

Streaked Horned Lark Working Group

Annual Meeting | October 27 & 28, 2014 | Portland, Oregon

In Attendance

Bob Altman, *American Bird Conservancy (ABC)*; Hannah Anderson, Elspeth Kim, Bill Kronland, Gary Slater, Adrian Wolf, *Center for Natural Lands Management (CNLM)*; Janell Barrilleaux, Kayla Morgan, *Federal Aviation Administration (FAA)*; Evan Hayduk; Jeff Foster, *Joint Base Lewis-McChord (JBLM)*; Elaine Stewart, *Metro*; Les Bachelor, Jim Regan-Vienop, *Natural Resources Conservation Service (NRCS)*; Joe Buttafuoco, *The Nature Conservancy (TNC)*; Sue Bielke, Ann Kreager, Martin Nugent, Liz Ruther, *Oregon Department of Fish and Wildlife (ODFW)*; Randy Moore, *Oregon State University (OSU)*; David Shepardson, *Oregon Zoo*; Dana Green, Nick Atwell, *Port of Portland*; Joe Liebezeit, *Portland Audubon*; Kristine Lightner, *US Army Corps of Engineers (USACE)*; Cat Brown, Kim Flotlin, Martha Jenson, Molly Monroe, Kevin O'Hara, Nate Richardson, Bill Ritchie, Chris Seal, Rich Szlemp, *US Fish and Wildlife Service (USFWS)*; Mary Linders, Derek Stinson, *Washington Department of Fish and Wildlife (WDFW)*.

Day 1 – Project Updates

Survey Results

Washington Abundance Surveys – Mary Linders, WDFW

The purpose of the project is to conduct breeding season surveys for SHLA to estimate abundance and trends in abundance at occupied sites. The majority of known occupied sites in Washington are surveyed annually. The sites are mapped with transects and bird detections are recorded. There are three surveys per site, and data is provided based on max males per survey and also by mean males per survey, which give similar representations with the current data. The ultimate goal is to understand the abundance and trends at a regional scale (rather than at a site scale).

Scott Pearson will be leading an effort to use this data to look at the feasibility of the n-mixture model approach to understand trends in abundance and will have a recommendation next year (~Q4 2015). The 2014 pilot distance sampling data collected on two sites in the Columbia River will also be looked to see if it can inform n-mixture models.

SeaTac Surveys – Hannah Anderson, CNLM

Surveys were conducted at SeaTac. No SHLA were sighted, but many savannah sparrows were.

Washington Coast - Bill Ritchie, USFWS

At Leadbetter State Park, 80 acres have been improved and SHLA populations appear to be holding static. There are typically 8-10 breeding pairs with 2-3 nests per year. Not all suitable habitat, including some areas that are occupied, is being surveyed. At Midway Beach the

population appears to be declining with only 2 pairs detected in 2014. More funding and resources are needed to expand surveys in the future.

Port of Portland Metro Areas – Nick Atwell and Dana Green, Port of Portland

Numbers were the same this year as last. Breeding surveys at Rivergate were done by Randy Moore show that there were 6 breeding pairs this year, consistent with the 5-6 breeding pairs observed in 2013. At PDX's SW Quad there is a breeding area with 2-4 pairs, which is consistent with previous years. For areas where there might be upcoming activity for the airport, site-specific surveys are conducted. Surveys for larks at Hillsboro and Troutdale ports haven't resulted in any observed larks.

The Port hopes to get permission to band larks on their sites, and will work with Randy Moore to do the banding, if permission is acquired.

Columbia River Surveys – Hannah Anderson, CNLM

Known occupied sites were surveyed, as well as area searches at additional sites within USACE sites. Rice and Brown islands have the highest levels of abundance. There has been a slight increase in raw counts over the last three years, though the data don't account for movement between sites and detectability. Newly documented occupied sites are Dibblee Point, Lower Deer, Gateway, and possibly Austin Point. There is documented movement between sites from seeing them fly from one site to another, including observations of a lark flying from Sandy to Lower Deer and to Port of Kalama, which is about 1 km across the river. Larks have also been observed flying between Rice and Miller. With these flight detections, it might be beneficial to look at sites as clusters.

Nest Monitoring & Banding at JBLM – Adrian Wolf, CNLM

Larks occupy active training areas at JBLM, so the goal of nest monitoring is to minimize impacts to nests and individuals at airfields and training areas. Transects are also conducted to understand population trends and survivorship. Population monitoring results for 2014 included 28-30 known pairs across 3 sites at JBLM (Gray Army Airfield, 13th Division Prairie, McChord Airfield). Area searches were also conducted at suitable habitat sites (Training Area 6, Range 50). The area searches resulted in evidence of a lark population at Range 50. 16 larks were seen in the early season, 3 pairs observed later in the season. There has been a huge improvement to habitat at 13th Division.

In using the data to minimize impacts to nests, detailed maps are provided to airfield managers weekly, showing vulnerability periods that include egg, nestling, and an additional 2-weeks post-fledging until young are able to fly well. Communication with managers had good result in 2014 with fewer direct impacts to nests and young. In addition, from 2013 to 2014, the number of dead and unhatched eggs decreased. Hatch rates climbed from 2013 to 2014, and although the hatch rate is still lower than standard, it is much higher than 2010 when the hatch rate was only 40%.

In 2014 there were 104 lark young banded. This is an increase over past years, as there were only a total of 98 larks banded from 2011-2013. This increased the amount of banded birds, and allows informed observations of movement around the Sound. There were 4 observed dispersals of 1st year breeding birds (between-year dispersal). Data is still being analyzed regarding site to site movement. Next year, with the increased amount of banded larks, there should be a lot more information available about movement. In addition to the increased banding, [a flyer was distributed](#) to allow folks who observe larks ID and report banded sightings.

Citizen Science Project – Joe Liebezeit, Portland Audubon

The Portland Audubon set out last winter to do a citizen science project to conduct an SHLA census in areas that haven't been surveyed before. 20 experienced birders conducted surveys from January to March and covered almost 50 sites. No larks were sighted. Although the results were disappointing, absence information is still important and now the Audubon knows they can mobilize a group of experienced and competent birders. The Salem and Corvallis chapters of the Audubon are interested in expanding the effort. Depending on where the most important information gaps are, Audubon would be happy to help with rangewide presence/absence surveys.

Corvallis Airport Population – Randy Moore, Oregon State University

Corvallis Airport has had the biggest known population of SHLA for years. It is a large airport with very light air traffic, and is one of the few places in the Willamette Valley that consistently and annually has available habitat. There are usually 75-100 breeding pairs, but in 2014, only 40 territories were found, with 50 territorial males detected in all. This is an alarming decrease in the population. Although there were suitable habitat areas that were not occupied, only ~26 males mated throughout the beginning of the season which is an unprecedented low at the site. This is at least a 67% reduction in the airport population since 2012.

There is no definitive reason why there was such a huge drop in just 1-2 breeding seasons. Nest success was typical, if anything it was higher than usual, but overall numbers were lower because of so many fewer pairs. A potential reason for the mating drop is that there are still some issues with vehicle use in the nesting area, including some observed fatalities. Mowing in nesting areas was also observed to be causing direct destruction and causing females to abandon nests. One other possible factor is an increase in voles in the area, a problem on ag land, which could result in an increased use of rodenticide pellets that could be ingested directly by larks (via pellets) or indirectly via insects. *****Follow Up***** USFWS may be able to help test specimens for specific toxins. Randy Moore, Cat Brown.

Project Updates

Genetic Rescue Project – Adrian Wolf, CNLM

The goal of the genetic rescue program is to increase hatchability and genetic diversity, as well

as assess the feasibility of such a program. Started in 2011, the program uses Corvallis Airport as the source site, and JBLM as the reception site. In 2011 there were four 3-egg clutches moved, none were moved in 2012 and three clutches moved in 2013. Due to a sharp decline in the lark population at the Corvallis Airport in 2014, no eggs were moved.

2012 saw the return of 1 male, but no breeding occurred. The same male returned again in 2013 and had 2 nests - both with 100% hatchability. The 6 nestlings resulting from these nests were banded. The male returned again in 2014 and had 3 nests with 6 hatchlings resulting (and banded). 2 of the hatchlings were resighted numerous times. These observations suggest strong site fidelity as all nests are about 130m away from the natal nest.

The full project still needs to be discussed to decide if translocations will continue, and if so, if it is worth considering captive rearing the displaced JBLM eggs at the Oregon Zoo. *****Action Item***** This discussion about zoo involvement needs to continue, and include discussion of what diet would be appropriate. Randy Moore, Bob Altman, Adrian Wolf, David Shepardson.

Genetic Analysis – Scott Pearson, WDFW

Genetic information was analyzed from South Puget Sound, Washington Coast, and lower Columbia River larks, but lacked a southern Willamette Valley sample. Results were [published in a paper in Conservation Genetics](#) in 2006. Additional genetic analysis as part of the Genetic Rescue project is planned for 2015.

Coastal Washington Predator Management – Bill Ritchie, USFWS

A predator management plan was expanded in 2014 to cover Washington State Park beaches and National Wildlife Refuge beaches. The strategy of the plan is to increase nesting success for SHLA and snowy plovers. The plan includes litter control and habitat restoration, as well as hazing and lethal removal of birds. The main predators on both sites are corvids. Hatch rates in 2014 were impressive with hatch rates and fledgling success after predator control much higher than the previous method (nest exclosures).

At Leadbetter, activity earlier in the season is mostly crows, with ravens being more active later in the season. Hazing includes noise, flushing/walking, and later in the season corvids respond to people and trucks before hazing happens. At Midway, there were a combined 76 dispersals and 27 removals at lark sites. Problem birds are defined as birds seen actively hunting in or adjacent to known nesting areas. Although they don't know individuals apart, they record every time they see birds (species, time, location) so that they can see patterns.

Suitable Habitat Decision Protocol – Hannah Anderson, CNLM & Scott Pearson, WDFW

Hannah and Scott are creating a decision tree protocol for determining suitable habitat. There may be different approaches for Washington and Oregon, as Oregon has a lot of private ag land that roadside point counts will be good for.

Willamette Valley Conservation Study – Kevin O’Hara, USFWS

USFWS is undertaking a species-based approach to identify the best opportunities for the NWR system to expand habitat protection in the Willamette Valley. Using Marxan, a reserve planning program, they broke the study area in to 13,300 planning units (250 acre hexagons), with habitats and features (highways, tax lots, etc) ID’d into each hexagon. Goals and feature preferences were set, and then Marxan runs two potential options, selecting the better one. This is done over and over again, with each run having 20 million iterations. Out of all the runs and iterations, the run that has the best solution is used to identify ‘priority conservation areas’.

Goals that were part of the analysis were based on having self-sustaining populations of species (1-2 selected per habitat type), with additional fine-filter species for site-specific actions. SHLA habitat is represented by Western Meadowlark and Vesper Sparrow, and habitat ID’d for their recovery should benefit SHLA as well. Although SHLA is not a core target species, it is part of the additional fine-filter. The long-term population goal is for 6,000 individuals by 2065, which would be a growth rate of 3.5% per year. The 10-year objective includes distribution of sub-populations and habitat needed to support those. The analysis was run on the assumption that 10.7 acres/pair were required, or 536 acres for 50 pairs of SHLA. *****Follow Up***** This analysis is still open to edits, Randy Moore will work with Kevin to ensure accuracy of assumptions.

Washington Port and Airport Updates – Martha Jenson, USFWS

Surveys are being conducted at all occupied port sites on Washington side of the Columbia. The Ports want to be able to use upland disposal sites for development and ensure that SHLA on property doesn’t impede their economic functioning, but are willing to discuss options. At the Olympia Airport, an occupied site, modifications were made to the annual Father’s Day Air Show to reduce impact to larks. In June/July there were new detections of larks at Tacoma-Narrows Airport. In 2015, surveys will be done on coastal airfields.

Larks, Airports, and Working Lands Working Group – Michelle Tirhi, WDFW

The Washington-focused Larks, Airports, and Working Lands Working Group first met in June 2014 and included site managers for each airport in the South Sound region. The group will meet every six months, and the December 2014/January 2015 meeting will focus on site and habitat management at airports using a set of management guidelines that are created with airports.

Port of Portland – Dana Green, Port of Portland

The FAA came down and held a meeting at the Port of Portland to discuss how civilian airports can meet FAA’s needs while still moving projects forward with federal consultation.

Consultation can be overwhelming for small civilian airports, so the Port has been encouraging them to start the process early to allow plenty of time for the process. Larks have been on every meeting agenda because of all of the problems that arise in relation to them. One of the biggest problem areas is with surveys. Surveys are currently only being done as needed and are too expensive and difficult. Collective planning to create a programmatic solution would be helpful.

*****Action Item***** Create a programmatic solution to support survey needs.

Longview Opportunity – Hannah Anderson, CNLM

There is a 100+ acre private site on the Columbia River near Longview that could potentially serve as a mitigation site. While this opportunity may not come to fruition, it's a good reminder that there are opportunities that come up here and there and if the ports got together they could potentially purchase sites such as this. Another opportunity is that the Port of Longview owns a site that they are considering having serve as a mitigation bank site.

US Army Corps of Engineers Update – Kris Lightner, USACE

USACE has 27 sites that receive upland and shoreline dredge material placement, ranging from 15-315 acres. USACE does not own any of the property but has rights of entry to place material on the site. Prior to the listing, little attention was paid to where dredge material was placed, but as the listing neared, USACE begin consultation and created a 5-year plan that walked through each step of dredge placement that could have an impact on larks. The habitat analysis to identify suitable habitat was based on Hannah Anderson's research and helps them determine where on each islands USACE want and can place material each year. Site prep starts in Jan/Feb for June/July placement to reduce impact on larks. A mid-February 2015 meeting with all stakeholders will be conducted to review the plan for the upcoming year.

Annual monitoring for birds and changes to habitat and critical habitat will occur 2014-2018 and paired with aerial data that will be collected every 5 years. Monitoring is limited to 'are we affecting trends' rather than 'what's happening to individual birds', and it is hard to find justification for USACE to fund individual banding, though working group members noted that a robust monitoring program would provide a lot more information. Hannah Anderson noted that repeat visits at each site will help provide some more information than is currently known.

Dana Green from the Port of Portland added that the Port has improved their technology and equipment so they are now able to be more flexible about where they can place dredge material.

Restoration at Joint Base Lewis-McChord – Bill Kronland, CNLM

Restoration actions are planned on multiple sites at JBLM but the focus is on 13th division prairie, which overlaps with Taylor's checkerspot habitat. The priority habitat outline 1100-1200 acres and management blocks were created around nesting sites and other key features. Specific objectives were assigned within each management block based on habitat classes. Class I – occupied high quality prairie; Class II – high quality prairie that is used; Class III – Moderate quality buffer; Class IV & V – increasingly degraded prairie.

Lark habitat objectives at JBLM have specific measurable targets are monitored to identify if targets are being measured. So far native vegetation cover objectives are being met but the non-native cover is still too high, causing a lack of open ground availability (the goal is 12% bare ground). There was a huge blackberry population explosion in July 2014 that was treated and

burned so that by September 2014 there were non-vegetated areas with gravel and larks did use the area. These spots may be augmented with gravel.

Land managers work closely to with bird monitors when doing early spring treatment that coincides with lark arrival and nest initiation. The larks are more flexible early on in the season so that is when the more active treatment regimen is carried out. Once birds start sitting on territories, management pulls out of those areas, and once the birds start sitting on nests, those areas are left alone. This is a precautionary protocol, and Randy Moore notes that some restoration actions could be conducted closer to nests that would be no more disruptive than nest monitors.

*****Action Item***** Identify what data exists about the impacts of various activities (walking, spraying, etc) on birds and nests to identify what activities can occur closer to nests.

St. Johns Prairie – Elaine Stewart, Metro

Two 5-acre open areas were created on the St. Johns prairie site, which is near Rivergate. Maintaining these plots requires a lot of active management so Metro is hoping to ID short-stature vegetation, seed, and then ID areas that it doesn't come up. They will supplement those areas with gravel to create and maintain lark habitat patches within low-stature prairie veg.

The major issue that Metro faces is that it works with many wet prairie sites that are too wet for treatment in March, and finding a way to work around that limitation is proving tricky. Issues with getting burn permits is resulting in limited to no burning, which is also making it hard to maintain lark habitat. Working to curate a set of seed lists and densities to create the correct habitat, but it's difficult as wet prairies require more seed types that tend to be more expensive.

Willamette Valley National Wildlife Refuges – Molly Monroe, USFWS

Molly is struggling with management for larks at her NWR sites and fitting larks into the grassland habitat management, which tends towards dense vegetation. NWR is finding that if they create lark habitat on site it becomes a bullseye that is predated right away. To get past these issues, NWR is working on integrating lark habitat management into agricultural management on site.

Wetlands Reserve Program – Nate Richardson, USFWS

Nate is facing similar issues as Metro is with wet prairie sites. The major issue is restoring a site while avoiding nesting areas. 18 Wetland Reserve Program (WRP) sites were monitored and 10 had larks. There is a trajectory towards wet prairie vegetation not being suitable long term and is considering a shifting mosaic management plan.

Partner Biologist Model – Various Partners

ABC's Bob Altman brings up that there is a model being used around the US that pairs biologists with private landowners called the 'Partner Biologist Model'. NGO's pay for a biologist that have a desk in an NRCS office and therefore can work with NRCS staff and clients (private

landowners) to implement practices allowed in the farm bill that also meet desires of the NGO for target species and habitat. This has proven to be a successful model and may be good option for larks, especially in Oregon.

USFWS's Chris Seal notes that the new farm bill has a Regional Conservation Partnership Program that is still being worked out but has financial resources that may pay for the partner biologist type of approach. OWEB also has a 'focused partnership' program.

CNLM's Hannah Anderson adds that leveraging the South Sound Prairies Sentinel Landscape initiative to the Willamette Valley would be ideal as it's a place where the biggest conservation progress could be made for the lark and where NRCS has a lot of influence, all of which could lead to big results for JBLM, a major component of Sentinel Landscape. Future option for potential funding.

*****Action Item***** Explore the feasibility of this model in Oregon.

Herbert Farm – Bob Altman, ABC

Herbert Farm is a property owned by the City of Corvallis and is less than a mile from the Corvallis airport. The Institute for Applied Ecology (IAE) is doing a management plan for the property and will carry out restoration at the site. There is a 200-acre ag field that will be converted to prairie incrementally. Experimental management activities will be carried out to demonstrate what types of restoration and management activities can be carried out on ag lands while still maintaining some level of agricultural production. This provides an opportunity to work with farmers to determine certain actions that help maintain production while benefitting larks. There will be 3 different habitat manipulations [1. Spray 2. Disc then spray 3. Disc then mow] in linear strips along an existing gravel road next to a grass field. ACUB funding for outreach will help bring results from the project to the agricultural community.

Coyote Creek – Ann Kreager, ODFW Willamette Mitigation Program

ODFW's Willamette Mitigation Program began in 2010 as the result of a \$117 million settlement to purchase 17,000 acres in the Willamette Valley for conservation and mitigation. SHLA are one of the target species, and Coyote Creek is a complex west of Eugene that has been purchased. There is a lot of potential SHLA habitat on the site and ODFW will be carrying out matrix restoration.

USFWS Programmatic Biological Opinion – Cat Brown

In an effort to avoid slowing down restoration activities, USFWS is undergoing an effort to provide umbrella consultation to allow restoration work for a number of listed species throughout the western United States. This has been going on for several years already but is being reinstituted to include SHLA and Taylor's checkerspot. A large overarching opinion will cover Oregon, Washington, and Idaho and all species and habitat for which USFWS funded projects on non-federal lands covers.

Recovery Planning Overview and Update - Cat Brown, USFWS

A recovery plan is meant to tell the greater community what USFWS think a recovered species would look like. It includes measurable things such as number of sites, individuals, and so on. Fortunately, the lark is already started down the recovery planning road as a virtue of the working group and action plan – further along than most of the other species listed around the same time. USFWS hopes to get a draft recovery plan out by late 2015. The recovery plan will go beyond the current working group action plan by setting longer term goals. Once completed, the recovery plan can help direct money and provide momentum for funding for big projects that are necessary for recovery – things like HCP planning, land acquisition, expansion of the refuge expansion analysis, and so on. The large quantity of listings recently means that money and people are stretched among them all, but Cat and others are working out the most efficient way to get recovery plans together.

Follow Up Items (In Review)

1. USFWS may be able to help test specimens for specific toxins. Randy Moore, Cat Brown.
2. The marxan analysis is still open to edits, Randy Moore will work with Kevin to ensure accuracy of assumptions.

Action Items (In Review)

1. The discussion about zoo involvement needs to continue, and include discussion of what diet would be appropriate. Randy Moore, Bob Altman, Adrian Wolf, David Shepardson.
2. Create a programmatic solution to support survey needs at airports.
3. Identify what data exists about the impacts of various activities (walking, spraying, etc) on birds and nests to identify what activities can occur closer to nests.
4. Explore the feasibility of the partner biologist model in Oregon.

Day 2 – Action Planning

See following pages for full list of ranked items and full action plan.

Updates

The group went through the action plan line by line and updated it based on completed items, items that are no longer relevant, improving language and adding new items. Updates to the action plan had a big emphasis on streamlining protocols, synthesizing range wide data and expanding research questions.

Ranking

Following the updates to the action plan, the group went through the ranked priorities line by line and noted if the priority has increased, remained the same, or decreased. The group identified action items that were new or not previously ranked that should be ranked. A discussion then followed to determine the new rank order. The ranked priorities actions are:

1. Seek opportunities to secure sites dedicated to lark conservation.
2. Secure protection commitment on priority occupied sites.
3. Finalize standardized survey and monitoring protocols range-wide that address occupancy, abundance, trends, use and spatial distribution.
4. Enhance existing habitat and increase amount of available habitat in the Willamette Valley, with an emphasis on implementing habitat restoration activities on breeding and wintering grounds.
5. Identify threats to population viability with an emphasis on determining factors limiting juvenile and adult survivorship in OR & WA.
6. Conduct genetic rescue aiming at stabilizing South Sound population. Evaluate success.
7. Evaluate appropriateness and feasibility of population augmentation, relocation or reintroduction.
8. Facilitate habitat restoration on private lands through incentive programs or other means.
9. Conduct habitat restoration in South Puget Sound to increase and improve lark habitat with a focus on implementing habitat restoration activities on breeding ground using all available tools.
10. Identify threats to population viability with an emphasis on evaluating the need to control predators and if implemented, evaluate the effect of predator management.
11. Identify threats to population viability with an emphasis on evaluating current state of knowledge and role of disturbances that may affect survival in all life stages and prioritize development of BMP's for certain actions.
12. Conduct habitat restoration on the Columbia River and Coast to increase and improve lark habitat with an emphasis on implementing habitat restoration activities on breeding and wintering grounds.
13. Identify threats to population viability with an emphasis on evaluating the effect of pest control agents to larks, and if so, are there different application techniques that can eliminate negative effect?
14. Utilize and collect data from color band resights with an emphasis on collecting and integrating existing color banded resight information from Oregon and Washington to inform conservation planning and habitat management.
15. Facilitate coordination and information sharing with an emphasis on maintaining range-wide working group.

2014-2015 Streaked Horned Lark Action Plan - Updated 29 October 2014

The purpose of this action plan is to identify the next-best conservation actions that can be conducted over the next 3-5 years to support SHLA recovery. [Ranking Key: The top 15 tasks are ranked. The 9 tasks marked with an * for the rank signifies increased emphasis, but not at the level of ranking.]

Category	Ref#	Task	Rank	Implementing Party
1. Determine population status, current distribution and limiting factors	1.1	1. Finalize standardized survey and monitoring protocols range-wide that address occupancy, abundance, trends, use and spatial distribution.	3	Working Group
	1.2	2. Identify threats to population viability.		
	1.2.a	a. Determine factors limiting juvenile and adult survivorship in OR & WA (e.g. predation). Does adult and juvenile survivorship limit population growth in OR (answered in WA)?	5	OSU
	1.2.b	b. Evaluate need to control predators (e.g., at airports) and if implemented, evaluate the effect of predator management (e.g., at Coast).	10	
	1.2.c	c. Evaluate current state of knowledge and the role of disturbances (e.g., recreation, military activities, industrial uses, researchers, restoration actions, dredge material deposition, airfield management actions, agricultural activities) that may affect survival in all life stages (i.e. nests, juveniles, adults) and prioritize development of BMPs for certain actions.	11	WDFW, OSU/ Randy does have some quantified mowing regime, so does CNLM/JBLM.
	1.2.d	d. Evaluate effect of pest control agents (e.g., zinc phosphide, maki) to larks (i.e., are they affected?) and if so, are there different application techniques that can eliminate negative effect?	13	
	1.2.e	e. Identify potential sink habitats (e.g., airports) and identify a process for potential management actions (e.g., creating recipient habitats, dissuasion at current sites), use qualitative approach as first step.	*	
	1.2.f	f. Track current climate change science to inform the role of climate change to streaked horned lark conservation decision making, e.g. northward expansion of prairie habitat		WDFW, OSU, USFWS, CNLM
	1.2.g	g. Examine genetic variability and population structuring.		WDFW, Smithsonian
	1.2.h	h. Determine factors limiting reproductive success in private working lands of the Willamette Valley.		
	1.2.i	i. Evaluate effect of different crops and agricultural management techniques to larks.		
	1.3	3. Utilize and collect data from color band resights.		
	1.3.a	a. Collect and integrate existing color banded resight information from Oregon and Washington to inform conservation planning and habitat management.	14	
	1.3.b	b. Inform and mobilize citizen science efforts (e.g., Audubon) to collect new color band resights.		
	1.4	4. Develop SHLA ID training and a certification process that integrates potential surveyors with (to be) established protocols.	*	
	1.5	5. Develop criteria to determine if habitat is suitable for all life history stages (i.e. How can I tell if I have habitat?).	*	
	1.5.a	a. Apply criteria to develop a range wide map of potential habitat.		
	1.6	6. Survey and monitor for larks.		
1.6.a	a. Conduct annual monitoring at occupied breeding sites.	*	WDFW, OSU, CNLM, JBLM, PDX, ODFW	
1.6.b	b. Survey new and historic sites. Potential examples: Rogue River valley, Roger's Washington townships, OR Coast, Cowlitz River, Port of Longview industrial area & coast, regional airports.	*	Portland Audubon, WDFW, CNLM, Metro, Port of	

				Portland, ODFW
	1.7	7. Identify important features that affect habitat quality and lark productivity.		
	1.7.a	a. Determine the effect of habitat parameters and seasonality on nest success (use existing WA data), and on private working lands in OR.	*	
	1.7b	b. Understand habitat quality in relation to food availability, including wintering habitat quality.		
	1.8	8. Address the need for coordinated and consolidated database for lark data (e.g., lark database manager and lead, FWS? WDFW? Other?).		
2. Protect Existing Populations and Habitats	2.1	1. Seek opportunities to secure sites dedicated to lark conservation (e.g. lark preserves).	1	
	2.2	2. Secure protection commitment on priority occupied sites (e.g. management plans, Safe Harbor).	2	Working Group
	2.3	3. Define and identify core sites for recovery.		
	2.4	4. Work with the regulatory community to identify mitigation opportunities including conservation banks.		
	2.5	5. Encourage partners to include management for larks in land protection plans when opportunities are available (e.g. Great American Outdoors Initiative, Willamette Wildlife Mitigation Program, SWAPs, legislative initiatives).		
	2.6	6. Work with NRCS and others to ensure larks are a priority for funding programs (e.g., easements) and landowner assistance (e.g. Partner Biologists).		FWS, ODFW, WDFW, CNLM
	2.7	7. Identify mechanisms to establish long-term management funding for important sites (e.g. endowments).		
	2.8	8. Address identified threats range-wide: Initiate protection measures, reduce predator impacts, redirect recreation, airport disturbance.		Working Group
	2.8.a	a. Redirect, adapt, or modify timing of incompatible aspects of land uses, e.g. airshows, police training, dog trials, model airplane use, ATVs, dredged material placement, airport management practices.		OSU, WDFW, FWS Refuges, CNLM, JBLM
3. Enhance viability of extant populations and habitats	3.1	1. Enhance existing habitat and increase amount of available habitat in the Willamette Valley.		OSU, WDFW, FWS Refuges, CNLM, JBLM
	3.1.a	a. Implement habitat restoration activities on breeding and wintering grounds.	4	NRCS, Private, Refuges, USFWS
	3.1.b	b. Update and implement management prescriptions to create breeding habitat and develop winter habitat prescription in agricultural matrix.		
	3.1.c	c. Investigate the value and feasibility of conservation burning for larks and its potential as an incentive for private landowners.		OSU, USFWS, NWR, NRCS
	3.2	2. Conduct genetic rescue aiming at stabilizing South Sound population. Evaluate success.	6	WDFW, ODFW, OSU, CNLM
	3.3	3. Evaluate appropriateness and feasibility of population augmentation, relocation or reintroduction (e.g., investigate lark colonization, captive rearing, hacking, cross fostering).	7	WDFW, OSU, Oregon Zoo, CNLM
	3.4	4. Conduct habitat restoration in South Puget Sound to increase and improve lark habitat.		
	3.4.a	a. Implement habitat restoration activities on breeding ground using all available tools (e.g., herbicide, fire). Focus on invasives that change the structure of the habitat - ongoing.	9	JBLM, CNLM, FWS, WDFW

	3.5	5. Conduct habitat restoration on the Columbia River and Coast to increase and improve lark habitat		
	3.5.a	a. Implement habitat restoration activities on breeding and wintering grounds (e.g. Damon Point, Midway Beach)	12	FWS, WDFW, WSP, ACOE, CNLM, WDNR
	3.5.b	b. Implement and monitor effectiveness of created lark habitat by dredge material deposition and implementing complementary strategy to control structure-modifying vegetation.	*	ACOE, CNLM, Port of Portland, FWS
	3.5.c	c. Implement habitat restoration activities on unoccupied sites within the breeding and wintering range (e.g. St. John's, Sauvie, Gov't island).		City of Portland, Port of Portland, Metro, OSU, USFWS, NRCS
	3.5.d	d. (Coast) Remove beach grass (use Leadbetter plover restoration HRA as demo project). Ongoing.		FWS, WDFW, WSP
	3.6	6. Develop strategy for compatible airport and lark use, develop management guidelines specific for each airport (e.g., Manage habitat to attract birds outside areas that the airport identifies as high risk for airport safety).		CNLM, Ports, FAA, WDFW, ODFW, OSU
4. Coordination, Education, and Outreach	4.1	1. Facilitate habitat restoration on private lands through incentive programs or other means.	8	
	4.1.a.	a. Disseminate lark information to NRCS and SWCDs and brainstorm on how to implement programs (first).		
	4.1.b	b. Encourage federal & state agencies to promote incentive programs.		WDFW, FWS
	4.2	2. Facilitate coordination and information sharing.		
	4.2.a	a. Maintain range-wide working group and coordination.	15	CNLM, FWS, Port of Portland, WDFW
	4.2.b	b. Open and maintain working groups/informational sharing forums about larks revolving around industry-specific issues (e.g. airports, ports, agriculture, developers/land use planning).	*	
	4.2.c	c. Maintain WA airports working group and maintain SHLA awareness in OAMA meetings.	*	CNLM, Port of Portland, FWS, WDFW, regional airports
	4.2.d	d. Columbia River port lark working group/ informational sharing meetings.		
	4.3	3. Develop outreach and educational materials.		
	4.3.a	a. Package existing habitat prescriptions specifically for agricultural producers (i.e., abridge Tech Note for lay audience) and distribute to agricultural community.		
	4.3.b	b. Conduct outreach to permitting entities (e.g. counties/cities, ODSL) regarding potential for lark impacts from development and other permitted activities.		
	4.3.c	c. Develop materials on habitat management and restoration for land managers including habitat targets.		
4.3.d	d. Reach out to additional partners by promoting regional recovery and habitat management (e.g. DNR aquatic lands, WA/OR State Parks, land trusts, mitigation banks, OR Dept. of State Lands).			