

**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: April 2010

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. is "yes", provide an explanation of why the action is precluded.

Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species.

We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR

(<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

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, Clackamas, Clatsop, Columbia, Lane, Linn, Marion, Multnomah, and Polk, Washington, and Yamhill Counties. An historic population in Jackson County was never confirmed as extirpated, and may still exist (Randy Moore, Oregon State University, in litt. 2010).

LAND OWNERSHIP:

In British Columbia, the last known breeding site was seen in 1987 at Vancouver International Airport, and the most recent indication of potential breeding was in 2002 at the Nanaimo Airport on southern Vancouver Island (COSEWIC 2003, p. 7), 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, p. 67).

In Oregon, streaked horned larks are found on Baskett Slough, Ankeny, and W.L. Finley National Wildlife Refuges, U.S. Army Corps of Engineers (COE) lands at Fern Ridge, dredge material plains at the Port of Portland, Portland International Airport, the Corvallis, Eugene, Salem, and McMinnville Airports, Willamette Mission State Park, and dredge material islands on the Columbia River (Bob Altman, American Bird Conservancy, pers. comm. 2000; Randy Moore, pers. comm. 2007, Randy Moore, in litt. 2010; David Helzer Port of Portland, pers. comm. 2007). The remainder of the population is on private lands.

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BIOLOGICAL INFORMATION:

Species Description

Horned larks (*Eremophila alpestris*) are small, ground-dwelling birds, approximately 16–20 centimeters (6–8 inches) in length (Beason 1995, p. 2). Adults are pale brown, but shades of brown vary geographically among the subspecies. The male's face has a yellow wash in most subspecies. Adults have a black bib, black whisker marks, and black “horns” – feather tufts that can be raised or lowered. 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, p. 4). This subspecies is conspicuously more yellow beneath and darker (reddish) on the back than almost all other subspecies of horned lark. The combination of small size, dark brown back, and yellow on the underparts distinguishes this race from all adjacent forms.

Taxonomy

Eremophila alpestris strigata was first described by Henshaw (1884, pp. 261-264, 267-268); the type locality was Fort Steilacoom, Washington (Henshaw 1884, p. 267). This is one of 21 subspecies of horned larks in North America; 15 subspecies occur in western North America (Beason 1995, p. 4). Subspecies of horned larks are based primarily on differences in color, body size, and wing length. Western populations of horned larks are paler and smaller than eastern and northern populations (Beason 1995, p. 3). There are three other breeding subspecies of horned larks in Washington: *Eremophila alpestris alpina*, *Eremophila alpestris merrilli*, and *Eremophila alpestris lamprochroma* (Rogers 2000, p. 17).

Drovetski et al. (2005, p. 877) evaluated the genetic distinctiveness, conservation status and level of genetic diversity of the streaked horned lark using the complete mitochondrial ND2 gene. Thirty-two samples from *strigata* in western Washington, and 66 horned lark samples from Alaska, alpine Washington, eastern Washington, eastern Oregon, and California were analyzed. Thirty haplotypes identified among 98 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) (Drovetski et al. 2005, p. 880).

Streaked horned larks were closely related to the California samples and only distantly related to the three closest localities (alpine Washington, 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 coastal California, and has “remarkably low genetic diversity.” All 32 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 (Drovetski et al. 2005, pp. 879-880).

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 differentiated and isolated from all other sampled localities. Streaked horned larks have been

evolving independently from the Pacific Coast lineage (of which it was historically a part) for some time. Genetic analyses support the subspecies designation for the streaked horned lark (Drovetski et al. 2005, p. 880), which has been considered a relatively well-defined subspecies based on physical characteristics (phenotypically) (Beason 1995, p. 4).

Habitat

The streaked horned lark nests on bare ground in sparsely vegetated sites dominated by grasses and forbs (Pearson 2003, p. 15; Pearson and Hopey 2005, p. 19). Historically this type of habitat was found in prairies in western Oregon and Washington, in dune habitats 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 and active agricultural fields, seasonal wetlands, sparsely-vegetated edges of grass fields, moderately- to heavily-grazed pastures, seasonal mudflats, airports, and dredge deposition sites in and along the tidal reach of the Columbia River (Altman 1999, p. 13; Rogers 1999, p. 9; Pearson 2003, p. 6; Pearson and Hopey 2005, p. 15; Pearson and Altman 2005, p. 5, Moore 2008b, pp. 9-10, 12-14, 16).

Historical Range/Distribution

Historically, the streaked horned lark's breeding range extended from southern British Columbia (Campbell et al. 1997, p. ; COSEWIC 2003, p. 5) south through the Puget lowlands and outer coast of Washington (Jewett et al. 1953, p. 438). At the time of European settlement, the streaked horned lark was described as a common summer resident in the prairies of the Puget Sound region in Washington (Bowles 1898, p.53). 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. Streaked horned larks may also have bred in King and Clallam Counties, although there are no known historic breeding records for those counties (Rogers 2000, pp. 24-26).

The breeding range extended south through the Willamette Valley of Oregon where the streaked horned lark was an abundant summer resident in the northern Willamette Valley (Johnson 1880, p. 636). In the 1940s, the subspecies was a "very common permanent resident" in the southern Willamette Valley (Gullion 1951, p. 141). The subspecies formerly bred in the Rogue River Valley of Oregon, with breeding confirmed as late as 1976 (Marshall et al. 2003, p. 425). 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 (Rogers 2000, pp. 22-27; Pearson 2003, p. 4). 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, p. 15). 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 at the Nanaimo Airport on

southeastern Vancouver Island (COSEWIC 2003, p. 7), though only a single male was found (Kevin Fort, [in litt.](#) 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. Breeding sites have been found in Grays Harbor, Mason, Pierce, Thurston, Pacific, and Wahkiakum Counties, Washington (Rogers 2000, p. 37; Pearson and Altman 2005, p. 23; Pearson et al. 2005a, p. 2, Anderson 2009, p. 4). 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 2005b, p. 7). Recent site visits suggest that streaked horned larks in Washington currently breed on 6 sites in the Puget lowlands (one site on McChord AFB, 3 sites on Ft. Lewis, Olympia Airport, and Shelton Airport), 4 sites on the coast (Damon Point, Midway Beach, Graveyard Spit, and Leadbetter Point), and 2 sites on islands in the lower Columbia River (White's/Brown's Island, and the Washington portion of Rice Island) (Anderson 2009, p. 4).

Streaked horned larks breed in the Willamette Valley in Oregon (Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington, and Yamhill Counties), and are most common in the central and south-central Willamette Valley. 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. An historic population in Jackson County was never confirmed as extirpated, and may still exist (Randy Moore, [in litt.](#) 2010). Larks breed on 5 Oregon islands in the lower Columbia River: Miller Sands Spit, Pillar Rock Sands, Crims Island, Sandy Island, and the Oregon portion of Rice Island (Pearson et al. 2005, p. 23; Anderson 2009, p. 4). Streaked horned larks over-winter in large groups (some groups are approximately 170 birds) of mixed subspecies of horned larks in the Willamette Valley, and smaller flocks along the lower Columbia River and Washington Coast (Pearson et al. 2005, p. 7; Pearson and Altman 2005b, p. 7).

Population Estimates/Status

The Canadian population is thought to be extirpated (COSEWIC 2003, p. 15, Environment Canada 2007, p. iv). A 2002 survey at Nanaimo Airport, the last known (1987) location of breeding in British Columbia, found only a single male. 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 (Kevin Fort, [in litt.](#) 2007).

Approximately 330 streaked horned larks breed at 12 sites in Washington, including 6 in the Puget lowlands, 4 on the Washington coast, and 2 on the Columbia River islands (Pearson and Altman 2005, p. 23, Stinson 2005, p. 64; Anderson 2009, p. 4). Most Washington birds winter in Oregon (Pearson et al. 2005b, p. 7). There are at least 500 streaked horned larks in Oregon, and likely 100s more, but there has been no Valley-wide survey, and a complete State estimate is not yet possible (Randy Moore, [in litt.](#) 2008, 2010). Altman's (1999, pp. 12, 18) preliminary data from the Willamette Valley showed low nest success, but 2008-2009 surveys in Oregon showed highly variable nest success, with some areas of high nest success (R. Moore, [in litt.](#) 2010). Pearson et al. (2008, p. 8) data confirmed low nest success in Washington. In fact, estimates of lambda that include vital rates from all of the primary nesting areas in Washington indicate that

the Washington population is declining by 40 percent per year ($\lambda = 0.61 \pm 0.10$ SD), apparently due to a combination of low survival and fecundity rates (Pearson et al. 2008, pp. 10, 13).

The Washington estimates are based on a significant amount of survey effort (Smith et al. 1997; Altman 1999, 2000; Rogers 1999, 2000; MacLaren 2000; MacLaren and Cummins 2000; Pearson 2003; Pearson and Hopey 2005; Pearson and Altman 2005; Pearson et al. 2005), but Oregon's surveys are as yet incomplete (Randy Moore, pers. comm. 2008).

THREATS:

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

A major long-term 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 due to fire suppression; 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*); and loss of habitat and young to dredging activities (Rogers 1999, p.5; Pearson and Hopey 2005, pp. 5, 27; Pearson et al. 2008, p. 14).

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, p. 11; Pearson and Altman 2005). In the south Puget Sound region, where most of western Washington's prairies historically occurred, only 10 percent of the historic prairie is considered intact (Altman 2000, p. 12), and only 3 percent remains dominated by native vegetation (Crawford and Hall 1997, p. 13). In the remaining prairies, many of the native bunch grass communities have been lost to nonnative pasture grasses (Rogers 2000, p. 35), which larks avoid using for territories and nest sites (Pearson and Hopey 2005, p.2). The grassland at Cattle Point on San Juan Island (an historic site for streaked horned larks) has been invaded by nonnative sod-forming grasses that are avoided by streaked horned larks (Scott Pearson, Ph.D., Washington Department of Natural Resources, pers. comm. 2004).

In coastal areas, the introduction of Eurasian beach grass (*Ammophila arenaria*) and American beachgrass (*A. breviligulata*), currently found in high and increasing densities in 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 lark nesting (MacLaren 2000, pp. 3-4; Wiedemann 1984, p. 28).

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, p. 8). The main wintering area for larks 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, p. 164) 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. Consequently, populations using these manmade habitats may have low nesting success and these areas may actually be population sinks (Stinson 2005, pp. 59, 71).

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, p. 27). 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 located on or adjacent to airports, including two military bases (Rogers 2000, p. 37; Pearson and Hopey 2005, p. 15). 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 these activities occur during the nesting season (Pearson 2003, p. 14; Pearson and Hopey 2005, p. 17; Stinson 2005, p. 72).

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 (Pearson and Hopey 2005, p. 29). 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, p. 72).

Streaked horned lark nests on dredge material islands in the Columbia River are subject to destruction by dredging activities. Dredged material is deposited on these islands during the nesting season in habitat with documented use by streaked horned larks (Eric Cummins, WDFW, pers. comm. 2000). New dredge material 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 materials 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 nests. This site had at least 21 nests and 13 territories during the 2005 nesting season (Pearson et al. 2008, p. 21).

In a similar situation on the Oregon side of the Columbia River, eight singing males were observed on Rice Island in June 2000. Dredge material 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, p. 10). No streaked horned larks were observed during the 2000 or 2008 season on Sand Island, an island near the mouth of the Columbia River where dredge material is deposited (MacLaren 2000, p. 10; Hannah Anderson, pers. comm. 2008).

There are two known nesting areas for streaked horned larks in Multnomah County, Oregon. ; Both are found on dredge material deposition industrial sites owned by the Port of Portland.

The first is at the Rivergate Industrial District, which was partially developed in 2007. In 2006, about six pairs of streaked horned larks were observed to breed at this site, and in 2009 the site is still active with approximately the same number of breeders (Randy Moore, pers. comm. 2007, 2009). The second area is at the "southwest quadrant" of Portland International Airport, which is a similar type of dredge material deposition site. In 2008, two to three territories were established there, and about the same number of breeders used the site in 2009 (Randy Moore, in litt. 2008, 2009).

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 river channel maintenance. Threats due to development and dredge material dumping have resulted in direct loss of nesting and foraging habitat in the last 4 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, p. 14; Pearson and Hopey 2004, p. 15); Pearson and Hopey 2005, p. 16; Stinson 2005, p. 58). Seventy percent of nest failures were caused by predation at four study sites in 2002. A garter snake (Thamnophis spp.), several northern harriers (Circus cyaneus), two American crows (Corvus brachyrhynchos), and western meadowlarks (Sturnella neglecta) have been observed eating young and eggs (Pearson 2003, p. 14; Pearson and Hopey 2005, p. 16; Scott Pearson, Ph.D., WDFW, in litt. 2007, Pearson and Hopey 2008, p. 4). In the southern Willamette Valley, northern harriers, red-tailed hawks (Buteo jamaicensis), American kestrels (Falco sparverius), great-horned owls (Bubo virginianus), mice (likely from the genera Peromyscus, Mus, or Microtus), and elk (inadvertent) (Cervus canadensis) have all been filmed depredating nests (R. Moore, in litt. 2010). Predation on grassland bird species by domestic cats and crows at one south Puget Sound site has been documented (Rogers 2000, p. 42). 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, p. 12). 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 (13th Division Prairie) has high predation rates (Pearson 2003, p. 14; Pearson and Hopey 2004, p. 15; Pearson and Hopey 2005, p. 17; Pearson and Hopey 2008, pp. 3-4). It's unknown why this is the case (Scott Pearson, Ph.D., pers. comm. 2007).

Streaked horned larks apparently disappeared from the San Juan Islands in 1962 (Rogers 2000, p. 26). 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 (Scott 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, p. 42).

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. However, 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 2005, p. 1755). A final recovery strategy for this species was released in July 2007 (Environment Canada 2007). The streaked horned lark is essentially extirpated from Canada (COSEWIC 2003, p. 7).

The streaked horned lark is listed as endangered by the Washington Department of Fish and Wildlife (WDFW), but receives little protection under State law. Under State law, State-listed species are protected from direct take, but their habitats are not provided protection (RCW 77.15.120). Currently, streaked horned larks in Washington occur mainly on Federal, State, City, and Port lands. As such, conflicts with private landowners have not arisen in any number. If streaked horned larks were to move onto private lands that were also protected prairies or sand dunes under the State’s critical area ordinances, their habitat would receive some level of protection. Development applications in those areas would then spur surveys and habitat assessments by WDFW and/or contractors in Thurston, Pierce, and Pacific Counties at least. WDFW would recommend an appropriate amount of protection of habitat to the county or city, which would pass that recommendation and/or a requirement for protection on to the developer in question.

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, p. 46). 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, p. 144). The CWCS is a non-regulatory statewide approach to conservation and fulfills a requirement for access to two new Federal grant programs. It 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. However, it is unknown when the Wildlife Action Plans will be completed, what actions will be proposed, or when such actions would be implemented. Because the species is state-listed, however, WDFW will continue to protect streaked horned larks where they are able, regardless of completion of the Wildlife Action Plans.

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

(ODFW 1996, p. 237), this designation provides little protection (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 Natural Heritage Program lists the streaked horned lark as imperiled (S2). ODFW and OSU continue to conduct research on the species.

In summary, there continue to be ongoing threats to the species due to the inadequacy of regulatory mechanisms. The Canadian recovery strategy is a positive forward step, however, as the species is thought to be extirpated from Canada, it is unlikely to result in a change in status there. Lack of essential habitat protection under State laws leaves the species at continued risk of habitat loss and degradation.

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

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. Small population sizes coupled with observations of mother-son pairings (which leads to decreased genetic diversity) in horned larks may explain the relatively low hatchability of lark eggs (Pearson et al. 2008, p.15). The small size of remaining individual nesting populations, combined with low genetic diversity, makes them vulnerable to local extirpation due to poor recruitment related to low hatchability, low adult survival, severe weather, predation, and human disturbance (e.g., mowing, trampling, etc.), which leads to nest destruction and/or nest abandonment.

As stated in a previous section, estimates of lambda that include vital rates from all of the primary nesting areas in Washington indicate that the Washington population of larks is declining by 40 percent per year, apparently due to a combination of low survival and fecundity rates (Pearson et al. 2008, pp. 10, 13). Adult growth rate has the greatest influence on population growth rate, and thus conservation actions in Washington should focus on improving adult survival. While natal and breeding dispersal has been observed into the coastal areas of the state, natal and breeding dispersal into the Puget lowlands has not been observed (Pearson et al. 2008, p. 1). It appears that there is habitat along the Washington coast that isn't being used by larks, while habitat is more limiting in the Puget lowlands (Scott Pearson, in litt. 2010). Coupling larks' high site fidelity with a declining Puget lowland population means it may be difficult to lure larks to restored sites until this negative population trend has been addressed. The Puget lowland population could become extirpated in the near future (Pearson et al. 2008, p. 14, 15).

Streaked horned larks are occasionally killed by aircraft at the various airports on or adjacent to their nesting areas (McChord Air Force Base (AFB), now part of Joint Base Lewis-McChord Field (JBLMF), Olympia airport). The Air Force maintains a database of bird strikes at Air Force bases across the U.S., which shows that horned larks are the most-struck animal in the U.S. (USAF BASH webpage, accessed April 15, 2009: <http://www.afsc.af.mil/shared/media/document/AFD-080130-041.pdf>). However, they're reported to be only about the 10th-most struck animal at all civil airports, well behind mourning

doves and European starlings in number (Dolbeer and Wright 2008, pp. 25-40). WDFW has found at least 3 dead birds along military runways which they suspect were struck by planes (Scott Pearson, Ph.D., WDFW, pers. comm. 2008; Scott Pearson, *in litt.* 2010). At McChord AFB, there have been seven confirmed streaked horned lark strikes from 2002 through 2009. The last streaked horned lark strike occurred in April 2008; no streaked horned lark strikes occurred in 2009 (Sharon Geil, *in litt.* 2010).

McChord AFB routinely flies falcons to scare all birds off the airfield, and started using dogs for this purpose in 2005. McChord AFB currently uses only one dog, which is used to scare Canada geese and gulls off the airfield. These birds are found on the airfield primarily during the winter (Sharon Geil, *in litt.* 2010). The dogs cause larks to become alert and fly away (Pearson and Altman 2005, p. 12).

Since 2005, in odd numbered years, McChord AFB has hosted a military training event (known as RODEO). This international military training exercise is generally held at the end of July. These events include aircraft, vehicles, and tents parked or erected on or near lark nesting areas. Ninety percent of all activities take place on concrete areas. McChord AFB has also hosted a public air show (known as Air Expo), which is generally scheduled in mid-July during even-numbered years. During the August 2005 Air Expo, one aerial event incorporated simulated bombing and fire-bombing (explosives and pyrotechnics launched from an airfield area burned in advance to prevent fires) adjacent to the area most heavily-used by streaked horned larks. This possibly affected fledglings of late nests (Stinson 2005, p. 72). The next Air Expo is scheduled for 16-18 July 2010, and the next RODEO is scheduled for 18-30 July 2011. These events are timed to occur during a period normally having good flying weather (for planes); which is also near the end of lark nesting activities. The first breeding period for streaked horned larks begins late April/early May and extends into late May/early June. A second period begins in early June and ends in late July/early August. The second period appears to consist of re-nesting after failed attempts, as well as second clutches (Pearson and Hopey 2005, p. 12).

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 (*Ammophila*), and thus unsuitable for lark nesting. Changes in hydrology and currents can reduce the amount of sand exported or affect the movement of sand along the coast (Pearson and Altman 2005, p. 13).

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, p. 42). 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, p. 42).

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, p. 13).

Cowbirds (*Molothrus ater*) may pose a parasitism risk to eggs or nestlings, and/or they may

lower streaked horned lark fledging success (Stinson 2005, p. 56). Cowbirds have been observed on many streaked horned lark study areas in Washington (S. Pearson, Ph.D., 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, p. 56). But in Washington and Oregon, of over 500 nests observed, none have been documented as parasitized by cowbirds (Randy Moore, in litt. 2008, 2010).

In summary, there are likely to be ongoing threats to the species due to natural and manmade factors such as aircraft collision, military activities, exotic plant and animal encroachment (and alteration of habitat), and accretion and erosion effects to habitat along the coast are ongoing. 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) are ongoing and have a high risk of significant negative impact to the species. Threats to the species due to low survival and fecundity rates appear to be particularly severe in the Puget lowlands. This portion of the breeding population could become extirpated in the near future if adult survival rates can't be stabilized and/or improved.

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, pp. 24-25; Pearson and Hopey 2005, pp. 26-30).

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 non-breeding season mowing and controlled burns to control Scot's broom (Pearson and Hopey 2005, p. 30). September 2004 burns resulted in increased lark abundance and a dramatic vegetative response on 13th 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 (Scott 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 13th Division Prairie during that time (Scott Pearson, Ph.D., in litt. 2007).

Pearson and Hopey (2005) initiated an experimental study at Gray Army Airfield to examine the effects of a grass-specific herbicide (sethoxidim, trade name Poast) 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 et al. 2005, pp. 12-14). 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, p. 14).

Fort Lewis has identified several grassland management goals for its ownership, and is currently working with the Service on a draft Candidate Conservation Agreement (CCA), in partnership with The Nature Conservancy. These include no net reduction in the quantity or quality of moderate- and high-quality prairie; and, the restoration and maintenance of viable populations of all prairie-dependent and prairie-associated species. Two of the six known Washington breeding sites are included in the Candidate Conservation Agreement.

The Nature Conservancy (TNC) has been enhancing the quality of several regional prairies, with funding provided by Fort Lewis and the Service. Two parcels (the Tenalquot Prairie Preserve (formerly known as the Morgan Prairie Preserve) and West Rocky Prairie Wildlife Area) were recently acquired using partial funding from the Service's section 6 Recovery Lands Acquisition Program.

(<http://www.nature.org/wherewework/northamerica/states/washington/press/press2044.html>).

West Rocky Prairie is 800 acres in size, 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 expanded the Mima Mounds Natural Area Preserve in 2008. 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 as a future nesting site, though (Scott Pearson, Ph.D., in litt. 2007).

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; currently it's 121 acres (Pearson et al. 2009a, p. 23). They have mechanically cleared beachgrass (mostly *A. breviligulata*) and spread oystershell across 45 acres, creating open sand habitat that is sparsely vegetated (which larks prefer for nesting). While the work focused primarily on western snowy plover (*Charadrius alexandrinus nivosus*), the streaked horned lark has benefitted as well. In 2006, WDFW found 3 streaked horned lark nests in the Leadbetter Point Unit. Such restoration helps address threats to the species due to beach grass encroachment. This same area had no known nests in 2005, 2

nests in 2004 (Pearson et al. 2005, p. 7), and was previously occupied by several pairs in the 1990s (Rogers 2000, p. 37). About 3 pairs of larks nested on the restoration site in 2008 (Scott Pearson, Ph.D., pers. comm. 2008), and 3 in 2009 (Pearson et al. 2009b). An estimated 8 to 10 territories were located in and adjacent to the restoration area (Bill Ritchie, Willapa NWR, in litt. 2010).

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, p. 16). TNC has been testing and improving Scot's broom control techniques (Dunn 2003 as cited in Stinson 2005, p. 17). The Washington Natural Heritage Program is leading a group to develop a conservation plan for Boistfort Prairie in Lewis County.

In 2008, TNC, in cooperation with WDFW and the Army Corps of Engineers, Portland District (COE) and funded by the Service, conducted an analysis of dredge material deposition in relation to streaked horned lark habitat. The results of this analysis will provide information to create temporal and spatial guidelines for future dredge material deposition. Careful deposition of dredge material can benefit the streaked horned lark by providing habitat in the early-successional phases preferred by larks with the goal of enhancing breeding habitat and expanding the population of streaked horned larks on the Columbia River islands in both Washington and Oregon (Hannah Anderson, in litt. 2008).

In 2009, TNC and COE, with Service funds, also initiated some trial restoration plots in unsuitable habitat at historic and occupied nesting sites along the lower Columbia River. Surveys found larks foraging on the new plots during the nesting season. This work will continue in 2010 (Anderson 2009, p. 3).

In May and June 2009, WDFW conducted consistent surveys on Olympia Airport. The population is estimated to be 20 plus pairs. While the Airport population goal is 18-30 pairs with a reproductive success of greater than/equal to 30 percent, reproductive success wasn't monitored. WDFW is working with the Port of Olympia on their 5- and 20-year management plans (Anderson 2009, p. 7).

Oregon

The Oregon Department of Fish and Wildlife (ODFW) has designated the streaked horned lark as a "strategy species" in the Oregon Conservation Strategy (ODFW 2006, p. 237). 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.

The Willamette Valley National Wildlife Refuge Complex (WVNWRC) has been working closely with Oregon State University and streaked horned lark researchers to monitor and assess the breeding biology of the species on NWR agricultural lands. This has included working

closely with the cooperative farmers on all three Valley NWRs to assess potential impacts from traditional agricultural practices. In addition, one large agricultural field on W.L. Finley NWR with a high density of streaked horned larks in past years, had specific experimental treatments in 2009 (including herbicide applications) to assess the attractiveness to, and breeding success of, streaked horned larks. It is anticipated that this work will continue in 2010. The NWR has a number of agricultural fields that, because of intensive grazing pressure by wintering geese, are not harvested by cooperative farmers and which are attractive to nesting larks in the late spring. The NWR will use the information from these assessments to improve potential breeding success on NWR lands (Jock Beall, Service, [in litt.](#) 2010).

Several habitat restoration projects implemented under the Wetland Reserve Program (WRP) are under way or being planned in the central Willamette Valley. In Linn County, a 243-hectare site at MDAC Farms was the focus of WRP restoration site; the project was funded by Natural Resources Conservation Service (NRCS) and the Service. The combination of habitat treatments (burning and vernal pool creation) resulted in excellent streaked horned lark habitat, with as many as 75 pairs breeding at the site in 2008 (Moore 2009), and over 70 pairs again in 2009, despite relatively dense vegetation covering the site (Randy Moore, [in litt.](#) 2010a).

Restoration on 430 acres of grasslands and wetlands will begin on three new WRPs in 2010. One of the projects is adjacent to Baskett Slough NWR, another is adjacent to W.L. Finley NWR, and the third is located between W.L. Finley NWR and the largest population of streaked horned larks at Corvallis Airport. All three of these projects will involve shallow wetland restoration with the nesting requirements of larks integrated into the construction design. These projects are being funded by the NRCS with technical assistance and in-kind work contributions from ODFW, WVNWRC, and the Willamette Valley Partners for Fish and Wildlife Program (Jarod Jebousek, Service, [in litt.](#) 2010).

In 2008, Oregon State University, the Port of Portland, and Metro cooperated to create a 5-acre habitat patch for streaked horned larks at the St. John's Landfill in northern Multnomah County. Potential habitat was created by spreading dredged sand material and seeding the site with native floodplain species. The Landfill is adjacent to the last known breeding site for the subspecies in the County (at the Rivergate Industrial Complex), which is also frequented by flocks of wintering larks (Randy Moore, pers. comm. 2007). No larks were detected at the new Landfill patch in 2008. In 2009, the Service and Metro worked together to begin a vocal attraction experiment at the site; decoys and recordings of streaked horned larks were deployed in September and October 2009 in an attempt to attract post-breeding larks to the site, but none were observed. The decoys and recordings were deployed again in February 2010, and within a day, two streaked horned larks were observed using the site (Cat Brown, Service, [in litt.](#) 2010). Monitoring will continue to determine if larks remain at the site and attempt to breed this year. If vocal attraction techniques are successful in establishing a new breeding site for the species, this method could be used elsewhere in the range of the species to attract larks to suitable but unoccupied habitats.

The Service is currently funding three studies in Oregon to obtain better information on the ecology and management needs of streaked horned larks. One study focuses on habitat- and locality-specific values of reproductive success for streaked horned larks in the Willamette Valley, and will attempt to identify the direct causes of nest failure in agricultural habitats. The second study is that described in the Washington section, above, wherein TNC, in cooperation with WDFW and the COE and funded by the Service, is conducting an analysis of dredge

material deposition in relation to streaked horned lark habitat on Columbia River islands (Cat Brown, in litt. 2009). The third study, also conducted both in Oregon and Washington, will evaluate the use of nest enclosures to reduce predation, which could prove a valuable tool for improving streaked horned lark nest success.

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

The following information is based on information contained in our files as of March 2010. No new information was provided in the petition received December 11, 2002. The streaked horned lark occurs in Washington and Oregon, and is thought to be extirpated in British Columbia, Canada (COSEWIC 2003, p. 7). The streaked horned lark nests on bare ground in sparsely vegetated sites in short-grass dominated habitats, such as native prairies, coastal dunes, fallow and active agricultural fields, seasonal wetlands, moderately- to heavily-grazed pastures, seasonal mudflats, airports, and dredge deposition sites in and along the tidal reach of the Columbia River. In Washington, surveys show that there are approximately 330 remaining breeding birds (Stinson 2005, p. 64). In Oregon, the breeding population is estimated to be over 500 birds (Randy Moore, in litt. 2008).

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), and dredging-related activities. 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. And those 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 are susceptible to unpredictable conversion to unsuitable over-wintering habitat, plant succession, and invasion by nonnative plants.

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 material deposition during the nesting season, as well as intentional disturbances such as at the Joint Base Lewis-McChord Field where falcons and a dog are used to haze birds in order to avoid aircraft collisions, and the biennial (but opposite-year) RODEO and Air Expo events occur on or adjacent to lark nesting habitat. In some areas, landowners have taken steps to improve streaked horned lark nesting habitat.

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) are ongoing and have a high risk of significant negative impact to the species. Efforts to restore and secure wintering habitats in Oregon may aid in ameliorating that threat. However, small population size will take quite awhile to overcome, and low genetic diversity is not something we can easily change.

Threats to the species due to low survival and fecundity rates appear to be particularly severe in the Puget lowlands. This portion of the breeding population could become extirpated in the near

future if adult survival rates can't be stabilized and/or improved. Research on the use of experimental exclosures to improve nest success may help to address this issue, but there are very few nests to exclose in the Puget lowlands.

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:

- Purchase sites and/or develop easements or agreements to protect existing populations.
- Implement nest exclosures range-wide; coordinate and use an experimental approach (planned for 2010).
- On the Columbia River and Washington coast, develop and implement habitat restoration activities on breeding and wintering grounds, using an experimental approach.
- Determine the effect of habitat parameters on nest success.
- Develop management prescriptions to create breeding and winter habitat in an agricultural matrix.
- Implement habitat restoration activities on breeding and wintering grounds.
- Implement a prescribed fire program in the South Puget Sound lowlands.
- Create new nesting habitat in Multnomah County, e.g., at St. John's Landfill
- Work with the COE to develop CCAs or other agreements to address lark habitat issues.
- Redirect incompatible land uses, e.g., Joint Base Lewis-McChord Field RODEO and Air Expo, dog trials, and model airplane use.
- Finalize a standardized range-wide monitoring protocol. Moore (2008a) discusses various survey protocols that may be used to produce a reliable global population estimate for larks and that makes use of repeatable methodology for future monitoring efforts.
- Conduct annual range-wide surveys and monitoring during the breeding season
- Determine the attributes of high-quality winter habitat, including dietary needs. Need a more complete data set.
- Evaluate the role of disturbance (e.g., predation, recreation, industrial uses) in nest failure.
- On the Columbia River and Washington coast, develop a strategy to control invasive beach grass.
- On the Columbia River and Washington coast, develop a winter habitat management prescription.

In the South Puget Sound lowlands, continue control measures to address invasive weeds on breeding grounds. Focusing on invasives that change the structure of nesting habitat. •

Examine methods to improve post-fledging juvenile survival

- Develop site-specific management plans that address local threats and nonnative and invasive species in particular
- Conduct research using nuclear genes to examine genetic diversity and structuring in streaked horned larks throughout its range
- Examine levels of contaminants in eggs and/or juvenile/adult tissues
- Examine the feasibility of creating a functioning lark metapopulation on dredge material islands on the lower Columbia River (ongoing in 2010)
- Cover garbage cans and pick up food scraps near streaked horned lark breeding locations to reduce predator food sources.
- Limit most human activities within 30 meters of breeding larks, and if possible schedule

them so as to avoid lark nesting areas, especially during the nesting season (mid-April to early August) (Pearson and Hopey 2005, p. 13). Mowing, dredge material 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 (although dredge material deposition could be managed in a way to create lark habitat with the cooperation of the agencies in charge).

- Maintain and create 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 material, or stage dredge operation machinery 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, pp. 15-16), 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
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3*
	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, rapidly declining populations, 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. The numbers of individuals are low and the numbers of populations are few. In addition, estimates of lambda using data from all of Washington's primary nesting areas suggest a rapidly-declining population (Pearson et al. 2008, p. 15). 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 material deposition can negatively impact streaked horned lark breeding and wintering (although current work being conducted by TNC may ultimately lessen this last threat). In Oregon, breeding and wintering sites occur on airports, Columbia River islands, in cultivated grass fields, grazed pastures, fallow fields, roadside shoulders, Christmas tree farms, seasonal wetlands, restored wet prairie, and wetland mudflats (Pearson and Altman 2005, pp. 6-7; Randy Moore, in litt. 2008). Such areas are subject to negative impacts such as dredge material deposition, development, plowing, mowing, pesticide and herbicide applications, trampling, vehicle traffic, and recreation.

Imminence: The immediacy of threat is considered to be imminent as a result of continued loss of suitable lark habitat, high nest predation rates, low adult survival and low fecundity. Low adult survival and fecundity rates in the Puget lowlands are of particular concern. Loss of habitat is being caused by plans for development on and adjacent to several of its nesting areas, including planned and/or continued expansions of the Fort Lewis Gray Army Airfield West Ramp and the Olympia Airport. Wintering populations are at risk in Oregon due to the manner in which larks gather in large flocks that are vulnerable to stochastic events, and also due to the fact that their wintering habitat occurs on privately-owned agricultural lands that are subject to unpredictable conversion. Other ongoing threats include those occurring on the Joint Base Lewis-McChord Field (hazing birds off the airfields, RODEO, and Air Expo).

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. Research completed in 2009 on the Columbia River dredge islands has a high likelihood of increasing the amount of suitable nesting and wintering habitat for larks there. It is hoped that ongoing Candidate Conservation Agreement negotiations will result in some benefits to the species since one-third of Washington's known nesting sites are included in the Candidate Conservation Agreement. The Puget lowland breeding population is declining rapidly, with little or no natal and breeding dispersal into the area (Pearson et al. 2008, p. 1). There is cause for concern that this portion of the population could become extirpated in the near future.

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, Bill Ritchie, Jarod Jebousek), WDFW (Scott Pearson, Ph.D., Derek Stinson, Mary Linders, Michelle Tirhi), OSU (Randy Moore), The Nature Conservancy (Hannah Anderson), and the American Bird Conservancy (Robert Altman). Regular web-based literature searches for this species are also completed. A streaked horned lark workshop was held in September 2007 by TNC, at which agencies and experts shared information gathered and research conducted in previous years. Subsequently, TNC, the Service, WDFW, ODFW, and many other partners have met at yearly or twice-yearly working group meetings, to discuss ongoing research and/or research needs of the species. Using information from the workshop and working group meetings, we have jointly developed a draft 5-year “Action Plan” which prioritizes research and/or other actions that need to be taken in order to improve the conservation status of the species. This will be an ongoing product, updated annually at a minimum with the help of all of our partners. 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, in Oregon’s Willamette Valley, and on islands in the Columbia River will continue in 2010.

Research and monitoring of wintering larks is being implemented 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. Their comments were incorporated into this assessment.

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

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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:

Carolyn L. Bohan
Acting Regional Director, Region 1, Fish and Wildlife Service 5/18/10
Date

Rowan W. Gould
ACTING
Director, Fish and Wildlife Service October 22, 2010

Concur:

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 19, 2010

Conducted by: Kim Flotlin
Wildlife Biologist, Listing and Recovery Division,
Washington Fish and Wildlife Office

Reviewed by: Jodi Bush Date: May 3, 2010
Division Manager, Listing and Recovery, Washington Fish and Wildlife Office

Ken Berg Date: May 3, 2010
Manager, Washington Fish and Wildlife Office