

COSEWIC
Assessment and Status Report

on the

Horned Lark
Strigata subspecies
Eremophila alpestris strigata

in Canada



ENDANGERED
2003

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA



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AU CANADA

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For additional copies contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, ON
K1A 0H3

Tel.: (819) 997-4991 / (819) 953-3215

Fax: (819) 994-3684

E-mail: COSEWIC/COSEPAC@ec.gc.ca

<http://www.cosewic.gc.ca>

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COSEWIC Assessment Summary

Assessment Summary – November 2003

Common name

Horned Lark *strigata* subspecies

Scientific name

Eremophila alpestris strigata

Status

Endangered

Reason for designation

Although this species has always been rare in Canada, it has declined steadily throughout its range over the last 50 years and is now nearly extirpated from Canada.

Occurrence

British Columbia

Status history

Designated Threatened in November 2003. Assessment based on a new status report.



COSEWIC
Executive Summary

Horned Lark
Strigata subspecies
Eremophila alpestris strigata

Species information

The Horned Lark *strigata* subspecies (*Eremophila alpestris strigata*) is the rarest subspecies of Horned Lark in Canada. It is a small, brown, yellow, and white bird with a distinctive black facial mask and black headband, which extends in the male into tiny feather tufts or “horns”.

Distribution

Eremophila alpestris strigata occurs only in the coastal plains of southwestern British Columbia, Washington and Oregon. In British Columbia, its distribution is restricted to the lower Fraser River valley from the mouth of the Fraser River east to Chilliwack, and southeastern Vancouver Island.

Habitat

Eremophila alpestris strigata occurs in short-grass habitats and areas with bare ground. In British Columbia, suitable sites may include natural areas such as spits, estuaries, sand dunes, and Garry oak ecosystems, as well as anthropomorphically modified areas such as pastures, airports, playing fields, and roadsides.

Biology

Eremophila alpestris strigata nests on the ground where its clutch of three to five eggs is placed next to a tuft of vegetation or small object. The breeding season in British Columbia was reported from early April to late August. It feeds primarily on seeds during non-breeding seasons but invertebrates are also consumed during spring and summer, and are a food source for nestlings. Birds may have migrated south to Washington and Oregon for the winter but a few may have remained in British Columbia in some years. Horned Larks are known to tolerate grazing and irregular operation of machines, but tend to nest away from urban landscapes and may suffer nest destruction from mowing or other vehicular traffic.

Population sizes and trends

The Canadian population is estimated to be between one and five birds. Only one bird was recorded during grassland surveys in 2002, and the subspecies was previously considered extirpated on Vancouver Island and extremely scarce in the lower Fraser River valley. *Eremophila alpestris strigata* was never known to be abundant in British Columbia. Populations likely peaked in the 1920s and 1930s, then declined through the 1980s to the point of extirpation. About 300-500 birds are thought to occur in Washington and Oregon. Trends in all jurisdictions are downward.

Limiting factors and threats

The primary limiting factor for this subspecies is the lack and decline of suitable breeding habitat. Habitats have become increasingly developed for human activities such as housing, recreation, agriculture and light industry. Continuing development pressures will, in the future, likely alienate most of the remaining habitat. Small areas of natural habitat also have increased pressure for use by humans, which is not compatible with ground-nesting birds such as Horned Larks.

Improved dyking of the Fraser delta has reduced the amount of sparsely vegetated sandy shoreline along the edges of the Fraser River. Invasions of exotic plants have alienated much of the remaining field, Garry oak and sand dune ecosystems. Increasing use of chemical pesticides, increasing predation pressure from domestic cats and wildlife that is associated with urban areas, and increasing recreational use of open spaces likely affect habitat suitability.

Populations in Washington and Oregon are also declining. Therefore it is becoming increasingly unlikely that there will be a source of dispersing birds to reestablish breeding populations in British Columbia.

Special significance of the species

In Canada, *Eremophila alpestris strigata* occurs only in southwestern British Columbia where it is one of a small group of vertebrates that are considered to be associated with the rare Garry oak ecosystems. The subspecies appears headed towards extinction, given severe downward population trends in all jurisdictions.

Existing protection or other status designations

Eremophila alpestris strigata is protected from persecution by the Migratory Bird Convention Act, 1994, and the British Columbia Wildlife Act. A few historical breeding sites are protected within regional parks.



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species and include the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal organizations (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership, chaired by the Canadian Museum of Nature), three nonjurisdictional members and the co-chairs of the species specialist and the Aboriginal Traditional Knowledge subcommittees. The committee meets to consider status reports on candidate species.

DEFINITIONS (After May 2003)

Species	Any indigenous species, subspecies, variety, or geographically or genetically distinct population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994.



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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report

on the

Horned Lark

Strigata subspecies

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SPECIES INFORMATION

Name and classification

The Horned Lark (*Eremophila alpestris*) is the only North American representative of the family Alaudidae. Twenty-one subspecies of Horned Lark are recognized in North America (AOU 1957), although many subspecies intergrade (Beason 1995). Eight subspecies occur across Canada. Four of these subspecies occur in British Columbia: one is a passage migrant and three others breed in the province. The Horned Lark, *strigata* subspecies (*E. a. strigata*) is the westernmost subspecies in the province, and has the most restricted distribution (Campbell et al. 1997; Cannings 1998).

Description

The Horned Lark is a slender, long-winged passerine. The beak is short and stout, the tail square with black edges evident in flight. The adult male is distinctively marked with a dark facial mask and breast band that contrasts with the pale face and throat. The “horns” for which the species is named are tiny, black feather tufts that are apparent only at close range. Variation in size and plumage (i.e., the colour of the back and the amount of yellow on the face, throat and breast) may allow the males of some subspecies to be distinguished in the field (Sibley 2000).

Adult females are similar to males, but duller, smaller, and they lack “horns”. Females cannot be separated to subspecies in the field. Juveniles are even more nondescript (Sibley 2000).

Eremophila alpestris strigata is relatively small compared to the other subspecies. Its upperparts are dark brown with a walnut brown nape. It has a yellow throat and eye stripe and yellowish underparts (Beason 1995). There is heavy, brown streaking on sides of the breast that should allow separation of this subspecies in the field (Sibley 2000). In the hand, the longest upper tail covert is distinctly streaked (Pyle 1997).

Nationally significant populations

There is essentially only one population of this very scarce taxon in Canada.

DISTRIBUTION

Global range

Horned Larks are found across much of North America and in Eurasia. The breeding distribution of the Horned Lark, *strigata* subspecies, however, is restricted to the coastal plains of British Columbia, Washington and Oregon (Beason 1995; Fig. 1). The centre of its breeding distribution is the glacial outwash prairies of the south Puget Sound area of western Washington (Rogers 2000). The subspecies is essentially nonmigratory, although there are winter records outside the breeding range in eastern Washington and Oregon and northern California (AOU 1957).

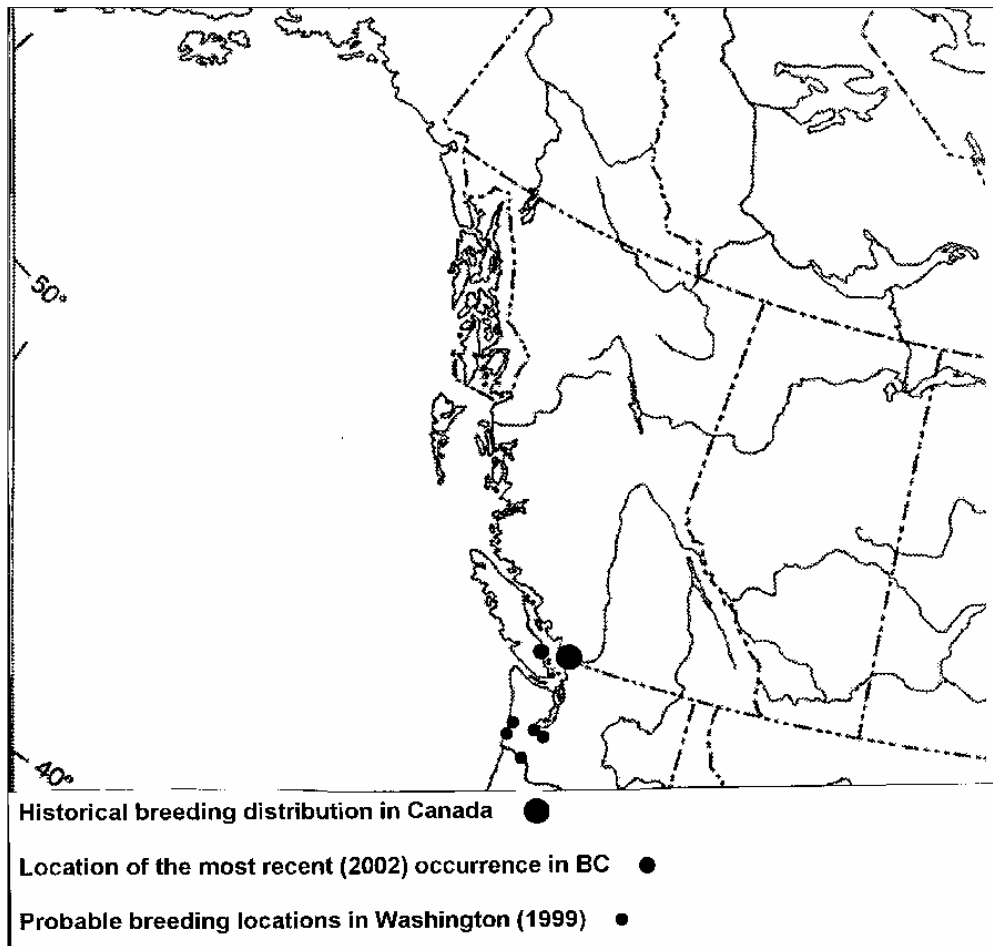


Figure 1. North American distribution of the Horned Lark, *strigata* subspecies.

Canadian range

The distribution of the Horned Lark, *strigata* subspecies in Canada is restricted to southwestern British Columbia (Godfrey 1986; Fig. 2) where it occurs only on southeastern Vancouver Island and in the lower Fraser River valley from Chilliwack west to the mouth of the Fraser River (Campbell et al. 1997). Breeding has not been documented on Vancouver Island or the southern Gulf Islands. However, it is possible that this subspecies did breed on the island in the past because some suitable habitat would have been available, and birds were known to occur in the area (Munro and Cowan 1947; Appendix 1). Although collection records are not from the peak breeding season, it seems unlikely that these were migrant birds, because central Vancouver Island probably represents the northern limit of suitable habitat and therefore range of this subspecies. In the lower Fraser River valley, breeding was concentrated near the mouth of the Fraser River on Sea Island, Iona Island, and Lulu Island. Other breeding localities included the University of British Columbia at Point Grey, and near Chilliwack (Campbell et al. 1997).

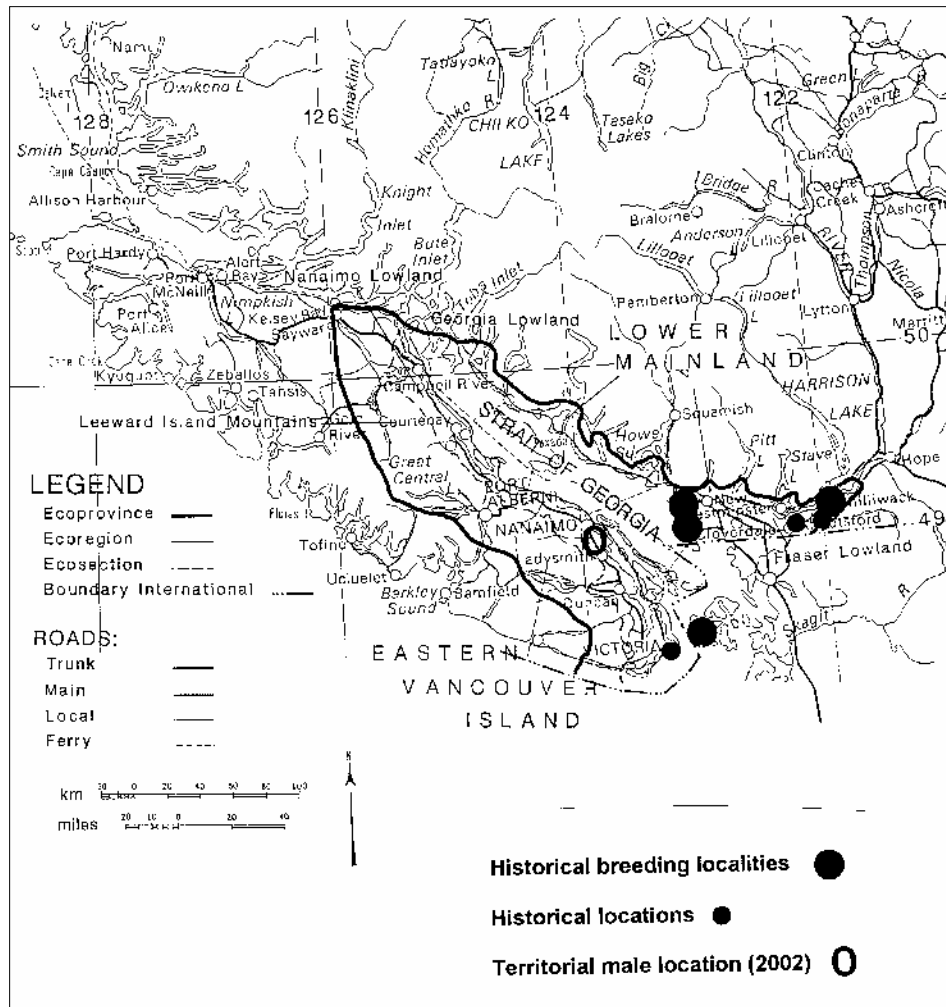


Figure 2. Historic distribution of the Horned Lark, *strigata* subspecies in Canada.

HABITAT

Habitat requirements

Across their range, Horned Larks are birds of open areas with short, sparse vegetation. The habitat requirements of *Eremophila alpestris strigata* are similar to other subspecies. In British Columbia, habitats used include agricultural fields, airports, beaches, sand dunes, short-grass playing fields, road sides, and other areas with bare ground. Documented breeding habitat was restricted to short-grass fields in agricultural areas, airports, and estuaries; and to sparsely vegetated, sandy beaches along the lower Fraser River (Butler and Campbell 1987; Campbell et al. 1997).

A recent inventory of sensitive ecosystems on eastern Vancouver Island and the Gulf Islands showed that naturally occurring, sparsely vegetated ecosystems (i.e., sand dunes, gravel and sand spits, and inland cliffs and bluffs) are the rarest terrestrial ecosystem in that region. The total area of this habitat type was estimated to be 37.9 hectares (Ward et al. 1998), therefore, very little suitable natural habitat currently exists.

In Washington, the centre of *Eremophila alpestris strigata* breeding distribution is in the glacial outwash prairies of south Puget Sound. These prairies were remnant grasslands left over from the last ice age. The soils of these prairies are thin, have low nutrient levels, and drain rapidly; characteristics that help maintain the prairie grassland condition. Other breeding sites in Washington and Oregon include dredged spoil islands in rivers, on sandy coastal beaches, or in disturbed areas on military training bases (Rogers 2000).

The last known breeding site in British Columbia was at the Vancouver International Airport from 1981 (Butler and Campbell 1987) and the most recent indication of potential breeding was from the Nanaimo Airport on Vancouver Island (Beauchesne 2002). In the Puget Sound area of Washington, four of five known breeding sites are at active airports. Elsewhere, airports are known to provide some of the last habitat refuge for grassland species, including Horned Larks. However, in an investigation of nesting success at ten airports, researchers found productivity to be much lower than in other grassland situations evaluated (Kershner and Bollinger 1996). Their data suggest that airports may be population sinks, offsetting any conservation benefits. Most of the nest failure recorded at airports was accidental destruction due to mowing. Although mowing regimes may be modified in other land-use areas to accommodate nesting birds, airports are bound by Federal Aviation Authority standards to maintain vegetation heights; which inevitably involves some mowing during the breeding season.

Trends

The amount of suitable habitat for the Horned Lark, *strigata* subspecies in British Columbia is very small and has undoubtedly declined over the last few decades as urbanization and other development has occurred within its breeding range.

Although historic habitat availability data for British Columbia is incomplete, some inferences can be made. Before European colonization, habitat was likely restricted to sparsely-vegetated sites such as spits, beaches, and, possibly, Garry oak ecosystems, especially those recently burned by First Nations peoples. A theoretical map of habitat types in existence prior to European colonization (1859) in the lower Fraser River valley shows "grassland" habitat along the edges of the Fraser River, Sumas Lake, and on the Fraser River delta (T. Lea pers. comm.). That grassland was extensive in places, as described by Lt. Charles Wilson, during the 49th Parallel Survey, 1858-1862. "The prairie runs down to the bank of the Chilukweyuk from which we are about 2 miles distant, the view from the camp is superb, the prairie in front with its beautiful *waving*

grass and belts of poplar, willow, ash and maple in the foreground” (Chilliwack Museum 2002). Although grassland type was not further specified, it is possible that some of that grassland was short-grass prairie which could have provided some habitat for Horned Lark, *strigata* subspecies Brooks (1917) refers to Horned Larks as “stragglers” in the area in the early 1900s, but they may have been breeding at an unknown location nearby (Rogers 2000).

The breeding of *Eremophila alpestris strigata* was not documented in the lower Fraser River valley prior to 1926 (Brooks and Swarth 1925). The first records for that region are from Chilliwack and Sumas in the late 1920s, with breeding confirmed in 1928 (Behle 1942). In 1925, Sumas Lake was drained, exposing 3,600 ha of lake bottom which was subsequently farmed. It is probably not a coincidence that Horned Larks, *strigata* subspecies began to appear in this area in 1926. The drained lake would have created large amounts of sparsely-vegetated habitat (i.e., the type of habitat used by nesting Horned Larks) a year or two after being drained. This pattern has been noted elsewhere; in Oregon, Horned Larks, *strigata* subspecies were inferred to move into land cleared for pasture (Gabrielson and Jewett 1940). It is likely that the draining of Sumas Lake provided suitable habitat for *Eremophila alpestris strigata* in the lower Fraser River valley. This population may have developed from pioneers, dispersing from further south or may have been an augmentation of a small population that already existed in the Sumas Prairie.

Farmland in the Chilliwack and Sumas areas probably continued to provide some suitable habitat over the next two or three decades. By the 1960s more intensive farming practices were introduced which have reduced the amount of suitable habitat to the point that almost none remains.

The quantity of suitable breeding habitat that historically existed on Vancouver Island and the Gulf Islands is unknown, but is assumed to be much greater than that available currently. The reduction of naturally occurring terrestrial habitats in the region over the past 150 years, due to human modifications, has been estimated at between 80% (Ward et al. 1998) and 95% (Fuchs 2001). Governor Douglas talks about “walking across open prairie for 6 miles behind Fort Victoria”, an indication that there were large areas of open grassland in the region. Maps of historic open plant communities in the Victoria region show that grassland and Garry oak savannahs were extensive (T. Lea pers. comm.), even though much of the information was compiled from surveys conducted 30 years or more after Governor Douglas banned grassland burning by First Nations so considerable in-growth by Garry oak and Douglas fir would have already begun (Lutz 1995, Turner 1999). Remnants of the large expanse of open prairie can be found at Beacon Hill Park, Victoria and Trial Island Ecological Reserve, Victoria. Although some of these areas appear to be suitable for horned larks, they are very small.

On Vancouver Island and the lower mainland, sandy beach and dune habitats have been drastically altered since the arrival of Europeans and large scale timber extraction, leading to changes in the amount and type of woody material deposited on

beaches. Formerly a large amount of woody material that ended up on beaches was from large trees undercut by rivers and streams. These relatively structurally complex pieces (e.g., trunks with root wads attached) did not roll and helped stabilize sand beach and dune systems. After the advent of widespread logging and booming of wood, much of the material deposited on beaches is of a considerably less complex nature. Trunks are limbed, and root wads are cut off. Informal surveys indicate that somewhere between 70 and 87% of the woody material on BC beaches has saw cut ends. This results in logs that act like “rolling pins” rather than dune stabilizing structures, considerably altering the dynamics of sandy beach and dune communities (E. Baron, Parks Canada pers. comm. fide D. Fraser); Maser and Sedell 1994). To illustrate the changes to beach habitat, Page (in prep) analysed air photos of sand dune habitats on southern Vancouver Island and found that, over a 40 year period (ending mid-1990s), sites lost between 21 and 50% of their open dune areas, grass and bryophyte areas declined from 6 to 52% and forest and shrub cover increased from 46 to 220%, changes that would impact a species that prefers open grass to forest. To further exacerbate the situation, many sparsely-vegetated spits and foreshore sites in the region have been used as building sites for residential or light industrial purposes and as such are no longer suitable for *Eremophila alpestris strigata*, or other grassland bird species (Dawe et al. 2001).

In summary, there was an historical increase in terrestrial habitat in southwestern British Columbia through clearing of forests and draining of wetlands for agricultural purposes, followed by a decline in those habitat areas through urbanization and intensification of agriculture. Agricultural land in the region continues to be converted to housing, golf courses, commercial developments, or industrial greenhouses that preclude use by the Horned Larks (Dawe et al. 2001). At the same time almost all of the natural habitat options have also been lost or drastically altered, so that naturally occurring, alternative habitats exist only as tiny remnants.

Elsewhere, declining populations in Washington are linked with habitat loss. Prairie habitat in western Washington has declined 98% since the arrival of European settlers, with prairies being converted to urban or unsuitable agricultural areas, returning to forest because of fire suppression, or being invaded by exotic plants (Smith et al. 1997; Rogers 2000).

Protection/ownership

A few former breeding sites are located within regional parks on Sea Island and Iona Island. Iona Beach Regional Park includes a few hectares of sand dune and spit habitat, but some of that habitat is impacted by an active log salvage operation. The Sea Island Conservation Area, adjacent to Vancouver International Airport and within the area formerly used by nesting *Eremophila alpestris strigata*, contains 140 ha of woodlands, wetlands, and old field habitat and is administered by Environment Canada. This area could contain suitable habitat but only if fields are mowed short. An unknown amount of old-field habitat occurs in Richmond’s Terra Nova Natural Area reserve, but its suitability as habitat for the Horned Larks is uncertain.

A small amount of potential habitat still remains on privately owned agricultural land. Other potential breeding habitat occurs at Vancouver International Airport, Boundary Bay Airport, Victoria International Airport, Nanaimo Airport, Abbotsford Airport, and Chilliwack Airport. None of these sites are managed to conserve habitat for Horned Larks.

In Washington and Oregon, there are no records of *Eremophila alpestris strigata* occurring on National Wildlife Refuges (USFWS 2002). Most of the remaining breeding habitat is on military reserves (Rogers 2000).

BIOLOGY

General

Very little is known about the ecology of the Horned Lark, *strigata* subspecies in British Columbia, therefore most of the following is inferred from studies done on this subspecies in southern parts of its range, or other subspecies elsewhere in the species range.

Reproduction

The Horned Lark is probably monogamous during the breeding season (Beason and Franks 1974). Between-season pair bond maintenance is unknown (Beason 1995). The male typically arrives on the breeding ground first and establishes a breeding territory. The female probably selects a territorial male upon her arrival, and then finds a nest site within his territory. The female alone constructs the nest by scraping a small hollow on the ground, or finding an existing depression (e.g., a hoof print; Campbell et al. 1997). The nest is then lined with fine grasses and other plant fibers (Cannings 1981; Campbell et al. 1997). Nests are usually situated with a protective object (e.g., a tuft of dirt, grass or other vegetation) to one side, possibly to help maintain the temperature within the nest (With and Webb 1993; Nelson and Martin 1995). Pebbles or other paving materials may be placed around the nest, or to one side (Baicich and Harrison 1997).

A clutch of four eggs is typical for the species, although two to seven eggs are possible (Baicich and Harrison 1997). The average clutch size reported for *Eremophila alpestris strigata* in the Puget Sound area (Bowles 1900 in Cannings 1981) was 2.5 eggs. Three Horned Lark, *strigata* subspecies nests have been found with eggs in British Columbia: two with three eggs and one with four eggs (Campbell et al. 1997). Eggs are incubated by the female for 11 or 12 days (Campbell et al. 1997). The female also broods the hatchlings but both parents typically feed the nestlings (Beason 1995). Nestlings fledge after approximately 10 days (Cannings 1981; Baicich and Harrison 1997). As with many other grassland bird species, the nestling period is short, with young fledging when they can walk but before they can fly (Beason 1995).

In the Georgia Depression, the Horned Lark breeding season was reported to extend from 5 April to 25 August (Campbell et al. 1997). Elsewhere, at low elevations and low latitudes, Horned Larks are known to breed two or three times per season (Sibley 2001). It is not known if *Eremophila alpestris strigata* in British Columbia have more than one brood.

Horned Larks are only rarely parasitized by Brown-headed Cowbirds (*Molothrus ater*; Beason 1995). This may be due to the fact that they typically begin nesting before cowbirds, their nests are exposed and they have a short nestling period, such that cowbird nestlings may be left behind when the larks fledge (Friedman 1963). There are no records of cowbird parasitism of Horned Larks of any subspecies in British Columbia (Campbell et al. 1997).

Survival

Nest failure may result from predation, bad weather or accidental destruction. Adults may also succumb to predation, poisoning, and accidental trampling by machinery or livestock (Beason 1995).

There are few documented cases of direct predation of Horned Larks. However, based on what is known about other grassland bird species, potential predators of eggs, nestlings and adults in the Georgia Depression include: birds of prey (e.g., Cooper's Hawk *Accipiter cooperii* and Merlin *Falco columbarius*); corvids (e.g., Northwestern Crow *Corvus caurinus* and Common Raven *C. corax*); small and medium-sized mammals (e.g., coyotes *Canis latrans*, foxes *Vulpes vulpes*, raccoons *Procyon lotor*, skunks *Mephitis mephitis*, domestic dogs *Canis familiaris*); and snakes (e.g., Common Garter Snake *Thamnophis sirtalis* and Western Terrestrial Garter Snake *T. elegans*). Domestic cats (*Felis catus*), however, probably represent the greatest predation threat in this region. Cats are known to be competent predators of small to medium-sized birds (George 1974; Cooper 1993; Coleman et al. undated). On southeastern Vancouver Island domestic cats were frequently seen during bird surveys at grassland sites, including the single site where a displaying Horned Lark, *strigata* subspecies was observed (Beauchesne 2002).

Bad weather may adversely impact nesting success. Cannings (1981) reports a nest with nestlings being abandoned during a hailstorm. Nestlings may also starve if cold wet weather precludes foraging by adults.

Agricultural practices including tilling or mowing during the breeding season may result in the accidental destruction of nests or trampling of adult birds (Kershner and Bollinger 1996). There are also documented cases of Horned Larks having been poisoned by pesticide applications (Beason 1995; Sibley 2001). The population level effect of lethal and sublethal contamination by agricultural chemicals is unknown and would be difficult to determine (Gard et al. 1993).

Movements/dispersal

Migration in Horned Larks varies between subspecies, with some entire northern populations migrating whereas some southern populations have year-round residents (Beason 1995). *E. a. strigata* are thought to be partial migrants. Populations from coastal British Columbia may have moved south in autumn to join permanent residents in coastal Washington and Oregon or may have moved as far as California (AOU 1957), but a few birds evidently overwintered based on winter (January) specimen records from the Fraser delta (Munro and Cowan 1947).

Horned Lark migration is diurnal. Hatch-year birds gather in the late summer and are joined by adults later in the season. Horned Larks will also form mixed flocks with other species (e.g., longspurs and buntings: Beason 1995; Sibley 2000).

Diet and foraging behaviour

Adult Horned Larks are primarily granivorous, but feed invertebrates to their young. Invertebrates are also consumed by adults, with more taken during the spring and early summer than at other times of the year. In the winter, this species feeds almost exclusively on seeds (Beason 1995).

Horned Larks typically search for food while walking on bare ground or amongst sparse vegetation. They will also perch on a low plant and take seeds directly from the seed head. They sometimes dig up invertebrates and will chase flushed insects (Beason 1995).

Territory

The male Horned Lark establishes a territory that is to be used for courtship, nesting and foraging. The male and, occasionally, the female, defends the territory against conspecifics. Territory size is variable and is dependant upon habitat quality, population density and food availability (Beason 1995). There are no data for territory size in the Georgia Depression.

Horned Larks also exhibit interspecific territoriality (Sibley 2001). They will drive off potentially competitive species, including Vesper Sparrows (*Pooecetes gramineus*: Beason 1995).

Adaptability

Studies in the Great Plains suggest that Horned Larks occur mainly in grazed areas (Jones and Bock 2002) and will tolerate even heavily grazed areas (Kantrud 1981; Bock et al. 1993). Horned Larks will also occupy disturbed sites. For example, Rogers (2000) found that Horned Lark, *strigata* subspecies preferentially foraged in wheel ruts in a grassland area. However, Horned Larks tend to avoid hayland (Kantrud 1981) and choose habitats relatively remote from urban landscapes (Jones and Bock 2002).

POPULATION SIZES AND TRENDS

The Canadian population of *Eremophila alpestris strigata* has declined to the verge of extirpation. Historically, the population was likely very small and locally distributed. Suitable habitat would have been limited to sand dunes and very sparsely vegetated natural grasslands prior to the arrival of European settlers. Subsequent to European arrival, additional habitat would have been created through clearing forest and draining wetlands. *Eremophila alpestris strigata* was first documented both in the lower Fraser River valley and on southern Vancouver Island in the late 1880s.

In the lower Fraser River valley, the population is described as “small” and is said to have “persisted from the 1920s through the next few decades” although precise population estimates are not made (Campbell et al. 1997). By the 1960s, breeding populations were confined to the mowed fields at the Vancouver International Airport, possibly near Abbotsford (Campbell et al. 1997), and in sand dune habitat on Sea and Iona islands (JMC unpublished data). As many as 7 birds were noted on Sea Island between 1963 and 1966. The last confirmed breeding record on Sea Island was in 1978, although breeding was suspected in 1981 (Butler and Campbell 1987). Although Weber et al. (1990) list the Horned Lark, *strigata* subspecies as a rare resident at Sea Island, the last known summer occurrence was 10 seen on 1 May 1987 (Campbell et al. 1997, W.C. Weber, pers. comm.). These birds were not identified to subspecies so they may not have been *E. a. strigata*, although lark migration is usually completed by the end of April (Campbell et al. 1997).

Although there are no breeding records from Vancouver Island or the Gulf Islands (Campbell et al. 1997), based on specimen records, it seems possible that *Eremophila alpestris strigata* formerly bred in the region. At least nine *Eremophila alpestris strigata* specimens were collected on Vancouver Island, between 1890 and 1953 (Appendix 1). Unfortunately, the amount of collection or nest finding effort was not documented, but it is speculated that effort was not extensive and this cryptic bird could have been easily overlooked. Therefore, given that there are some specimens, it is assumed that *Eremophila alpestris strigata* was not rare.

Campbell et al. (1997) considered *Eremophila alpestris strigata* to be extremely scarce in the lower Fraser River valley and Fraser et al. (1999) considered it extirpated on southeastern Vancouver Island, although systematic surveys have never been undertaken in either region. However, in 2002, while searching southern Vancouver Island for Vesper Sparrows, a species with similar habitat requirements, a single male was observed in 30 survey days (approximately 240 hrs; Beauchesne 2002). This bird was engaged in a breeding display; however, a mate was not located, nor was a nest found in approximately 16 hours of search time (SMB unpublished data). In 2003, 30 days (approximately 240 hrs) were again spent searching in similar habitat types, but no Horned Larks were located (Beauchesne in prep.). No other recent records of this subspecies are known to exist (D. Allinson pers. comm.; N. Dawe pers. comm.; M. McNichol pers. comm.; G. Monty pers. comm.).

Population levels of Horned Lark, *strigata* subspecies were not addressed by Beason (1995), even though it was widely believed that numbers were declining. In Washington and Oregon, there are only an estimated 300-500 birds remaining (S. Pearson, pers. comm.), of which approximately 100 occur in the Puget Sound lowlands of Washington with the remainder on coastal Washington and on islands in the Columbia River. Many historically occupied territories in Washington and Oregon are now vacant (S. Pearson pers. comm.).

In the San Juan Islands of Washington (approximately 18 km across the Strait of Juan de Fuca, east of southeastern Vancouver Island), Horned Larks were first noted as breeding in 1946, after which they were recorded as breeding “commonly at times”. Breeding has not been recorded since 1962 (Rogers 2000).

In western Oregon, the Horned Lark, *strigata* subspecies was noted as a common breeder in the 1930s. It was even “particularly abundant” in Polk and Yamhill Counties. In the fall groups of dozens or hundreds were noted (Gabrielson and Jewett 1940). However, possible confusion between subspecies raises question as to the veracity of that account and the possibility that they never were that common in Oregon (Rogers 2000).

LIMITING FACTORS AND THREATS

The primary limiting factor is the lack of suitable breeding habitat. Although habitat was never large in extent, suitable habitat has been in decline over the last few decades.

The range of this subspecies overlaps with areas and habitats that have become increasingly developed for human activities such as housing, recreation, and light industry. This development has fragmented or destroyed most suitable habitat (Campbell et al. 1997). Continuing development pressures will, in the future, likely alienate most of the remaining habitat. None of these sites are managed specifically for ground nesting birds such as Horned Larks.

The intensification of agriculture has reduced the suitability of some farmlands that were previously used for nesting. Improved dyking of the Fraser delta has reduced the amount of sparsely-vegetated sandy shoreline along the edges of the Fraser River. In addition, industrial agricultural practices increasingly rely on chemicals, which have unknown consequences for most species of birds (Gard et al. 1993).

Invasions of exotic plants such as Scotch broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), Himalayan blackberry (*Rubus discolor*), and tall non-native grasses have alienated most of the remaining field, Garry oak and sand dune habitats (Fraser et al. 1999).

The effects of predators in increasingly urbanized landscapes may also limit this bird. It is possible that increased predation pressure from domestic cats and native species

such as Northwestern Crows may tip the balance. Increasing human disturbance, which logically goes along with increasing human populations, may affect ground-nesting birds as well. Activities such as horse back riding, dog walking, bird watching, and trail bike riding may be incompatible with ground-nesting birds (Rogers 2000).

Populations in Washington and Oregon are becoming increasingly unlikely to be the source of dispersing birds that might re-establish breeding populations in British Columbia because numbers there are also declining.

SPECIAL SIGNIFICANCE OF THE SPECIES

The Horned Lark is the only species of lark that occurs in North America (Beason 1995). The species is widely distributed in the northern hemisphere; however, the Horned Lark, *strigata* subspecies subspecies has an extremely restricted distribution and populations are declining in all jurisdictions, some to the point of extirpation.

In Canada, *Eremophila alpestris strigata* occurs only in southwestern British Columbia where it is one of a small group of vertebrates that are considered to be associated with the rare Garry oak ecosystem. In British Columbia, suitable habitat is extremely limited in extent, the remaining potential habitat is threatened, and populations are virtually extirpated.

EXISTING PROTECTION OR OTHER STATUS

The Horned Lark, *strigata* subspecies is protected by the federal Migratory Birds Convention Act, 1994 which makes it illegal to possess migratory birds or their nests. It is also protected as wildlife under the British Columbia Wildlife Act, which prohibits shooting, trapping, poisoning or any other measure of killing of wildlife, or the disturbance or destruction of eggs or active nests.

In British Columbia, the Horned Lark, *strigata* subspecies is ranked as G5T2 globally and as historical (SH) provincially by the BC Conservation Data Centre (Fraser et al. 1999). It is currently on the Red List as a candidate for designation as an endangered species (Fraser et al. 1999). In Washington, it is listed as a candidate for the Washington State Endangered Species List and in Oregon, it is designated as a State Sensitive Species with "critical status" (Rogers 2000). In October of 2001, the US Fish and Wildlife Service elevated Horned Lark, *strigata* subspecies from a species of concern, to a "candidate" for the endangered species list (USFWS 2002).

SUMMARY OF STATUS REPORT

The Horned Lark, *strigata* subspecies is essentially extirpated in British Columbia and Canada. Breeding has not been confirmed since 1978. Breeding populations in the

Fraser delta appear to be gone, even though they were not difficult to locate in some areas in the 1960s. Sightings of even single birds in the 1990s and 2000s are very rare: The news of the arrival of one Horned Lark, *strigata* subspecies on Vancouver Island in 2002 was greeted with astonishment by all knowledgeable persons.

Populations in the USA (Washington and Oregon) have suffered severe declines in numbers and in extent of distribution. Only about 300-500 birds are thought to exist between those states, and that population comprises the only remaining members of this subspecies.

Suitable natural habitats such as sand dunes, spits, and sparsely-vegetated grasslands are extremely limited. In coastal British Columbia, these natural habitats have been used extensively for farming, housing and light industrial purposes. Other suitable short-grass habitats such as pastures, farms, spoil piles, and other bare lands are available, but declining, and are subject to increasing intensity of human disturbance. Although airports may provide some of the last available habitat, this presents unique habitat management challenges in that the first responsibility of the airport manager is to provide a safe place for airplanes to operate and this typically involves a mowing regime that is not conducive to ground nesting bird reproductive success (Beauchesne 2002). A few small areas that were formerly used for nesting are protected within regional parks on Sea and Iona Islands, but are not managed as breeding habitat for Horned Larks.

Limiting factors include current scarcity of suitable habitat, historical decline of suitable habitat, increased human disturbance in remaining habitats, increased predation pressure related to increased urbanization, invasion of exotic plants, increased pesticide use, and severe decline of a source population for immigration.

There is potential for managing existing habitat in a few protected areas for Horned Larks, but this would require careful consideration of rare plants and other rare wildlife species. Reduction of human disturbance in suitable areas may be problematic as there is very high demand for use of open spaces for recreation within the range of the Horned Lark, *strigata* subspecies. Recovery will require an international effort to conserve and enhance existing habitat, create new habitat, and to increase productivity of remnant populations.

TECHNICAL SUMMARY

Eremophila alpestris strigata

Horned Lark, *strigata* ssp.

Alouette haussecol, de la sous-espèce *strigata*

Range of Occurrence in Canada: British Columbia

Extent and Area Information	
• <i>Extent of occurrence (EO)(km²)</i>	<10 km ²
• <i>Specify trend in EO</i>	Decline
• <i>Are there extreme fluctuations in EO?</i>	No
• <i>Area of occupancy (AO) (km²)</i> Only one sighting of a territorial male	<1 km ²
• <i>Specify trend in AO</i>	Decline
• <i>Are there extreme fluctuations in AO?</i>	No
• <i>Number of extant locations</i>	0 -1
• <i>Specify trend in #</i>	Decline
• <i>Are there extreme fluctuations in number of locations?</i>	No
• <i>Specify trend in area, extent or quality of habitat</i>	Declining (extent and quality)
Population Information	
• <i>Generation time (average age of parents in the population)</i>	1 year
• <i>Number of mature individuals</i>	0 – 5
• <i>Total population trend:</i>	Decline
• <i>% decline over the last/next 10 years or 3 generations.</i>	> 90% decline since 1970s (possibly extirpated)
• <i>Are there extreme fluctuations in number of mature individuals?</i>	N/A
• <i>Is the total population severely fragmented?</i>	Yes
• <i>Specify trend in number of populations</i>	Decline
• <i>Are there extreme fluctuations in number of populations?</i>	No
• <i>List populations with number of mature individuals in each</i>	Vancouver Island (0-1)
Threats (actual or imminent threats to populations or habitats)	
<ul style="list-style-type: none"> - Habitat loss on Vancouver Island due to urbanization - Intensification of agriculture practices in the Fraser Valley - Destruction of shoreline habitat due to dikes (Vancouver Delta) - Invasive species (Vancouver Island) - Increase in predators (everywhere) 	
Rescue Effect (immigration from an outside source)	Low
• <i>Status of outside population(s)? Yes</i> USA: candidate for Endangered	
• <i>Is immigration known or possible?</i>	Possible
• <i>Would immigrants be adapted to survive here?</i>	Yes
• <i>Is there sufficient habitat for immigrants here?</i>	Yes
• <i>Is rescue from outside populations likely?</i>	No
Quantitative Analysis	N/A
Current Status:	
not previously assessed by COSEWIC	

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: B1ab(i-v)+2ab(i-v); C2a(i); D1
Reasons for Designation: Although this species has always been rare in Canada, it has declined steadily throughout its range over the last 50 years and it is currently nearly extirpated in Canada.	
Applicability of Criteria	
Criterion A (Declining Total Population): Not applicable; no numerical data for decline	
Criterion B (Small Distribution, and Decline or Fluctuation): Meets Endangered B1ab (i-v) because of very small distribution and declines in all criteria, and Endangered B2ab(i-v) because of small area of occupancy and decline.	
Criterion C (Small Total Population Size and Decline): Meets Endangered C2a(i) because of observed decline and fragmented population—Canadian population is somewhat disjunct from US and is very small (certainly less than 250). C1 not applicable because there are no numerical data for decline.	
Criterion D (Very Small Population or Restricted Distribution): meets Endangered D1 because of very small population (certainly less than 250)	
Criterion E (Quantitative Analysis): Not done.	

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BIOGRAPHICAL SUMMARY OF THE REPORT WRITERS

Suzanne Beauchesne is the principal of Western Wildlife Research, an environmental consulting company that focuses on wildlife and habitat conservation issues. Suzanne has studied forest, grassland, and freshwater birds, mammals, amphibians, and molluscs in British Columbia and the western United States. Suzanne has co-authored management strategies for nine bird species, stewardship accounts for four bird species and numerous other technical reports on birds.

John Cooper is a partner in Manning, Cooper and Associates, an environmental consulting firm that specializes in biodiversity studies, wildlife impact assessment for the wind power, oil and gas, and forest industries, and sustainable forest management planning. John has 25 years' experience studying birds in British Columbia and has conducted field studies in all regions of the province. He is co-author of *The Birds of British Columbia Vols. 1-4*, *The Rare Birds of British Columbia*, 12 provincial status reports for birds at risk, five provincial inventory standards for various wildlife groups, and more than 140 other scientific, technical and popular papers on birds.

AUTHORITIES CONSULTED

- Allinson, D.E. September 2002. President, Rocky Point Bird Observatory Society, Victoria, BC.
- Altman, B. October 2002. American Bird Conservancy, Northern Pacific Rainforest BCR Coordinator, 311 NE Mistletoe Circle, Corvallis, OR 97330
- Alvo, R. November 2002. Parks Canada.
- Dawe, N.K. June 2002. Senior Wildlife Technician, Canadian Wildlife Service, Environment Canada.
- Donovan, M. November 2002. Biological Information Coordinator. Ministry of Sustainable Resource Management. 722 Johnson Street, Victoria, BC V8W 9R7.
- Fraser, D. November 2002. Species Specialist. Ministry of Water, Land and Air Protection. Government of British Columbia. 2975 Jutland Road, Victoria, BC V8W 9M1.
- Lea, T. November 2002. Vegetation Ecologist. Ministry of Water, Land and Air Protection. Government of British Columbia. 2975 Jutland Road, Victoria, BC V8W 9M1.
- McNall, N. October 2002. Collections manager, Royal British Columbia Museum, Victoria, BC.
- McNicholl, M. October 2002. Wildlife Biologist, Vancouver, BC.
- Monty, G. August 2002. President, Nanaimo Field Naturalists
- Pearson, S., Ph.D. August 2002. Natural Areas Ecologist, Washington Department of Natural Resources Asset Management and Protection Division, Box 47014, 1111 Washington St. S.E., Olympia, WA 98504-7014.

Appendix 1. Royal British Columbia specimens of Horned Lark, *strigata* subspecies

RBCM number	Collection Location	Date	Sex/age	Collector
643	Sumas Lake	26 Apr 1899	M	A.C. Brooks
645	Victoria	10 Apr 1898	M	F. Kermode
646	Victoria	Apr 1890	F	F. Kermode
1808	Victoria	Apr 1897	F	E.M. Anderson
1809	Victoria	26 Sept 1899	M	F. Kermode
4921	Sea Island	11 Feb 1927	F	R.A. Cummings
6568	Chilliwack	25 Aug 1928	M/imm.	R.M. Stewart
6569	Chilliwack	25 Sept 1927	F	R.M. Stewart
6570	Chilliwack	13 Sept 1927	F	R.M. Stewart
6571	Chilliwack	19 Mar 1928	M	R.M. Stewart
6572	Sumas Prairie	7 June 1928	M	R.M. Stewart
6573	Comox	20 Dec 1925	F	R.M. Stewart
6574	Chilliwack	17 Sept 1927	M/juv	R.M. Stewart
6575	Chilliwack	8 Sept 1927	U	R.M. Stewart
6576	Chilliwack	6 Sept 1927	F	R.M. Stewart
7174	Lulu Island	20 Sept 1930	M/juv	R.A. Cummings
7175	Lulu Island	20 May 1936	F	R.A. Cummings
7176	Lulu Island	20 May 1936	M	R.A. Cummings
8844	Lulu Island	17 Feb 1940	M	Cowan
8845	Lulu Island	17 Feb 1940	M	Cowan
8846	Lulu Island	17 Feb 1940	M	Cowan
8847	Lulu Island	17 Feb 1940	F	Cowan
8848	Lulu Island	17 Feb 1940	F	Cowan
8849	Lulu Island	17 Feb 1940	F	Cowan
9459	Comox	6 Jan 1935	F	A.C. Mackie
10071	Pt. Kalmes? (Comox)	21 April 1953	M	R. Prior or R. Fryer
13257	Seal Island (Comox)	25 April 1938	M	H.M. Laing
13258	Seal Island (Comox)	25 April 1938	F	H.M. Laing