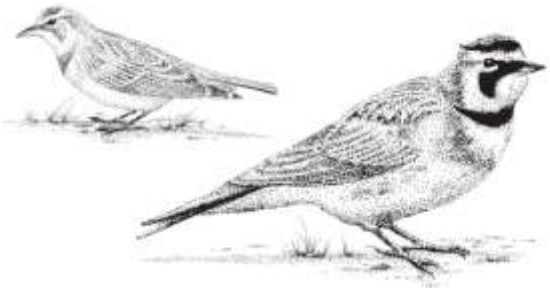
PROCEEDINGS



Streaked Horned Lark and Pacific Northwest Airports

A Collaborative Workshop

9 March 2011

Water Resources Education Center

Vancouver, WA

Hosted by The Nature Conservancy with support from the

US Fish and Wildlife Service and the Department of Defense Legacy Program.

Table of Contents

Executive Summary

This full-day workshop on Streaked Horned Larks and Pacific Northwest Airports took place on March 9, 2011 in Vancouver, Washington. The key object of the workshop was to explore opportunities for conserving the streaked horned lark – a candidate for listing under the federal Endangered Species Act which frequently occupies Pacific Northwest airports – without impacting aircraft safety.

The workshop drew about 50 participants from many different realms, including airport and airfield management, state and federal wildlife agencies, the US Department of Agriculture, the US Navy's Bird Aircraft Strike Hazard (BASH) Program, and nonprofits.

The workshop surveyed the field of topics involved in this complex issue. The morning presentations focused on the hazard that birds present to aircraft, with presentations from representatives of both the civilian and military wildlife strike prevention programs, namely the US Department of Agriculture Wildlife Services, and the US Navy BASH Program. The wildlife hazard prevention manager at Portland International Airport – a site currently occupied by streaked horned larks – described the airport's wildlife hazard prevention program. Then a leading US researcher on the potential synergies between grassland bird hazard management and conservation at airfields, Dr. Kimberley Peters of the New Jersey Audubon Society, made a keynote presentation. Dr. Peters is currently studying how grassland birds react to different types of grassland management on military airfields, and shared her results to date.

The afternoon's proceedings focused on streaked horned larks in the Pacific Northwest, covering natural history and conservation, as well as the potential impacts to airports and airfields should listing under the federal Endangered Species Act occur. The final presentations for the day focused on actual experiences at airports and airfields currently occupied by streaked horned larks, namely Joint Base Lewis-McChord, Portland International Airport, Corvallis Airport and the Olympia Airport.

On March 10, 2011 some participants took a field trip to Portland International Airport to see the airport's wildlife hazard management program firsthand. The field trip included the SW Quad, where the larks are known to breed.

Overall the workshop was a great success, bringing together for the first time partners from the aviation world and the streaked horned lark conservation world to talk about how lark conservation might occur at the airports and airfields, without increasing hazards to aircraft and their passengers. By the end of the workshop, professionals from both wildlife and aviation better understood the issues raised by streaked horned lark's presence on Pacific Northwest airports. This common understanding should result in increased cooperation and buy-in by partners as we move to the next step in the process: creation of a working group to develop a clear roadmap on how to approach conservation of streaked horned larks on Pacific Northwest airports. We anticipate the working group will address several outstanding issues, including surveys of airports with streaked horned lark habitat, wildlife assessments for airports with known streaked horned lark populations, recommendations to be incorporated into management plans, and conservation incentives which may be available to airport operators.

Presentations: National Perspective

Birds and Airports: National Overview

Presented by
Hannah Anderson, Cooperative Conservation Program Manager, The Nature Conservancy
Written by
Marnie Lassen, Conservation Analyst/Coordinator, The Nature Conservancy

This presentation set the stage for the workshop by presenting a broad-scale national background to the issues revolving around birds at airports including safety concerns, general management guidelines, and rare and/or listed species conservation and management at airports.

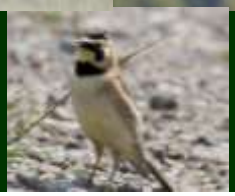
Hannah Anderson is the Cooperative Conservation Program Manager for the South Puget Sound office of The Nature Conservancy of Washington. Her program focuses on promoting and facilitating recovery of rare species occurring in prairies and oak woodlands of the Pacific Northwest. She facilitates several cooperative efforts for rare species conservation including the streaked horned lark range-wide working group and the Joint Base Lewis-McChord Army Compatible Use Buffer Program. She has been engaged in streaked horned lark ecology and conservation since 2004, when she completed her Master's thesis with the species. She continues on-the-ground lark work in the south Puget Sound and the islands of the lower Columbia River.

Remember this?

FAA wildlife strike data 1990-2008

- **~89,700 strikes**
- **Birds in >97% of strikes**
- **86% no aircraft damage**
- **14% some damage**
- **<1% aircraft destroyed**

Are all species equally hazardous?



#1 Mule deer

#7 Canada goose

#69 Horned Lark

(2009 analysis of FAA strike reports)

Known horned lark strikes in Pacific Northwest

Managing airports for wildlife deterrence

- Audiovisual deterrents
- Infrared / radar beams
- Dogs / falconry
- Lethal control

Most effective technique:

Habitat modification

- Netting
- No standing water
- No attractive crops / vegetation
- Grass height management

Can we manage for both safety and conservation?

Some successful techniques:

- Airport hazard assessment
- Modify flight times
- Adjust mowing schedule
- Reduce mowing /vehicle footprint
- Create buffer areas

Potential consequences of listing

- **Consultation with Fish & Wildlife Service**
- **Fish & Wildlife Service biological opinion**
- **Habitat management**
- **Development restrictions**

California Least Tern: San Diego Airport

Thank you!

Photos:

Rod Gilbert
Dolbeer & Wright
airliners.net

Managing Wildlife Hazards at Airports

Presented by
Laurence M. Schafer, USDA Wildlife Services Airport Coordinator, WA/AK

Every airport is responsible for providing a safe operating environment. Wildlife in and around airports put themselves and aviation safety at risk. Substantial lawsuits have been lost when airport management was shown to not be doing their due diligence in mitigating wildlife hazards. Wildlife strikes cost U.S. civil aviation $500-$600M in losses each year, are responsible for substantial delays and cancelled flights, and nearly always kill the wildlife causing the strike. An average of 7,300 strikes were reported each year between 2004 and 2008, and only about 25% of all strikes are actually reported. Birds are responsible for roughly 97% of all reported strikes with only 24% occurring between climb and descent. Simply, most wildlife strikes occur inside or immediately adjacent to the airfield. When species was confirmed, 12% of strikes involved grassland passerines (excluding European starlings). Ducks, geese, raptors, and gulls are the most commonly struck species and responsible for most damage. The principle hierarchy of airport wildlife management BMPs is habitat management, exclusion, harassment, and lethal reinforcement.

Habitat management focuses on creating an environment that possess the fewest attractive components for the greatest number of hazardous species possible. Increasing the intensity of direct control efforts (i.e., harassment and lethal reinforcement) is not an acceptable substitute for creating or allowing the presence of things which attract hazardous wildlife. Food, water, and shelter are key attractants. Any sort of management that creates habitat for one wildlife species, creates a feeding source for other wildlife species. Managing habitat for threatened, endangered, and species of special concern limits habitat management options to deter other wildlife. In order to reduce total bird harassment and mortality on airfields should rely upon employing the best habitat management practices available. Synergistic and stochastic effects must not be ignored when developing habitat management alternatives on and around airfields. Doing so could put airport management at risk of being viewed as not performing their due diligence in mitigating wildlife hazards.

Laurence M. Schafer began his career with USDA Wildlife Services after earning his BS in Wildlife Biology from the University of Montana in 1997. His first position was as a specialist at Atlantic City International Airport. In 1999, he became the Project Leader for the Wildlife Program at O'Hare International Airport, where he conducted his master's research on the efficacy of raptor translocation as a management tool. Though devastated to have to leave the soothing climate of Chicago, Laurence accepted a position as the Airport Coordinator/Staff Wildlife Biologist for USDA Wildlife Services in Washington and Alaska in 2002. While there, Laurence has assisted with the development of numerous Wildlife Hazard Assessments and Management Plans for WA and AK airports. His secondary interests are collaborating with the USDA Wildlife Services National Wildlife Research Center and other agencies to develop additional operational management tools and Wildlife Hazard Assessment techniques. If Laurence cannot be reached by phone, he's probably too busy fighting a fish or taking his Labradors hunting.

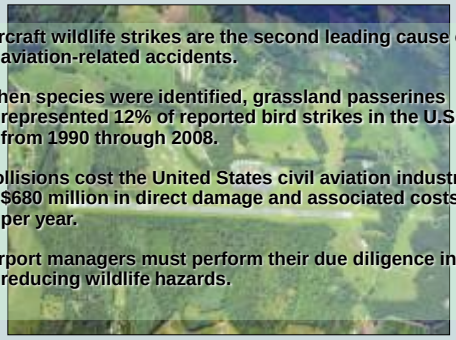
Streaked Horned Lark and Airport Workshop, Managing Wildlife Hazards

Presented by:
Laurence M. Schafer
USDA APHIS Wildlife Services
Airport Coordinator, WA/AK
360.753.9884

Wildlife and Aircraft Don't Work Well Together!

Sometimes with explosive results

The Facts



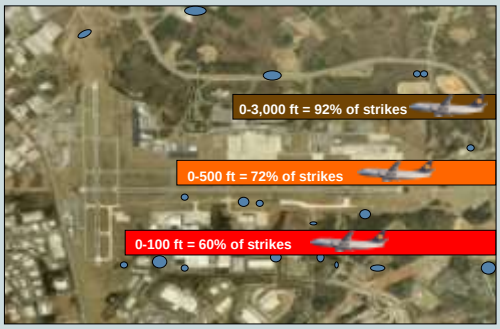
Aircraft wildlife strikes are the second leading cause of aviation-related accidents.

When species were identified, grassland passerines represented 12% of reported bird strikes in the U.S. from 1990 through 2008.

Collisions cost the United States civil aviation industry $680 million in direct damage and associated costs per year.

Airport managers must perform their due diligence in reducing wildlife hazards.

Most Wildlife Strikes Occur On or In Immediate Proximity to the Airfield



Conflicting Mandates and Regulatory Requirements

- Endangered Species Act
- Clean Water Act, Section 401 and 404
- Federal Aviation Administration (FAA) guidance for addressing hazardous wildlife
- State Department of Ecology lead agency for stormwater management
  - WSDOT developed an Aviation Stormwater Design Mannual with criteria for distances from the airfield following FAA guidance.
- DNR, NOAA-Fisheries
- USDA Wildlife Services
- Other regs: Local growth management act critical area requirements

FAA Regulatory Requirements

- Advisory Circular 150/5200-33B – Guidance on land uses that have potential to attract hazardous wildlife.
  - Airports that receive Federal grant-in-aid assistance must use these standards.
  - Increasing the intensity of wildlife control efforts is not a substitute for eliminating or reducing a proposed wildlife hazard.
- CertAlert 06-07 – Habitat for State-listed Threatened, Endangered, and species of special concern
  - Airport operators must decline to adopt habitat management techniques that jeopardize aviation safety.
- Grant Assurances
  - Number 19, Operation and Maintenance. "…airport sponsor will not cause or permit any activity or action which would interfere with its use for airport purposes."
  - Number 20, Hazard Removal and Mitigation. "It will take appropriate action to… protect… operations to the airport…and by preventing the establishment or creation of future airport hazards."
  - Number 21, Compatible Land Use. "It will take appropriate action… to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and taking off."

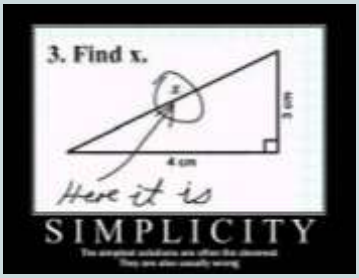
State and Local Regulatory Requirements

- RCW 36.70.547 – General Aviation Airports, siting of incompatible land uses.

  Every county, city, and town in which there is located a general aviation airport …, shall, … discourage the siting of incompatible uses adjacent to such general aviation airport. Such plans and regulations may only be adopted or amended after formal consultation with: Airport owners and managers, private airport operators, general aviation pilots, ports, and the aviation division of the department of transportation.

- Local Codes –

Wildlife Management at Airports is Complex



Coordinate with Airport Wildlife Biologists to Help Identify Hazardous Wildlife

Advisory Circular 150/5200-36 – Identifies the necessary qualifications of an FAA-approved Airport Wildlife Biologist.

There is no Silver Bullet

Integrated Wildlife Damage Management

Habitat Modification
Exclusion/Deterrents
Harassment
Population Management
Creativity & Obstinacy

Nothing works all of the time, some things work some of the time, other things never seem to work.

Habitat Modification

Manage the habitat to reduce its attractiveness for as many hazardous species as possible

Exclusion

Try to make it so they can't get to the habitat

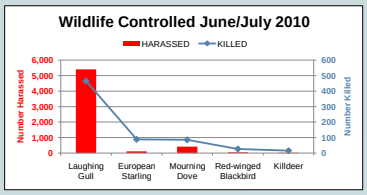
HARASSMENT

Make it so they don't want to come back….

LETHAL REINFORCEMENT

The USFWS issues Depredation Permits which authorize the killing of migratory birds.

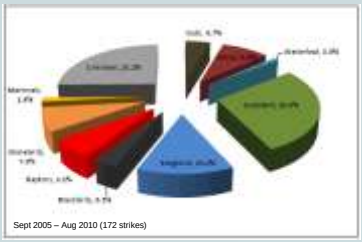
Every airport should have a Depredation Permit



Mitigation Banking? The Highway Departments have great programs and access…

People used to say wetland mitigation banking wouldn't work…

Is it truly in the best interests of threatened, endangered, or species of special concern to attract them into sink habitats?



Wildlife Strikes are a Lose:Lose

Actually, is it in the best interest of any wildlife to attract it to an area where it will likely be harassed and possibly killed? There were 9,474 reported events in 2009 where wildlife wouldn't think so.

US Navy Bird Airstrike Hazard Program

Presented by

Matthew W. Klope, Wildlife Biologist, Naval Facilities Engineering Command, BASH Program Manager

An overview of the Navy's BASH Program was presented with emphasis on airport habitat management and wildlife issues. Topics will include the Navy's Natural Resources Managers responsibilities, the Facility Integrated Natural Resources Management Plan (INRMP), and NEPA review responsibilities for proposed projects that might increase the risk of a BASH event to the military aviator.

Matthew Klope has worked for the Department of the Navy for the past 31 years as a wildlife biologist managing natural resources management and environmental protection programs at two Navy facilities on the west coast. For the past ten years Matthew has been the Navy's BASH Program Manager for the NAVFAC Headquarters. His duties include the coordination between Aviation Operations, Aviation Safety and Natural Resources Departments regarding all aspects of the BASH Program involving Navy and Marine Corps airfields worldwide.

BIRD/ANIMAL AIRCRAFT STRIKE HAZARD (BASH)
Department of the Navy

Streaked Horned Lark and Airport Workshop
9 March 2011

Matthew W. Klope
Naval Facilities Engineering Command BASH Program

Report and Communicate

T-45A CRASH SITE NAS MERIDIAN MAY 20 2008
CLASS ALPHA MISHAP $21,736,000.00
Pectoral Sandpiper (2.3 ounces)

Navy Safety Center Wildlife Strike Data 1980 – Dec 2010

• 19 CLASS ALPHA	$357,981,892.00	2 FATAL
• 47 CLASS BRAVO	$ 13,114,611.00	
• 385 CLASS CHARLIE	$ 21, 434,411.00	
• 16860 HAZREPS	$ 2,640,214.00	
	$395,171,128.00	

CLASS A	>$2 Million
CLASS B	$500K - $2 Million
CLASS C	$50K - <$500K
HAZREP	<$50K

UPDATED GUIDANCE FOR IMPLEMENTATION OF THE SIKES ACT IMPROVEMENT ACT

- The new SAIA "requires" the Secretaries of the Military Departments to prepare INRMPs in cooperation with the other two parties, and require the plans to reflect "mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources." The new§101(a) language achieves four important objectives:

- 1. INRMPs -- comprehensive plans for the management of all installation natural resources (substantially expanded beyond the scope of fish and wildlife cooperative plans)--are now mandatory "unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate."

- 2. INRMPs shall be prepared to assist installation commanders in their efforts to conserve and rehabilitate natural resources ***"consistent with the use of military installations to ensure the preparedness of the Armed Forces."*** INRMPs are intended principally to help installation commanders manage natural resources more effectively so as to ensure that installation lands remain available and in good condition to support the installation's military mission (i.e., ensure "no net loss in the capability of military installation lands to support the military mission of the installation").

- 3. INRMPs are to be prepared "in cooperation with" the FWS and appropriate State fish and wildlife agencies.

- The Department of Defense is satisfied that the revised Sikes Act will enable the Military Departments to take advantage of the FW S and State fish and wildlife agencies expertise in preparing meaningful and useful INRMPs that are consistent with the use of military installations.

NEPA PROGRAM REVIEW

ALL ASPECTS OF THE NAVY'S BASH PROGRAM NEED TO BE EVALUATED BY THE NEPA PROCESS.

CATEX's, EA's, and EIS's
ASK THE BASH PROGRAM QUESTIONS: Will the proposed project have an effect on aviation safety and air operations?

- **PROJECT MEETINGS**
- **SCOPING MEETINGS**
- **CHECKLISTS**
- **CONSULTATIONS**
- **PROJECT REVIEWS**

Commander Navy Installations Command (CNIC)
Bird Animal Aircraft Strike Hazard (BASH) Manual
Jan 2010

"There is no grass height management standard that fits all installations. Grass management is installation specific and must be based on the best wildlife information available."

Navy / Smithsonian Institution Partnership

September 2008 Navy Contract Initiated with the hiring of Biologist Jim Whatton
To date: 1008 samples identified.
Sponsored Two Field collecting trips to MCAS Iwakuni Japan and the Pacific Missile Range Facility, Kauai and Joint Base Hickam AFB/ NS Pearl Harbor, Hawaii
Investing $43K for the replacement of 50 year old laboratory lighting with "Specialized Lighting Equipment to Enhance Birdstrike Identifications".

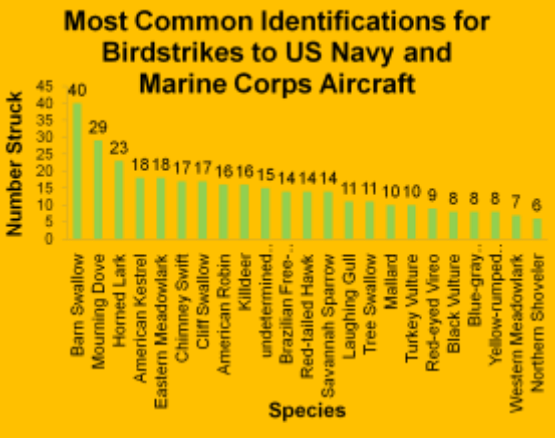
An Installation cannot manage a BASH Program if it does not know what is being struck!!!

You can invest a lot of funding and manpower towards species that may NOT be the biggest problem or present the greatest risk.

Yet, the greatest challenge is to get Installations and Squadrons to collect and turn in remains. Estimated only 20 – 25 percent of non-damaging HAZREPS are reported and fewer have the remains turned in.

IT'S A FREE SERVICE PROVIDED TO ALL NAVY AND MARINE CORPS FACILITIES,USE IT!

FL_	FL_	WESS_#	Local_Ser_#	UIC	Incident_Date	Reporting Base	POC	ID_Date	Method	Common Name
000	001	1215721988178	19-08	m02001	03-Jul-08	Cherry Point	Steve Ball	31-Oct-08	Whole	Osprey
000	002	1221484914124	25-08	m02001	04-Sep-08	Cherry Point	Steve Ball	31-Oct-08	Whole	Seminole Bat
000	003	1221486302412	26-08	m02001	04-Sep-08	Cherry Point	Steve Ball	31-Oct-08	Whole	Mourning Dove
000	004	1220363172470	24-08	m02001	02-Sep-08	Cherry Point	Steve Ball	31-Oct-08	Whole	Killdeer
000	005	1219959354346	23-08	m02001	27-Aug-08	Cherry Point	Steve Ball	31-Oct-08	Whole	Short-billed Dowitcher
000								31-Oct-		



How do we get the word out to the Navy and Marine Corps Facilities that the Smithsonian Feather lab needs specimens?

FIGURE XX

MCAS FUTENMA WILDLIFE HAZARD ASSESSMENT
SURVEY SUMMARY DATA JAN - NOV 2010

NO.	GUILD	SPECIES	JAN WINTER	APR SPRING	JUL SUMMER	NOV FALL	TOTAL
1	Song	Fan-tailed warbler		245	252	42	539
2	Shore	Pacific-golden plover		93		204	297
3	Song	Blue rock thrush	73	61	42	65	241
4	Song	Rock dove	69	63	33	58	223
5	Song	Eurasian skylark	138	25		30	193
6	Song	Pacific swallow	5	20	443	69	137
7	Song	Light-vented bulbul	2	2	36	44	84
8	Song	Scaley-breasted munia	50			30	80
9	Song	Oriental turtle dove	6	4	48	21	79
10	Song	White wagtail	30			43	73
11	Shore	Common sandpiper	26	15			41
12	Raptor	Common kestrel	14	1		24	39
13	Diver	Great cormorant				39	39
14	Song	Brown-eared bulbul		2	7	17	26
15	Song	Grey wagtail		19		1	20
16	Song	Eurasian tree sparrow		1	11	3	15
17	Raptor	Osprey	7	1		7	15
18	Raptor	Common buzzard	5			8	13
19	Song	Jungle crow		4	2	7	13
20	Wader	Great egret		7		3	10
21	Shore	Little-ringed plover		9			9
22	Raptor	Peregrine falcon	4	3		1	8
23	Wader	Intermediate egret		1		7	8
24	Wader	Black-crowned night heron			4		4
25	Shore	Black-winged stilt		1		1	2
26	Wader	Grey heron				2	2
27	Song	Pale thrush	1				1
28	Song	Japanese paradise flycatcher		1			1
29	Wader	Chinese pond heron		1			1
30	Shore	Wood sandpiper			1		1
31	Shore	Little tern			1		1
32	Shore	Common snipe		1			1
TOTAL SPECIES BY SEASON			14	23	12	23	
SONGBIRD	15 46.9%		374 87.0%	447 77.1%	474 98.7%	430 59.2%	1725
SHOREBIRD	7 21.9%		26 6.0%	119 20.5%	2 0.4%	205 28.2%	352
WADER	5 15.6%		0	9 1.6%	4 0.8%	12 1.7%	25
RAPTOR	4 12.5%		30 6.7%	5 0.7%	0	40 5.5%	75
DIVER	1 3.1%		0	0	0	39 5.4%	39
WATERFOWL	0		0	0	0	0	0
MAMMAL	0		0	0	0	0	0
TOTAL	32 100%		430 100%	580 100%	480 100%	726 100%	2216

FIGURE XX

KADENA AIR FORCE BASE REPORTED WILDLIFE STRIKE DATABASE
1992 - 2010

NO.	GUILD	SPECIES	WINTER DEC - FEB	SPRING MAR - MAY	SUMMER JUN - AUG	FALL SEP - NOV	TOTAL
1	Shore	Pacific-golden plover	13	10	4	23	50
2	Shore	Kentish plover	7	4	3	10	24
3	Shore	Oriental pratincole		6	4	4	14
4	Raptor	Common kestrel	1			13	14
5	Raptor	Short-eared owl	4	4		1	9
6	Song	Barn swallow	1		3	4	8
7	Song	Oriental turtle dove		4	1	2	7
8	Song	Brown-headed bulbul	3			2	5
9	Shore	Mongolian plover	1		1	3	5
10	Shore	Dunlin	3		1		4
11	Raptor	Grey-faced buzzard	1			3	4
12	Shore	Little tern			3		3
13	Shore	Black-bellied plover		1		2	3
14	Wader	Little egret		1	1	1	3
15	Song	Blue rock thrush			2	1	3
16	Shore	Little-ringed plover			1	2	3
17	Raptor	Common buzzard	1	1			2
18	Raptor	Osprey	2				2
19	Song	Japanese thrush	1			1	2
20	Song	Pale thrush	1			1	2
21	Raptor	Peregrine falcon	2				2
22	Wader	Intermediate egret	1		1		2
23	Song	Rock dove		1		1	2
24	Song	Eurasian skylark			1	1	2
25	Wader	Ruddy kingfisher			1	1	2
26	Wader	Great egret				2	2
27	Song	House martin				2	2
28	Song	Arctic warbler				2	2
29	Shore	Grey-headed lapwing	1				1
30	Raptor	Amur falcon		1			1
31	Water	Goose sp.		1			1
32	Song	White wagtail		1			1
33	Song	White-bllied green pigeon		1			1
34	Song	Yellow wagtail		1			1
35	Shore	Eurasian woodcock		1			1
36	Song	White-cheeked starling			1		1
37	Shore	Black-headed gull			1		1
38	Wader	Cattle egret			1		1
39	Shore	Red knot			1		1
40	Raptor	Japanese sparrowhawk			1		1
41	Song	Common raven				1	1
42	Shore	Least sandpiper				1	1
43	Song	Siberian thrush				1	1
44	Shore	Common snipe				1	1
45	Shore	Snowy plover				1	1
46	Wader	Grey heron				1	1
47	Shore	Whiskered tern				1	1
48	Song	Gray's grasshopper sparrow				1	1
49	Song	Japanese bush warbler				1	1
50	Mammal	Ryukyu flying fox				1	1
TOTAL SPECIES BY SEASON			15	16	19	32	
SONGBIRD	18 36%		6 14.3%	8 20.5%	8 25.0%	21 22.8%	43
SHOREBIRD	16 32%		25 59.5%	22 56.4%	19 59.3%	48 52.2%	114
RAPTOR	8 16%		10 23.8%	7 17.9%	1 3.1%	17 18.5%	35
WADER	6 12%		1 2.4%	1 2.6%	4 12.5	5 5.4%	11
WATERFOWL	1 2%		0	1 2.6%	0	0	1
MAMMAL	1 2%		0	0	0	1 1.1%	1
TOTAL	50 100%		42 100%	39 100%	32 100%	92 100%	205

CURRENT NAVY/ USDA Wildlife Services BASH Program

Financial and Work Plan 01 October 2010 – NTE 5 Years

CNIC Air Operations Program Director/ Deputy Administrator,

USDA, APHIS Wildlife Services

- NAS Pensacola, Florida
- NAS Whiting Field and NS Mayport , Florida
- NAS Whidbey Island, Washington
- NAS Meridian, Mississippi
- NAS Kingsville, Texas
- NAS Corpus Christi, Texas
- Naval Base Coronado, NAS North Island, California
- Naval Base Ventura County, NAS Point Mugu, California
- Naval Air Station Oceana and NAS Chambers Field, Virginia
- NAS Fort Worth, Texas
- NAS New Orleans, Louisiana (New Installation FY 11)
- NAS Key West, Florida (New Installation FY 11)
- NAS Patuxent River, Maryland (New Installation FY 11)
  NAS Jacksonville, Florida (New Installation FY 11)

Pacific Missile Range Facility, Hawaii
NAS Lemoore, California

Navy and Marine Corps **BASH** Training Module

- **Developed by Naval School, Civil Engineering Corps Officers, Port Hueneme, CA**
- **45 Minute, all encompassing web-enabled or stand alone course**
- http://www.cecosweb.com/offerings/BASH
- **Possible inclusion into CNATRA Student Pilot Curriculum**
- **New Revised Module available Winter 2010**

DOD LEGACY PROGRAM
DOD Partners in Flight

Research into grassland management within the Airport Operating Area (AOA) for the preservation of grassland avian species of concern and species at risk is on the rise.

- Grassland bird productivity on military airfields in the Mid-Atlantic regions (Year 3), New Jersey Audubon
- Migration ecology and population connectivity of at-risk grassland birds (Proposed), Vermont Center for Ecostudies

Be careful what technologies are placed and used on the airfields.

Make sure the strategy fits the problem species. This is why it is important to report strike events and turn in remains for positive identification.

MEETINGS AND TRAINING

- NMFWA Annual meeting: 14 – 19 March 2011, Kansas City, Missouri, BASH Program Breakout Session
- 13^{TH} Annual North American Birdstrike Meeting 12 – 15 September 2011, Niagara Falls, Ontario, Canada


QUESTIONS??????

PDX Wildlife Hazard Management Program

Presented by

Nick Atwell, Wildlife Manager, Aviation, Port of Portland

The overall objective of the Port of Portland's (Port) Wildlife Hazard Management Plan (WHMP) is to develop an integrated and adaptive program that effectively manages risk at the Portland International Airport (PDX) by reducing the probability of wildlife/aircraft collisions. Wildlife exclusion fencing was installed around the airfield perimeter in 1997 and has reduced the incursion of terrestrial wildlife onto the airfield to a manageable level. Avian species, however, remain a statistically higher risk for aircraft at PDX, especially during the critical phases of flight. Consequently, the risk evaluation process of the WHMP focuses on avian wildlife. It is recognized that the risk of a bird strike at PDX can never be completely eliminated, given the eco-regional location of the airport on the Pacific flyway and at the confluence of two major river systems, all of which serve as major movement corridors for migratory and resident species of birds. Among the most hazardous birds to aircraft operations are raptors. The raptor monitoring, trapping, banding, and translocation program seeks to identify and monitor resident breeding Red-tailed Hawks and control the twice annual influx of non-resident migratory and transient raptors. The underlying premise of the Wildlife Hazard Management program is that it is possible to manage the risk to an acceptable level. The intent of the WHMP is to provide the necessary direction to do so, in a scientifically sound manner, utilizing non-lethal means wherever possible.

Nick Atwell started working for the Port of Portland dealing with Aviation Wildlife in 1998 and then moved onto the Natural Resources Department in 1999. There he worked as a Natural Resources Specialist which required being a Wildlife Biologist & Wetland Scientist. Nick's current responsibilities at PDX include managing a full-time proactive aviation wildlife management program, conducting research into new non-lethal wildlife deterrents, and making habitat modification recommendations while focusing on environmental policy/regulations. He is a certified Wetland Scientist & Aviation Wildlife Biologist with an Associate's degree in Natural Resources and a Bachelor of Science degree in Organismal Biology.

Portland International Airport

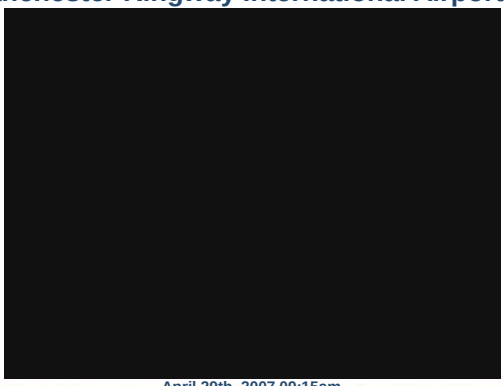
14.5 million passengers per year

PDX Wildlife Hazard Management Program

Mission Statement:

To control aviation wildlife hazards with non-lethal means when possible by focusing on daily dispersals and long-range habitat modifications.

Manchester Ringway International Airport UK



April 29th, 2007 09:15am

PDX January 2001

MD-11 struck a Herring gull (body mass ≈ 2.5 lbs)

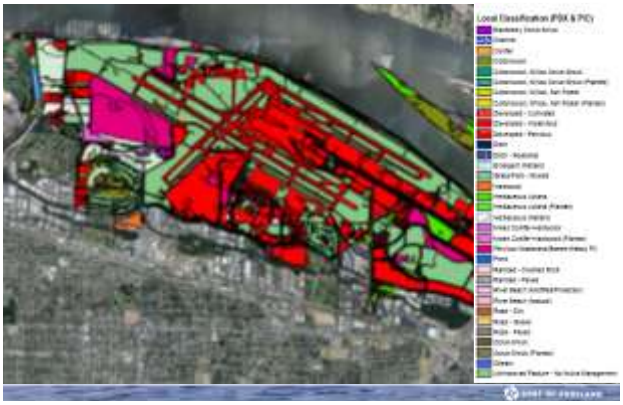
Aborted take-off.
Engine destroyed.
Runway closed for 3.5 hours for debris removal.

PDX Wildlife Program is Based on 4 Pillars

1. **Short-term: Operational Strategies**
   - ***Intensive Hazing, Trapping & Relocation***
2. **Research and Development**
   - ***Prey base Studies, Deterrents, other research as needed***
3. **Long-term: Management Strategies**
   - ***Compatible Land use Planning, Habitat Management***
4. **Information and Education**
   - ***Bird Strike Committee USA/Canada, Conferences, Airport Open Houses & other Public Events***

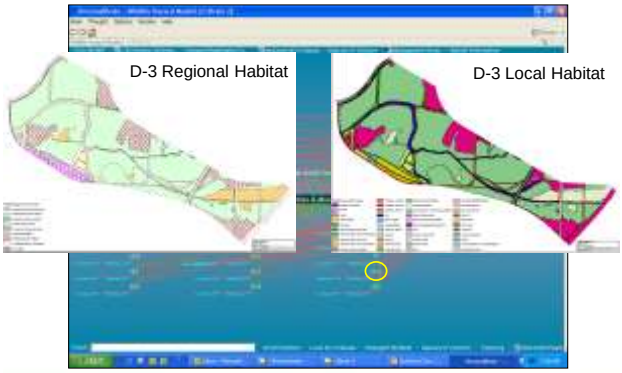
PDX Airfield

Local Habitat Classifications



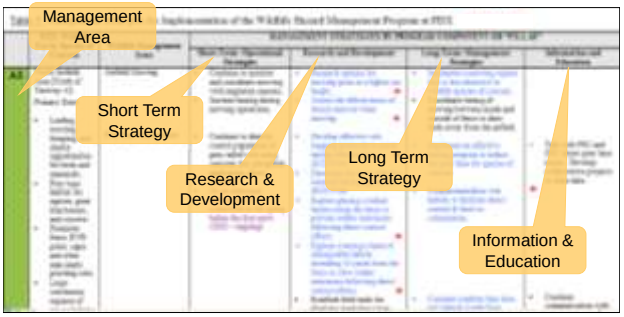
Habitat Management Areas

Brain® Software



Habitat Management Areas

The Four Pillars of Wildlife Management at PDX



PDX Risk Assessment Model - 2010

PROBABILITY

SEVERITY	Very High	High	Moderate	Low	Very Low
Very High		Mallard	Osprey Canada Goose		Green-winged Teal Northern Pintail Turkey Vulture Wood Duck [Bald Eagle] [Deer]
High	Red-tailed Hawk	Great Blue Heron	Rock Pigeon American Crow Gull spp.	Coyote Great-horned Owl	
Moderate					
Low		Barn Owl European Starling		Short-eared Owl	Killdeer Northern Harrier
Very Low	American Kestrel	Swallow spp.			

Gray-tailed Voles, *Microtus canicaudus*

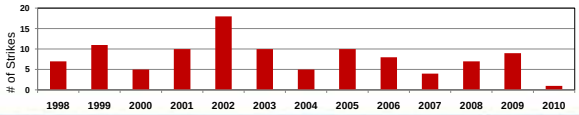
Gray-tailed Voles, *Microtus canicaudus*

Prey Base Research

Small Mammal Surveys are conducted bi-monthly to determine species composition & density

Red-tailed Hawks

- Trapping Status (1999-2010)
  - –911 relocated off the airfield
  - –20% return rate
  - –Peak #'s during the spring & fall migration
- Resident Hawks
  - –6 resident pairs identified
- Nest Interventions



Red-tailed Hawk Trapping and Relocation Program

911 Red-tailed Hawks captured and relocated since 1999

Marking Techniques

PDX color bands

wing tags

blue marker

USDA WS airport band

Individuals also identified by age class, plumage, behavior, and location.

Nest Intervention

Red-tailed hawk hatchlings

Flight Cages on Sauvie Island

Great-blue Herons

Great-blue Herons

- Short grass increases hunting success
- Prey base is more visible to predators

Hazing Tools

Habitat Modification
Runway Safety Area Improvement Project

Airfield Safety Improvement
Project: 8.25 acres of wetlands
Mitigation Site: Vanport Wetlands

Vanport Mitigation Site
Successful Habitat for Many Wildlife Species

Successful Breeding

Adaptive Management

First deterrent did not work!

Osprey nesting on airfield

Adaptive Management

Pinwheels have been effective!

Osprey nesting elsewhere

Flock of Canada Geese

Adaptive Management

Adaptive Management

Adaptive Management

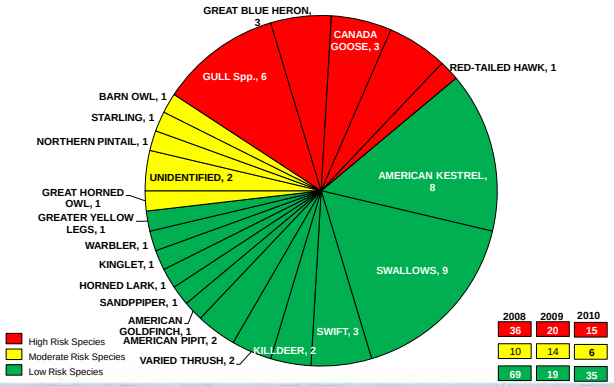
Boeing Hangars & Retention Pond

12,835 square feet
160,000 Bird Balls ®

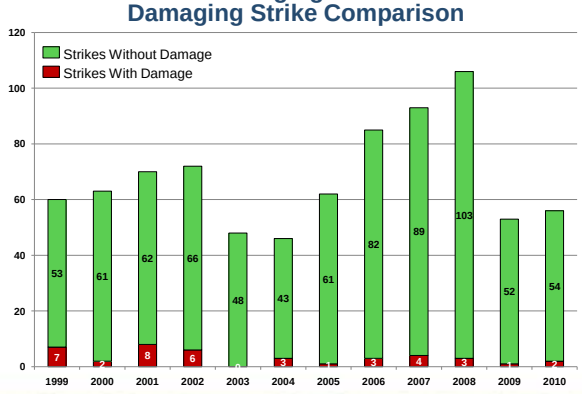
Adaptive Management

Coyote Deterrent Fencing

2010 PDX Strikes by Species & Risk Category

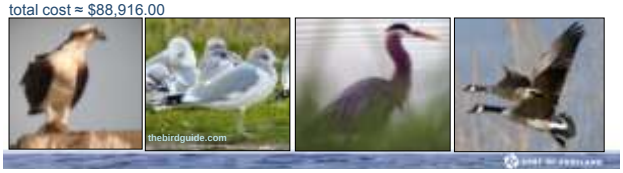


Non-damaging Strikes & Damaging Strike Comparison



PDX Damaging Strikes

2004 - Mallards, Great Blue Heron, and an Osprey
total cost ≈ $2,908,000.00
2005 - Mallard
total cost ≈ $130,085.00
2006 - Great Blue Heron, Mew gull, and Red-tailed hawk
total cost ≈ $327,285.00
2007 - Mew gull, Thrush, Great Blue Heron, and Geese,
total cost ≈ $69,522.00
2008 – Great Blue Heron, Green-winged teal, Red-tailed hawk
total cost ≈ $36,409.00
2009 - Red-tailed hawk
total cost ≈ $8,645.00
2010 – Northern Pintail, Thrush
total cost ≈ $88,916.00



Avian Responses to Grassland Management on Military Airfields in the US Northeast

Presented by

Dr. Kim Peters, Director of Research and Monitoring Program, New Jersey Audubon Society

Grasslands associated with airfields in the eastern U.S. frequently support breeding populations of regionally important grassland birds, but can also support bird species that are potentially hazardous to aircraft operations. Therefore, a better knowledge of how various species respond to management actions in airfield grasslands will have benefits for both conservation and air safety. We studied the relationships among avian habitat use, nesting success, grassland habitat management, vegetation, and landscape characteristics on three military airfields in the Northeastern U.S.: Joint Base McGuire-Dix-Lakehurst (New Jersey, LAKEHURST), Westover Air Reserve Base (Massachusetts, WARB), and Patuxent River Naval Air Station (Maryland, PRNAS).

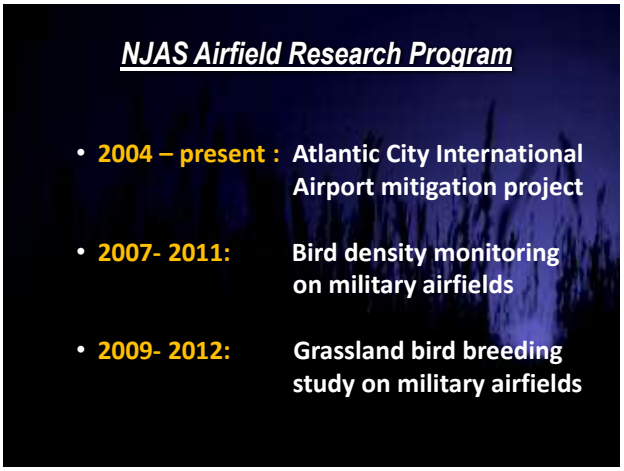
Between 2007 and 2010, we estimated avian densities using line-distance sampling surveys performed bi-monthly during the breeding and migration periods. Data were analyzed as total avian density, as well as by functional groups (e.g., "BASH strike-risk", "conservation-value"). Models showed that on military airfields that were regularly mowed, strike-risk bird density was higher on transects with shorter average vegetation height. In contrast, densities of breeding conservation-value species on two of the bases were positively related to vegetation height. Horned lark was more likely to be present on plots that were mowed according to BASH standards. Models relating avian densities or horned lark presence to immediate conditions at each transect did not strongly indicate that birds were tracking habitat conditions, or changing patterns of use, within seasons.

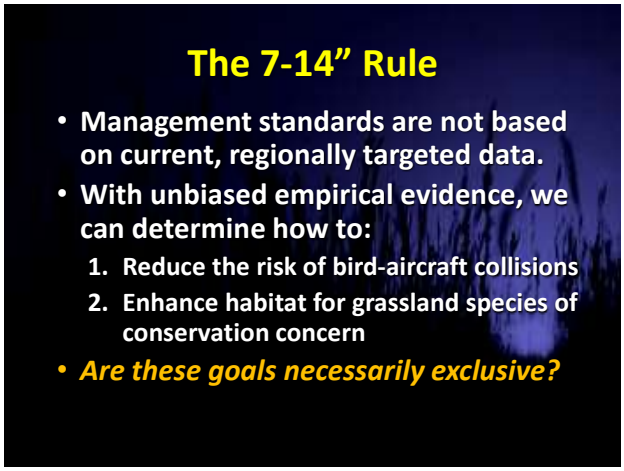
In 2009 and 2010, we located and monitored 115 grasshopper sparrow nests, 86 eastern meadowlark nests, and 86 nests of other grassland-obligate passerines. Daily survival rates (DSR) were comparable to or higher than those reported in the literature from non-airfield sites. DSR modeling did not reveal any strong predictors for grasshopper sparrow nesting success. We did observe a potential relationship between DSR and the distance of nests from active runways at WARB and PRNAS, but the direction of these relationships differed between sites. DSR models predicting eastern meadowlark nesting success indicated that horizontal vegetation cover was most strongly associated with success. Although mowing variables did not emerge as good predictors of nest survival for either target species, we did observe some direct mortality due to mowing. We also documented potential secondary mortality due to predation or abandonment. Only 7 horned lark nests were monitored during the study, and all but one nest failed. None of these nests were mowed over while active, likely due to the fact that most nests were initiated before spring mowing regimes were enacted.

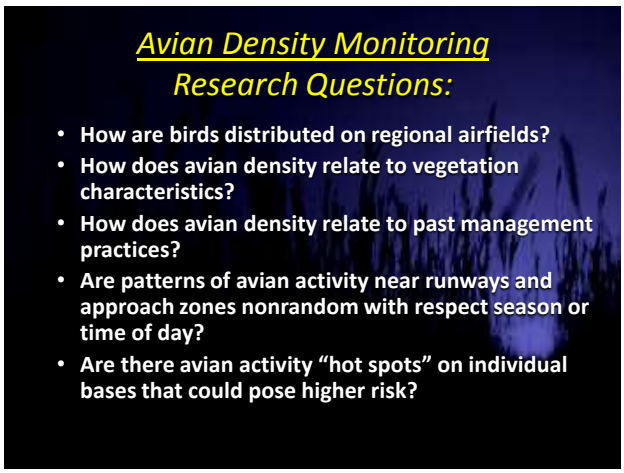
Overall, our results suggest that management practices geared toward minimizing bird-aircraft collisions on airfields may not necessarily be in conflict with efforts designed to encourage less risky, vulnerable species. Because of the variable results observed among our study sites, we also strongly encourage that grassland management decisions be made on a site-by-site basis, as management strategies employed at one installation may be ineffective or detrimental at others, even within the same geographic region.

Dr. Kimberly Peters is Director of Research and Monitoring Programs at New Jersey Audubon Society. Founded in 1897, NJAS is one of the oldest independent Audubon societies and has no connection with the National Audubon Society. Kim has over 17 years of experience working with terrestrial and coastal birds in the eastern U.S. She began her ornithological career in 1994 working with gray jays in the Northeast Kingdom of Vermont, received a M.Sc. degree in Fisheries and Wildlife Science from North Carolina State University in 1999, and a Ph.D. in Zoology from Clemson University in 2005. Kim joined NJAS as Director of Research in 2005, and currently heads up their airfield research program, which has grown exponentially since its inception in 2004. The program examines avian response to grassland management on commercial and military airports, and includes several projects in New Jersey and other states in the region. The ultimate goal of the program is to influence airfield management strategies so that they reduce birds that pose a potential strike risk to aircraft, while simultaneously providing suitable habitat for small grassland breeders of conservation concern. Kim is also Co-PI for New Jersey Audubon's Delaware Bay and South

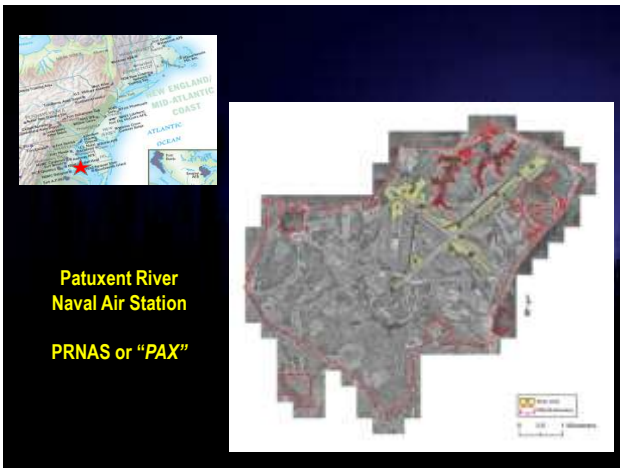
America shorebird banding projects, which aim to document potential changes in shorebird stopover and overwintering ecology. In addition, she contributes to the organization's small scale wind farm projects, for which she is responsible for assessing mortality caused by wind turbines.



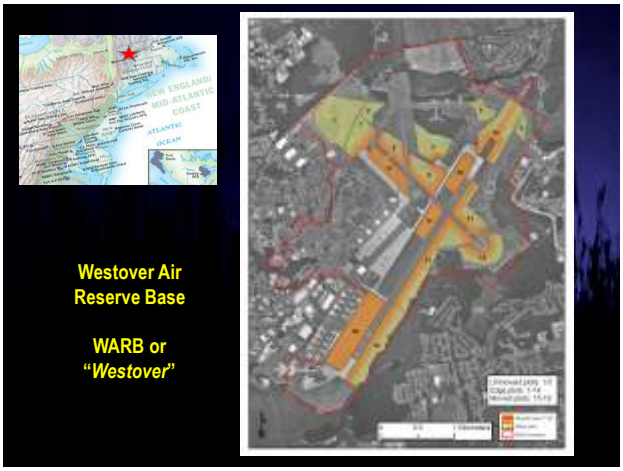


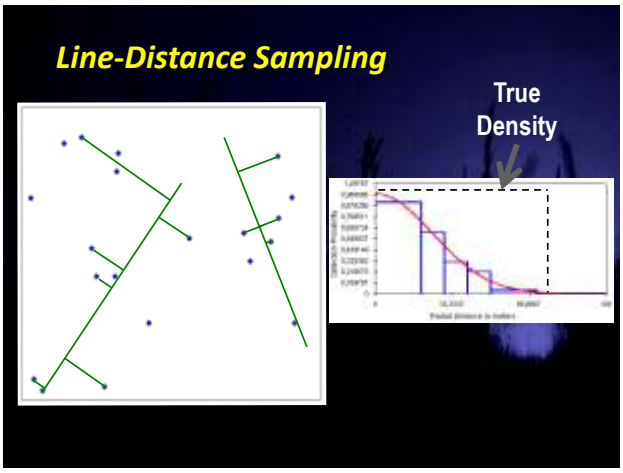



NEW ENGLAND/
MID-ATLANTIC
COAST
ATLANTIC
OCEAN


Patuxent River
Naval Air Station
PRNAS or "PAX"


Joint Base McGuire-Dix-Lakehurst
"Lakehurst"


Westover Air
Reserve Base
WARB or
"Westover"


Line-Distance Sampling
True
Density

Detection *P Adjustments:*

- 5 candidate models were tested in program DISTANCE
  - Detection functions varied by *key function* and *series expansion*
- Best fitting model was then rerun with stratifications
  - Season, time of day, site (base), mean grass height
  - Data truncated to 100 m
- **Findings:**

Small birds	Observer
Medium birds	Observer
Large birds	Grass Height Category

Adjusted Density Estimates:

- Detection-adjusted density estimates:
  - All birds
  - High conservation-value species
  - High collision-risk species
- Conservation
  - PIF Continental Plan, Regional PIF plans for Regions 9 and 14, USSCP, NAWMP, North American Waterbird Plan and North American Solitary Nesting Waterbird Species Plan
  - Relativized 1-5 score
- Risk
  - Hazard Index Score: HI_S, Zakrajsek and Bissonette 2005
  - $HI_S = (C_S \times W_C) + (B_S \times W_B) + (A_S \times W_A)$
  - Relativized 1-5 score

Strike-risk & Conservation-value Scores

Common Name	Conservation Score
Upland Sandpiper	4.68
Field Sparrow	4.13
Brown Thrasher	4.00
Eastern Towhee	4.00
Marsh Wren	4.00
Pine Warbler	4.00
Short-eared Owl	4.00
Grasshopper Sparrow	3.69
Killdeer	3.00

Species Group	Risk Score
Vulture	5.00
Goose	3.38
Pelican	2.46
Blackbird-Starling	2.45
Buteo	1.95
Horned Lark	1.78
Swallow	1.73
Gull	1.22
Duck	1.17

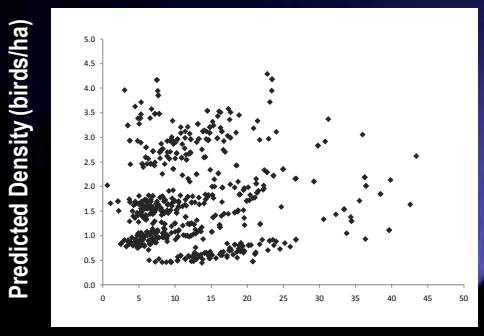
Model Parameters

- 1546 Transect samples (to date):
  - 615 -- YEAR 1 (August 07-July 08)
  - 638 – YEAR 2 (August 08-July 09)
  - 327 – YEAR 3 (August – Dec 2010)
- Vegetation data
  - Mean vegetation height
  - Vegetation height-density
  - Horizontal cover: grass, shrub, forb, bare ground
- Management data
  - Date of last mow
- Landscape data

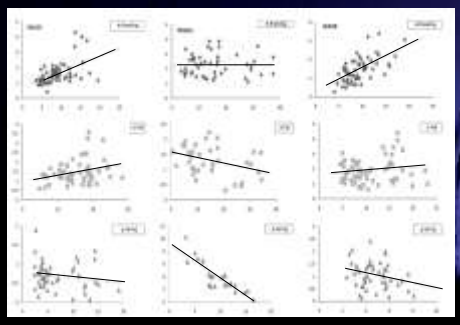
Issues with Temporal Scale…

- Samples are NOT independent
- For habitat selection among sampled areas , look at AVERAGE VALUES and GENERAL MANAGEMENT strategies
  - mean vegetation height
  - mowed plot?
  - General Linear Models, Logistic Regression
- To track response to changes within the same transect
  - grass height on day of avian count
  - when last mowed?
  - Linear Mixed Models, Stratified Logistic Regression

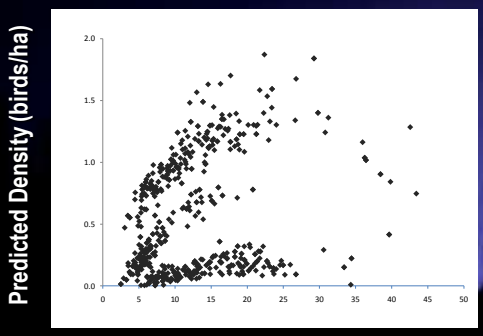
Findings -- Total Birds (among transects)



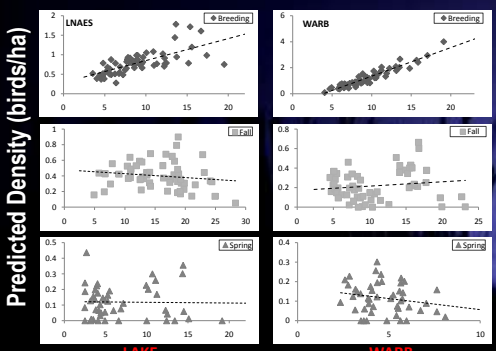
Findings -- Total Birds (among transects)



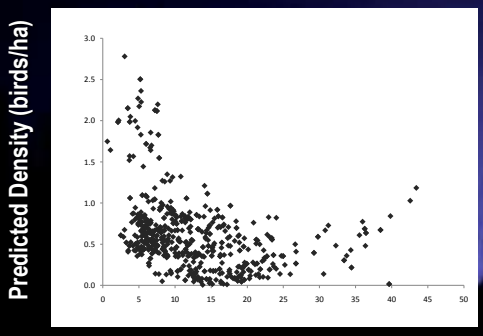
Findings -- Conservation-Value Birds (among transects)



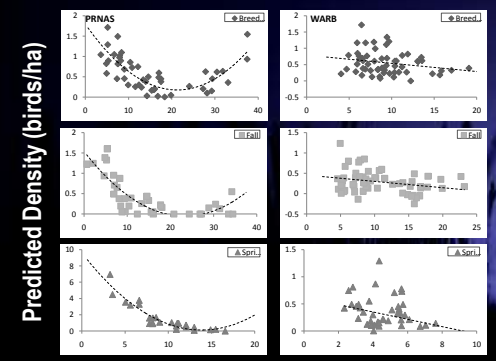
Findings -- Conservation-Value Birds (among transects)



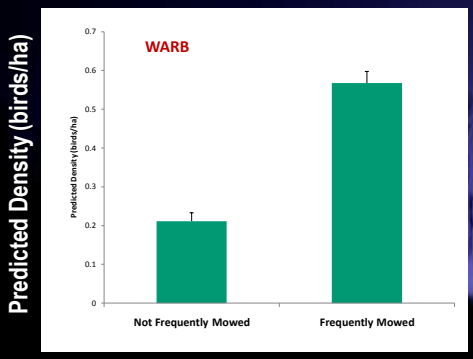
Findings -- Strike-Risk Birds (among transects)



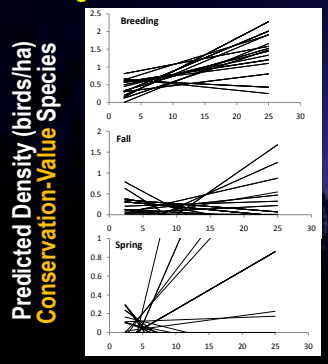
Findings -- Strike-Risk Birds (among transects)



Strike-Risk Birds -- Mowed vs. Unmowed Areas…



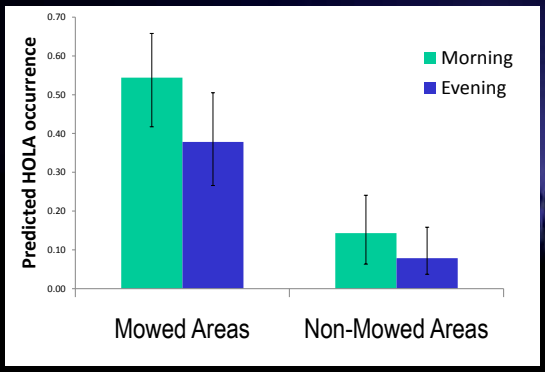
Findings: Conditions *within* transects



So,
what about Horned Lark?

	Est.	SD	P	
a.m. vs. p.m.	1.2529	0.4089	0.002	**
Mean Vegetation Height	-0.1758	0.0518	0.0007	***

At WARB:
- Significantly more likely to be present on Mowed plots.

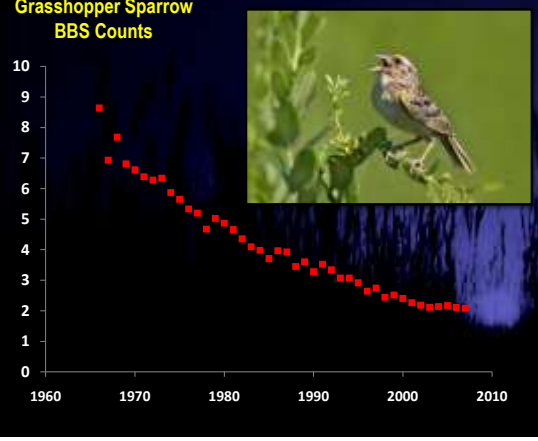


Monitoring: Conclusions

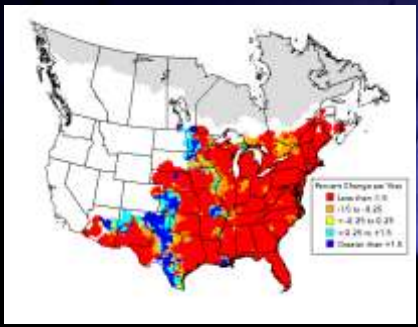
- Total bird density was associated with differences in vegetation height, but responses varied among sites.
- Responses to vegetation height differed between conservation and collision-risk species, and showed clearer associations across sites.
  - Conservation – ↗ vegetation height
  - Collision-risk – ↘ vegetation height

Research Question 2: Do airfields provide GOOD breeding habitat for grassland birds?

Grasshopper Sparrow BBS Counts

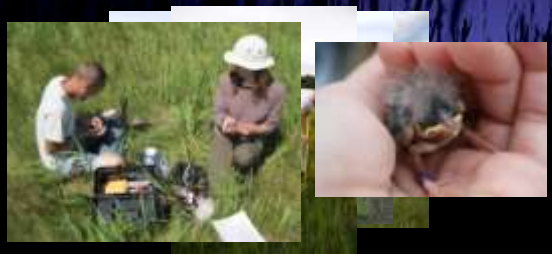


Eastern Meadowlark: population declines, especially in the Northeast



Nest Searching:

- Each site divided into plots
- Rope dragging, "sticking", behavioral observation
- Nests checked every 3 days until fail or fledge
- Chicks batch marked for recruitment estimation
- Logistic Survival Models (program MARK)



Findings:

- 117 Grasshopper sparrow
- 89 Eastern meadowlark
- 86 Other grassland obligates (horned lark, field sparrow, bobolink, savannah sparrow)

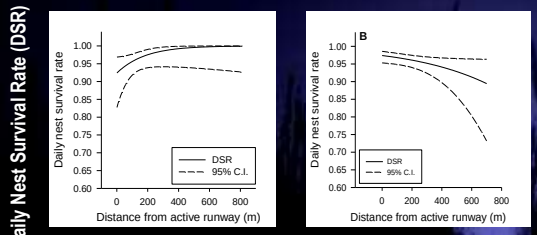
Daily Nest Survival (DSR) rates

•Overall, were comparable to or higher than those reported from other sites

•Grasshopper Sparrow: Ours -- 0.96-0.97
Theirs - 0.91-0.96

•Eastern Meadowlark: Ours -- 0.94-0.97
Theirs - 0.93-0.95

Grasshopper Sparrow:



WARB PAX

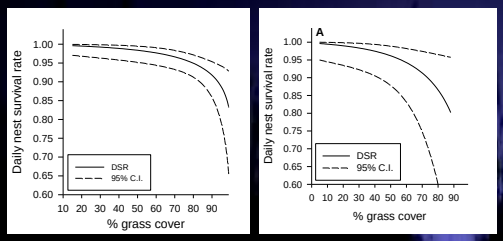
Distance to Runway

Westover Air Reserve Base

WARB or *"Westover"*

Eastern meadowlark:

Daily Nest Survival Rate (DSR)

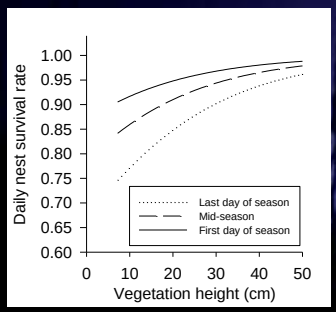


WARB LAKE

Percent Grass Cover

Eastern meadowlark:

Daily Nest Survival Rate (DSR)



PAX

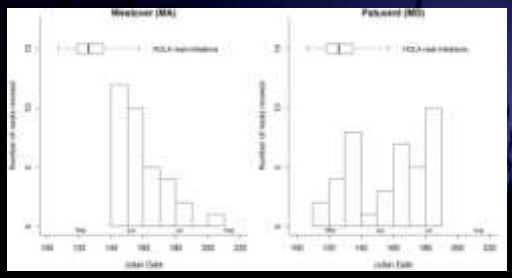
Mean vegetation height

Horned Lark

- Only 7 nests monitored
- All but 1 nest failed
- None of these nests were mowed over

Horned Lark

Number of nests mowed



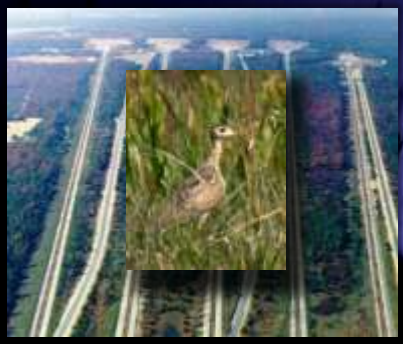
Julian Day

Bottom line on mowing?

- Still needs to be determined
- Nest survival rates overall were HIGH at all 3 sites
- Survival models incorporating MOW effects did not perform exceptionally well
- However, we did observed some mortality (primary and secondary) due to mowing:
  - 19% of GRSP nests mowed over
  - 1 of 14 (7%) mowed GRSP nests failed because of mowing
  - 46% of EAME nests mowed over
  - 26% of mowed EAME nests failed because of mowing

Take-home message from both studies combined:

1. Can we provide habitat for grassland breeders without compromising airfield safety?



Yes, probably, in some cases….

Birds that are problematic DECREASE in longer grass

Birds that are of conservation concern INCREASE in longer grass

But this determination needs to be made on a site-by-site basis

2. Do airfields provide suitable breeding habitat?

Yes, possibly , even WITH the mowing… but we are still looking into this

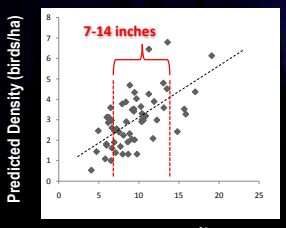
Suggestions for future directions….

- Site and species-specific research
- Experimental approach
- Structured Decision Making context (ARM)

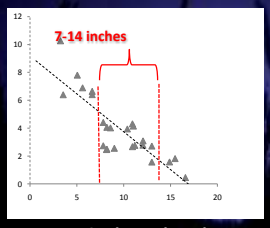
SDM Step 1: Define Goals & Objectives

- Define Clear Targets for Management:
  - Total birds?
  - High risk species?

Total bird density? Management should be targeted to individual sites:



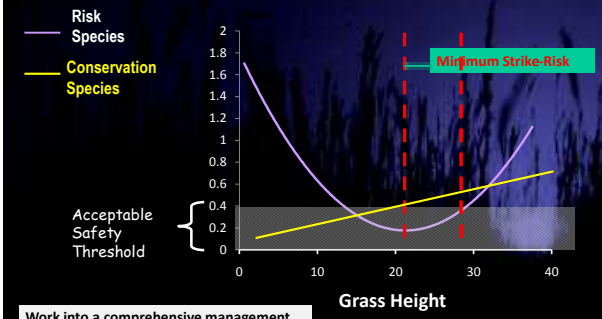
WARB -- Breeding



PAX – Spring Migration

Strike-Risk birds? Again, management should be targeted to individual sites, and 7-14" is not *always optimal*

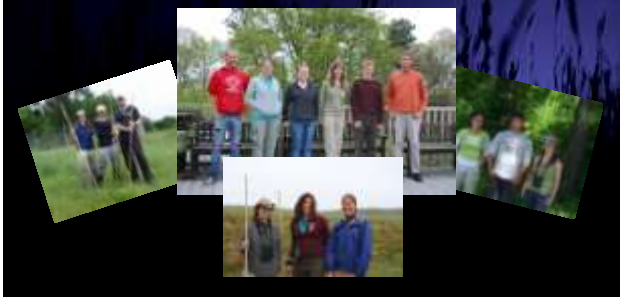
Is there an "Optimal" grass height?



Work into a comprehensive management plan that goes **BEYOND** grass height.

Acknowledgements

LNAES – John Joyce
PAX – Kyle Rambo, Jim Swift, Bob Boxwell
WARB -- Drew Milroy



Presentations: Streaked Horned Larks in the Pacific Northwest

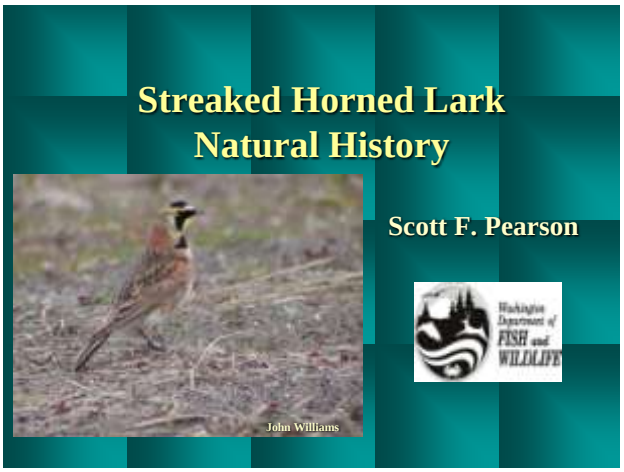
Streaked Horned Lark Natural History

Presented by

Dr. Scott Pearson, Research Scientist, Washington Department of Fish and Wildlife

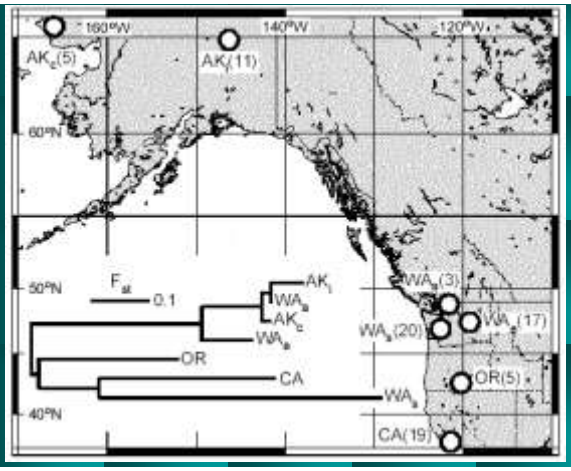
The streaked horned lark (*Eremophila alpestris strigata*) is a rare migratory sub-species that is classified as a federal candidate for listing under the Endangered Species Act and is listed as endangered by the state of Washington and by the Species at Risk Act in Canada (Canadian Species at Risk Act 2002, c.29). Genetic data indicate that this subspecies is unique, isolated, and has little genetic diversity (Drovetski et al. 2005). Its breeding range has contracted over time with local extirpation from former breeding sites across the range (northern Puget trough, southern British Columbia, the Washington Coast north of Grays Harbor, and the Rogue River Valley of Oregon) (Rogers 2000, Beauchesne and Cooper 2003, Stinson 2005). In Washington and Oregon, the streaked horned lark nests in grass and forb dominated habitats located in south Puget Sound prairies and airports, coastal Washington dune habitats and on islands in the lower Columbia River, and agricultural and grass dominated habitats of the Willamette Valley. The objective of this talk is to briefly describe lark taxonomy, distribution, life cycle, reproductive rates and demographics, and finally habitat associations.

Dr. Scott Pearson is a research scientist with Washington Department of Fish and Wildlife where he oversees the western Washington research team, conducts research on seabirds, shorebirds and on the streaked horned lark. Scott has been conducting research on the streaked horned lark since 2002 and, along with partners, has published results in journals and agency reports describing streaked horned lark genetics, breeding phenology, over-wintering distribution, habitat characteristics at the nest site and territory scales, effects of fire on lark habitat, use of nest exclosures to improve nesting success, demographic information (nest success, fecundity, survival) and population modeling.

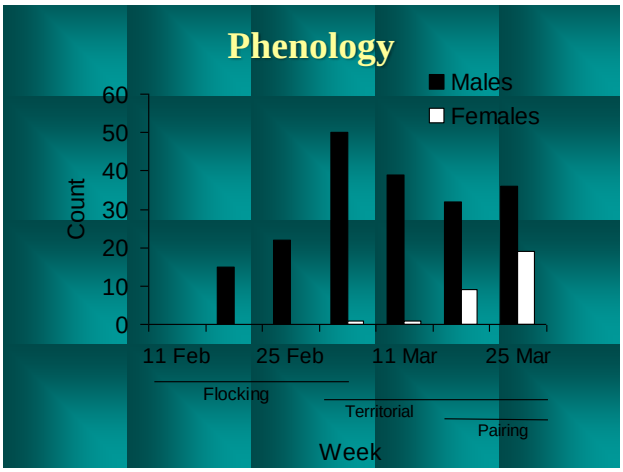


Taxonomy

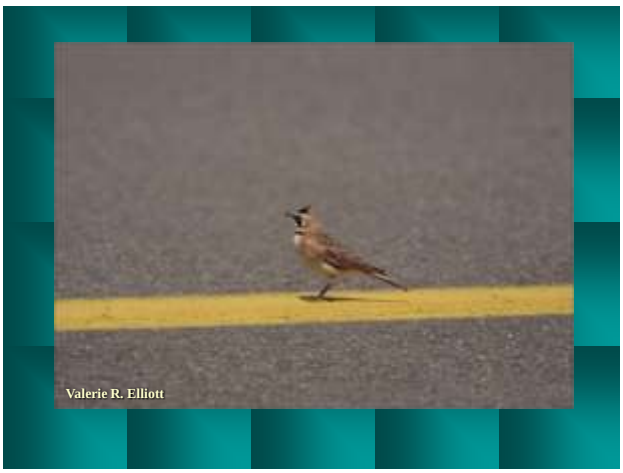
- Streaked horned lark (*Eremophila alpestris strigata*) is a recognized subspecies of the horned lark
- Considered to be one of the most distinctive subspecies based on plumage and size differences
- Genetically distinct



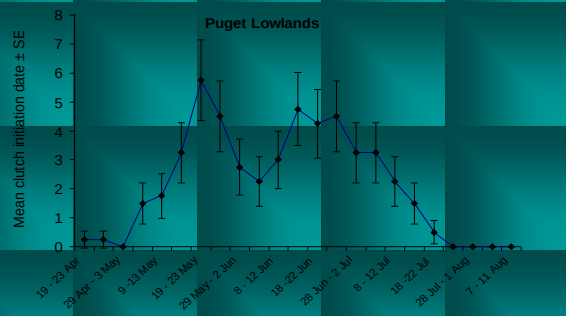
Distribution


Phenology
Males
Females
Count
60
50
40
30
20
10
0
11 Feb
25 Feb
11 Mar
25 Mar
Flocking
Territorial
Pairing
Week


Rod Gilbert


Valerie R. Elliott

Clutch Initiation



Movement Patterns

Breeding Dispersal

Adult

Banding location	Resight location: Puget Lowlands	Washington Coast	Columbia River
Puget Lowlands	12		
Washington Coast		8	
Columbia River			12

Natal Dispersal

Young of the year

Banding location	Resight location: Puget Lowlands	Washington Coast	Columbia River
Puget Lowlands	11	4	1
Washington Coast		4	
Columbia River			4

Vital Rates

- Low survival and fecundity relative to the alpine horned lark subspecies
- Washington population is declining rapidly

Reproductive Success

- Predation was the primary source of nest failure
- Some sites have low egg hatchability

Predators

Habitat Use

Landscape Scale

- Very large sites – all > 300 acres (Willamette Valley and Puget lowlands)
- Almost no shrubs or trees
- Dominated by grasses and forbs
- High percent bare ground

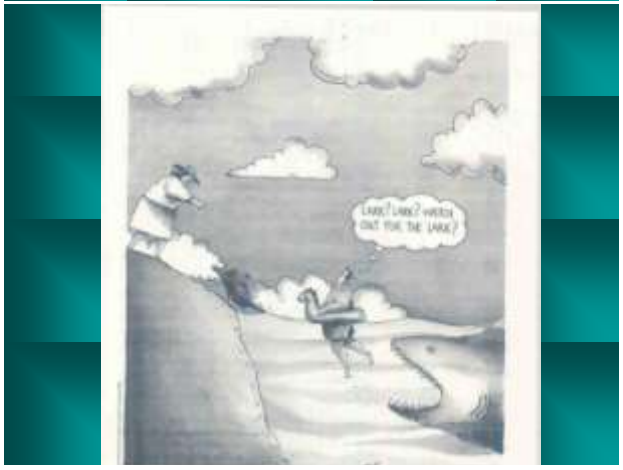
Habitat Variables
High vs. low density

- Positive correlations
  - Non-vegetated
  - Annual grass
  - Rock
- Negative correlations
  - Moss/lichen
  - Shrubs
  - Vegetative hits
  - Perennial grasses


Rod Gilbert


Charlie Wright


Randy Moore

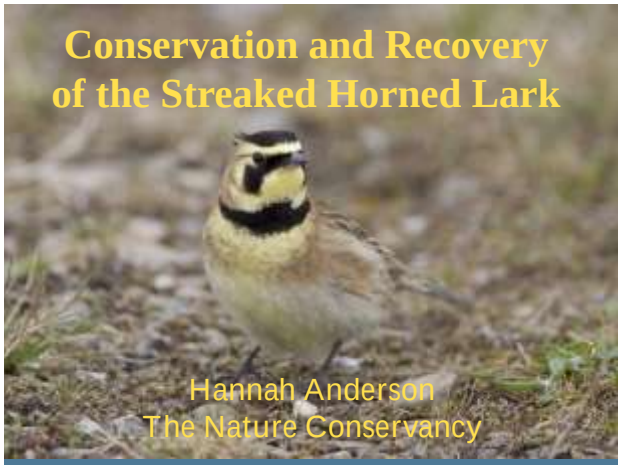

LARK? LARK? WATCH OUT FOR THE LARK!

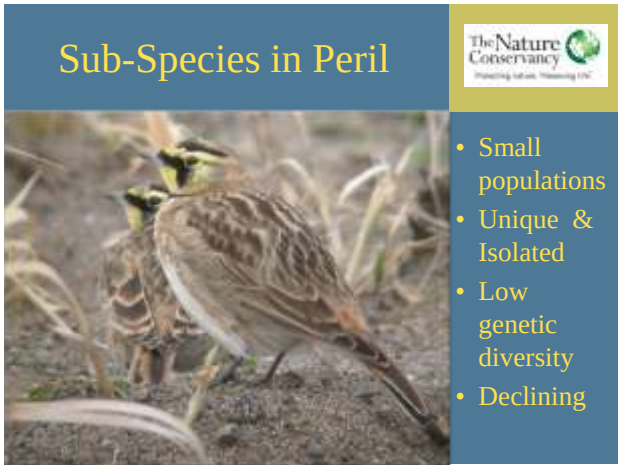
Lark Conservation and Recovery

Presented by

Hannah Anderson, Cooperative Conservation Program Manager, The Nature Conservancy

Streaked horned larks occur not only at airports, but are also found in a variety of sites in the Pacific Northwest with habitat types ranging from native prairie, to coastal beaches and river islands, to agricultural lands. There is considerable momentum underway to recover the streaked horned lark throughout its range. Partners are working together at unprecedented rates including an inter-entity, range-wide working group that meets annually to share information, discuss conservation opportunities and prioritize recovery actions. We will briefly share the collective research, monitoring, and management actions conducted and underway throughout the range all aimed at conservation of streaked horned larks.





Where we work

Inventory & Monitoring

Where are they?

Trend?

Preferred Habitat

What do they like?

Habitat Management

Create what they like

Breeding Monitoring

How are they doing?

Population Modeling

Simulations indicate that for WA populations, larks may be declining by as much as 40% per year

Predators Identified

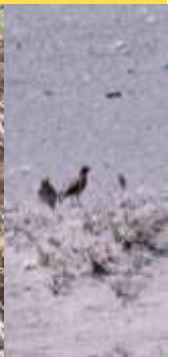
Who is eating them?

Nest Exclosures

Reduce impact of predators

Working Group

Considerable Momentum



Larks in the Regulatory Environment

Presented by

Cat Brown, U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, Portland, OR

The declining status of the streaked horned lark has been recognized by the Federal and state governments in the Pacific Northwest; the subspecies is a candidate for listing under the Federal Endangered Species Act, is listed as endangered in the state of Washington, and is considered sensitive-critical by the Oregon Biodiversity Information Center. The horned lark is also protected by the Migratory Bird Treaty Act. These designations offer a variety of protections to the streaked horned lark. If the subspecies is listed as threatened or endangered by the U.S. Fish and Wildlife Service, additional protections would come into play, including the prohibition against take in section 9 of the Endangered Species Act and the requirement for consultation in section 7. Airport managers with streaked horned larks at their facilities have options that would minimize the effects of listing, including candidate conservation agreements and programmatic consultations.

Cat Brown is a wildlife biologist with the U.S. Fish and Wildlife Service in the Oregon Fish and Wildlife Office in Portland. She works on various endangered species issues (consultation, listing, recovery planning and implementation, and candidate conservation), and is an instructor for classes on Section 7 Consultation for the Service's National Conservation Training Center.

Streaked Horned Larks & The Regulatory Environment

Cat Brown, US Fish and Wildlife Service, Portland, OR

Current Status of the Streaked Horned Lark

Federal	**Endangered Species Act**	**Candidate**
	Migratory Bird Treaty Act	**Protected**
State	**Washington**	**Endangered**
	Oregon	**Sensitive – Critical**

How Does a Species Get from Candidate to Listed?

Section 4

Adding a Species to the Federal List of Endangered and Threatened Species requires a formal rulemaking published in the *Federal Register.*

Five Factors Considered:

Section 4

A. Present or threatened destruction, modification, or curtailment of the species range or habitat
B. Over-use for commercial, recreational, scientific, or educational purposes
C. Disease or predation
D. Inadequacy of existing regulatory mechanisms
E. Other natural or man-made factors affecting the continued existence of the species

Definitions

Section 4

Endangered Any species in danger of extinction throughout all or a significant portion of its range

Threatened Any species likely to become endangered in the foreseeable future

Critical Habitat Specific geographic areas with physical and biological features essential to the conservation of a listed species

Designating Critical Habitat

Section 4

- May be designated at the time of listing a species, or later
- Requires a formal designation process (rulemaking published in the *Federal Register*)
- May include areas not currently occupied by the species but that will be needed for its recovery
- The only part of the ESA that requires an economic analysis

Listing Process and Time Frames

Section 4

- USFWS reviews best available scientific information, prepares proposed rule
- Proposed rule published in the *Federal Register*
- 60-day comment period
- USFWS considers public comments
- Final rule to list or withdrawal of proposed rule within 1 year
- Listing takes effect 30 days after publication of final rule

Recovery Planning

Section 4

- Goal: reduce threats, restore self-sustaining populations, remove from the list.
- A Recovery Plan is the road map to recovery:
  - Developed with stakeholders
  - Formulates a recovery strategy
  - Identifies tasks and partners
  - Establishes targets (criteria)
  - Provide estimated time table and costs

Prohibited Acts: Wildlife

Section 9

Take means: harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in these activities.

• The take prohibition for wildlife applies to any person including a Federal agency.

• Also prohibits import, export, interstate transport, possession or sale.

Harass

Section 9

Defined by regulation (50 CFR 17.3)

Harass: Actions that create the likelihood of injury to listed species to such an extent as to <u>significantly disrupt normal behavior patterns</u> which include, but are not limited to, breeding, feeding or sheltering.

Harm

Section 9

Defined by regulation (50 CFR 17.3)

Harm: An act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

Exceptions/Exemptions from Take Prohibitions

Sections 7 & 10

- Interagency consultation under section 7
  - For actions with a Federal nexus
- Scientific take and incidental take permits under section 10
  - for actions without a Federal nexus

Federal Nexus

Section 7

"… fund, authorize or carry out"

If a Federal agency action **may affect** a listed species or critical habitat, the agency must initiate consultation with USFWS or NMFS

Effects to listed species or CH
+ Federal nexus
= section 7 consultation

With No Federal Nexus

Section 10

Prohibition against take…

If a non-federal action is **likely to take** a listed species, the action must get a permit to exempt incidental take

Take of listed species
+ No Federal nexus
= section 10 permit

Candidate Conservation Agreement

Section 7

Voluntary action taken to benefit a candidate species

- A formal agreement between a landowner and USFWS delineating voluntary actions taken to protect a candidate species
- Must meet a high standard (*would preclude the need to list if all similar landowners participated*)
- Assurances offered to **non-federal landowners** that guarantee the landowner will not be required to do more than agreed to if the species is listed

Interagency Consultation

Section 7

Affirmative conservation mandate for Federal agencies

Section 7(a)(1) - Federal agencies shall use their authorities to carry out their programs for the **conservation** of endangered & threatened species

- **conservation:** the use of methods and procedures to bring any endangered or threatened species to the point where provisions of the ESA are no longer necessary

Interagency Consultation

Section 7

Required when a Federal action **may affect** a listed species

- Section 7(a)(2) - Federal agencies must ensure that actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of listed species or adversely modify critical habitat
- Results in a biological opinion with terms and conditions and Incidental Take Statement

Habitat Conservation Planning

Section 10

Required when incidental take is likely for projects with no Federal nexus

- A mechanism for permitting incidental take of listed species for actions with no Federal involvement
- Action receives an incidental take permit and "no surprises" guarantee

Safe Harbor Agreement

Section 7

Voluntary action to benefit a listed species

- Available to non-federal landowners
- Must provide a net conservation benefit to the species (conservation is the purpose of the activity)
- May provide a **temporary** benefit to the species, before returning the habitat to original baseline conditions

Lots more information available:

USFWS Website: http://www.fws.gov/endangered/

- Candidate Conservation
- Section 7 Consultation
- Habitat Conservation Planning
- Safe Harbor Agreements

or

Contact me: cat_brown@fws.gov

Department of Defense Approach to Rare Species Conservation

Presented by
Paul Steuke, Environmental Chief, Joint Base Lewis-McChord

Joint Base Lewis-McChord (JBLM) is the third largest U.S. Army installation with a community of approximately 85,000 people, including Service and family members, civilian workers, and retirees. JBLM has taken a proactive approach to sustaining the military's ability to train through candidate species conservation, including managing land for the species as well as supporting off-post habitat management and rare-species recovery. This is just one component of a strategy based in the philosophy of Sustainability, a concept that is rapidly overtaking traditional environmental, social, and business models of operation. Sustainability weaves the natural, social, and business worlds together so as to meet the needs of today's generation, without compromising the ability of future generations to meet their own needs. Simply put, it is the application of the golden rule, from generation to generation.

In 2002 JBLM (then known as Fort Lewis) emerged as a Sustainability leader within the U.S. Army. As currently structured, JBLM's Sustainability Program is guided by eight 25-yr goals across the six areas of Air Quality, Water Resources, Energy, Products & Materials Management, Sustainable Community Team, and Sustainable Training Lands. The two goals under the Sustainable Training Lands initiative are:

> (1) Maintain the ability of JBLM to meet current and future military missions without compromising the integrity of natural and cultural resources, both on the installation and regionally.
>
> (2) Recover all listed and candidate federal species in South Puget Sound.

To achieve these aggressive goals, JBLM is working regionally, creatively, and aggressively. Good progress has already been made, including efforts under the Army Compatible Use Buffer (ACUB) program. In collaboration with Washington Department of Fish and Wildlife (WDFW), Wolfhaven, the Nature Conservancy, and Washington Department of Natural Resources (WDNR), the Army provides funding for the development of prairie habitat conditions on secured non-military lands for the re-introduction of federal candidate species such as the streaked horned lark; the Mazama pocket gopher; and the Mardon skipper and Taylor's checkerspot butterflies. Other recovery efforts include the Oregon spotted frog and Western bluebird. In partnership with the WDFW and Northwest Trek Wildlife Park, 536 juvenile frogs have been released back into the wild at Dailman Lake on JBLM. Beyond the installation borders, JBLM native Western bluebirds have been successfully reintroduced back onto the San Juan Islands. In keeping with the integrative nature of Sustainability, these ongoing efforts, either directly and/or indirectly, support the military mission and both the social and ecological infrastructure of the installation and region.

Mr. Steucke has a BS Engineering degree and is (since 1997) the Environmental Chief at Joint Base Lewis-McChord, Washington. JBLM Public Works was ISO 14001 certified in 2000. In 2001, JBLM forests were certified sustainable by the Forest Stewardship Council, and in 2002, JBLM began its quest to achieve a sustainable installation by 2025. Mr. Steucke was a member of the Sustainable Washington Advisory Panel drafting committee and is passionately working to bring about a sustainable planet. He is married to his wife, Stacy of 22 years with four daughters, aged 20 to 28.

SUSTAINABILITY:

"From there and back again"

EO 13514 (2009) ~ Federal leadership in Environmental, Energy and Economic Performance

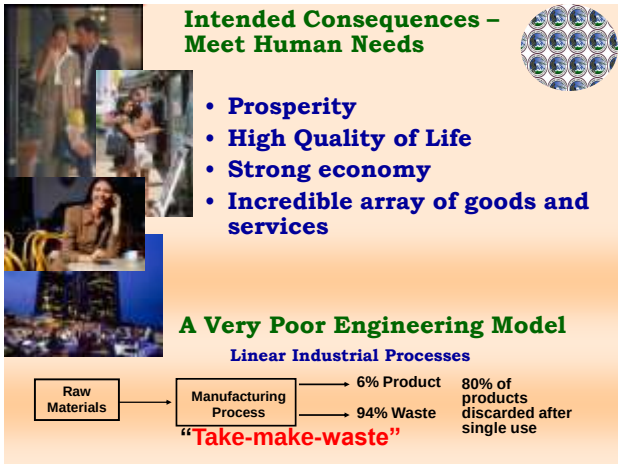
DoD SSPP (2010) ~ The DoD Strategic Sustainability Performance Plan establishes a path by which DoD will serve as a model of sustainability for the nation while enhancing our ability to achieve our mission

Army Strategy for the Environment (2004) ~ encompasses mission, environment and community; focusing on six goals that embrace sustainability

ASCP (2010) ~ The Army Sustainability Campaign Plan which will institutionalize sustainability in doctrine, policy, training, operations and acquisitions

Installation Management Campaign Plan (2010-2017) ~ Sustainability inculcated into the 6 Lines of Effort to ensure future installation capabilities by integrating sustainability into planning, training, procurement and operations

Installation Sustainability Program (2002) ~ 2nd Army installation to plan and implement a sustainability program; employing sustainable action teams, integrated with EMS and governed by a Sustainability Board chaired by Senior Mission Commander



Intended Consequences – Meet Human Needs

- **Prosperity**
- **High Quality of Life**
- **Strong economy**
- **Incredible array of goods and services**

A Very Poor Engineering Model

Linear Industrial Processes

Raw Materials → Manufacturing Process → 6% Product, 94% Waste

80% of products discarded after single use

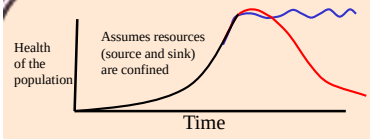
"Take-make-waste"

Unintended Consequences –

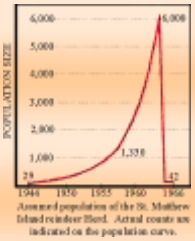
a crashing biosphere and disenfranchised people

"Only once in the history of this planet -- now -- have total flows and movement of materials by one species matched or exceeded natural planetary flows."

Sustainability Science



Reindeer



Assumed population of the St. Matthew Island reindeer Herd. Actual counts are indicated on the population curve.

Sustainability is …

Term describing a state of community growth and development where:

- **Present requirements are met**
- **without compromising ability of future generations**
- **to meet their own needs**

"The application of the Golden Rule from generation to generation."

Common key points

- Systems approach
- Feedback loops
- A System of systems
- Economy, Equality, Ecology - the "triple bottom line"
- Solution oriented
- Urgency, hope and a "can do" attitude
- We're all in it together

JBLM Sustainability Goals

1. Reduce installation stationary source and non-source motor vehicle air emissions 85% by 2025
2. Sustain all activities on post using renewable energy sources and generate all electricity on post by 2025
3. Reduce total energy consumption by 30% by 2015
4. Create sustainable neighborhoods for a livable Fort Lewis community that enhances the Puget Sound Region
5. Cycle all material use to achieve zero net waste by 2025
6. Maintain the ability of Fort Lewis to meet its current and future military missions without compromising the integrity of natural and cultural resources, both on the installation and regionally
7. Recover all listed and candidate federal species in the Puget Sound Region
8. Treat all wastewaters to Class A Reclaim Standards by 2025 to conserve water resources and improve Puget Sound water quality

Management Actions Beneficial to Both Training and Rare Species

Major effort on JBLM is the control of Scot's broom, which inhibits training and eliminates potential habitat for four federal candidate species.

Native Prairie Vegetation on Airfields

- Native prairie species are short and die back by mid summer
- Native prairie vegetation = reduced mowing and beneficial to native wildlife species

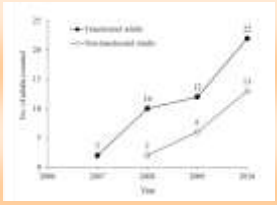
Conversion from Non-Native Dominated Landscape to Native Historic Conditions

- Planting native prairie plants following site preparation including burning and herbicide application.

Other JBLM Initiatives:

Bluebird Conservation and Reintroduction

84 juveniles fledged in 2010 on San Juan Island



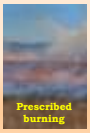
Oregon Spotted Frog Conservation and Reintroduction

- 2,200 individuals have been released since 2008

Joint Base Lewis-McChord (JBLM) Army Compatible Use Buffer Program

Problem:

- JBLM possesses remnant native prairie with four ESA candidate species
- Listing will severely restrict military training if proactive conservation is not undertaken



Objectives:

- Acquire native prairie parcels in the southern Puget Lowlands
- Manage those parcels for the recovery of candidate species
- Accomplish the above through partnerships with other regional landowners

Conservation Actions:

- Land acquisition
- Habitat restoration
- Species reintroduction
- Planning, research, monitoring

Accomplishments:

- 1,025 acres acquired (total protected = 4,247 acres)
- Restoring prairie habitat on seven ACUB properties
- Four species reintroductions

Partners:

The Nature Conservancy
WA Dept. of Nat Res
WA Dept. of F&W
Wolf Haven

Questions?

"Argue for your limitations, and sure enough, they are yours"
-Richard Bach

Paul Steucke & Terry Austin
Environmental Division
Public Works, JBLM, WA
(253) 966-1760/6463,
paul.steucke@us.army.mil/terry.austin1@us.army.mil

Larks at PDX – A Compatible Land Use Management Perspective

Presented by

Dana R. Green, Natural Resources Manager/Aviation, Port of Portland

The proposed listing of SHL's has management implications for both current airfield operations and also future airfield development of aviation reserve properties at PDX, such as the SW Quad. This presentation will look at these issues at several scales and will assess management implications as well as management options from the airport's perspective, both pre-listing and post listing.

Dana Green is the Aviation Natural Resources Manager for the Port of Portland, with program responsibilities at PDX and the General Aviation airports of Hillsboro, and Troutdale. He is responsible for all aspects of natural resource management on airport properties, as well oversight of the wildlife hazard management program specific to aviation safety in an airport environment. Before joining the Port in 2001, Dana worked for 15 years as a Natural Resources Manager for the United States Air Force, holding management positions on Eglin Air Force Base, the U.S. Air Force Academy, and Peterson Air Force Base. He has almost 35 years of career experience in the fields of forestry, fire ecology, wildlife management, threatened and endangered species management, and natural and cultural resources program management. Dana graduated from the University of Montana with a B.S. in Forest Management.

Implications of Listing for Airfield Operations

- Low numbers of STHL's:
  - Compatible with airport operations
  - Mowing schedules can likely be adjusted to accommodate nesting season
    - Note: open fields outside the fence are mowed strategically to provide attractive hunting/foraging alternative to airside
  - Would likely require Section 10 "incidental take "permit for:
    - Infrequent but probable aircraft/bird strikes
    - Airfield hazing activities
    - Site disturbance activities
- High numbers of STHL's
  - Larks flock in numbers in excess of 100's
  - Individually small [32g], but en masse can be a wildlife strike hazard
  - Potential issue with creating an ecological habitat "trap" for listed species

Implications of Species Listing on Aviation Property Management

- Present/interim management of undeveloped properties would likely be subject to Section 7, Section 9.
  - Interim WHMP management of SW Quad to deter Canada geese and avoid wetland emergence inadvertently creates/maintains suitable STHL habitat.
  - Would likely require Section 10 "incidental take " permit.
- Future airport development of aviation reserve may be precluded if not able to manage STHL habitat off site.

Known PDX STHL Nesting Site

SW Quad: Strategic Aviation Reserve

SW Quad: Site Description

- SW quadrant defined by two active runways
- 204 acres total
  - 176 acres classified as “Pervious Wasteland/Barren/Weedy Fill”
  - >1 million cu. yards Columbia River dredge sand
  - >15 miles of perforated pipe drainfield to manage sub-surface groundwater
  - 72” mainline stormwater pipe – drains west side of airfield
  - Interim objective – wildlife hazard management
  - Future management objective – airfield infrastructure

Maintaining the Drainage System

SW Quad Safety Fill Project

Habitat Modification

SW Quad Stormwater Canal:
Pre-construction

SW Quad Stormwater Canal:
During Construction

SW Quad Stormwater Canal:
During Construction

SW Quad Stormwater Canal:
Install 72" Main Line

Alternatives

I. No action: upon listing and critical habitat designation - accept ESA constraints on land use [Section 9 "take" liability, Section 7 consultations].

- Conflict with intended purpose of parcel, site would not be available for airfield development.
  - Significant federal and Port investment, unique location fronting 2 active runways [dedicated land use].
- Site conditions favorable to STHL are not sustainable without recurring management intervention.
- Wildlife hazard site management to exclude/deter Canada geese [primary interim management of site pre-development] would have to demonstrate compatibility with ESA [Section 7].
- Would likely require Section 10 "incidental take" permit.

Alternatives

I. No action: upon listing and critical habitat designation - accept ESA constraints on land use [Section 9 "take" liability, Section 7 consultations].

- Conflict with intended purpose of parcel, site would not be available for airfield development.
  - Significant federal and Port investment, unique location fronting 2 active runways [dedicated land use].
- Site conditions favorable to STHL are not sustainable without recurring management intervention.
- Wildlife hazard site management to exclude/deter Canada geese [primary interim management of site pre-development] would have to demonstrate compatibility with ESA [Section 7].
- Would likely require Section 10 "incidental take" permit.

Potential Habitat on Government Island

- Historical dredge deposition sites.
- Approximately 175 acres suitable for SHL habitat conversion.
- Area is under OP&RD lease for recreation, public access.
  - Manage potential seasonal conflict with nesting season.
  - Former dredge deposition sites are developing sucessional herbaceous cover.
  - Would require recurring site disturbance management prescription.
  - Looks like suitable STHL habitat, but no documented presence or use.
  - What might the measures of success look like?

Questions???

Some Thoughts……..

- To be an effective ESA recovery strategy for this species, would likely require both Port owned and non-Port owned commitments on a regional basis?
- Nature of ephemeral habitats created by natural system dynamics on a regional scale v. management of a fixed land base
  - Not sustainable without recurring management intervention over time.

Some Questions…….

- Can artificially maintained site conditions be designated under the ESA as “critical habitat”?
- Given a substantial 40 year federal commitment/nexus in the purchase, interim management and intended long term use of the SW Quad as aviation property, is there a conflict?
- If a CCA with A is applicable, is there time to initiate one prior to proposed listing date?
- Is there sufficient potential habitat [and would it qualify] on other historical dredge deposition sites, and what level of management intensity would be required to satisfy conservation plan commitments?

Some Questions…….

- If there is sufficient potential habitat that could be managed to offset the SW Quad, what would the measures of success look like?
- With only two airport + five MID known nest sites in Multnomah County, can any conservation actions on Port properties preclude listing? Or is the conservation scale necessarily bigger/regional?
- Are there opportunities to overcome federal, state, regional and local obstacles to beneficial re-use of dredge material to mimic ephemeral alluvial habitats in the lower Columbia River system?
- Where do we go from here?

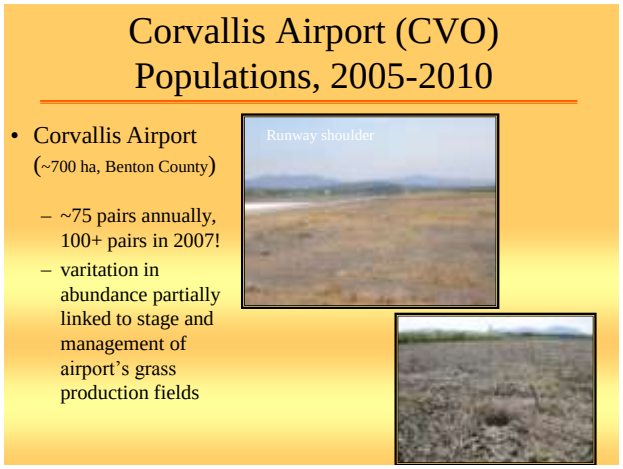
Streaked Horned Larks and the Corvallis Airport

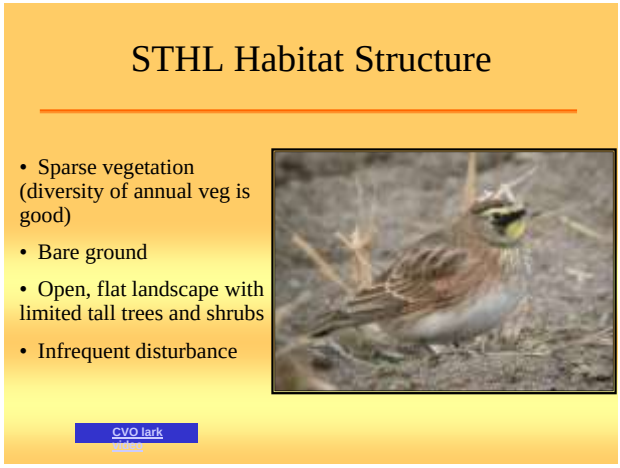
Presented by

Dr. Randy Moore, Oregon State University

Corvallis Airport (CVO) harbors the largest known concentration of breeding STHL in existence. CVO is more consistently occupied than any other study site in the south Willamette Valley; it annually hosts between 73-100 pairs, a significant portion of the global population. It also hosts a robust wintering population of usually 100-200 individuals. 4+ years of intensive study has provided good data on wintering and breeding ecology with which to begin crafting a site management plan. The plan should focus on encouraging larks to use alternate agricultural habitat, and on discouraging them from using runway rights of way in winter when the species occurs in flocks.

Randy Moore received his PhD in Wildlife Ecology from Oregon State University in 2006, the dissertation part of which had nothing to do with streaked horned larks. But he did begin studying them for a side project in 2003-2005; after completing his degree, he undertook studying STHL ecology full-time. During the 8 years he has been working with STHL in the Oregon segment of their range, he has intensively studied their breeding and wintering ecology at the Corvallis Municipal Airport and PDX, among other non-airport sites. He has been mistaken for an industrial saboteur only once during this period.





Management Considerations

Do STHL need to be managed at all?

- *Breeding* STHL likely not problematic for CVO air traffic
  - -Mainly low speed piston driven aircraft
- CVO has many more pressing wildlife issues
  - -geese
  - -blackbirds (adjacent dairy)
  - -Waterfowl
- However, STHL do flock in winter....

Wintering STHL have not proven to be problematic at CVO, but they do form flocks

3 Management Options

1. **Ignore them**
2. **Remove them altogether**
   - -cost/benefit ratio suspect
   - -success suspect
3. **Target management to address most serious threat**
   - -Manage existing winter hotspots to remove winter food
   - -Provide alternate winter habitat away from active runways

<u>Positives</u>

- Moves STHL flocks out of approach
- Probably only modest impact to breeding population
- Easily reversible if ineffective
- Reduces goose foraging habitat http://www.youtube.com/watch?v=lgspIiTFWIk

<u>Negatives</u>

- Loss of grass seed/hay production revenue for city.
- Modest maintenance costs associated with habitat management
- ?

http://www.youtube.com/watch?v=9yWKaE2B6ow

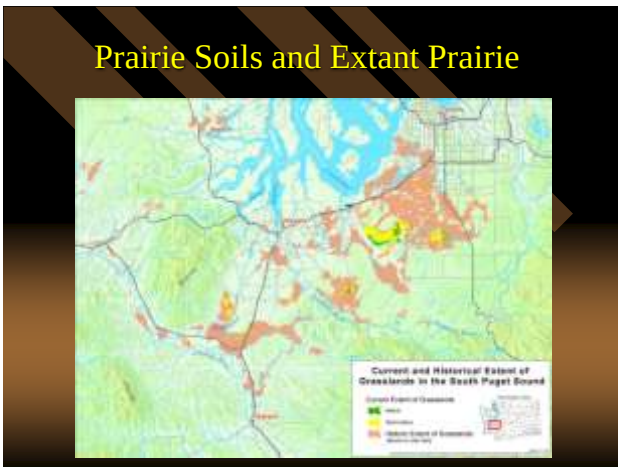
Streaked Horned Larks at the Olympia Airport

Presented by

Michelle Tirhi, District Biologist, Washington Department of Fish and Wildlife

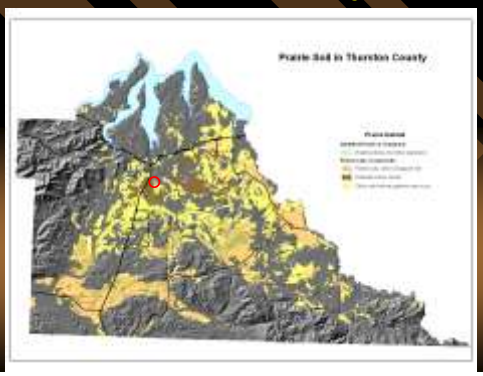
Managing threatened and endangered wildlife in an intensively-used landscape is always a challenge. The South Puget Sound region presents a unique opportunity to creatively manage seven state listed/federal candidate prairie species within urban growth boundaries and urban fringe. The Washington Department of Fish and Wildlife has worked closely with the Olympia Airport since 2005 on preserving a remnant population of Streaked Horned Larks while maintaining the functionality of the airport. This has been a challenging yet rewarding experience in that both wildlife and airport managers have kept open minds and focused on the dual needs of the agencies involved. The Department has reviewed and provided management guidance on the airport's 5-year, 20-year and Master Plan update as well as ad hoc airport management tasks, as needed. This talk will provide an overview of issues and solutions that have arisen thru this working relationship.

Michelle Tirhi earned her Bachelor of Science degree in Wildlife Management from Washington State University completing post graduate work at Brookhaven National Laboratory in Upton, New York on Lyme Disease in deer. Michelle completed graduate courses at University of Washington on Canadian Lynx. From 1991 to 1997, Michelle worked as a Threatened and Endangered Recovery biologist for the Washington Department of Fish and Wildlife (WDFW). From 1997 to 2006, she was the WDFW Urban Biologist for the South Puget Sound region and in 2007, assumed the District Biologist position for Pierce and Thurston Counties. Her duties include conducting biological surveys and inventory, working with cities and counties on wildlife regulatory issues, and managing terrestrial wildlife in the South Puget Sound region. Her night job consists of a daughter (age 10), son (age 8), and husband.



Prairie Soils and Extant Prairie Pierce County

Prairie Soils and Extant Prairie Thurston County

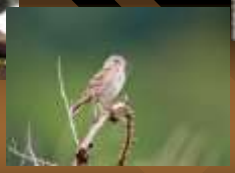


Olympia Airport Bush Prairie

Prairie Species

Mazama Pocket Gopher
(Thomomys mazama)

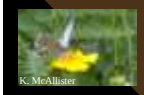
Streaked Horned Lark ***(Eremophila alpestris strigata)***



Oregon Vesper Sparrow
(Pooecetes gramineus affinis)

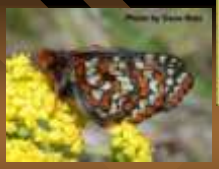
Prairie Species

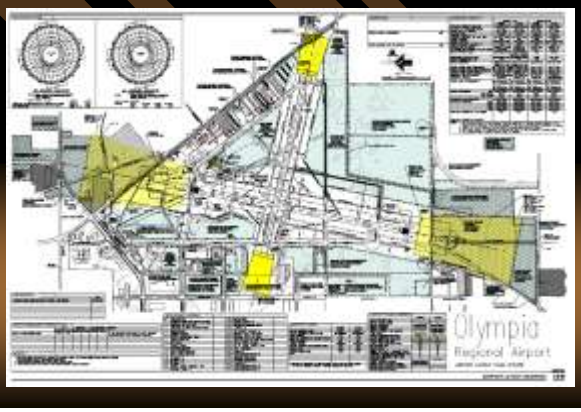
Puget Blue
(Plebejus icarioides blackmorei)



Mardon Skipper
(Polites mardon)

Taylor's Checkerspot
(Euphydryas editha taylori)





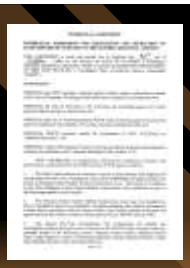
Airport Planning

- Airport Layout Plan (2003)
  - Reflects "as built" construction projects in 2010
- Habitat Management Plan (2007)
- Five Year Development Plan (2008)
- Master Plan Update (draft 2011)

Habitat Management Plan (2007)

Streaked Horned Lark/Mazama Pocket Gopher/Oregon Vesper Sparrow management zone

Prairie habitat and butterfly management zone



Inter-local Agreement


Questions?

Materials provided to Workshop participants

Natural History of the Streaked Horned Lark

(Eremphila alpestris strigata)

Male (left) and female (right) streaked horned larks in South Puget Sound. *Photos by Rod Gilbert.*

Population Status:

The Streaked Horned Lark is a genetically distinct subspecies of the Horned Lark that historically occurred on grass and forb dominated landscapes in the Rogue and Willamette Valleys, the Puget lowlands and Georgia Basin of Washington and British Columbia and the coastal beaches in Washington. The historic distribution has been significantly reduced; today, breeding populations remain in the Willamette Valley, dredge material islands of the Columbia River, coastal beaches of Washington from Grays Harbor south, and the grasslands of South Puget Sound. Populations have been lost from British Columbia, northern Puget Sound, and along the coast north of Grays Harbor in the northern portion of the historic range and from Rogue River Valley in the southern portion of the range.

Conservation Status:

Federal Candidate for listing as endangered or threatened under the US Endangered Species Act

Listed as Endangered in Canada by the Committee on Status of Endangered Species in Canada

Listed as Endangered under the Washington State Endangered Species Act

Red Listed in British Columbia

Designated as State Sensitive Species in Oregon

Threats:

The very small population of animals that is unique and isolated with low genetic diversity makes the birds extremely vulnerable to inbreeding as well as catastrophic events. Demographic modeling indicates that the Washington population is declining rapidly primarily due to low survival and fecundity. Nest predation has been documented as the primary cause of nest failure. Nesting and wintering habitats have been lost to human development, and habitat changes associated with plant community succession and invasion by non-native and invasive grasses and shrubs.

Habitat:

Larks occur on treeless, grass and forb dominated landscapes. Within those non-forested habitats, they select sparsely vegetated areas with both short vegetation and low vegetation density and a relatively high percent of bare ground. Streaked horned larks avoid areas dominated by shrubs and non-native turf-forming grasses.

Breeding:

Migratory portions of the population, arrive on their breeding grounds late February or early March. The nesting season starts in April and continues into August. For migrant populations to the north, they depart the breeding grounds in October and move to over-wintering areas in southern Washington and in the Willamette Valley of Oregon.


Streaked horned lark nestlings at McChord Field.

The males hold territories and females select nest sites within those territories. Nests are constructed of grasses and small sticks on the ground at the northern base of forb or bunch grass. Typically, 2-3 nesting attempts are initiated per season.

Females lay from 1 to 5 eggs in each clutch, usually about 3. The incubation period lasts about 12 days, an additional 9 days pass until the young birds fledge from the nest. Both parents feed insects to the young, both on and off the nest.

Wintering:

Streaked horned larks spend their winters in flocks in the Willamette Valley, Washington Coast, and Lower Columbia River islands.

For more information on Streaked Horned Larks, the following references are available at www.southsoundprairies.org/documents.htm

References:

Altman, B. 2003. Horned lark. Pp. 425-428 *in* D.B. Marshall, M.G. Hunter and A.L. Contreras (eds.). Birds of Oregon: a General Reference. Oregon State University Press, Corvallis, Oregon. 768 pp.

Anderson, H.E. 2005. Streaked horned lark *(Eremophila alpestris strigata)* nest predation on lowland Puget prairie remnants, Washington State – the effects of internal edges and Scot's broom *(Cytisus scoparious)*. Masters thesis The Evergreen State College. Olympia, Wa.

Anderson, H.E. 2009. Columbia River streaked horned lark habitat analysis and management recommendations. Final reportto the US Fish and Wildlife Service. 33pp.

Beauchesne, S. & J. Cooper. 2003. COSEWIC status report on the Horned Lark *Strigata* Subspecies *Eremophila alpestris strigata*. Status report prepared for the Committee on the Status of Endangered Wildlife in Canada. COSEWIC Secretariat c/o Canadian Wildlife Service, Environment Canada, Ottawa, Ontario.

Camfield, A. F., S. F. Pearson, & K. Martin. 2010. Life history variation between high and low elevation subspecies of horned larks *Eremophila* spp. *Journal of Avian Biology*. 41:273-281.

Drovetski, S.V., S.F. Pearson, and S. Rohwer. 2005. Streaked horned lark *(Eremophila alpestris strigata)* has distinct mitochondrial DNA. Conservation Genetics 6: 875-883.

Moore, R. 2007. Notes for the separation of *eremophila alpestris strigata* from *e.a. merrilli*.

Moore, R. 2007. Winter Diet of Streaked Horned Larks in Oregon.

Pearson, S.F. 2003. Breeding Phenology, nesting success, habitat selection, and census methods for the streaked horned lark in the Puget lowlands of Washington. Natural Areas Program Report 2003-2. Washington Department of Natural Resources. Olympia, WA.

Pearson, S.F., and M. Hopey. 2004. Streaked Horned Lark inventory, nesting success and habitat selection in the Puget lowlands of Washington. Natural Areas Program Report 2004-1. Washington Department of Natural Resources, Olympia, WA.

Pearson, S.F., and M. Hopey. 2005. Streaked Horned Lark nest success, habitat selection, and habitat enhancement experiments for the Puget lowlands, coastal Washington and Columbia River Islands. Natural Areas Program Report 2005-1. Washington Dept. of Natural Resources. Olympia, WA.

Pearson, S.F., and B. Altman. 2005. Range-wide Streaked Horned Lark *(Eremophila alpestris strigata)* assessment and preliminary conservation strategy. Washington Department of Fish and Wildlife, Olympia.

Pearson, S.F., H. Anderson, and M. Hopey. 2005a. Streaked horned lark monitoring, habitat manipulations and conspecific attraction experiment. Washington Department of Fish and Wildlife, Olympia.

Pearson, S.F., M. Hopey, W. D. Robinson, R. Moore. 2005b. Range, abundance and movement patterns of wintering Streaked Horned Larks in Oregon and Washington. Natural Areas Program Report 2005-2. Washington Dept. of Natural Resources. Olympia, WA.

Robinson, W.D. & R.P. Moore. 2004. Range, abundance, and habitat associations of streaked horned lark *(Eremophila alpestris strigata)* during winter. Department of Fisheries and Wildlife and Oak Creek Lab of Biology, Oregon State University, Corvallis, Oregon. 5 pp.

Stinson, D. W. 2005. Draft Washington State Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot. Washington Department of Fish and Wildlife, Olympia.138+ xii pp.

Streaked Horned Lark Distribution


Streaked
Horned Lark
Current Range
2011
Legend
Confirmed Occupied
Current Distribution*
Historic Range
British Columbia
Washington
Oregon
Area of Enlargement
* Due to shifts in land use, particularly from agriculture, only small portions of this area are truly occupied at any one time.
The Nature Conservancy
Oregon State OSU
AMERICAN BIRD CONSERVANCY

Birds and Airports: A National Literature Review

Can airports be managed to both minimize bird strikes and protect vulnerable grassland bird species such as the streaked horned lark?

This workshop addresses two potentially conflicting issues:

1. Airports present some of the best remaining habitat for grassland birds, including the vulnerable streaked horned lark, and
2. Birds are a known hazard to aircraft.

Reconciling these two issues requires an understanding of their current state of knowledge. This summary provides a summary of the scientific literature on the issues, and notes studies which address the intersection of the two.

1. Airports are some of best remaining habitat for grassland birds, including the vulnerable streaked horned lark

Many species of birds that depend on grassland or savanna habitats have shown substantial overall population declines in North America. During the last 25 years grassland birds have shown steeper, more consistent, and more geographically widespread declines than any other behavioral or ecological guild of North American bird species (Askins et al. 2007). Declines in grassland bird populations can be attributed to a wide variety of factors, including habitat fragmentation and degradation, nest parasitism, pesticides, invasion of woody vegetation, and agricultural intensification (Askins et al. 2007; Johnson & Igl 2001).

Airports and military installations often provide some of the largest areas of grassland habitats available and are therefore attractive to grassland birds (Blackwell et al. 2009; Seamans et al. 2007; Kershner & Bollinger 1996; Osborne & Peterson 1994; Vickery et al. 1994).They host some of the largest remaining populations of grassland birds such as upland sandpipers, grasshopper sparrows, horned larks and vesper sparrows (Seamans et al. 2007). As grassland disappears, airports will become increasingly important for managing grassland birds (Vickery et al. 1994).

Streaked horned larks are known to occur on only a small number of sites in the Pacific Northwest, and those sites include the Olympia Regional Airport, Shelton Airport, Corvallis Airport, Portland Airport, and Joint Base Lewis McChord (including McChord Airfield).

2. Birds are a known hazard to aircraft

Much literature exists on the hazard that wildlife, especially birds, presents to aircraft. It generally falls into three categories: historic strike data, species' rankings according to their strike risk, and how wildlife can be managed to decrease aircraft strike risk.

a. Strike Data

Summary. Wildlife strike data is compiled from reports filed with the FAA through a voluntary reporting program. Globally, wildlife strikes killed more than 219 people and destroyed over 200 aircraft between 1988 and 2007 (Dolbeer et al. 2009). Most air crashes occur when a bird hits the windshield or is inducted into the engine (Sodhi 2002). Civil and military aircraft strike most birds near airports: on takeoff, climb, descent, and landing. However, military aircraft also strike birds during low-level flight at training routes and bombing ranges (Zakrajsek & Bissonette 2005).

The threat of strikes is increasing due to the increased incidence of some wildlife at airports (such as geese), the global increase in air traffic, and the advent of faster and quieter aircraft (Dolbeer et al. 2008).

Wildlife involved. For the 19-year period 1990-2008, 89,727 wildlife strikes were reported to the FAA. Birds were involved in 97.4 percent of the reported strikes, with terrestrial mammals, bats and reptiles making up the remainder (Dolbeer et al. 2009).

Damage. Almost 80 percent of bird strike reports from 1990-2008 reported as to whether any damage resulted from the strike. Of these reports:

- 86 percent indicated the strike did not damage the aircraft;
- 7 percent indicated the aircraft suffered minor damage;
- 4 percent indicated the aircraft suffered substantial damage;
- 3 percent reported an uncertain level of damage; and
- less than 1 percent indicated the aircraft was destroyed as a result of the strike (Dolbeer et al. 2009).

Economic losses. For the 19-year period 1990-2008, reported losses from bird strikes totaled 393,521hours of aircraft downtime and $308.3million in monetary losses (Dolbeer et al. 2009).

Underreporting. Analysis of strike reports from USA airports and airlines indicated that less than 20 percent of all strikes were reported to the FAA. The information on the number of strikes and associated costs compiled from the voluntary reporting program is believed to severely underestimate the magnitude of the problem (Dolbeer et al. 2009).

Total estimated economic losses. Assuming a 20 percent reporting rate, the annual cost of wildlife strikes to the USA civil aviation industry is estimated to be in excess of 592,000 hours of aircraft downtime and $614 million in monetary losses (Dolbeer et al. 2009).

b. Species risk

Not all birds are equally hazardous to aviation. Airports need to understand the relative risk of birds and other wildlife so that they can prioritize their management actions. (Dolbeer et al. 2000; Dolbeer & Wright 2009) Generally, heavier bird species such as vultures and geese are more hazardous to aircraft than lighter species such as sparrows and swallows (Dolbeer et al. 2000). Also, flocking birds pose a greater risk – an aircraft striking a flock of birds is more likely to sustain damage than if it strikes a solitary bird (Dolbeer et al. 2000).

Based on 18 years' worth of strike data at civilian airports, Dolbeer & Wright compiled a wildlife strike risk ranking table showing the 89 species most commonly represented in strikes in the United States. Horned larks were ranked as #69, with a risk categorization of "Low". Of 659 reported strikes by horned larks during that period, 2 strikes were reported to have caused damage. 27 of the reported strikes involved multiple birds. (Dolbeer & Wright 2009).

An earlier study analyzed the wildlife hazard to military aircraft, based on U.S. Air Force records of wildlife strikes (Zakrajsek & Bissonette 2005). In that study, several smaller birds appeared higher in the rankings than they appear in Dolbeer & Wright's 2009 rankings, with the horned lark ranked 6th. The authors noted that this ranking was higher than civilian rankings, and theorized that perhaps these relatively small species are under-reported by civilian pilots, or perhaps differences in military and civilian airfield operations account for the difference (Zakrajsek & Bissonette 2005). They also noted that horned larks have a habit of foraging in flocks in the open areas that airports provide, and flying back and forth across the runways (Zakrajsek, pers. comm.; Bissonette, pers. comm.).

A 2007 study found horned larks to be the bird species 4th most struck at an Air Reserve Base over an 8 year period, but did not rank the species according to damage like the Dolbeer and Zakrajsek studies. The author noted that the exact numbers of swallows and horned larks struck is uncertain because these species tend to collide with aircraft as flocks and there are times when it is not possible to collect sufficient, recognizable remains to count the numbers of individuals involved. (Milroy 2007)

The FAA Wildlife Strike Database reports that 10 strikes in Washington have involved horned larks. Of those, three incidents occurred in Puget Sound – at SeaTac in 2002 and 2003. No damage was reported. Two of the incidents involved one bird, and the other incident involved 3 to 4 birds.

The FAA Wildlife Strike Database also reports 10 strikes in Oregon involving horned larks. Of those, three incidents occurred in the Willamette Valley in 2004 and 2005– two at Portland International and one at Mahlon Sweet Field. None of them resulted in any damage. All incidents involved only one bird.

c. Wildlife hazard management

The FAA/USDA manual *Wildlife Hazard Management at Airports* (Cleary and Dolbeer 2005) provides guidance to airport personnel in developing and implementing wildlife hazard management plans. Importantly, plans must be tailored to the conditions existing at individual airports. The first step in developing a wildlife hazard management plan is to assess the hazards posed by wildlife at the airport. Then airport managers must take appropriate actions, under the guidance of professional biologists trained in wildlife damage management, to minimize the risks posed by wildlife (Dolbeer et al. 2008).

Note that these requirements generally apply to "certificated" airports – airports approved by FAA for scheduled flights of aircraft with more than 9 passenger seats or unscheduled flights of aircraft with more than 30 seats. However general aviation (GA) airports in the USA generally are not required by the FAA to address wildlife hazard issues. GA airports face considerable challenges in managing wildlife hazards, as they often are located in rural areas with high densities of birds and other wildlife. Further, many GA airports have inadequate funding and few, if any, trained personnel available for wildlife hazard management. (DeVault et al. 2009)

Airports have experimented with many different management actions to deter wildlife. Generally, habitat alteration is believed to provide the most effective and lasting effect, but other more short-term actions are often used as part of an overall wildlife management plan. The following is a list of the more common wildlife management actions currently used at U.S. airports, along with their pros and cons.

Flight schedule alteration. Although not generally practical for regularly scheduled commercial traffic on larger airports, there may be various situations when flight schedules of some aircraft can be adjusted to minimize the chance of a strike with a wildlife species that has a predictable pattern of movement (Cleary & Dolbeer 2005).

Audiovisual Deterrents. Short term solutions generally rely on scaring birds with pyrotechnics, alarm calls, infrasound, and lasers. However, without direct association with an actual threat, birds rapidly habituate to scare techniques, reducing their effectiveness. (Anderson & Otter 2007)

Chemical Deterrents. Chemical deterrents that irritate birds have been used to deter birds from foraging on airports and croplands. However, their effectiveness requires that birds use the area for feeding, not just resting, and they also tends to be too costly for large-scale application. (Anderson & Otter 2007)

Infrared or Radar Beams. Infrared beams or modulation of high powered radar can cause birds to swerve out of the beam. However the power requirements for these systems, and their associated cost, make consideration of these as a feasible deterrent system somewhat prohibitive. (Anderson & Otter 2007)

Lethal Control. Shooting individual birds has been used effectively as a temporary measure. Without removal of the resources that initially attracted the animals, however, emigration of new individuals to replace those killed is likely. Thus, this technique is sustainable only with repeated culling of populations. Lethal control is usually not well accepted by the public, and it remains a reactive, short-term solution. (Anderson & Otter 2007)

Dogs. Dogs are perceived as a natural predator by terrestrial birds, which leave the area to seek more secure habitat elsewhere. Border collies have been used very effectively to scare birds off the runways because, unlike other scare tactics, they represent a real threat. Cost is the primary consideration in this technique, as specially-trained dogs can cost several thousand dollars, and require the assignment of permanent handlers and housing costs. (Anderson & Otter 2007)

Falconry**.** Falconry has also been used at airports to introduce a real threat to birds in a publicly acceptable matter. However, success of falconry programs appears to depend on a large number of uncontrolled variables, including airport layout, habitat, and weather, and success is not always directly correlated with effort. For this reason, it is generally recommended as part of a comprehensive management program rather than as the sole method of dispersing problem birds. (Anderson & Otter 2007)

Habitat Alteration**.** Long term mitigation tends to focus on habitat alteration. Although this does not deter birds that fly over the airport, it provides a more permanent solution to managing birds that use the airfield. Since most bird strikes occur in the 0 to 500 feet above the ground airspace, the problem is mostly thought to be birds that are using the airfield itself.

Habitat alteration can include application of netting (especially around eaves of buildings), replacement of grass with boulder fields, replacement of cattail marsh with shrubby marsh, and removal of attractive crops and garbage dumps. Nest or roost trees may have limbs removed if raptors are a problem. Marshlands attract waterfowl, so removal of standing water is important. (Anderson & Otter 2007) One commonly used habitat alteration tool is managing grass height, discussed in the following point.

Grass height management. The management of an airport's airside ground cover to minimize bird activity is a controversial subject in North America. The general recommendation, based on studies in England in the 1960s and 1970s, has been to maintain a monoculture of grass at a height of 6-10 inches (Transport Canada) or 7-14 inches (U.S. Air Force). Tall grass, by interfering with visibility and ground movements, is thought to discourage many species of birds from loafing and feeding. (Cleary & Dolbeer 2005)

However, the limited studies conducted in North America have not provided a consensus of opinion on the utility of tall-grass management for airports (Cleary & Dolbeer 2005; Milroy 2007; DeVault et al. 2009). For example, a recent study found no difference in the number of birds using short- (9–15 cm) and tall-vegetation (15–30 cm) plots (Seamans et al. 2007).

In addition, maintenance of tall grass can result in increased rodent populations, a food source for raptors. Further, maintenance of monotypic, uniform stands of tall grass is difficult and expensive on many airports because of varying soil conditions and the need for fertilizer and herbicide applications. Arid regions in the western USA cannot maintain tall grass without irrigation. (Cleary & Dolbeer 2005)

The FAA/USDA Manual states that it will not issue general guidelines on grass height or vegetation type for airside ground cover until more research is completed (Cleary & Dolbeer 2005). Clearly, more work is needed to refine recommendations for grass height management in the U.S. (Milroy 2007; Seamans et al. 2007; DeVault et al. 2009)

3. Can airports manage for both wildlife hazard management and vulnerable species conservation?

Historic management for vulnerable species. Modifications in habitat management practices at military and municipal airports have already clearly benefited grassland birds. These practices include deferred mowing schedules and reduced vehicular traffic in grassland areas. For example, at a Massachusetts Air Reserve Base, populations of upland sandpipers and grasshopper sparrows have increased by more than 200% as a result of these management changes. (Askins et al. 2007) Similarly, a New Hampshire airport has altered its mowing regime to both meet airport guidelines and protect the upland sandpiper during nesting periods. During that time the population has remained stable. (Hunt & DeLuca 2005)

The most comprehensive study on this topic is currently being completed by researchers with the New Jersey Audubon Society. Preliminary results have been released (Peters & Allen 2010), and the final report is due in 2012. (Ms. Peters will present separately on her work at this workshop.) The preliminary results found that conservation-value species increased with vegetation height (20-24 inches), while strike-risk decreased within the same range of vegetation height (Peters & Allen 2010).

Sink population? A 1996 study found a low level of nesting success on airports by grassland birds, suggesting that these areas are unproductive compared with most other grassland habitat. The study suggested that airports support sink populations, which are unable to sustain their populations (Kershner & Bollinger 1996). The study found that the primary disturbance contributing to low nesting success was mowing. It stated that adjusting mowing schedules would be an optimal management plan to conserve vulnerable species, but that that is realistic only for large airports. For small rural airports, the authors believed the best management practice may be to discourage birds from attempting to nest by mowing the grass low. They suggest that small airports do not have enough room to both comply with FAA safety regulations regarding grass length requirements surrounding runways, and enhance grassland bird breeding (Kershner & Bollinger 1996).

Conservation management techniques. Some techniques which may achieve both wildlife hazard prevention and rare grassland bird conservation are:

- Modifying aircraft flight times to avoid times of known bird movement

- Modifying the timing of mowing to avoid the breeding season (Milroy 2007)
- Using sickle-bar mowers or other equipment to reduce mower wheel "footprints", and thus bird and chick mortality (Milroy 2007)
- Planting vegetation that does not require mowing (Milroy 2007)
- Detailed analysis of the inter-specific variations in some processes that can affect local populations, such as density-dependence, behavioral responses to aircraft or aversive methods (speed of reaction, sensitization, habituation, etc.), and movement between suitable patches within and surrounding an airfield. Once this is established, airports could create buffer areas based upon the analysis. (Blackwell et al. 2009)

4. What does management for a listed species actually look like?

California least terns – a state and federally listed endangered species – have nested at San Diego International Airport since at least 1969. In 1970 the airport supported the third largest colony in California, and nesting has been documented there in 28 of the years from 1970 to 2008. The number of tern nests fluctuates, but in 2006 there were estimated to be 131 nests and 114 breeding pairs. Terns have nested at several locations around the airport.

Various projects at the airport have obligated tern management efforts at the airport, and a Biological Opinion prepared by the US Fish and Wildlife Service requires reasonable and prudent measures for protecting terns. The Biological Opinion's conditions/protective measures include:

- The FAA and the Airport Authority will maintain in perpetuity four ovals as nesting habitat for the California least tern.

- The FAA and the Airport Authority placed tern fledgling nest barriers/fencing around the perimeter of the above ovals to prevent the movement of fledglings outside these areas onto runways and taxiways. The fence is inspected and maintained by a qualified tern biologist with the appropriate endangered species permit issued by the US Fish and Wildlife Service.

- The FAA and the Airport Authority provide annual funding for a predator control program; however, no shooting of tern predators at the airport is allowed and non-lethal means are preferred.

- The FAA and the Airport Authority will prepare and maintain in perpetuity a minimum of 6.2 acres of contiguous supratidal habitat at the Chula Vista Wildlife Reserve in south San Diego Bay for tern nesting.

- The FAA and the San Diego Unified Port District are responsible for assuring ongoing monitoring of tern populations at the airport and at Chula Vista Wildlife Reserve by qualified tern biologists.

- Where construction crews are working on facility improvements, they must be educated on:
    - prohibitions to applying materials, storing equipment, or performing maintenance near the ovals,
    - constraining ingress and egress routes to specific locations during the nesting season (greater than 1,200 feet from the ovals),
    - lowering crane booms when not in use,
    - ensuring that trash would be properly disposed, and
    - not feeding potential tern predators in the area.

(San Diego County Regional Airport Authority 2008)

References

Anderson, M.L., K. A. Otter. 2007. Spatial and Temporal Analysis of Avian Movement Patterns at the Prince George Regional Airport. Technical Report to the Prince George Airport Authority. Available online at http://cwee.unbc.ca/publications/Prince%20George%20Airport%20-%20Final%20Report.pdf (accessed October 21, 2010)

Askins, R. A., F. Chavez-Ramirez , B. C. Dale, C. A. Haas, J. R. Herkert, F. L. Knopf, P. D. Vickery. 2007. Conservation of Grassland Birds in North America: Understanding Ecological Processes in Different Regions. White Paper for American Orthinologists' Union Conservation Committee. Available online at http://www.aou.org/committees/docs/ConservationAddn4.pdf (accessed January 3, 2011)

Blackwell, B. F., T. L. DeVaulta, E. Fernández-Juricicb, R. A. Dolbeer. 2009. Wildlife collisions with aircraft: A missing component of land-use planning for airports. Landscape and Urban Planning. Volume 93, Issue 1, 30 October 2009, Pages 1-9

Cleary E. C. & R. A. Dolbeer. 2005. Wildlife hazard management at airports. A manual for airport personnel. Produced by FAA and USDA

Devault, T. L., J. E. Kubel, O. E. Rhodes Jr., R. A. Dolbeer. 2009. Habitat and bird communities at small airports in the midwestern USA. Proceedings of the Wildlife Damage Management Conference 13:137-145. 122K. Available online at http://www.aphis.usda.gov/wildlife_damage/nwrc/publications/09pubs/devault094.pdf (accessed November 11, 2010)

Dolbeer, R. A., S. E. Wright, E. C. Cleary. 2000. Ranking the hazard level of wildlife species to aviation. Wildlife Society Bulletin 28:372-378. Available online at http://www.aphis.usda.gov/wildlife_damage/nwrc/publications/00pubs/00-14.pdf (accessed November 11, 2010)

Dolbeer, R.A., Wright, S.E., Begier, M.J. & Weller, J. 2009. *Wildlife Strikes to Civil Aircraft in the United States 1990–2008. Federal Aviation Administration National Wildlife Strike Database Serial Report Number 15*. Washington, DC: Report of the Associate Administrator of Airports Office of Airport Safety and Standards & Certification

Hunt, P.D, D. De Luca. 2005. Upland Sandpiper Species Profile for New Hampshire Wildlife Plan. Available online at http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/WAP_species_PDFs/Birds/UplandSandpiper.pdf (accessed 7 February 2011)

Johnson, D.H., and L.D. Igl. 2001. Area requirements of grassland birds: a regional perspective. Auk 118:24-34

Kershner E. L. and Eric K. Bollinger. 1996. Reproductive Success of Grassland Birds at East-central Illinois Airports. American Midland Naturalist Vol. 136, No. 2 (Oct., 1996), pp. 358-366

Milroy, A. G. 2007. Impacts of mowing on bird abundance, distribution and hazards to aircraft at Westover Air Reserve Base, Massachusetts. Thesis submitted to University of Massachusetts Amhurst

Osborne, D. R. and A. T. Peterson. 1984. Decline of the Upland Sandpiper (Bartramia, Longicauda) in Ohio: An Endangered Species. The Ohio Journal of Science. v84, n1 (March, 1984), 8-10

Peters K.A. and M.C. Allen. 2010. Avian response to grassland management on military airfields in the mid-Atlantic and Northeast (interim report). Available online at http://www.dodpif.org/plans/legacyprojects/legacy2008.php (accessed on December 2, 2010)

San Diego County Regional Airport Authority. 2008. Final Environmental Impact Report, SCDRAA # EIR-06-01, State Clearinghouse No. 2005091105,Airport Master Plan, San Diego International Airport. Available online at http://www.san.org/sdcraa/airport_initiatives/master_plan/eir.aspx (accessed on March 7, 2011)

Sodhi, N. S. 2002. Competition in the air: Birds vs aircraft. The Auk 119(3):587-595

Seamans, T.W., Barras, S.C., Bernhardt, G.E., Blackwell, B.F., Cepek, J.D., USDA, APHIS. 2007. Comparison of 2 vegetation-height management practices for wildlife control at airports. Human-wildlife conflicts. 2007 Spring, v. 1, no. 1, p. 97-105

Vickery, P. D., M. L. Hunter and and S. M. Melvin. 1994. Effects of habitat area on the distribution of grassland birds in Maine

Wright, S.E. 2007. Bald Eagles: A Threatened Species becomes a Threat to Aviation. In: Bird Strike Committee Proceedings, 2007 Bird Strike Committee USA/Canada, 9th Annual Meeting, Kingston, Ontario. Available online at http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1015&context=birdstrike2007 (accessed February 7, 2011)

Zakrajsek, E. J., JA Bissonette. 2005. Ranking the risk of wildlife species hazardous to military aircraft. Wildlife Society Bulletin. Vol. 33, No. 1 (Spring, 2005), pp. 258-264

FAA wildlife requirements for airports

Extracted from: Master Plan Update – Port of Olympia / Olympia Regional Airport, Appendix 2: Airport Critical Area / Priority Habitat & Species White Paper, December 2010

Federal Aviation Administration (FAA) Compliance Program

The primary role of responsibility for the FAA is ensuring the safe and efficient operation of airports within the national aviation system, and Federal law pre-empts local regulations on issues or conflicts related to aircraft safety, navigable airspace, flight operations, and noise control. However, the FAA has no statutory or regulatory authority for controlling land uses or zoning within the airport environs, but they do have some leverage with regard to Airport Sponsor grant assurances in conjunction with Federal funding participation for eligible airport projects. …. These obligations (or assurances), which are enforced by the FAA through the Airport Compliance Program, require the recipients to maintain and operate their facilities safely and efficiently and in accordance with specified conditions that are set forth in numerous Airport Advisory Circulars and Federal Aviation Regulations.

It should be noted that the Airport Sponsor grant assurances do not specifically reference the mitigation of wildlife hazards on airports; however, three of the grant assurances (i.e., No.'s 19, 20, and 21), which are presented in the following text, can be broadly interpreted to address the issue:

- **Grant Assurance No. 19/Operation & Maintenance:** The airport and all facilities shall be operated at all times in a safe and serviceable condition, and the airport sponsor will not cause or permit any activity or action thereon, which would interfere with its use for airport purposes. *Issue for consideration: Does the designation of priority wildlife habitat areas on airport property interfere with the safe operation of the airport?*

- **Grant Assurance No. 20/Hazard Removal and Mitigation:** The airport sponsor will take appropriate action to assure that such terminal airspace, as is required, to protect instrument and visual operations to the airport will be adequately cleared and protected by removing, lowering, relocating, marking, lighting, or otherwise mitigating existing airport hazards and preventing future airport hazards. *Issue for consideration: Does the existing wildlife within the designated priority wildlife habitat areas on airport property constitute an airport hazard?*

- **Grant Assurance No. 21/Compatible Land Use**: The airport sponsor will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to, or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. *Issue for consideration: Does the designation of priority wildlife habitat areas on airport property conflict with the compatible land use objectives of the airport sponsor?*

FAA's Safety Management System (SMS)

In addition to the safety compliance system that was described in the previous section, the FAA has recently embarked on a new program, designed to "raise-the-bar" of the U.S. aviation system to the next level of safety. This program is known as the Safety Management System (SMS) and applies to all lines of business within the FAA and throughout the aviation industry. According to information contained in FAA Order 5200.11 *FAA Airports (ARP) Safety Management System*, an SMS provides a consistent means of assessing safety risks through the establishment of an integrated Safety Policy, a functioning Safety Risk Management (SRM) approach, a Safety Assurance model that identifies performance targets and facilitates continuous improvement, and a program of Safety Promotion that includes clear communication.

- **Safety Policy.** Outlines the methods and tools for achieving desired safety outcomes and details management responsibility and accountability for safety.
- **Safety Risk Management (SRM)**. Is a formalized approach to safety that ensures sound safety decisions by identifying and examining hazards early, while laying the groundwork for effective risk mitigations based on well-documented data. In simple language, SRM attempts to gauge how likely a

hazard is to result in an incident, define the potential consequences, and determine how much risk (if any) is acceptable.

- **Safety Assurance.** Includes formalized processes that proactively identify hazards and risks. It provides tools that allow the FAA to track how the SMS performs, confirm the SMS is achieving intended outcomes, and continuously improve standards, operations and practices to increase safety.
- **Safety Promotion.** Promotion of a positive safety culture is essential to Safety Promotion in an SMS. It provides a method for sharing safety information to develop and apply lessons learned and best practices for hazard identification, Safety Assessments and mitigations, and other SRM responses.

Overall, SMS provides an opportunity to identify and address safety issues before they can become hazards, with the objective being to increase aviation system safety.

As presented in FAA Order 8000.369 *Safety Management System Guidance*, the FAA's statutory authority for SMS is derived in part from Title 49 of the United States Code (49 U.S.C.) and Title 14 of the Code of Federal Regulations (14 C.F.R.). Title 49 U.S.C. Chapter 401 of subpart I, part A, Section 40101 (d), establishes safety considerations in the public interest. In addition, 49 U.S.C. Chapter 447 of subpart III, part A, subtitle VII, prescribes the authority and powers of the FAA concerning safety regulations.

According to FAA Fact Sheet, dated November 4, 2010, the FAA is in the process of implementing SMS and system safety-based oversight. In October of 2010, the FAA issued a proposed rule that would require airports certificated under Part 139 to establish SMS for all airfield and ramp areas. Congressional action has mandated that the FAA develop a rule requiring all Part 121 operators to implement SMS, and the FAA is considering SMS regulations for other groups of aviation service providers, including Part 135 operators and Part 145 repair stations.

FAA & Wildlife Hazards

In their continuing efforts to promote airport safety, the FAA has been proactive in the support of research and the preparation of guidance documents on the subject of wildlife hazards and airports (i.e., *Hazardous Wildlife Attractants On or Near Airports*/AC No. 150/5200-33). The FAA has also sponsored the preparation of a research document produced through the Airport Cooperative Research Program (ACRP) Report 32/*Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports*. In addition, the FAA has collaborated with other Federal agencies [i.e., the U.S. Air Force (USAF), the U.S. Army, the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USF&WS), and the U.S. Department of Agriculture (USDA)], with the establishment of a *Memorandum of Agreement (MOA) to Address Aircraft-Wildlife Strikes*, which effectively addresses existing and future environmental conditions contributing to aircraft-wildlife strikes throughout the United States. The FAA and the USDA Wildlife Services (USDA WS) have also established a Memorandum of Understanding (MOU), No. 12-34-71-0003-MOU, to formalize continued cooperation in the mitigation of wildlife hazards to aviation.

Hazardous Wildlife Attractants On or Near Airports/AC No. 150/5200-33. Aircraft collisions with wildlife represent a serious economic and public safety concern, and Advisory Circular (AC) 150/5200-33 provides guidance on the various land uses that have the potential to attract wildlife on, or in the vicinity of, airports. Airports that have received FAA-administered airport financial assistance programs must follow these standards. Many airports … have relatively large tracts of open and undeveloped land, which can be attractive to wildlife for feeding, loafing, reproduction, and escape. Any wildlife in these areas can present potential hazards to aviation, particularly within the airport's approach/departure airspace or air operations area. The AC also specifies the recommended separation criteria for hazardous wildlife attractants from airports (e.g., 10,000 feet for airports serving turbine-powered aircraft) and offers airport sponsors procedures for wildlife hazard management, which includes the preparation of Wildlife Hazard Assessments (WHAs) and Wildlife Hazard Management Plans (WHMPs). It should also be noted that in the Fall of 2009, the FAA's AIP funding and eligibility requirements for WHAs was modified to include general aviation airports with documented reports of wildlife hazards.

Airport Cooperative Research Program (ACRP) Report 32, Guidebook for Addressing Aircraft/Wildlife Hazards and General Aviation Airports. This guidebook is a useful resource to airport management and staff, offering techniques and strategies for addressing wildlife hazards at general aviation airports. The report includes information on the different species that can be found at airports, guidance for identifying and controlling these species, reference to the various wildlife attractants and best management practices that can be used to minimize

wildlife activity on and around airports, wildlife control strategies and techniques that are best used at general aviation airports, and how to develop a wildlife control program.

Memorandum of Agreement (MOA) to Address Aircraft-Wildlife Strikes. This MOA between Federal resource agencies that was previously referenced was established in 2003 to acknowledge their respective missions in protecting aviation from wildlife hazards. These efforts are intended to minimize wildlife risks to human safety while protecting environmental resources. According to information presented in the Agreement, aircraft-wildlife strikes are the second leading cause of aviation-related fatalities, and approximately 97% of the reported civilian aircraft-wildlife strikes involve common, large-bodied birds or large flocks of small birds. In addition, about 90% of aircraft-wildlife strikes occur on or near airports when aircraft are at altitudes of less than 2,000 feet. Therefore, the signatory agencies will encourage stakeholders to promote land uses that comply with the siting criteria specified in AC 150/5200-33 (see Attachment A in the AC). Exceptions to these siting criteria will be considered (see Section 2.4.b of the AC) in conjunction with critical habitats for Federally-listed endangered or threatened species and ground water recharge. …

When there is disagreement among the signatory agencies about whether a particular land use is attractive to wildlife, the FAA, USAF, or USDA WS will conduct a WHA to determine whether a WHMP should be prepared. The Plan, if required, should avoid adverse impacts to wildlife populations or other sensitive habitats (e.g., the existing critical habitat areas on the Airport) to the maximum extent practical, and unavoidable impacts will be fully compensated pursuant to all applicable Federal laws, regulations, and policies. …

Memorandum of Understanding (MOU)/No. 12-34-71-0003-MOU. This MOU between the FAA and USDA WS was established in 2005 to promote the mitigation of wildlife hazards to aviation. According to the Understanding, it is agreed that the USDA WS "has the professional expertise, airport experience, and training to provide support to assess and reduce wildlife hazards to aviation on and near airports." Technical support to the FAA or Airport Sponsor from USDA WS may include site visits and a WHA, as well as support in developing WHMPs and recommendations on control and habitat management methods designed to minimize the presence of hazardous wildlife on or near the airport.

Workshop Participant Contact Information

First	Last	Association	Email	Speaker?
Bob	Altman	American Bird Conservancy	baltman@abcbirds.org	
Hannah	Anderson	The Nature Conservancy	handerson@tnc.org	Speaker
Nick	Atwell	Portland International Airport, Port of Portland	Nick.Atwell@portofportland.com	Speaker
Susan	Barnes	Oregon Dept Fish & Wildlife	susan.p.barnes@state.or.us	
Suzanne	Beauchesne	Cooper Beauchesne and Associates Ltd	sbeauchesne@cooperbeauchesne.com	
Robert	Bright	Aviation Division, Joint Base Lewis-McChord	robert.bright@us.army.mil	
Cat	Brown	US Fish & Wildlife Service	Cat_Brown@fws.gov	Speaker
Jodi	Bush	US Fish & Wildlife Service	Jodi_Bush@fws.gov	
Daniel	Butler	McChord Field, Joint Base Lewis-McChord	Daniel.Butler2@mcchord.af.mil	
David	Clouse	Joint Base Lewis-McChord	david.c.clouse@us.army.mil	
Chris	Cummings	Oregon Department of Aviation	christopher.cummings@state.or.us	
Jerry	Dale	Sportsman Airpark	jerry@sportsmanairpark.com	
Justin	Dayton	US Dept of Agriculture, APHIS Wildlife Services		
Pat	Dunn	The Nature Conservancy	pdunn@tnc.org	
Valerie	Elliott	McChord Field, Joint Base Lewis-McChord	valerie.r.elliott@us.army.mil	
Kim	Flotlin	US Fish & Wildlife Service	kimberly_flotlin@fws.gov	
Jeff	Foster	Joint Base Lewis-McChord	jeffrey.r.foster@us.army.mil	
Tom	Franklin	Independence State Airport (Salem)	tfranklin@cityofsalem.net	
Dana	Green	Portland International Airport, Port of Portland	dana.green@portofportland.com	Speaker
James	Greene	Aero Maintenance Inc.	jgreene@aeromt.com	
Dave	Helzer	City of Portland	David.Helzer@portlandoregon.gov	
Matt	Klope	US Navy Bird Air Strike Hazard (BASH) Program	matt.klope@navy.mil	Speaker
Ann	Kreager	Oregon Dept Fish & Wildlife	ann.kreager@state.or.us	
Sandra	Larsen	Oregon Department of Aviation	Sandra.Larsen@state.or.us	
Dane	Ledbetter	US Dept of Agriculture, APHIS Wildlife Services		
Aaron	Loucks	US Dept of Agriculture, APHIS Wildlife Services		
Jim	Lynch	Joint Base Lewis-McChord	jim.lynch1@us.army.mil	
Larry	Mason	Toledo Airport and Packwood Airport	airportman@toledotel.com	

First	Last	Association	Email	Speaker?
Kimberly	Mason	Toledo Airport and Packwood Airport	airportman@toledotel.com	
Dan	Mason	Corvallis Airport	dan.mason@ci.corvallis.or.us	
Randy	Moore	Oregon State University	randy.moore@oregonstate.edu	Speaker
Cayla	Morgan	Federal Aviation Administration	cayla.morgan@faa.gov	
Jim	Neva	Ilwaco Airport	jneva@portofilwaco.org	
John	Overholser	Astoria Regional Airport	joverholser@portofastoria.com	
Brandon	Palmer	Port of Shelton	brandonp@portofshelton.com	
Scott	Pearson	WA Dept of Fish & Wildlife	pearssfp@dfw.wa.gov	Speaker
Kimberly	Peters	New Jersey Audubon Society	kim.peters@njaudubon.org	Speaker
Thomas	Pytel	Joint Base Lewis-McChord	Thomas.r.pytel@us.army.mil	
Robert	Rodriguez	Gray Army Airfield, Joint Base Lewis-McChord	robert.h.rodriguez@us.army.mil	
Eileen	Rodriguez	McChord Field, Joint Base Lewis-McChord	eileen.rodriguez@mcchord.af.mil	
Allyn	Roe	Chehalis-Centralia Airport	aroe@flycls.com	
Robert	Russell	Medford Airport	russelrj@jacksoncounty.org	
Laurence	Schafer	US Dept of Agriculture, APHIS Wildlife Services	Laurence.M.Schafer@aphis.usda.gov	Speaker
John	Shambaugh	WA Dept of Transportation	shambaj@wsdot.wa.gov	
Paul	Steuke	Joint Base Lewis-McChord	paul.steucke@us.army.mil	Speaker
Derek	Stinson	WA Dept Fish & Wildlife	stinsdws@dfw.wa.gov	
Michelle	Tirhi	WA Dept Fish & Wildlife	tirhimjt@dfw.wa.gov	Speaker
Patrick	Viehoever	US Dept of Agriculture, APHIS Wildlife Services		
Katy	Weil	Metro	Katy.Weil@oregonmetro.gov	
Willy	Williamson	Pearson Field	willy.williamson@ci.vancouver.wa.us	
Angela	Withrow	McChord Field, Joint Base Lewis-McChord	angela.withrow@mcchord.af.mil	
Paul	Wolf	WA Dept of Transportation	wolfp@wsdot.wa.gov	