Habitat Characteristic Assessment Tool – Hannah Anderson, CNLM
A document published in April 2015 describes a stepwise process to identify streaked horned lark habitat. The document attempts to identify landscape, site, and patch habitat features used by breeding streaked horned larks (*Eremophila alpestris strigata*). The information is provided in a hierarchical framework from weakest to strongest evidence of suitable habitat to help inform where to focus potential survey effort. Quantitative assessments were relied upon to describe lark habitat but qualitative descriptions of occupied habitats and expert opinion were used where necessary.

When using this document, it is important to consider that there was little to no information available on the relative influence of different habitat conditions on lark reproduction and survival. In addition, larks readily use landscapes recently modified by humans (e.g., airfields, expanses of dredged material, agricultural fields), which indicates that the landscapes used by larks today are not necessarily reflective of those used in the past. Thus, the fitness consequences of habitat selection to larks are not discussed.

Finally, because larks tend to use early successional habitats and vegetation conditions may change rapidly within and between seasons, habitat suitability may change over time depending on the site, the type of vegetation, and the nature of past and ongoing human disturbance. Because of these changing conditions, it may be necessary to periodically re-evaluate a site’s suitability.

The document is not regulatory. It will be up to regulatory agencies to determine if and how to use the information in this report. The goal was to help focus monitoring and surveys in areas that are more likely to supporting nesting larks. Streaked horned larks are federally listed as Threatened under the Endangered Species Act, which is regulated and enforced by the US Fish and Wildlife Service. If readers have questions about habitat suitability or the need to conduct surveys, they should contact their local US Fish and Wildlife Service office for guidance.

The document can be downloaded at:
cascadiaprairieoak.org/documents/streaked-horned-lark-habitat-characteristics

Lark Occupancy and Abundance Protocols – Scott Pearson, WDFW
A draft protocol document has been produced, led by WDFW, to define the timing, frequency, and methods to determine occupancy and abundance for streaked horned larks. While initially the task was to create an occupancy protocol, the document goes further than just occupancy because how you determine
occupancy needs to be put into context of where you might look. The document presents both field protocols and justifies the methods.

All the data was brought together to understand the phenology of the species and give a clear picture of when surveys for breeding season adults should be done. Nesting phenology is very similar for all parts of the range. The document also addresses issues of detectability, which can be influenced by a large number of factors.

Results show that the probability of detecting larks if the site is occupied (i.e., the probability of occurrence) increases with number of visits (84% probability with 3 visits, 91% with four visits, and 95% with 5 visits). USFWS will have to make a determination regarding what level of effort is required for occupancy surveys.

**Protocol will be available at cascadiaprairieoak.org once finalized.**

**Update from Washington State Surveys - Derek Stinson, WDFW**

Standardized surveys at all known occupied sites in Washington have been conducted by a variety of partners for several years. Derek presented the raw counts for 2015 as well as past year’s results.
Abundance and Trends for Puget Lowlands and Lower Columbia River/Coast 2010-2014 - Scott Pearson, WDFW

As described in the protocol document, the first step for lark monitoring is to set the sampling frame of where we are going to look. Once you are at the right habitat, then use the occupancy protocol to confirm habitat is occupied. Once we know it is occupied, then use abundance protocol to determine abundance and trend.

Users will want a statistically based sampling plan (or set of plans) to monitor population trends within occupied sites (a temporal assessment that may be conducted at the site or landscape scale). Trends may be based on abundance or occurrence as appropriate.

When looking at trends over time, it is necessary to address issues of detectability. There are both field methods and statistical methods to address the issue. For instance, distance sampling addresses issues of imperfect detectability, but can be problematic because it requires accurate estimates of distance in the field. This can be addressed with a single well-trained crew that calibrates regularly. However, lark surveys are accomplished by many different individuals across several entities making training and calibration difficult. So, instead, WDFW used an analytical approach, the N-mixture analysis, which uses data from standardized surveys, repeated 1-4 times per season.

Good news: Previous estimates of population growth (lambda) based on vital rates and data from 2002-2005 indicated larks in these same geographic regions were declining by 38% per year (λ = 0.62 ± 0.12 SD) (Camfield et al. 2010). However, these recent results suggest relatively stable breeding populations.
Results show that males and females have a very different detection probability, with detection higher for males. Results also show that we are starting to see divergence in trends between males and females. Females showing decline in year to year comparisons, males even showing increasing trend. Suggestion that there is a need to see more years of data before becoming alarmed by the loss of females.

Some thoughts regarding why females might be declining:
- When bird sex ratios are skewed they tend to be male biased – not uncommon for passerines (See review by Donald 2007).
- But for larks, we weren’t seeing a male biased population and now we are.
  - Longer dispersal for females
  - Predation during incubation
  - Differences in foraging behavior
  - Differences in wintering habitats for migratory species
  - Introduced predators
  - Females being the heterogametic sex may be more prone to the expression of recessive mutations
  - Small and declining populations are more likely to exhibit male biased sex ratios.
  - Physiological demands on females greater, so if there are limited resources, the effect to females may be higher.
  - Renesting causes females to spend more energy. Less cost to a female when there is less predation.

WA Coast Update - William Ritchie, UWFWS
Habitat restoration work at Leadbetter Point continues on 450 acres. Historically, Leadbetter was a very open terrain consisting of hummocks and swales. *Ammophila* builds the dune, stabilizes the dune, and shrinks the beach profile. In 2002 *Ammophila* removal began to increase quality and quantity of plover/lark habitat.

Initial plan was to clear an area behind a back dune and put in connective corridors out to outer beach. But, connectivity not really working and predators were targeting the corridors. In recent years, they’ve removed all the grass in the swale and made a contiguous connection between interior and exterior areas.

Habitat management process:
1. Post-nesting herbicide treatment – helicopter
2. Bulldozing, disking/tilling, spreading shell hash in wintertime
3. Maintenance – disking, harrowing, spot herbicide, hand pulling, uproot clumps

Have now about 450 acres and can’t maintain it all to one standard (lark or plover) in each year, so have a moving mosaic of habitat that moves from lark to plover to lark to plover to unsuitable etc…

At other sites (e.g., Midway beach state and private land just to the north) there has been change to where the habitat is, but not much change in the amount of the habitat. Suitable habitat is now closer to the beach and that is where interactions with public are likely not good. Damon Point has a lot of invasives and human recreation; habitat there is shrinking in quality and amount. Graveyard Spit probably has more habitat than in recent years due to Corps dredging. Also coastal sites open for motorized vehicles; there are only two sites where they are not allowed - Damon Point and tip of Long Beach peninsula.

Predator management is underway on the Coast aimed at predators (primarily corvids) of western snowy plover at 2 sites, Leadbetter Point (3rd year) and Midway Beach (2nd year). Predator management plan is
to decrease foraging in horned lark and snowy plover nesting areas by controlling litter, restoring habitat, and deterring human use of area. Direct hazing and removal of problem individuals also occurs, but limited lethal control needed. For plovers they are seeing good effect of the predator control and increased reproductive success. Assume similar effect for larks.

**Willamette Valley Airport Update - Randy Moore**

Surveys were conducted in 2015 at Corvallis, Eugene, Salem, and McMinnville. The latter three were not airport wide surveys, but were in response to FAA sponsored projects that needed to go through for the next year or two.

**Eugene**

Small section of main runway at Eugene that had about 12 pairs of larks breeding around it, which was a small area of the airport. Eugene has the potential to being one of the big strongholds of consistently available lark habitat in the valley. There are more projects coming up, so we’ll be able to do better surveys throughout the airport so they can plan around the regulatory process for their upcoming projects.

**McMinnville**

There were 5-6 pairs detected along the main runway. Randy’s guess is that there are about 12-15 pairs there. They were able to minimize the impact to larks and thus dodge the regulatory burden by changing the date of their event to 22-23 August. That date may not typically be late enough at a place like CVO where there are lots of pairs. However, could work for fewer animals and at CVO in early August there was only one active pair.

**Salem airport**

Air Nat’l guard portion of Salem does not have larks. Reports of other places indicate there are only few pairs there. The habitat there is not so great for larks and there is much less of it.

**Corvallis**

The Corvallis airport used to support the largest localized population that we knew about. In 2014 there was a population crash. The number of territories dropped by 1/3 (loss of 44 territories) and the number of mated pairs dropped by 2/3 (loss of 25 pairs); prior to 2014 it was unprecedented to have more than one or two unmated males. In 2015, there was a slight recovery, essentially the same number of territories, with about 35 mated. There was not a noticeable difference in habitat to explain the crash. Also in 2015 there was some “weird stuff” happening – pairs were there, and then not there for a month, and then back - several times throughout the season.

Extensive work on nest survival and post-fledgling survival (via telemetry) has been occurring for several years now. The nest survival of larks in the agricultural matrix is extremely variable throughout the breeding season. The beginning of the season daily survival rate (DSR) is extremely low, attributed to very high levels of predation – primarily northern harriers and kestrels. When the grass seed harvest occurs sometime mid-season, the avian predators switch their prey base and move into the harvested fields to eat small mammals exposed by the harvest. At this time lark nest survival increases dramatically.

Huge variability in reproductive success rates through time due to this phenomena: in 2012 rep success ranged from 1.5% - 63%. In 2014 in ranged from 10.1% - 78%. A very similar pattern of variable success depending on timing observed for fledglings 0.1% - 79% in 2012 and 0.0% - 88.5% in 2014.

Translating DSR to overall rep success in 2012 = 1.5% to 63%. Huge variability – from extremely low to extremely high. Depending on when the grass harvest is, early (early-mid June) or later (late July) larks can get different levels of clutches out when there is less predation pressure.
**Willamette Valley Refuges - Graham Evans-Peters, USFWS**
The refuge was established in the 1960s for dusky Canada geese – over 10k acres. The refuge hosts a robust cooperative farming program to create food for geese, which is working. There is a disproportionate amount of geese that use refuge lands. 50k to 100k geese use the 3 refuges in winter.

Agriculture is the most dominant habitat type typically producing Annual rye, perennial rye, and tall fescue. Geese occupy the fields from Oct-May, which provided an incentive for the farmers: they get to plant a spring or summer crop after the geese use up the winter grass crops.

Annual rye is a crop that really sets us set up well for larks. Geese really hammer it. As long as there is no spring/summer crop they have the management option to do whatever they want for larks. If they leave it alone and do nothing, lots of regrowth. So manage with disking and chemical fallow.

Ankeny gives the best conditions for larks and most flexibility for treatment. There is quite a bit of riparian habitat and wet/clay soils. Those soils prohibit perennial rye and tall fescue, so grow a lot of annual rye there. FWS farms most of the annual rye themselves because it is basically a complete loss. In order to convince them to do that, need to incentivize with allowing summer crop or giving other fields. At Ankeny, they are currently managing about 150 acres for lark conditions, 50 acres at Basket, and some also at Finley.

The abundance protocol was followed at the three sites as well as one added survey in early August to look at recruitment. Estimates of pairs are:

- Ankeny: 8 pairs
- Basket: 23 pairs
- Finley: 8 pairs
- Private lands – WRPs: 15 pairs

**Port of Portland Update – Nick Atwell, Dana Green, Port of Portland**
3 pairs estimated at the SW Quad of PDX, 5 pairs estimated at Rivergate.

Port continues to plan for development at Rivergate. They are now looking at developing an HCP that would utilize occupied river sites that are no longer planned for dredged material placement as conservation measure.

Q: what are the mitigation ratios the service is looking for?
FWS response: Don’t know yet. Also with larks, have to factor in the “discount” of habitat maintenance that would otherwise be lost if no habitat management and disturbance occurred.

Speaks to the importance of a Recovery plan and building a conservation framework to show a net increase over time.

Concerns raised about going from 8 birds (RVG + Sandy) to 3 birds (just Sandy). An HCP should show net benefit, not just maintenance of one of the sites.

**Sauvie Island Update - Joe Lebezeit, Portland Audubon & Jane Hartline**
Audubon conducted surveys using the ODFW protocol for grassland birds (transects once per week late March – late July) at 4 ODFW Sauvie Island sites, including the Grandma’s kitchen site, where restoration actions are aimed at creating lark habitat. No larks were detected.
Playbacks and decoys were placed on Sauvie, but no larks were detected during once per week monitoring visits.

Sauvie Island does have a lot of the characteristics for larks and would like to have them live on the islands. Also, ODFW owns more than half of the island and have made a commitment to grassland birds and have designated 4 areas that will be focused on grassland birds.

**JBLM Update – Hannah Anderson, Adrian Wolf, Gary Slater, CNLM.**

**Minimizing Direct Impact**

CNLM is working with JBLM to provide to the minute updates on nest status and recommendations for avoidance. Nests are relatively easy to avoid, once you know where they are. The flightless and vulnerable fledglings are trickier. By resighting banded fledglings from known nest locations we documented that the mean distance of <14 day-old post-fledged larks from their natal nests was 118.6m (+9.3, n=33). CNLM recommends a 119m radius avoidance circle be placed around known nest locations during the 2 weeks post fledging to minimize impacts.

**Nest Survival**

We have calculated nest survival using the Program Mark on 118 nests with known fates. 2014 was a particularly good year, with Daily Nest Survival estimates of 71%. In 2013 DSR was 37%, 34% in 2012, and 38% in 2011. We’ve not yet calculated DSR for 2015, but the straight proportion successful was 63%.

**Genetic Rescue**

Due to observed low rates of hatching, in 2011 CNLM and WDFW with their partners embarked on a project to increase hatch rates by bringing in genes to the South Sound population from a population of larks not exhibiting low hatch rates.

To date there have been 20 eggs moved from Corvallis, only one animal has returned to breed in South Sound – named Brian after the biologist that brought his egg from Oregon. 2015 is Brian’s fourth breeding year. He had four attempts, with the fourth attempt successfully fledging 2 young.

WDFW is engaged in a genetic analysis for the project to look for evidence of inbreeding and to identify if Oregon genes enter the WA population and ultimately if there is an effect. Analyses are underway.

See the CPOP website technical library for reports on this project: [http://cascadiaprairieoak.org/technical-library](http://cascadiaprairieoak.org/technical-library)

**Survival**

Survival has a strong effect on population dynamics, and we ultimately aim to provide management recommendations to increase survival. CNLM is looking at lark survival in three life stages – adult, juvenile, post-fledgling. Below are some quick draft results:

Adult return rates – 2013 to 2014 - 71% banded adults returned. Small sample sizes. Good news: Camfield survival was 55% for males 47% for females, so now higher.

Juvenile return rates – substantially lower return rates for juvie females – 11%, 32% for males. Good news: Camfield survival 17%, our corrected estimate 27%.

Post Fledgling survival – very vulnerable stage, and best opportunity to have influence through management. The period fledging through 10weeks post-fledging was examined.
Looked at five 2-week periods, and the probability of surviving one period to the next. The only variable that showed an influence in the model was age. The first 2 week period they were particularly vulnerable. Cumulative probability throughout the full 10-week period is 32%. Once they survive to 10 weeks, they essentially enjoy survival rates of an adult.

Take home: They are extremely vulnerable during first two weeks post-fledging. There was no difference in survival detected between airfields and native prairie. There also is no info on causes of mortality to date. Future analyses with 2015 data hope to include year as a factor.


Lark Attraction
The management plan for the landfill is to be restored to upland prairie next and part restoration will include 10 acres of lark habitat, currently laid out in two 5-acre plots. The 1st was created in 2007 by placing dredged material. The 2nd was created in 2011 by being mowed, sprayed, disked top soil. Metro continues to disturb both plots each year to keep it low and in suitable lark conditions.

In 2015, we used vocal attraction in the 2nd plot and monitored the plot once per week to check for presence. No sightings in 2nd plot, despite playbacks, but there was one observation, an adult and juvie together, in 1st plot beginning of 5 August.

Safe Harbor
Safe harbor being negotiated for 3 sites owned by Metro. They are interested in getting the agreement because they have the potential to provide habitat for larks incidentally with management of wet and mesic habitats.

Although we don’t have it all wrapped up and signed in a pretty package yet (signed) we’ve been following the protocols that are described. The most important thing is that before we do any action in spring-early summer, we do area searches to determine if we have larks on the site. Also the draft agreement describes that if they find nesting larks there are some contingencies and buffers around nests or timing delays or activities. The document has drafted a lot of contingencies for habitat management actions that may be useful for other partners.

So far no larks have been detected at the sites during the breeding season. But it has taught us that doing these area searches every year will range from the $1000-$3000 range.

Columbia River Dredged Material Deposition Sites - Kris Lightner, Jake Watts, USACE; Gary Slater, CNLM.

The Army Corps has been following the plans outlined in their Biological Opinion regarding their dredged material deposition. There are 25 placement sites in their network from the mouth of the river to Portland. Not all sites are used for placement each year. The Corps is also tracking the effects of their actions via a habitat analysis using remote imagery to predict expanse of suitable habitat as well as CNLM-led lark monitoring. Results of those surveys were reported with WA update.

In addition, the Corps in collaboration with CNLM mapped territories of larks at several deposition sites. The primary objective of the territory mapping was to refine habitat analysis, also secondarily evaluate the accuracy of abundance survey estimates.
Territories were mapped at four sites – Brown, Crims, Sandy, and Sand islands, which represents a variety of deposition history and size. Territory mapping visits were conducted in mid-June to early July in an attempt to time surveys with imagery collection flight. Pairs were followed 30-60 minutes/locations were collected each visit with a total goal to collect >30 locations.

Most pairs were observed breeding except at Brown Island, where past deposition may have influenced use. At Brown there were 7-8 pairs observed, but breeding only observed in 3 use areas and there were an additional 5-8 single males.

Beaches and slopes were used by breeding larks. Abundance estimates between territory mapping and standardized abundance surveys were similar. But all males not paired and all pairs not breeding, which may lead to an overestimate of breeding pairs if using the high count of single males detected during one visit as the metric. Overlapping home ranges 0.5 to 3.5 ha (1.5 – 8 acres).

**NRCS Update - Chris Reidy, NRCS**

NRCS is revisiting opportunities to create and manage lark habitat. Traditionally our lark work has revolved around wetland restorations and vernal pool habitats, but not sure how many more of those will occur in the Valley. Need to look outside that if we’re going to make a dent in lark habitat.

Ideas include enhancing buffers around roadways, or other unproductive areas and how can we incentivize maximizing that kind of habitat, such as with a foregone income payment. In order for foregone income to work need to have large land owners that have a diverse enough operation for that enough. Need them to get “credit” for producers that come forward. Not just money but also visibility and good green label. Having discussions with regional folks and running some economic analyses to see if that can be something that can be offered to producers.

NRCS programs are a very locally driven process as local resource concerns identified within each region. Those strategies to address those concerns are where funding is directed. As such it is critical to have bottom up influence and need to infuse and influence local workgroup.

There are other challenges as well. Soil quality and soil health are resource concerns and strategies to address that are not compatible with larks, such like use of cover crops. Plus with 4d, they don’t have a need to do anything different unless there is some incentive to do that.

Chris imagines that NRCS can play some role, but have a relatively small footprint in the WV. And! Many grass seed producers are not eligible for NRCS programs.

**Partner Biologist – Bob Altman, ABC**

A Partner biologist is a well-established model for someone who works for an NGO, but sits in an NRCS office, and supports NRCS staff and helps NRCS implement programs specific to NGO objective. Works for their specific interest within the context of NRCS programs. ABC seeing incredible results getting habitat put on the ground in other areas. With the lark it is more than that, more challenging, merging agricultural practices with conservation.

All these questions and ideas that we have about getting incentives out to producers. The lark conservation community needs an individual devoted 100% on how to work these things out, to do the outreach with landowners/producers, and to work through the bureaucracy with the agency in order to get things done. Other benefits for this position is that the individual has flexibility to work with other partners too, maybe a certain landowner is not a good candidate for NRCS programs, but they could be a candidate for a FWS Partners, or ODFW private lands.
Bob has found some tentative money from ABC to help fund this position. Needs additional funding to make it go for a 2-yr position. ABC will support 1/3 of 2-yr position.

**Habitat Selection and Influence on Reproductive Success - Scott Pearson, WDFW**

WDFW recently conducted a new analysis on habitat characteristics and its influence on reproductive success using data collected 2002-2005 in Puget Lowlands and Columbia River/WA Coast. That document can be found on the CPOP website. Below is the abstract:

If habitat selection is adaptive and has reproductive consequences, it has important implications for conservation activities. When there is a relationship between habitat characteristics and nest success in birds, those characteristics can be manipulated to improve habitat quality and ultimately species vital rates. We examined habitat selection by the threatened Streaked Horned Lark (*Eremophila alpestris strigata*) at both the breeding-site (territory) and nest-site scales. Larks were selective at both spatial scales but with contrasting selection. At the territory scale, larks selected sparsely vegetated grasslands with relatively short vegetation. At the nest site scale, female larks selected sites within territories with higher vegetation density and more perennial forbs. These nest site scale choices had reproductive consequences with greater nest success in areas with higher densities of perennial forbs. Finally, we experimentally examined the effects of late summer prescribed fire on lark abundance and habitat characteristics and found relatively weak effects in the direction preferred by larks but that those effects quickly attenuated. These results highlight the importance of considering spatial scale and reproductive consequences of habitat selection and the importance of conducting restoration activities in a research context. For example, it appears that prescribed fire creates the sparsely vegetated conditions selected by larks but quickly attenuates suggesting the potential value of examining more frequent burns or hotter fires. Also, the observed benefits of habitat characteristics to nest success suggest the value of assessing the effects of creating forb rich patches within the sparsely vegetated landscape preferred by larks.

**FAA Update - Janell Barrilleaux, FAA**

FAA gives grants to airports to improve runways and such, and those are the things that have a federal nexus, which drives them to have to consult with FWS. Of the 25 airports that do or may have larks, FAA and FWS sit down together to talk about what upcoming projects are for all those airports and then plan out the year. Of these 25 airports, 5 of them have not yet been surveyed (Renton, Bowerman, King Co. International (Boeing), Pearson, Lebanon). Until there is a project that requires survey, FAA can’t go out and fund surveys. Of the 20 surveyed, 9 sites have had larks - Salem, Eugene, Corvallis, Tacoma Narrows, McMinnville, Olympia, Shelton, Independence, + one more! So, 11 have had surveys and have not detected larks.

**Washington Port Update - Martha Jensen, USFWS**

Port of Kalama looking to eliminate Northport site and are looking for nearby mitigation opportunities. FWS has talked about doing a consultation.

Port of Vancouver did a project that impacted habitat for larks at the Gateway site, but not permanent loss of habitat. Consulted with FWS.

Q: What are they required to do? They are maintaining as a dredge site and it has potential to be habitat again in the future. FWS did not push for mitigation.

Port of Olympia – airport site: Airshows are planned during the nesting season, in June and July. Asked to move them out of the nesting season, given lots of reasons why that is not possible. Airshow acrobats are scheduled nationwide not economically feasible to schedule outside of nesting season.
**CBD intent to sue USFWS - Jeff Dillon, USFWS**
Center for Biological Diversity sent USFWS an intent to sue in early August. Oregon Wild, and Oregon Wild also a partner in CBD. Felt that they should have listed as Endangered and they have challenged the use of the 4D.

**Recovery planning – Cat Brown, USFWS**
Service is moving in to a new way of Recovery planning. This new approach is called the Recovery Enhancement Vision (or REV). Old model is not so viable, given the huge number of species needing recovery plans. Rather, the new model will be more dynamic, but will still include a species status review, recovery strategy, goals and objectives with specific measurable targets, and schedule and budget. Old way is that the recovery plans were very out of date within a year or two, which hampered actions and funding as things changed.

The action plan will remain a very important piece of the Recovery Plan, and will be a more nimble, flexible way to identify the specific steps necessary to meet the overall recovery goals for the species. The action plan will continue to be used to guide funding and actions as long as they are in service to the goals/objectives that are set in Recovery Plan.

The USFWS has started to work on the components of the new REV Recovery Plan for the lark, and we hope to have a draft in 2016.