

**2010 Streaked Horned Lark Survey:
Summary Report**

Mary Linders
Washington Department of Fish and Wildlife
Wildlife Program, Region 6
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Streaked horned larks (*Eremophila alpestris strigata*) are migrant, ground-dwelling passerines that nest on open grasslands, sparsely vegetated beaches and dredge spoil islands; they choose grass and forb dominated sites with a high percent cover of bare ground with relatively short vegetation (6-8 inches; Stinson 2005). Both males and females are detectable during the breeding season, which occurs from about March through August. The streaked horned lark is classified as a federal candidate for listing under the Endangered Species Act and listed as endangered by the state of Washington. The breeding range of *E. a. strigata* 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 from Pearson et al. 2008).

Estimates of population growth rate from birds nesting in the Puget lowlands, lower Columbia River and the Washington coast indicate populations of *E. a. strigata* in Washington are declining by approximately 40% per year (Camfield et al. 2010). This trend appears to be driven by combined effects of low fecundity and survival; the risk of losing the remaining Washington populations is high, exacerbated by loss of nesting and foraging habitat due to development at key locations such as Gray Army Airfield on Joint Base Lewis-McChord ((Pearson et al. 2008, FLDPW 2010).

Surveys for streaked horned lark in Washington have not been conducted in a standardized manner across sites and years. Most data have been collected as part of research efforts looking at population vital rates and habitat selection (e.g., Pearson 2003, Pearson and Hopey 2004, Pearson and Hopey 2005, Pearson et al. 2005, Rogers 2000). Pearson et al. (2008) recommended developing a comprehensive monitoring scheme to examine range wide population trends that could also be used to evaluate the effectiveness of management actions.

Objectives: The main objectives of this project are to collect streaked horned lark data that can: 1) detect changes in abundance of adults at occupied sites. A follow-on objective is to use these data to develop an efficient and effective statewide monitoring scheme that can account for differences in detectability between sites, observers, survey periods and environmental conditions in order to increase precision and minimize variance surrounding abundance estimates.

Methods

Sampling was conducted along line transects spaced 150 m apart and designed to cover the majority of suitable habitat at a site. Observers mapped and tabulated all streaked horned

larks seen or heard, their initial behavior, sex and age if known; environmental variables and predator/competitor tallies were also recorded. Surveys commenced in April and concluded in July; survey timing was designed to coincide with initiation of the earliest and latest clutches (Pearson et al. 2005). See Appendix A for additional details of the survey protocol and field form.

Results and Discussion

Surveys for streaked horned lark were conducted at occupied sites in the south Puget lowlands and 10 islands in the lower Columbia River. Of the sites surveyed in 2010, four sites were surveyed 4 times, six sites were surveyed 3 times, five sites were surveyed 2 times and one site was surveyed 1 time (Table 1). Puget lowland sites were surveyed 3-4 times each; Columbia River sites were surveyed 1-3 times each. A total of 522 lark detections were recorded during 45 surveys; many of these detections are assumed to be repeated detections of the same bird. Two sites had high counts of more than 30 larks, two sites reported 20-30 larks each, three sites had 10-20 larks each and seven sites had between 1 and 10 larks each; no larks were observed at two of the surveyed sites. Categorical distribution of abundance by site based on mean counts is nearly identical (Table 1), suggesting that numbers detected were relatively stable at most sites throughout the survey season.

Table 1. Number, mean, variance and range of streaked horned lark detections by site during April-July surveys in Washington in 2010.

Site	Location	#Surveys	Mean	SD	SE	Min	Max
McChord	Puget Sound	4	18.50	5.80	0.67	12	26
GAAF	Puget Sound	4	24.00	6.38	0.65	18	30
13th Division	Puget Sound	3	3.67	3.06	0.92	1	7
Range 76	Puget Sound	4	6.50	4.12	0.81	2	12
Olympia Airport	Puget Sound	3	42.67	2.31	0.20	40	44
Shelton Airport	Puget Sound	4	13.25	1.26	0.17	12	15
Cottonwood	Columbia River	1	NA	NA	NA	0	0
Crims	Columbia River	2	1.00	1.41	1.00	0	2
Miller Sands	Columbia River	2	5.50	0.71	0.21	5	6
Pillar Rock	Columbia River	3	3.33	2.08	0.66	0	5
Rice	Columbia River	2	12.00	2.83	0.58	10	14
Sandy	Columbia River	2	0.50	0.71	0.71	0	1
Tenasillahee	Columbia River	3	2.33	1.53	0.58	1	4
Wallace	Columbia River	3	0.00	0.00	NA	0	0
Welch	Columbia River	2	3.00	0.00	0.00	3	3
Whites	Columbia River	3	24.33	10.79	1.26	12	32

Males and adults were identified most readily (Appendix B). Of birds identified to sex, 67 percent were males, although males made up 52 percent of all birds detected (including those of unknown sex); suggesting this disparity may be explained by differences in detectability of males OR by a skewed sex ratio. Ninety-eight percent of larks detected to age were adults; two percent of all larks detected were identified as young-of-the-year and six percent were of unknown age. Males outnumbered females at six of the seven largest sites. At least one young-of-the-year was identified at 4 of 16 sites (range 1-3); young-of-the-year were only detected on sites with high counts of at least 10 larks. Foraging and flying were the two most common behaviors recorded, accounting for 50 percent of 508 initial recorded behaviors; song, alert and agonistic behaviors accounted for an additional 35 percent of initial behaviors recorded.

Environmental data reveal several commonalities across both surveys and sites. On 32 of 45 surveys cloud cover was recorded as a "3" (100 percent) for part or all of the survey. For surveys in which data on precipitation was recorded, 37 of 41 surveys had no precipitation for part or all of the survey. Crows, meadowlarks and killdeer were the most common predators/competitors recorded numerically. The highest crow count for a single survey was 69, recorded at Olympia Airport; remaining counts for all sites ranged from 1-19 per survey. Meadowlark (range 1-49) and killdeer (range 1-42) numbers were also notably high at some sites. Collectively these three species accounted for 85 percent of 506 recorded observations. Crows were recorded at all sites except for 13th Division Prairie and Range 76, both on Joint Base Lewis-McChord; 1 corvid was recorded at 13th Division Prairie.

Recommendations

Two clarifications already made to the protocol involving how behavior is recorded in 2011 surveys will improve the usefulness of the data with respect to detectability. There are two primary purposes for recording behavior:

- 1) Understand how the behavior affects detectability. Basically we need to know if the bird is flying or on the ground and making a noise or not making a noise.
- 2) Understand if successful breeding is occurring at the site: consistent evidence of males and females at the site, evidence of mating, evidence of nest building, evidence of feeding young, evidence of young.

More data will lend context to the efficacy of the survey timing window. Few young-of-the-year were detected during 2010 surveys. This may be due to the timing of the surveys, the low detectability of young in general or some other factor. To capture more reproductive data would require a more intensive survey effort later in the season. At Gray Army

Airfield and some other sites, many of the birds were in relatively large groups during the April surveys, but displayed typical pairing during remaining surveys. It is not clear whether this was due to a relatively late spring or other factors; inflated or depressed numbers affect the variance surrounding abundance estimates and reduce confidence in those estimates. Clarifying primary and secondary objectives of the surveys may help prioritize what data are collected and why, as these have been expressed differently in meetings, discussions, and the written protocol (Appendix A).

Predator/competitor data was collected inconsistently, with most observers recording abundance and a few indicating presence/absence. The protocol was recently changed to a presence/absence format for 2011. It is not clear how predator/competitor data relate to the objectives of the survey, however the presence/absence format is of little use relative to the abundance data, and a return to the original abundance protocol is recommended.

Only tabulated digital data were supplied to Mary Linders in 2010, and most surveyors did not send hard copy data forms to Olympia headquarters. As a result, there is no centralized location for all data, and no means to check forms where inconsistencies or inaccuracies appear. It is recommended that hard copy, tabulated and mapped data all be sent a single source for central storage and to assist in the writing of the report. Similarly, changes to written protocols, field forms and summary reports often require an iterative approach; efficacy would be improved by consistency in personnel.

Literature Cited

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- Stinson, D. W. 2005. Washington State Status Report for the Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot. Washington Department of Fish and Wildlife, Olympia. 141+ xii pp.

Appendix A. Draft protocol for streaked horned lark abundance surveys.

PROPOSED METHODS FOR WILDLIFE DATA COLLECTION "FORM B"

(Consult instructions before completing this form)

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This form should be attached to "Form A" when completed

Submitted by: ___Michelle Tirhi and Tammy Schmidt_____

Date: ___4/15/2011_____

Mailing Address: 7801 PHILLIPS RD SE, LAKEWOOD, WA 98498

Brief description of proposed activity (copy from Form A):

Conduct surveys to detect presence and acquire indices of abundance of the Streaked Horned Lark (*Eremophila alpestris strigata*) by visual and/or auditory detection during the breeding season on known occupied habitat.

1. Species: Streaked Horned Lark (*Eremophila alpestris*)

- 2. Objectives:**
- Confirm the presence of Streaked horned larks by conducting line transect surveys throughout occupied habitat at Joint Base Lewis-McChord -- airfields, artillery impact area, 13th Division Prairie, Ranges 74/76/51; Olympia Airport; Shelton Airport, outer Washington coast; Columbia River islands.
 - Acquire estimates of abundance
 - Provide a minimally disruptive method of inventory
 - Provide an efficient and repeatable survey design
 - Provide consistency among surveyors
 - Provide standardized protocol for survey and management

3. Describe in detail the methods that will be used to complete the above activity (Or attach description to this form):

Surveys to detect presence: Streaked horned larks are migrant, ground-dwelling passerines that have adapted to nesting on open grasslands, sparsely vegetated beaches and dredge spoil islands (Stinson 2005). They prefer bare ground and vegetation no more than several inches tall (Beason 1995, Altman 1999, Rogers 2000, Pearson and Hopey 2005). Streaked horned larks are loosely colonial nesters, with both males and females detectable during the breeding season, which occurs roughly from March through August. Survey timing is designed to coincide with clutch initiation curves – first clutches are initiated at the end of April at all sites and taper off dramatically in the Puget Sound area in early July; later on the coast and Columbia River (Pearson et al. 2005). Mates are socially monogamous for the breeding season. Males are easier to detect because they sing on the ground and also perform aerial courtship displays.

Methods: Observers should be in position on transect and ready to begin the survey at the predetermined time. Surveys will begin ½ hour after sunrise and end by 12:00 noon on days when wind is less than 20 mph with little to no precipitation (light drizzle and brief showers are fine). Surveys should end by 11:00 a.m. or earlier on days when the predicted maximum temperature is 80 F or higher. Every effort will be made to complete surveys within the allotted survey windows. If a survey is not feasible during the suggested window then conduct the survey as soon as possible rather than omit altogether. A survey including multiple observers will designate a lead observer to record environmental data and to gather/submit individual bird detection forms of all other observers. The lead observer will make all decisions regarding delaying for lighting or weather conditions. The lead observer will be responsible for communicating with ground security or the tower for surveys conducted on airfields. All observers are expected to adhere to FAA/DOD regulations and instructions.

Attempt four surveys per location between 19 April and the first week of July in the Puget lowlands and between 19 April and mid-July for the outer coast and Columbia River -- with a goal of obtaining three complete surveys, but preferably all four if feasible, during the nesting season as follows:

Survey 1: last two weeks of April **Survey 2:** mid two weeks of May **Survey 3:** mid two weeks of June
Survey 4: first week of July (Puget lowlands) through second week of July (outer coast and Columbia River). At sites where access is limited, priority should be given to May – July surveys.

Line transects – observers should be positioned 75 m from the survey boundary and 150 m apart (to avoid double-counting and to maximize detection ability) on predetermined transects and should maintain a slow-moderate, synchronous pace. Observers should stop every 150 m (paced) for approximately 1 minute to listen and scan for larks. Pausing to confirm detection or behavior should not exceed 5 minutes, and all observers should pause and remain parallel during that time. Observation time exceeding 5 minutes will be considered “off-effort” wherein no additional birds observed in the area will be recorded. Once observers resume moving, begin recording again as “on-effort”. Transects should cover as much suitable habitat as possible in the allowed time window. Surveyors must be adept at recognizing vocalizations of male streaked horned larks, flight display behavior, and differentiating larks by sex and age. Periodic testing may be required.

Every effort should be made to cover all areas with suitable habitat, preferably each time a site is surveyed. However, varying the area surveyed during each of the four surveys is acceptable for large expanses to ensure complete coverage. Observers should walk transects in the opposite direction on subsequent surveys. Observers should rotate between transects on subsequent surveys as well as sites, when possible.

Within their designated field of vision, observers will independently record the approximate detection location of each bird on an area orthographic map, as well as the corresponding bird number from the field form. Transect Number, Time of detection, Age, Sex and Behavior - Primary Behavior when first observed and Secondary Behavior subsequent to detection (see below). Observers may communicate with each other by radio or cell phone if necessary to avoid double counting; however, the lead observer will make the final decision if questions arise. Observers may briefly leave a line to avoid flushing birds or disturbing nests. Recording GPS locations of observers at the beginning and end of each transect will assist with maintaining proper distance and direction of travel.

Data Recording: (field form attached)

- To avoid confusion, the date should be written with a two-digit numeric for day first, the month using a three-letter abbreviation (e.g., Feb, Mar) second, and the year as a four-digit number last (ex. 26FEB2010).
- The lead observer should record surveyors' full names (not just initials), cloud cover, wind, precipitation, and air temperature as averages for the entire survey.
- The lead observer should record the survey start/stop times and survey duration. Time should be recorded on a 24-hour clock to avoid confusion with differentiating AM versus PM (e.g., 5:00 PM is 1700 hrs).
- Each observer will receive an ortho map of the survey area, containing transect lines and start/stop locations for each transect.
- Each observer will receive data sheets for recording detections and a notes sheet.
- Record any incidental nests found--mark location on ortho, record coordinates and contents on notes sheet.
- Data to record for each detection include:

TRANSECT # - refer to ortho map for an observer's transect position

TIME of Detection – using 24 hour clock

AGE – A (adult), YOY (young of the year), U (unknown)

SEX – M (male), F (female), U (unknown and young of the year)

PRIMARY BEHAVIOR (when first observed; use one code from each group) – **FLT** = in flight, or **GRD** = on ground; **VCL** = vocal or **SIL** = silent

SECONDARY BEHAVIOR (subsequent to detection; can use more than one code) – **S** = Song, **C** = call (males or females call from an elevated height), **F** = Foraging, **FD** = flight display (males rise, sing, drop, sing, before diving to ground), **FL** = flight, **A** = agonistic behavior (chase or aggressive contact), **AI** = alert posture (standing erect with neck extended and appearing vigilant but not singing or

calling), **FC** = food carry, **CO** = copulation, **NM** = carrying nest material, **FS** = flushed, **R** = resting.

- The lead observer will collect all observers' bird detection field forms for the survey and consolidate into a single document. The lead observer will be responsible for entering all data digitally into the annual Survey Results spreadsheet. Mary Linders will distribute the annual Survey Results spreadsheet template prior to the beginning of each year's survey season.
- Copies of maps and all detection field forms will be submitted to Scott Pearson, WDFW for inclusion in the WSDM database. Original maps and individual observers' field forms will be retained by regional district biologists. Digital data will be submitted to Mary Linders, WDFW using the completed Survey Results spreadsheet (see bullet above).

Appendix B. Streaked horned lark survey results for 2010 by site and date in Washington

Site	Date	M	F	Unk Sex	# Adults	# YOY	Unk Age	Total
McChord	04/26/2010	10	6	3	19	0	0	19
McChord	05/19/2010	13	7	6	26	0	0	26
McChord	06/18/2010	11	3	3	17	0	0	17
McChord	07/09/2010	9	0	3	7	0	5	12
GAAF	04/28/2010	11	15	4	30	0	0	30
GAAF	05/24/2010	15	11	3	29	0	0	29
GAAF	06/07/2010	10	3	6	19	0	0	19
GAAF	07/16/2010	6	4	8	13	3	2	18
13th Division	04/29/2010	3	2	2	7	0	0	7
13th Division	05/11/2010	0	0	1	1	0	0	1
13th Division	06/03/2010	1	2	0	3	0	0	3
Range 76	04/28/2010	0	0	2	0	0	2	2
Range 76	05/27/2010	5	1	0	6	0	0	6
Range 76	06/08/2010	10	1	1	12	0	0	12
Range 76	07/07/2010	3	0	3	4	2	0	6
Olympia Airport	04/29/2010	23	15	2	40	0	0	40
Olympia Airport	05/13/2010	20	13	11	43	0	1	44
Olympia Airport	06/24/2010	35	8	1	44	0	0	44
Shelton Airport	04/30/2010	6	6	0	12	0	0	12
Shelton Airport	05/11/2010	6	8	1	15	0	0	15
Shelton Airport	06/21/2010	9	3	1	12	1	0	13
Shelton Airport	07/06/2010	7	4	2	11	2	0	13
Cottonwood	05/11/2010	0	0	0	0	0	0	0
Crims	05/11/2010	0	1	1	2	0	0	2
Crims	07/20/2010	0	0	0	0	0	0	0
Miller Sands	05/10/2010	2	2	2	6	0	0	6
Miller Sands	06/01/2010	3	2	0	5	0		5
Pillar Rock	05/10/2010	3	2	0	5	0	0	5
Pillar Rock	06/01/2010	2	1	1	4	0	0	4
Pillar Rock	07/20/2010	1	0	0	1	0	0	1
Rice	05/10/2010	5	0	5	10	0	0	10
Rice	07/20/2010	6	2	6	8	0	6	14
Sandy	05/11/2010	1	0	0	1	0	0	1
Sandy	07/20/2010	0	0	0	0	0	0	0
Tenasillahee	05/10/2010	2	2	0	4	0	0	4
Tenasillahee	06/01/2010	1	0	0	1	0	0	1
Tenasillahee	07/20/2010	1	0	1	2	0	0	2
Wallace	05/10/2010	0	0	0	0	0	0	0
Wallace	06/01/2010	0	0	0	0	0	0	0
Wallace	07/20/2010	0	0	0	0	0	0	0
Welch	06/01/2010	1	1	1	2	0	1	3
Welch	07/20/2010	1	2	0	3	0	0	3
Whites	05/10/2010	15	4	10	29	0	0	29
Whites	06/01/2010	10	2	0	12	0	0	12
Whites	07/20/2010	5	2	25	18	1	13	32

