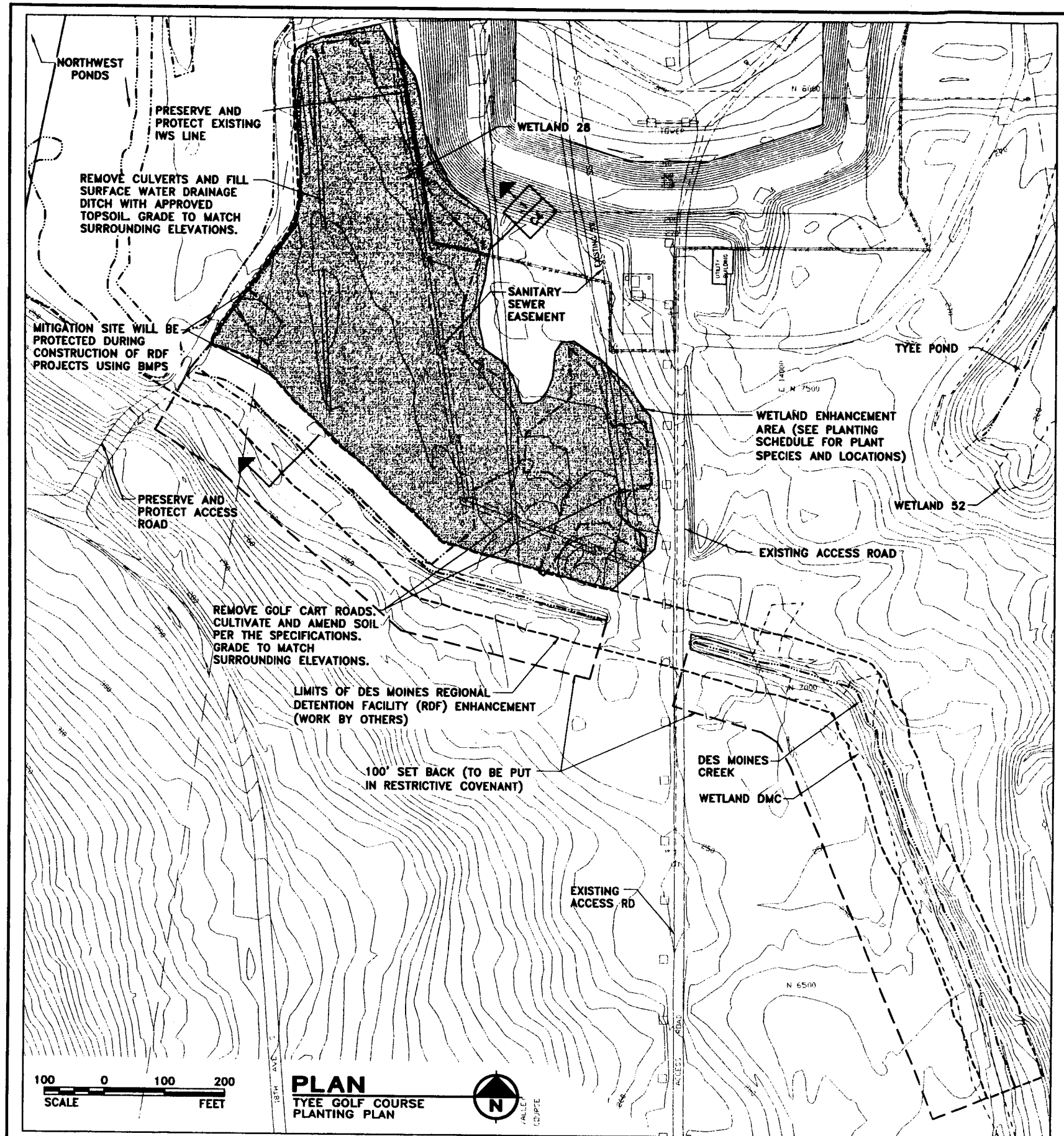
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT

PROJECT: MILLER CREEK INSTREAM AND BUFFER ENHANCEMENT - WHMP

SHEET TITLE: **PROJECT PLAN**

WORK ORDER NO. -
CONSULTANT'S NO. WHMP
PORT OF SEATTLE NO. STIA-XXXX-C2A

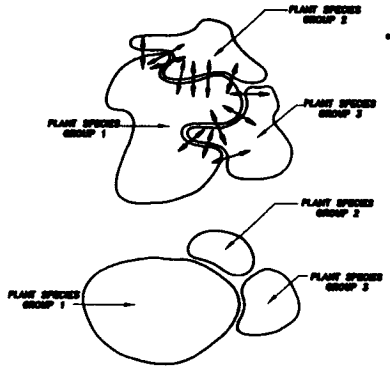
291201BA2 291281DE 291281SV 291201WL



PLAN
TYEE GOLF COURSE
PLANTING PLAN

NOTES:

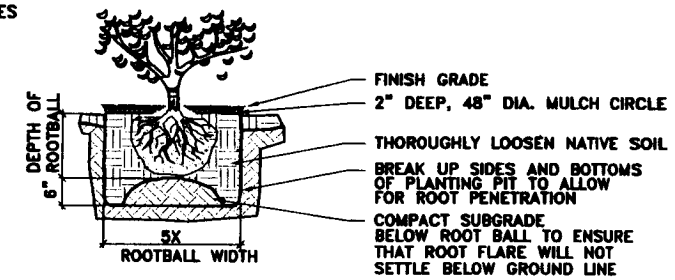
1. PLANT QUANTITIES STATED IN THE PLANTING SCHEDULE ARE FOR CONTRACTOR'S CONVENIENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR ENSURING PLANT COVERAGE STATED IN THE PLANT SCHEDULE.
2. PRESERVE AND PROTECT ALL TREES AND SHRUBS NOT DESIGNATED FOR REMOVAL. PROVIDE, ERECT, AND MAINTAIN BARRICADES NECESSARY TO PREVENT ACCESS TO AREA WITHIN DRIP LINES OF EXISTING TREES. ALLOW NO VEHICULAR AND PEDESTRIAN TRAFFIC, OR STACKING AND/OR STORAGE OF CONSTRUCTION MATERIALS WITHIN BARRICADES.
3. CONTRACTOR SHALL LAY OUT A 10,000 S.F. TEST PLOT, IN WHICH THE POSITIONS OF ALL PLANTS SHALL BE STAKED WITH FLAGS THAT ARE COLOR CODED TO REPRESENT SPECIFIC SPECIES. LAYOUT SHALL BE INSPECTED AND APPROVED BY ENGINEER PRIOR TO COMMENCEMENT OF PLANTING. APPROVED STAKING SHALL SERVE AS THE PLANT LAYOUT STANDARD FOR THE REMAINDER OF THE PLANTING AREA.
4. SHRUB MASSES SHALL CONSIST OF MULTIPLE SINGLE-SPECIES GROUPS (SEE DETAIL 1). CONTRACTOR SHALL ENSURE THAT THESE SINGLE-SPECIES GROUPS HAVE A VARIETY OF SIZES AND SHAPES, AND THAT SHRUB MASSES HAVE A VARIETY OF SPECIES. SEE PLANTING SCHEDULE FOR NUMBERS OF PLANTS IN SINGLE-SPECIES GROUPS.
5. CONTRACTOR SHALL COMPLY WITH ARCHAEOLOGICAL MONITORING REQUIREMENTS, AND RESTRICTIONS RESULTING FROM CONTACT WITH ARCHAEOLOGICALLY SIGNIFICANT OBJECTS (SEE SPECIFICATIONS).
6. CONTRACTOR SHALL HYDROSEED ALL AREAS DISTURBED BY WORK, USING HERBACEOUS WETLAND SEED MIX (SEE SPECIFICATIONS). RE-SEED ALL AREAS THAT ARE DISTURBED BY SUBSEQUENT WORK.
7. AN AUTOMATIC IRRIGATION SYSTEM WILL BE PROVIDED FOR ALL PLANTING AREAS.



DO THIS:
UTILIZE INTERMINGLED "PUZZLE-SHAPED" PLANT GROUPS TO PROVIDE HIGH LEVELS OF INTERACTION BETWEEN PLANT SPECIES IN THE MASSES.

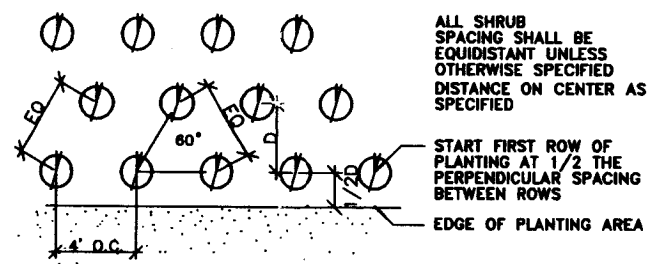
NOT THIS:
UNCONNECTED PLANT GROUPS THAT PROVIDE LITTLE INTERSPERSION OF PLANT SPECIES.

DETAIL 1 TYP
SHAPES OF PLANTING MASSES
NTS



DETAIL 2 TYP
SHRUB PLANTING
(TYPICAL)

NOTE:
ALL SHRUB SPACING SHALL BE EQUIDISTANT UNLESS OTHERWISE SPECIFIED
DISTANCE ON CENTER AS SPECIFIED



DETAIL 3 TYP
TRIANGULAR SHRUB SPACING
(TYPICAL)

PLANT SCHEDULE

Symbol	Botanical Name	Size	Quantity	Remarks
	Physocarpus capitatus/Pacific ninebark	1 gal.	x	CONTAINER.
	Rosa pisocarpa/Clustered rose	1 gal.	x	ROOTING TO SIDES AND BOTTOM OF CONTAINER.
	Salix hookeriana/Hookers willow	1 gal.	x	5' O.C. SPACING TYP.
	Salix scouleriana/Scoulers willow	1 gal.	x	LOCATE PLANTS IN SINGLE-SPECIES GROUPS OF 7 TO 12.
	Salix sitchensis/Sitka willow	1 gal.	x	
	Spiraea douglasii/Hardhack spiraea	1 gal.	x	

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DRAWN J. KELLEY
CHECKED C. COX/P. TOGHER
SCALE 1"=100'
DATE AUGUST 2000
CHECKED BY:
APPROVED BY:

REVISIONS

NO.	DATE	BY	DESCRIPTION	APP'D
NO.	DATE	BY	DESCRIPTION	APP'D

PROJECT ENGINEER:
DESIGNED BY:
DRAWN BY:
SCALE:
DATE:
CHECKED BY:
APPROVED BY:

Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
PROJECT: TYEE VALLEY GOLF COURSE
WETLAND ENHANCEMENT - WHMP
SHEET TITLE: PLANTING PLAN

WORK ORDER NO.
CONSULTANT'S NO. WHMP
PORT OF SEATTLE NO. S714-XXXY-C2A

APPENDIX J ***Section 401 and Section 404 Permit Conditions***

[To be provided when available]