

**U.S. FISH AND WILDLIFE SERVICE  
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Eremophila alpestris strigata*

COMMON NAME: Streaked horned lark

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: March 2007

STATUS/ACTION:

Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: December 11, 2002

90-day positive - FR date:

12-month warranted but precluded - FR date:

Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. *We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, since publication of the last CNOR, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs), because most of our national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken, see the discussion of "Progress on Revising the Lists" in the current CNOR, which can be viewed on our Internet website (<http://endangered.fws.gov/>).*

No Listing priority change

Former LP: \_\_\_\_\_

New LP: \_\_\_\_\_

Date when the species first became a Candidate (as currently defined): October 30, 2001

N/A Candidate removal: Former LP: \_\_\_

- \_\_\_ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
- \_\_\_ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- \_\_\_ F – Range is no longer a U.S. territory.
- \_\_\_ I – Insufficient information exists on biological vulnerability and threats to support listing.
- \_\_\_ M – Taxon mistakenly included in past notice of review.
- \_\_\_ N – Taxon does not meet the Act’s definition of “species.”
- \_\_\_ X – Taxon believed to be extirpated.

ANIMAL/PLANT GROUP AND FAMILY: Bird; Alaudidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Washington, Oregon, and British Columbia, Canada

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:

Washington (Grays Harbor, Mason, Pacific, Pierce, Thurston, and Wahkiakum Counties), Oregon (Benton, Lane, Marion, Multnomah, and Polk Counties), and British Columbia, Canada (Vancouver Island)

LAND OWNERSHIP:

In British Columbia, the last known breeding site was in 1987 at Vancouver International Airport, and the most recent indication of potential breeding was in 2002 from the Nanaimo Airport on southern Vancouver Island (COSEWIC 2003), though this was only a single male (Kevin Fort, Canadian Wildlife Service, *in litt.* February 2007). A small amount of potential habitat occurs on private lands.

In Washington, two breeding sites are owned by the U.S. Fish and Wildlife Service (Service), one by the Washington Department of Natural Resources (WDNR), one site by the Washington Department of Fish and Wildlife (WDFW), one site by State Parks, four sites by the U.S. Department of Defense, two sites by municipal airports, one site is owned by the Shoalwater Indian Tribe, and one is privately owned (Stinson 2005).

In Oregon, streaked horned larks are found on Baskett Slough, Ankeny, and Finley National Wildlife Refuges, U.S. Army Corps of Engineers lands at Fern Ridge, dredge spoil plains at the Port of Portland, Portland International Airport, and two dredge spoil islands on the Columbia River and Willamette Mission State Park. These lands contain perhaps 20–25 percent of the Willamette Valley population (Bob Altman, American Bird Conservancy, pers. comm. 2000; Randy Moore, Oregon State University, pers. comm. 2007; David Helzer Port of Portland, pers. comm. 2007). The remainder of the population is on private lands.

LEAD REGION CONTACT: Scott McCarthy (503-231-6131), scott\_mccarthy@fws.gov.

LEAD FIELD OFFICE CONTACT: Western Washington Fish and Wildlife Office, Kim Flotlin (360-753-5838), [Kimberly\\_Flotlin@fws.gov](mailto:Kimberly_Flotlin@fws.gov)

## BIOLOGICAL INFORMATION:

### Species Description

Horned larks (*Eremophila alpestris*) are small, ground-dwelling birds, approximately 16–20 centimeters (6–8 inches) in length (Beason 1995). Adults are pale brown, but shades of brown vary geographically among the subspecies. The face has a yellow wash. Adults have a black bib, black whisker marks, and black “horns” – feather tufts that can be raised or lowered, but are usually raised in males. Black tail feathers have white margins. Juveniles lack the black face pattern and are varying shades of gray, from almost white to almost black with a silver-speckled back. The streaked horned lark (*Eremophila alpestris strigata*) has a dark brown dorsal surface, yellowish underparts, a walnut brown nape and yellow eyebrow stripe and throat (Beason 1995). This subspecies is conspicuously more yellow beneath and darker (reddish) on the back than any other subspecies of horned lark. The combination of small size, dark brown back, and yellow on the underparts seem to distinguish this race from all others (Behle 1942).

### Taxonomy

*Eremophila alpestris strigata* was first described by Henshaw in 1884; the type locality was Fort Steilacoom, Washington (Rogers 2000). This is one of 21 subspecies of horned larks in North America; 15 subspecies occur in western North America (Beason 1995). Subspecies of horned larks are based primarily on differences in color, body size, and wing size. Western populations of horned larks are paler and smaller than eastern and northern populations (Beason 1995). There are three other breeding subspecies of horned larks in Washington: *Eremophila alpestris alpina*, *Eremophila alpestris merrilli*, and *Eremophila alpestris lamprochroma* (Rogers 2000).

Drovetski et al. (2004) evaluated the conservation status and level of genetic diversity of the streaked horned lark using complete mitochondrial ND2 gene. Twenty samples from the southern Puget Sound region of Washington, and 60 horned lark samples from Alaska, Washington, Oregon, and California were analyzed. Twenty-eight haplotypes identified among 80 horned larks formed three clades: Pacific Northwest (alpine and eastern Washington, Alaska), Pacific Coast (streaked horned lark (Puget Sound and Washington coast) and coastal California), and Great Basin (Oregon). Streaked horned larks were closely related to the California samples and only distantly related to the three closest localities (alpine and eastern Washington and Oregon). Only one of the eastern Washington individuals shared the streaked horned lark haplotype, indicating a single example of gene flow from western Washington to eastern Washington. There was no evidence of immigration into the streaked horned lark population from any of the sampled localities. Analyses indicate that the streaked horned lark population is well differentiated and isolated from all other sampled localities, including western California, and has “remarkably low genetic diversity.” All 20 streaked horned lark individuals shared the same haplotype with no variation in the ND2 sequences. All other localities had multiple haplotypes despite smaller sample sizes. A bottleneck caused by range contraction and habitat loss due to human activity probably caused such severe reduction of mitochondrial DNA (mtDNA) diversity. Streaked horned larks are unique, isolated, and have little genetic diversity, indicating the subspecies has been evolving independently for some time. Genetic analyses support the subspecies designation for the streaked horned lark (Drovetski et al. 2004), which has

been considered a relatively well-defined subspecies based on physical characteristics (phenotypically) (American Ornithologists Union 1957; Behle 1942; Beason 1995).

### Habitat

The streaked horned lark nests on the ground in sparsely vegetated sites dominated by grasses and forbs (Pearson 2003; Pearson and Hopey 2005). Historically this type of habitat was found in prairies in western Oregon and Washington, along the coast of Washington, perhaps on the sandy beaches and spits along the Columbia River, and in prairies or prairie-like areas, estuaries, and sandy beaches in British Columbia. Today the streaked horned lark nests in native prairies, coastal dunes, fallow agricultural fields, sparsely-vegetated edges of grass fields, lightly- to moderately-grazed pastures, seasonal mudflats, airports, and dredge spoil islands in the Columbia River (Gabrielson and Jewett 1940; Altman 1999; Rogers 1999a; Pearson 2003; Pearson and Hopey 2005; Pearson and Altman 2005).

### Historical Range/Distribution

Historically, the streaked horned lark's breeding range extended from southern British Columbia (Campbell et al. 1997; COSEWIC 2003) south through the Puget lowlands and outer coast of Washington (Jewett et al. 1953). At the time of European settlement, the streaked horned lark was described as very abundant in all of the prairies of the Puget Sound region in Washington (Suckley and Cooper 1860; Dawson and Bowles 1909). The subspecies was considered common in the early 1950s on the prairies of western Washington and abundant throughout the valleys west of the Cascades in Washington (Jewett et al. 1953). There are historical breeding records for Whatcom, Skagit, Island, Pierce, Thurston, Mason, Grays Harbor, Pacific, and Clark Counties, Washington. Although there are no known breeding records, streaked horned larks may also have bred in King and Clallam Counties (Rogers 2000).

The breeding range extended farther south through the Willamette Valley of Oregon where the streaked horned lark was a year-round resident in the northern Willamette Valley (Johnson 1880). In the 1940s, the subspecies was a "very common permanent resident" in the southern Willamette Valley (Gullion 1950). The subspecies was formerly known to breed in the Rogue River Valley of Oregon, with breeding confirmed as late as 1976 (Marshall et al. 2003; Pearson and Altman 2005). Historically, the streaked horned lark was considered scarce along the Oregon coast (Gabrielson and Jewett 1940).

### Current Range/Distribution

The streaked horned lark is currently considered rare and has been extirpated as a breeding species throughout much of its range, including the San Juan Islands and the northern Puget Sound region of Washington, and the Rogue Valley in Oregon (Altman 1999; Rogers 2000; Pearson 2003). It is thought to have always been rare in British Columbia and has declined steadily over the past 50 years. It is now likely extirpated from Canada (COSEWIC 2003). The last known breeding record in British Columbia was in 1972 and the last summer sighting was in 1987. A few may have persisted in the Fraser Valley until the mid-1990s (Campbell *et al.* 1997). The most recent indication of potential breeding was in 2002 from the Nanaimo Airport on southeastern Vancouver Island (COSEWIC 2003), though only a single male was found (K. Fort, *in litt.* February 2007). Recent annual surveys for coastal vesper sparrows on the Airport indicate that the streaked horned lark is no longer present there.

In Washington, the streaked horned lark is found in the Puget lowlands, coastal areas, and on Columbia River islands. Thirteen breeding sites are found in Grays Harbor, Mason, Pierce, Thurston, Pacific, and Wahkiakum Counties, Washington (Rogers 2000; Pearson and Altman 2005; Pearson et al. 2005). Some streaked horned larks over-winter along the coast and lower Columbia River of Washington, but it appears that most over-winter in the Willamette Valley of Oregon (Pearson and Altman 2005).

Streaked horned larks breed in the Willamette Valley in Oregon (Benton, Lane, Marion, Multnomah, and Polk Counties), and are most common in the central Willamette Valley, particularly in and around Baskett Slough National Wildlife Refuge. Breeding is not known in the Rogue and Umpqua Valleys in southwestern Oregon, and there is little information available on streaked horned larks breeding along the Oregon coast. Streaked horned larks over-winter in large groups in the Willamette Valley (Pearson and Altman 2005).

### Population Estimates/Status

The Canadian population is thought to be extirpated (COSEWIC 2003). A 2002 survey at Nanaimo Airport found only a single male, although this was the last known (1987) location of breeding in British Columbia. Suitable habitat still occurs on southeastern Vancouver Island, the Lower Mainland, and the Lower Fraser Valley. Recent intensive annual surveys for the coastal vesper sparrow have not turned up any larks (K. Fort, *in litt.* February 2007).

The range-wide total population of streaked horned larks is likely less than 1,000 individuals. Approximately 330 streaked horned larks breed at 13 sites in Washington, including 6 in the Puget lowlands, 4 on the Washington coast, and 3 on Columbia River islands (Stinson 2005). Most Washington birds winter in Oregon (Derek Stinson, WDFW, *in litt.* 2007). There are approximately 400 streaked horned larks at an unknown total number of sites in Oregon (Pearson and Altman 2005). Preliminary data indicates low nest success (Altman 1999).

Both the Washington and Oregon estimates are based on a significant amount of survey effort (Smith et al. 1997; Altman 1999, 2000; Rogers 1999a, 2000; MacLaren 2000; MacLaren and Cummins 2000; Pearson 2003; Pearson and Hopey 2005; Pearson and Altman 2005; Pearson et al. 2005).

### THREATS:

#### A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The greatest threat to the streaked horned lark is loss of habitat. Primary factors contributing to the loss and degradation of habitat include the conversion of native grassland to other uses, such as agriculture, recreation areas, industry, and homes; encroachment of woody vegetation because of fire suppression; and invasion of prairie and coastal habitat by nonnative plant species, such as Scot's broom (*Cytisus scoparius*) and sod-forming grasses (*Holcus* spp. and *Arrhenatherum elatius*) (Hall 1995; Rogers 1999a).

Native prairies and grasslands have been virtually eliminated throughout the range of the species as a result of human activity. In the Willamette Valley in Oregon, native grassland has been reduced from the most common vegetation type to scattered parcels intermingled with rural

residential development and farmland. It is estimated that less than 1 percent of the native grassland and savanna remains in Oregon (Altman 2000; Pearson and Altman 2005). In the south Puget Sound region, where most of Washington's prairies historically occurred, only 3 percent of the historic prairie is considered intact (Crawford and Hall 1997). In the remaining prairies, many of the native bunch grass communities have been lost to nonnative pasture grasses (Rogers 2000), which larks avoid using for territories and nest sites (Pearson and Hopey 2005). The grassland at Cattle Point on San Juan Island has been invaded by nonnative sod-forming grasses that are avoided by streaked horned larks (S. Pearson, Ph.D., WDNR, pers. comm. 2004).

In coastal areas, the introduction of Eurasian beach grass (*Ammophila arenaria*) and American beachgrass (*A. breviligulata*), currently found in high densities on most of coastal Oregon and Washington, has drastically altered the structure of dunes on the outer coast. The tall, dense, leaf canopy of this plant creates unsuitable habitat for streaked horned larks (Rogers 1999b; MacLaren 2000). The vegetation density of this beach grass has increased in the fore and secondary dunes where streaked horned larks are likely to nest (Wiedemann 1987).

Streaked horned larks also use a variety of manmade habitats having sparse vegetation similar in structure to native prairies. However, these manmade habitats are subject to human disturbance (plowing, mowing, recreational and military activities), flooding (wetland mudflats), or are ephemeral in nature (plowed fields, bare ground in fields) (Altman 1999). The main wintering area is among grass seed farms in the Willamette Valley. Streaked horned lark populations are vulnerable to both direct threats (e.g., nest destruction) and indirect threats (e.g., nest abandonment due to disturbance and/or increased predation. Miller et al. (1998) documented the presence of a well-used nature trail in the vicinity of nesting grassland birds had a negative effect on bird productivity. In a study of four sites in 2002 and 2003, abandonment caused more than 20 percent of nest failures, and human activities caused 8 percent of nest failures (Stinson 2005). Consequently, populations using these areas may have low nesting success and these areas may actually be population sinks (Rogers 1999a).

The extent of changes in streaked horned lark populations along the Columbia River is unknown. One result of flood control by the construction of dams is the establishment of willows (*Salix* spp.), black cottonwood (*Populus trichocarpa*), and other vegetation on sandbars where this species may have nested (Rogers 2000). Such establishment causes a loss of the open nesting habitats that larks prefer.

Four streaked horned lark nesting sites in the south Puget Sound region are associated with airports, including two military bases (Rogers 2000; Pearson and Hopey 2005). All are located on former prairies with some native vegetation. Although regular grass mowing to meet flight path regulations may help maintain the grassland habitat, nests are occasionally destroyed by maintenance activities, especially when they are not adjusted in a way so as to avoid the nesting season (Pearson 2003; Pearson and Hopey 2005; Stinson 2005).

Airport expansions could result in further losses of some of these populations. At the Olympia Airport, hangars were built in 2005 on habitat used by larks for foraging, resulting in a net loss of grass/forb-dominated habitat (S. Pearson, Ph.D., *in litt.* 2007). Both the Olympia Airport and the Shelton Airport plan to develop grassland areas surrounding their runways for port-related businesses, which could eliminate lark nesting and foraging habitat (Derek Stinson, WDFW, *in litt.* 2007). Also, the West Ramp at Gray Army Air Field on Fort Lewis was expanded in 2005

into areas previously used by breeding larks, resulting in a net loss of available breeding habitat (Stinson 2005).

Streaked horned lark nests on dredge spoil islands in the Columbia River are subject to destruction by dredging activities. Dredged material is deposited on spoil islands during the nesting season in habitat with documented use by streaked horned larks (Eric Cummins, WDFW, pers. comm. 2000). New dredge spoil was deposited at a location where streaked horned larks occurred in 1999 near Puget Island in the Columbia River. Although streaked horned larks were observed in the vicinity in 2000, only sparse low vegetation remained on the island. In 2006, dredge spoils were deposited on Browns Island (a.k.a. Whites Island, on the eastern end of Puget Island) while larks were actively nesting. All nests at this site were apparently destroyed. WDFW observed the inundation and watched adults attempt to feed nestlings as the water and sand covered the nest. This site had at least 21 nests and 13 territories during the 2005 nesting season (S. Pearson, Ph.D., *in litt.* 2007). In a similar situation on the Oregon side of the Columbia River, eight singing males were observed on Rice Island in June 2000. Dredge spoil was deposited in July 2004, on Miller Sands Island where singing males had been observed. In 2005, dredging equipment was staged on Miller Sands Island adjacent to nesting areas and two nests were abandoned (Pearson and Altman 2005). No streaked horned larks were observed all season on Sand Island, an island near the mouth of the Columbia River where dredge spoil is deposited (MacLaren 2000).

The last known nesting habitat for streaked horned larks in Multnomah County, Oregon, is found on a dredged industrial site owned by the Port of Portland. This parcel is slated for development in the upcoming year (Elaine Stewart, Metro, pers. comm. 2007). In 2006, about 6 pairs of streaked horned larks were observed to breed at this site (R. Moore, pers. comm. 2007).

In summary, there continue to be ongoing threats to the species habitat due to conversion through farming, nonnative plant encroachment, human disturbance (plowing, mowing, recreational, and military activities), and flood control. Threats due to development and dredge spoils dumping have resulted in direct loss of nesting and foraging habitat in the last two years.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

None known.

C. Disease or predation.

Disease is not known to be a factor.

Predation is the primary source of nest failure (Pearson 2003; Pearson and Hopey 2005; Stinson 2005). Seventy percent of nest failures were caused by predation at four study sites in 2002. A garter snake (Thamnophis spp.), a northern harrier (Circus cyaneus), and two American crows (Corvus brachyrhynchos) were observed eating young and eggs (Altman 1999; Pearson 2003; Pearson and Hopey 2005; S. Pearson, Ph.D., *in litt.* February 2007). Predation on grassland bird species by domestic cats and crows at one south Puget Sound site has been documented (Rogers 2000). Predation rates in the Puget lowlands and Columbia River/Washington coast lark sites are often higher than rates reported for other grassland breeding birds (Pearson and Altman 2005). For example, the Columbia River sites and sites at the Olympia and Shelton airports have generally low predation rates, but the one native prairie with reproductive information (13<sup>th</sup>

Division Prairie) has high predation rates. It's unknown why this is the case (S. Pearson, Ph.D., pers. comm. 2007). This is a research need.

Streaked horned larks apparently disappeared from the San Juan Islands in 1962 (Lewis and Sharpe 1987; Rogers 2000). Cattle Point, a former breeding site on San Juan Island, had not undergone a dramatic change in vegetation in 1962, although it has since been invaded by nonnative sod-forming grasses avoided by streaked horned larks (S. Pearson, Ph.D., WDNR, pers. comm. 2004). Introduction of several exotic animal species to the island roughly coincides with the disappearance of the streaked horned lark. Introduced predators, including feral ferrets (Mustela outorius) and red foxes (Vulpes vulpes), may have significantly affected ground nesting birds and played a role in the decline of streaked horned larks (Rogers 2000).

In summary, there continue to be ongoing threats to the species due to predation. Upcoming research may help to guide future conservation efforts in regards to this threat.

#### D. The inadequacy of existing regulatory mechanisms.

The streaked horned lark is protected by the Federal Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and by State laws as a nongame species. Breeding habitat, however, receives little protection from these laws. For example, the Migratory Bird Treaty Act prohibits the taking of "nests" but does not protect habitat.

The streaked horned lark is on the British Columbia Conservation Data Centre's red list. Such listing does not confer any protection to the species (Lucy Reiss, Canadian Wildlife Service, *in litt.* 2007). The streaked horned lark was assessed as nationally endangered by COSEWIC in November 2003, and was added to Schedule 1 of the Species at Risk Act in July 2005 (Government of Canada 2007). A recovery strategy for this species is in draft, but has not yet been released to the public (Government of Canada 2007). The streaked horned lark is essentially extirpated from Canada (COSEWIC 2003).

The streaked horned lark is listed as endangered by the Washington Department of Fish and Wildlife (WDFW), but receives little protection under State law. State listed species are protected from direct take, but are not provided protection for their habitat (RCW 77.15.120). The streaked horned lark is a Priority Species under the WDFW Priority Habitats and Species Program. As a Priority Species, the streaked horned lark may receive some protection of its habitat under environmental reviews of applications for county or municipal development permits (Stinson 2005). Streaked horned larks are listed as critically imperiled (S1) by the Washington Natural Heritage Program. It is also a species of greatest concern under Washington's Comprehensive Wildlife Conservation Strategy (CWCS) (WDFW 2005). The plan is a non-regulatory statewide approach to conservation and fulfills a requirement for access to two new Federal grant programs. The draft strategy describes basic biology and distribution, general and specific problems facing the species, and general conservation strategies for the species. It also identifies specific conservation actions for the species. Development of the CWCS has proceeded on a parallel track with completion of ecoregional assessments for nine ecoregions in Washington. For each ecoregion, WDFW will complete Wildlife Action Plans that will include species-specific proposed conservation actions. The Wildlife Actions Plans are anticipated to be completed in 2008. However, it is unknown what actions will be proposed, or when such actions would be implemented.

The Oregon Natural Heritage Program lists the streaked horned lark as imperiled (S2). Oregon has a State Endangered Species Act, but the streaked horned lark is not State listed. Although this species is on the Oregon sensitive species list and is considered critically sensitive, this designation provides little protection (ODFW 1996, OAR 635–100–0040). The “critical” designation indicates a species for which a listing as threatened or endangered is pending or listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Once an Oregon “native wildlife” species is federally listed as threatened or endangered, it is included as a State listed species and receives some protection and management, primarily on State-owned or -managed lands (OAR 635–100–0100 to OAR 635–100–0180; ORS 496.171 to ORS 496.192). The Oregon Department of Fish and Wildlife (ODFW) has prepared a draft Comprehensive Conservation Strategy (ODFW 2006). The plan is a non-regulatory statewide approach to conservation in Oregon and fulfills a requirement to access two new Federal grant programs. The draft strategy identifies the streaked horned lark as a “strategy species.” Strategy species are low and declining, and an at-risk species, and the plan targets conservation actions for the most at-risk species. The strategy generally identifies special habitat needs, limiting factors and data gaps for the streaked horned lark. It also identifies specific conservation actions for the species. The strategy also identifies ecoregion opportunity areas. For example, Baskett Butte in the Willamette Valley is identified as an ecoregion opportunity area, and streaked horned larks are a key species for this opportunity area. Identified conservation actions include to maintain and enhance native remnant upland prairie, and to promote early detection and suppression of invasive weeds. However, this is the only ecoregion opportunity area identified in the Conservation Strategy that mentions streaked horned larks, even though they occur in other places in Willamette Valley. Also, it is unknown how and when any actions tied to the Conservation Strategy will be implemented.

In summary, there continue to be ongoing threats to the species due to the inadequacy of regulatory mechanisms. The Canadian recovery strategy (in draft, not yet released) is a positive forward step, however since the species is thought to be extirpated from Canada, it is unlikely to result in a change in status there. WDFW’s completion of a Wildlife Action Plan (not yet begun, and thus the completion date is unknown) for streaked horned lark may result in on-the-ground conservation actions for the species. It is also unknown when any actions tied to ODFW’s Conservation Strategy may be implemented. WDFW continues to conduct research on the species (S. Pearson, Ph.D., pers. comm. 2007).

E. Other natural or manmade factors affecting its continued existence.

Streaked horned larks regularly collide with aircraft at the various airports on or adjacent to their nesting areas (McChord Air Force Base (AFB), Olympia airport). McChord AFB regularly flies falcons to scare birds off the airfield, and started using dogs for this purpose in 2005. The dogs cause larks to become alert and fly away (Pearson and Altman 2005). In June 2005, McChord AFB also hosted a military training event which included aircraft, vehicles, and tents parked or erected adjacent to and on top of lark nesting areas. And in August 2005, McChord AFB’s annual air show included simulated bombing and fire-bombing of the area most heavily used by streaked horned larks, possibly affecting fledglings of late nests (Stinson 2005).

The small size of remaining individual nesting populations, combined with low genetic diversity, makes them vulnerable to local extirpation due to severe weather, predation, and human disturbance (e.g., mowing, trampling, etc.), which leads to nest destruction and/or nest abandonment. Analysis of mtDNA shows that streaked horned larks probably have suffered a

loss of genetic diversity. Decreased genetic diversity causes an increased chance of inbreeding depression, reduced disease resistance, and reduced adaptability to environmental change, leading to reduced reproductive success.

The disappearance of streaked horned larks from San Juan Island, Washington, may also be related to the introduction of other exotic species, including the Eurasian rabbit (*Oryctolagus cuniculus*) (Rogers 2000). The grazing patterns of the Eurasian rabbit may have altered the vegetation structure preferred by streaked horned larks. Introduction of exotic species to the island roughly coincides with the disappearance of the streaked horned lark (Rogers 2000).

Along the coast of Washington, the amount of nesting habitat available is subject to the dynamic process of erosion and accretion of sandy soils. When new land is created through accretion, there is a narrow window of time during which it is sparsely vegetated (and thus suitable for lark nesting), after which it becomes colonized by non-native beach grasses (and thus unsuitable for lark nesting). Changes in hydrology and currents can reduce the amount of sand export or affect the movement of sand along the coast (Pearson and Altman 2005).

In winter, streaked horned larks congregate in larger groups, and reside in fewer areas. Their wintering habitats mainly occur on privately-owned farmlands that are subject to unpredictable conversions to unsuitable foraging habitats. Also, when they are grouped together in larger numbers, they become even more susceptible to stochastic events that may occur in the winter (Pearson and Altman 2005).

Cowbirds (*Molothrus ater*) may pose a parasitism risk to eggs or nestlings, and/or they may lower streaked horned lark fledging success (Stinson 2005). Cowbirds have been observed on all streaked horned lark study areas (S. Pearson, Ph.D., WDFW, unpubl. 2007). Although none of the studied nests have been found to contain cowbird eggs, fledgling cowbirds have been observed begging food from adult streaked horned larks (Pearson and Hopey 2004). Horned larks in other states have suffered up to a 20 percent cowbird parasitism rate, with up to 63 percent of second clutches being parasitized (Stinson 2005).

In summary, there are likely to be ongoing threats to the species due to factors such as aircraft collision, exotic animal encroachment (and alteration of habitat), accretion and erosion effects to habitat along the coast, and cowbird parasitism. There is no recent information to suggest that these threats are increasing. Threats to the species due to potential stochastic events (due to small population size, low genetic diversity, and clumping of wintering birds in unsecured habitats) is an ongoing threat that has a high risk of significant negative impacts to the species.

#### CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

##### Washington

The Service has funded surveys of breeding larks in Washington to better describe numbers and distribution of streaked horned larks. A streaked horned lark project, "Identifying Habitat Features and Developing a Survey Protocol for Breeding Streaked Horned Larks in the Puget Lowlands of Washington," was funded, in part, by the Service through a Cooperative Agreement with the WDNR in FY2002, FY2003, and FY2004. Objectives of the study included developing a streaked horned lark survey protocol and identifying habitat features important to successful breeding at the nest site, territory, and landscape scales. In 2002, 59 nests were located and

monitored for reproductive success. Monitoring information gathered included arrival dates, clutch initiation dates, and dates of nesting activity. Habitat variables associated with 42 territories and 59 nests were measured at 4 Puget lowland sites. A GIS layer was created using location and behavior information for use by land managers in identifying streaked horned lark activity centers and adjusting management activities (e.g., mowing) in those areas. Three census methods were evaluated. Management recommendations included minimizing human activities in breeding areas, habitat restoration, Scot's broom control, control of sod-forming grasses, mowing timing and grass height, and eliminating potential sources of food (e.g., garbage and food scraps) for predators (Pearson 2003; Pearson and Hopey 2005).

Pearson and Hopey (2005) initiated an experimental study at Gray Army Airfield to examine the effects of a grass-specific herbicide that apparently kills nonnative pasture grasses but not native bunch grass (*Festuca roemerii*) or sedge (*Carex inops*). Application of the herbicide to areas with high coverage of nonnative grasses should result in a more sparsely vegetated habitat preferred by streaked horned larks. The first year of application (2003) was ineffective, likely due to bad timing of the application (Pearson and Hopey 2005). A second treatment was conducted in 2004. There was no effect of herbicide treatment on lark response. The number of birds decreased in both the treated and untreated areas (Pearson et al. 2005).

As a consequence of this project, local land/airport managers became concerned about the importance of the four breeding sites and, in consultation with the researchers, adjusted mowing activities to avoid streaked horned lark nests, restricted public access, restricted model airplane flying over streaked horned lark activity centers, and were interested in the potential effects of usual activities, including troop training on Fort Lewis, on streaked horned lark breeding. Gray Army Airfield modified mowing regimes to avoid disturbing or destroying nests. Fort Lewis did not renew a permit allowing a model airplane club's use of a streaked horned lark breeding area. Fort Lewis posted signs prohibiting all recreational activities near nesting streaked horned larks. From 2001 through 2004, Fort Lewis used nonbreeding season mowing and controlled burns to control Scot's broom (Pearson and Hopey 2005). September 2004 burns resulted in increased lark abundance and a dramatic vegetative response on 13<sup>th</sup> Division Prairie. Relative to the control sites, late summer fire in 2006 increased the use of burned areas by larks immediately after the fires, and in the breeding season following the fires (S. Pearson, Ph.D., *in litt.* 2007). The abundance of streaked horned larks at Gray Army Air Field steadily decreased between 2003 and 2005, but was apparently stable at 13<sup>th</sup> Division Prairie during that time (S. Pearson, Ph.D., *in litt.* 2007).

Fort Lewis has identified several grassland management goals for its ownership, and is currently working with the Service on a Candidate Conservation Agreement with Assurances, in partnership with Port of Olympia, The Nature Conservancy, Thurston County, WDFW, and WDNR. These include no net reduction in the quantity or quality of moderate- and high-quality prairie; and, viable populations of all prairie-dependent and prairie-associated species (Entrix, Inc. 2006). A draft Agreement is anticipated during the Fiscal Year 2007. The Nature Conservancy (TNC) has been working with Fort Lewis on prairie habitat enhancement, and with help from the Service purchased 125 acres of prairie habitat adjacent to Fort Lewis in 2005 (<http://www.nature.org/wherewework/northamerica/states/washington/press/press2044.html>).

The Service has a habitat restoration area on the Leadbetter Point Unit of the Willapa National Wildlife Refuge Complex. In 2006, it was 64 acres. They have mechanically cleared beachgrass (mostly *A. breviligulata*) and spread oystershell in the area, creating open sand habitat that is

sparsely vegetated (which larks prefer for nesting). While the work focused primarily on western snowy plover, the streaked horned lark has benefitted as well. In 2006, WDFW found 3 streaked horned lark nests in the Leadbetter Point Unit. This same area had no known nests in 2005, 2 nests in 2004 (Pearson et al. 2005), and was previously occupied by several pairs in the 1990s (Rogers 2000). Such restoration helps address threats to the species due to beach grass encroachment.

WDFW and WDNR, in cooperation with and with funding from the Service, have been conducting prairie restoration work in various Wildlife Areas and Natural Area Preserves in Washington.

The Washington Natural Heritage Program, WDNR, Service, University of Washington's Center for Urban Horticulture, and TNC have worked together on prairie plant propagation research (as cited in Stinson 2005). TNC has been testing and improving Scot's broom control techniques (Dunn 2003 as cited in Stinson 2005). The Washington Natural Heritage Program is leading a group to develop a conservation plan for Boistfort Prairie in Lewis County.

WDFW recently purchased 800 acres of the West Rocky Prairie, the largest and highest quality remaining south Puget Sound prairie that remained in private lands. WDFW also purchased an 80-acre private inholding at the Black River-Mima Prairie Glacier Heritage Preserve. WDNR intends to expand the Mima Mounds Natural Area Preserve when they have available funding and willing sellers. TNC recently received a conservation easement donation on 613 acres of the Cavness ranch on Frost Prairie south of Tenino. This purchase will protect prairie lands from development. However it is uncertain whether or not these sites are appropriate for streaked horned larks. West Rocky Prairie is felt to hold the greatest promise, though (S. Pearson, Ph.D., *in litt.* February 2007).

In 2007, WDFW will be conducting research by placing cameras at lark nests to see if they can better identify sources of predation. They will also be looking for banded birds to gain an estimate of survivorship and return rates (S. Pearson, Ph.D., pers. comm. 2007).

## Oregon

The Oregon Department of Fish and Wildlife has designated the streaked horned lark as a "strategy species" in the Oregon Conservation Strategy (Oregon Department of Fish and Wildlife 2006). Strategy species are defined as species that are "low and declining" or are otherwise at risk. The purpose of designating strategy species is to prevent these species from declining further and, where possible, to restore their populations.

Several habitat restoration projects implemented under the Wetland Reserve Program are being planned in the central Willamette Valley. A large (nearly 600-acre) habitat restoration project in central Linn County will include about 80 acres of exposed mudflats that may provide suitable nesting habitat for streaked horned larks. Work will begin in mid-2007. Five similar, though smaller, projects are also being planned which will provide nesting habitat for larks. These projects are being funded by the Natural Resources Conservation Service and were planned and will be implemented with the technical assistance of the Service (Jared Jebousek, USFWS, pers. comm. 2007).

The Service's Willamette Valley National Wildlife Refuge Complex has initiated a project on the William L. Finley National Wildlife Refuge to restore an 80-acre retired grass seed field to

wet prairie habitat. The project involves seeding at a density that will create a significant amount of bare ground among the native grasses and forbs, providing nesting habitat for streaked horned larks. Monitoring over the next three years will determine if the restoration efforts will be successful in attracting nesting larks (Jock Beall, USFWS, *in litt.* February 2007).

Oregon State University, the Port of Portland, and Metro are working on plans to create habitat for streaked horned larks at the St. John's Landfill in northern Multnomah County. Habitat would be created by spreading dredge spoils and planting the site with native floodplain species. The Landfill is adjacent to the last known breeding site for the subspecies in the County, and is frequented by flocks of wintering larks (R. Moore, pers. comm. 2007).

The Oregon Department of Fish and Wildlife has funded a Landowner Incentive Program grant in Polk County. The project will create about 80 acres of vernal pool habitat. It is hoped that streaked horned larks will nest in the sparsely vegetated flats that occur in the area after the water recedes in late April and early May (R. Moore, pers. comm. 2007).

Benton County is developing a Habitat Conservation Plan (HCP) to cover management of County lands and impacts caused by County permitting authorities. The streaked horned lark has been identified as a target species for the HCP, and will likely benefit from restoration and mitigation projects as part of the HCP's implementation (R. Moore, pers. comm. 2007).

The Service is currently funding three studies in Oregon to obtain better information on distribution and habitat needs of streaked horned larks. One study will develop protocols for breeding surveys, and fill gaps in existing knowledge regarding the subspecies' winter range. The study includes exhaustive surveys for wintering larks in the southern portion of its range in the Rogue River Valley in Jackson and Klamath Counties, Oregon, and Shasta County, California. This study will also quantify habitat structure and plant species composition in occupied winter habitat. Another study will determine forage requirements across the winter range of the streaked horned lark. A third study will conduct an inventory of streaked horned lark populations on public lands in the Willamette Valley, with habitat assessments of occupied sites and management recommendations for those sites.

**SUMMARY OF THREATS** (including reasons for addition or removal from candidacy, if appropriate):

This review is based on information contained in our files as of March 2007. The streaked horned lark occurs in Washington and Oregon, and is thought to be extirpated in British Columbia, Canada (COSEWIC 2003). The streaked horned lark nests on the ground in sparsely vegetated sites in short-grass dominated habitats, such as native prairies, coastal dunes, fallow agricultural fields, lightly- to moderately-grazed pastures, seasonal mudflats, airports, and dredged-material formed islands in the Columbia River. In Washington, surveys show that there are approximately 330 remaining breeding birds (Stinson 2005). In Oregon, the breeding population is estimated to be approximately 400 birds.

The streaked horned lark's breeding habitat continues to be threatened by loss and degradation due to conversion of native grasslands to other uses (such as agriculture, homes, recreational areas, and industry), encroachment of woody vegetation, and invasion of nonnative plant species (e.g., Scot's broom, sod-forming grasses, and beachgrasses). Native prairies have been nearly eliminated throughout the range of the species. It is estimated that less than 1 to 3 percent of the

native grassland and savanna remains. Those that remain have been invaded by nonnative sod-forming grasses. Coastal nesting areas have suffered the same fate. A recent purchase of prairie lands in Washington has secured habitat that would have been developed. Its status as suitable lark nesting habitat is unknown.

Wintering habitats are seemingly few, and susceptible to unpredictable conversion to unsuitable over-wintering habitat. Where larks inhabit manmade habitats similar in structure to native prairies (such as airports, military reservations, agricultural fields, and dredge-formed islands), or where they occur adjacent to human habitation, they are subjected to a variety of unintentional human disturbances such as mowing, recreational and military activities, plowing, flooding, and dredge spoil dumping during the nesting season, as well as intentional disturbances such as at the McChord AFB where falcons and dogs are used to haze the birds in order to avoid aircraft collisions. In some areas, landowners have taken steps to improve streaked horned lark nesting habitat.

The magnitude of threat is considered high due to small populations with low genetic diversity, and patchy and isolated habitats in areas desirable for development, many of which remain unsecured. The threat of invasive plant species is high and constant, aside from a few restoration sites. The numbers of individuals are low and the numbers of populations are few. Over-wintering birds are concentrated in larger flocks and subject to unpredictable wintering habitat loss (especially in Oregon), potentially affecting a large portion of the population at one time. In Washington, known populations occur on airports, military bases, coastal beaches, and Columbia River islands, where management, training activities, recreation, and dredge spoil dumping continue to negatively impact streaked horned lark breeding and wintering. In Oregon, breeding and wintering sites occur on Columbia River islands, in cultivated grass fields, grazed pastures, fallow fields, roadside shoulders, Christmas tree farms, and wetland mudflats (Pearson and Altman 2005). Such areas continue to be subject to negative impacts such as dredge spoil dumping, development, plowing, mowing, pesticide and herbicide applications, trampling, vehicle traffic, and recreation.

The immediacy of threat is considered to be imminent, due to the continued loss of suitable lark habitat, risks to the wintering populations, plans for development on and adjacent to several of its nesting areas, use of falcons and dogs to haze breeding birds at McChord AFB, planned and/or continued expansions of the McChord AFB West Ramp and Olympia Airport, and annual Air Force military training and fire-bombing on top of lark nesting habitat.

We find that this species is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

#### RECOMMENDED CONSERVATION MEASURES:

- Identify primary nest predators
- Identify habitat features associated with successful nesting
- Cover garbage cans and pick up food scraps near streaked horned lark breeding locations to reduce predator food sources.
- Mowing, dredge spoils deposition, vehicle traffic, model airplane flying, bird watching, kite flying, fireworks, dog walking, and gatherings of people and vehicles appear to negatively affect the breeding success of streaked horned larks. The timing and/or

locations of these activities should be scheduled so as to avoid lark nesting areas, especially during the nesting season (mid-April to early August) (Pearson and Hopey 2005). Limit most human activities within 30 meters of breeding larks.

- Conduct controlled burns in known breeding areas after mid-August and before March. This should not occur in high-quality native prairies, or where/when other rare prairie-dependent species may be negatively affected.
- Create and maintain high-quality prairie habitat, away from suburban and forested edges. In the Puget Sound lowlands, focus on large, open grasslands (100s of acres in size).
- In airport areas, mow streaked horned lark nesting areas very low before and/or after the breeding season.
- Restoration activities should be treated as experiments so that the effectiveness of treatments can be assessed.
- Do not deposit dredge spoils on active breeding areas during the breeding season.
- Encourage farming practices that create and maintain bare ground within grass and forb dominated fields in Oregon.
- Along the coast, use volunteers to encourage people to avoid lark nesting areas and to educate them about the lark’s vulnerability to human activities. Limit beach access in lark nesting areas.
- Increase the amount and extent of lark wintering habitat to reduce the potential for large population losses due to sudden changes in habitat or severe weather.
- Identify nesting sites that can be restored and then protect them.
- Determine the feasibility of reintroducing larks to protected areas.
- Conduct research such as discussed in Pearson and Altman (2005), which would increase our understanding of lark habitat selection, location, amount, and use, and those factors which affect survival of larks in their nesting and wintering habitats.

LISTING PRIORITY:

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		Species	2
		<b>Subspecies/population</b>	<b>3*</b>
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

## **Rationale for listing priority number:**

*Magnitude:* The magnitude of threat is considered high due to small populations with low genetic diversity, and patchy and isolated habitats in areas desirable for development. The threat of invasive plant species is high and constant. The numbers of individuals are low and the numbers of populations are few. Over-wintering birds are concentrated in larger flocks and subject to unpredictable wintering habitat loss (especially in Oregon), potentially affecting a large portion of the population at one time. In Washington, known populations occur on airports, military bases, coastal beaches, and Columbia River islands, where management, training activities, recreation, and dredge spoil deposition can negatively impact streaked horned lark breeding and wintering. In Oregon, breeding and wintering sites occur on Columbia River islands, in cultivated grass fields, grazed pastures, fallow fields, roadside shoulders, Christmas tree farms, and wetland mudflats (Pearson and Altman 2005). Such areas are subject to negative impacts such as dredge spoil deposition, development, plowing, mowing, pesticide and herbicide applications, trampling, vehicle traffic, and recreation.

*Imminence:* The immediacy of threat is considered to be imminent, due to the continued loss of suitable lark habitat, risks to the wintering populations, plans for development on and adjacent to several of its nesting areas, use of falcons and dogs to haze breeding birds at McChord AFB, planned and/or continued expansions of the McChord AFB West Ramp and Olympia Airport, and annual Air Force military training and fire-bombing on top of lark nesting habitat.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No Although there are few populations, they are widely scattered such that there is no single threat likely to result in extirpation simultaneously. Conservation measures for the listed snowy plover may benefit coastal populations of streaked horned larks. It is hoped that ongoing Candidate Conservation Agreement negotiations with some of the major nesting area landowners in Washington will result in significant benefits to the species, but based on activities occurring at one of these areas in 2005, the end results remain to be seen.

## **DESCRIPTION OF MONITORING:**

The Service has funded, in part, much of the recent survey, research, and monitoring efforts for the streaked horned lark. We maintain contact with the responsible agencies and species experts and annually request their reviews and updates to the candidate assessment forms during the revision process. Relevant literature and data for this species are obtained principally from contacts with responsible agencies and experts and their reports. We contacted other Service offices/staff (Cat Brown, Jock Beall, Kirsten Brennan, Jarod Jebousek, Doug Spencer), WDFW (Scott Pearson, Ph.D., Derek Stinson, Eric Cummins), OSU (Randy Moore), the Canadian Wildlife Service (Kevin Fort, Lucy Reiss), the American Bird Conservancy (Robert Altman), Portland Metro (Elaine Stewart), and the Port of Portland (David Helzer). Some were asked to review the species assessment, while others were asked to provide updated information on lands they manage and which contain streaked horned lark nest sites. Periodic web-based literature searches for this species are also completed. This level of monitoring is appropriate, as these are the primary entities responsible for conservation of the species and/or management of lands containing habitat.

Monitoring and research to obtain information on populations, habitat variables, and features associated with streaked horned lark populations along the Washington coast and on islands in the Columbia River will continue in 2007.

Research and monitoring of wintering larks is being implemented for wintering larks in southern Oregon and northern California. Inventory of lark populations on public lands is planned for the Willamette Valley, with particular emphasis on National Wildlife Refuge lands there.

#### COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Washington and Oregon. Also British Columbia, Canada. Their comments were incorporated into this assesement.

Indicate which State(s) did not provide any information or comments: N/A

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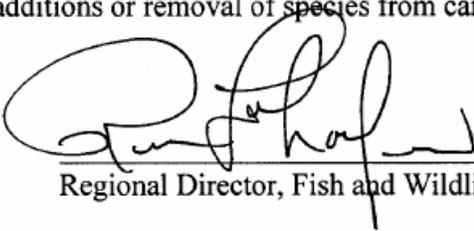
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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:  6/1/07  
Regional Director, Fish and Wildlife Service Date

Concur:  November 27, 2007  
Acting Director, U.S. Fish and Wildlife Service Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: March 22, 2007  
Conducted by: Kim Flotlin, USFWS

Reviewed by: Jodi Bush Date: March 27, 2007  
Division Manager, Listing and Recovery, WWFOW

Ken Berg Date: March 30, 2007  
Manager, WWFOW