

**Streaked Horned Lark Monitoring
at Herbert Farm Natural Area, 2021**



Photo: Joel Geier

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**Prepared for:
Institute for Applied Ecology**

October, 2021

Background

The Streaked Horned Lark (hereafter lark) is a Threatened species under the U. S. Endangered Species Act (Federal Register, October 2013, 78 FR 61452). The majority of its population (<2,000 birds) occurs in the southern Willamette Valley, Oregon on private agricultural lands where they nest in the edges of fields, roads, swales, vernal pools, and other sparsely-vegetated areas (Altman 2011). A critical recovery objective is to secure more populations on dedicated conservation lands where habitat management and other conservation actions can be targeted for them ([USFWS] U.S. Fish and Wildlife Service 2019).

Goal and Objectives

The primary goal of this project is to contribute to lark recovery in the Willamette Valley, Oregon through research and monitoring at a conservation site. There were two objectives in 2021:

- 1) Conduct monitoring to determine occurrence, abundance, and nesting status of larks.
- 2) Identify lark nest site locations to provide real-time updates for avoidance during ongoing habitat management and restoration activities during the breeding season.

Site

Herbert Farm and Natural Area is a 221 acre conservation property just south of Corvallis, in Benton County, Oregon. It is owned by the City of Corvallis with a conservation easement facilitated by the Oregon Department of Fish and Wildlife and Bonneville Power Administration. The easement preserves and protects the conservation values of the property in perpetuity as mitigation for the Willamette Basin federal hydro-electric dams and reservoirs. The property is bordered by the Marys River and Muddy Creek, and has remnant flood channels and swales formed by the rivers during previous floods.

There has been recent and ongoing conversion from agriculture (i.e., grass seed fields) to native prairie on over 100 acres on the east end of the property. One 25-acre section, which had been in chemical fallow since 2014, was seeded in fall 2018 and 2019 to create a mosaic of bare ground and sparse, low-statured vegetation. This field had two berms created by the USFWS Partners for Fish and Wildlife Program to flood swales and potentially create more suitable lark habitat during the breeding season. An additional 84 acres was put into chemical fallow in 2017-2018. Thirty-five acres of this area was seeded in fall 2020, and the remainder was in chemical fallow through 2021.

The property is less than one mile from the Corvallis Airport, which supports the largest known population of larks in the Willamette Valley. Larks were known to have nested at Herbert Farm prior to 2014 in sparsely vegetated areas of natural swales, roadside ditches, and field borders of the grass seed fields (R. Moore pers. comm.). However, from 2014-2018, there were only a few sightings and no known nesting (Altman 2015, pers. obs.). This coincided with a substantial drop in the local population of larks in 2014, likely due to an extreme weather event in December 2013, which resulted in the Corvallis Airport population reduced by approximately 50 pairs of larks (R. Moore pers. comm.).

In 2014, there were regular sightings in June and July of a pair of larks in a prairie restoration field west of the current prairie restoration. It is likely they attempted to nest given the amount of time on site, but no fledglings were observed. In 2015, there were no sightings until July when a pair was detected in that same field that included a male banded at the Corvallis Airport in 2012 as a nestling (Altman 2015). These late season sightings were likely birds displaced from nesting attempts elsewhere. In 2016, there was one territorial pair prior to the nesting season, and sporadic occurrences of at least five individuals but no nesting was documented (Moore 2016). In 2017, there was only a single bird detected on one occasion (Moore 2017). Artificial conspecific attraction using playbacks and decoys was conducted from 2018-2020 (Lapinski and Bahm 2018). In 2018, there were only three sightings in April in advance of the breeding season. However, in 2019 there were 2-3 nesting pairs (Altman 2019), and 3-4 nesting

pairs in 2020 (Altman 2020). Artificial conspecific attraction was discontinued in 2021 with the establishment of a population.

Methods

Surveys

Lark surveys were conducted using an area search methodology in which the observer moves freely through a defined area emphasizing time spent in locations where birds are occurring (Ralph et al. 1995). This method results in complete coverage of the area, with the freedom of movement to seek out and follow-up on detections.

Area searches were conducted at least twice a week during the breeding season and twice a month during the pre-breeding (April) and post-breeding season (August). Most visits were at least two days apart, conducted during morning hours when birds are most active (i.e., before 11 am), and only under favorable weather conditions for bird detection (i.e., no rain or high winds). The number, gender, and age of all larks was recorded. Each visit took approximately 1-2 hours to document the occurrence and nesting status of any larks. Results are presented as total count of birds by gender and by adults versus hatch-year.

In addition to area search population counts, most of the time was spent trying to locate lark nests. Nests were located through behavioral approaches (Martin and Conway 1994). Nests were marked by inconspicuously placing colored flagging or natural material (e.g., rocks, sticks) within a few meters of the nest in a manner conducive to relocation yet minimal in visual prominence, and revisited in a manner to minimize predator attraction and investigator-induced predation (Martin and Conway 1994). To determine nest outcome, nests were checked every 1-4 days until either the young fledged or the nest failed. A nest fledging at least one young was considered successful. If nest contents (eggs or nestlings) were removed more than two days before the projected fledging date, and the parents could not be found feeding fledglings or behaving in a protective manner, the nest was considered depredated. Causes of nest failure were surmised based on examinations of the nests and the surrounding area (Patterson and Best 1996). At 5-6 days of age, each nestling was uniquely color-banded with two bands on each leg, a USFWS aluminum band and color band on one leg, and two color bands on the other leg.



Photo: Bob Altman

Results

Larks were detected on all 31 surveys (Table 1). There were 3 confirmed nesting pairs, although there were an additional 1-2 males throughout May suggesting at least a fourth pair.

Table 1. Streaked Horned Lark breeding season surveys at Herbert Farm and Natural Area, 2021.

Date	Adults			Hatch-Year	Comments
	Male	Female	Unknown		
4/12	3	3	0	0	
4/21	3	2	0	0	
5/2	3	3	0	0	pair at parking spot on bend; another pair flew E where male seen later (sing); 3 rd pair flew far to north
5/9	4	3	0	0	2 males and 1 female near road; pair NW near parking; pair on road near parking and in filberts, may have doubled up on one male
5/11	3	2	0	0	female gathering nesting material ~80 m SSE of parking area; female on W side of big swale that drains to triple culverts, 100 m S of road; male nearby
5/13	4	0	0	0	at least 4 males, possibly 5, singing and interacting out in big swale SSW of triple culvert
5/16	4	3	0	0	pair ran out in area ~50 m S of triple culverts; second pair just WSW beyond flagging. 3 rd pair in native annual plantings ~12 m SSW of flagging
5/23	4	2	0	0	nest HEFA.01 has 2 eggs, pair nearby; second pair ESE across big swale; 2 other males in territorial interactions in swale S of parking area
5/25	5	3	0	0	nest HEFA.01 failed (predation), pair still in area; noted crows foraging around parking area to west of nest; found nest HEFA.02 just SE of parking area
5/29	2	2	0	0	one pair near HEFA.02; another pair on east side of triple-culvert swale
6/2	3	2	0	0	nest HEFA.02 has 3 nestlings, adults nearby, female seen carrying food to nest area; second female and two males in triple-culvert swale, female just foraging
6/4	3	3	0	0	nest HEFA.02 has 3 nestlings; found HEFA.03 with pair carrying food to 2 nestlings; third pair in triple-culvert swale, female flushed with alarm calls.
6/7	3	2	0	0	nest HEFA.02 fledged, but one banded nestling (yal:db/r) found dead 35 m from nest; still 2 nestlings in HEFA.03, look ready to fledge
6/9	3	1	1	0	nest HEFA.03 apparently fledged, female appeared to be carrying food into vicinity of nest
6/15	2	0	0	0	short visit as heavy showers moved in. At least two males, possibly three
6/16	4	3	0	0	pair flying reluctantly in restoration plantings S of HEFA.03; also pair in SE area and on road
6/21	3	1	0	0	no obvious nesting behavior, males all singing; female foraging alone west of HEFA.03

6/23	3	1	0	0	pair sneaking around by parking spot; grass seed harvest in progress with 30+ TUVUs, 2 CORAs and 1 BAEA scavenging adjacent fields
6/29	2	1	0	0	pair just north of parking spot at right-angle turn, then later back along road west of triple culverts, no sign of nesting or tending young
7/2	1	1	0	0	pair near N44.51880, W123.29025; searched area but could not find nest; could possibly have been one more male nearby
7/5	3	3	0	0	two pairs foraging together in SC part of site; pair with new nest start in swale in restoration area SW of parking area (nest complete and ready for eggs)
7/7	3	1	1	0	nest HEFA.04 has 1 egg
7/9	3	3	0	0	nest HEFA.04 has 2 eggs; second pair may be nesting near HEFA.02, saw female go in twice; third pair farther east by swale
7/13	3	1	0	0	nest HEFA.04 with 2 eggs; female nearby; harriers hunting over suspected nest area near HEFA.02
7/15	3	2	0	0	nest HEFA.04 still with 2 eggs; pair near HEFA.02, female with small food item; made short flight and dropped down in weedy area just to S
7/19	2	2	0	0	nest HEFA.04 still 2 eggs with pair nearby; no eggs in new nest start(?) HEFA.0a to S of HEFA.02; second pair seen twice near HEFA.03
7/20	3	2	0	0	nest HEFA.04 still 2 eggs with pair nearby; no eggs in HEFA.0a; pair sneaking around in open area of new plantings WSW of there, returned to same area
7/23	4	2	0	1	no change in HEFA.04, looks abandoned; HEFA.0a partly dug up; unbanded juvenile in new prairie plantings to W, then flushed out to near HEFA.02
7/26	2	1	1	0	no change in HEFA.04, looks abandoned though pair nearby; one male singing near parking
8/4	2	3	0	4	female with food near fledglings but not interested in them and then flew with food a pretty long distance
8/18	3	3	0	4	

Four lark nests were located and monitored (Table 2). Two were successful fledging five birds. Predation of eggs was the cause of failure in one nest, and the other was abandoned prior to hatching of the eggs. One additional nest start was located, but it never had any eggs laid.

Table 2. Streaked Horned Lark nest monitoring summary at Herbert Farm and Natural Area, 2021.

Nest	Date	Contents	Outcome	Comments	Coordinates
HEFA.01	5/17	nest building	failed	predation on eggs	44.51912, -123.28900
HEFA.02	5/25	3 eggs	successful		44.51904, -123.29030
HEFA.03	6/4	2 nestlings	successful		44.51947, -123.21987
HEFA.04	7/5	nest building	failed	abandoned	44.51941, -123.29262



Photo: Bob Altman

Five nestlings from two nests were uniquely color-banded (Table 3).

Table 3. Streaked Horned Lark color-banding summary at Herbert Farm and Natural Area, 2021.

Date	Band Number	Right Top	Right Bottom	Left Top	Left Bottom	Nest
6/2	2821-72631	dark blue	light blue	yellow	aluminum	HEFA.02
6/2	2821-72632	dark blue	red	yellow	aluminum	HEFA.02
6/2	2821-72633	dark blue	orange	yellow	aluminum	HEFA.02
6/4	2821-72634	dark blue	yellow	yellow	aluminum	HEFA.03
6/4	2821-72635	dark blue	dark green	yellow	aluminum	HEFA.03



Photo: Bob Altman

There were no live resightings of any of the color-banded fledglings. One fledgling was found dead five days after banding approximately 40 meters from the nest. There were four unbanded fledglings detected in August suggesting at least two more successful nests that were not located.

There was one resight of a color-banded bird from a previous year. A nestling banded in July 2020 was observed and photographed in May 2021 approximately nine miles away on Finley National Wildlife Refuge (B. Root, pers. comm.).

Discussion

Lark Habitat

Larks evolved as an early-successional landscape-dependent species. The key features are a large landscape of herbaceous vegetation that includes areas that are sparsely vegetated. Herbert Farm is in the developing stages of prairie restoration from a former grass seed field. These types of sites have the potential for significant lark colonization, especially in the first couple years. Colonization by larks often occurs after ground disturbance that results in substantial bare and sparsely vegetated ground. However, larks have high breeding site fidelity, and movement to a new site is usually dependent on the presence of a population nearby that has displaced individuals seeking suitable nesting habitat. This displacement is typically the result of vegetation succession moving a site out of suitability, or disturbance during the nesting season from agricultural operations in the fields where they are nesting.

Herbert Farm occurs within a local landscape that has patches of suitable habitat in grass seed fields (e.g., field edges, swales, drown-out depressions), and includes one of the densest populations of larks throughout their range (i.e., Corvallis Airport approximately one mile away). Thus, there is regular opportunity for displacement of birds from the nearby agricultural fields, and from dispersing birds in years when the airport population is productive.

The last 3-4 years there has been abundant suitable lark habitat at Herbert Farm due to the initiation of prairie restoration, which required extensive spray-out of the former grass seed field, and the presence of four natural swales to provide potential mid to late season breeding habitat. Additionally, in 2018 there was berm creation within one swale to expand potential lark habitat by retaining more water for a longer period to extend the temporal suitability of conditions for nesting within a season. In 2019 and 2020, larks did not nest in any of the swales, but in upland areas between swales where there was variable degrees of spray-out and some disking and plowing, and suitability through the breeding season. In 2021, one late season nest was located in a swale.

As prairie vegetation becomes more established over the first 2-3 years post-restoration, the habitat typically becomes less suitable for larks and the population declines. The ability to maintain a population is usually dependent on the natural or created presence of swales or vernal pools. These areas hold water longer in the spring and dry-out at variable rates depending on water depths and other factors. They provide potential suitable habitat for larks, which use the sparsely-vegetated dry-out areas for nesting and foraging. As the prairie becomes less suitable for larks with vegetation development, vernal pools or swales can provide some annual suitable habitat for nesting larks. However, this is dependent on the timing of the draw-down of the water (e.g., wet winter/spring versus dry winter/spring), and the degree of sedimentation and seed sources within the vernal pools (which changes over time). Both of these and other factors can affect the type and rapidity of the vegetation development within the vernal pool, and hence the presence and amount of suitable habitat for larks.

Due to concerns from the City of Corvallis (landowner) and Oregon Department of Fish and Wildlife (conservation easement holder) over the long-term cost of maintaining bare ground and sparse vegetation, most of the newly-created habitat will become more typical vegetated prairie which is less likely to be favorable for larks. In September 2021, two new berms were created at swale outlets to provide more bare ground and sparse vegetation as waters recede in the spring. It is hoped that these swales will provide ongoing habitat for the small resident population of larks.



Photo: Bob Altman

Lark Populations

Larks have high site-fidelity, and since there was no recent nesting at Herbert Farm prior to 2019, there were no birds imprinted to return there to nest. With at least two pairs and two successful nests in 2019 and 2020, and 3-4 pairs and successful nesting in 2021, there is the potential to maintain an annual population at Herbert Farm from returning site-faithful birds.

The reestablishment of a population in 2019 was likely due to the increase availability of habitat once prairie restoration started, and potentially enhanced with artificial conspecific attraction (Altman 2019). However, the size and persistence of a population at Herbert Farm is dependent on several factors. First, small populations can have a tenuous existence since they are always subject to extirpation from multiple factors associated with natural annual variability (e.g., productivity, over-winter survival) or stochastic events like an extreme winter storm in 2013 that reduced the population at the Corvallis Airport significantly in 2014. Secondly, as natural succession occurs in the prairie, there will be less habitat available, and larks will be mostly dependent upon the degree to which the swales can provide

suitable habitat. As described above, this is an unknown with a great deal of potential annual variability due to water levels and draw-down rates, but often it is a reduced feature over time as the seed source builds up in the swales resulting in a more rapid denser vegetation layer.

There is the potential that Herbert Farm could support 3-5 pairs of nesting larks in the next two years within the early restoration prairie and swales, but after that the population would likely drop to 1-3 pairs when only the swales are available as habitat. This could drop to zero pairs in some years if productivity or survival is poor which would then put the site in the need of recruitment from outside. Also if vernal pools become vegetated too quickly and provide limited lark habitat, alternatives in the fully restored prairie would be some annual spring spot-spraying of patches of invasive species or creation of small “sacrifice” areas where prairie vegetation is not emphasized and spot-spraying is used to provide suitable lark habitat conditions.

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Acknowledgments

Funding for this project was provided by the U.S. Fish and Wildlife Service and administered by the Institute for Applied Ecology. Peter Moore of the Institute for Applied Ecology coordinated the project within the context of the prairie restoration activities. Special thanks to Joel Geier who conducted the lark monitoring, and the City of Corvallis for providing access to their land and support of this research for lark conservation and recovery.