COSEWIC
Assessment and Status Report

on the

Vesper Sparrow *affinis* subspecies
Pooecetes gramineus affinis

in Canada

ENDANGERED
2006

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

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DES ESPÈCES EN PÉRIL
AU CANADA

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Please note that throughout the report the Vesper Sparrow *affinis* subspecies is referred to as the Coastal Vesper Sparrow.

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Vesper Sparrow *affinis* subspecies — Provided by Suzanne Beauchesne.

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COSEWIC
Assessment Summary

Assessment Summary – April 2006

Common name
Vesper Sparrow *affinis* subspecies

Scientific name
Pooecetes gramineus affinis

Status
Endangered

Reason for designation
This songbird, a subspecies of the Vesper Sparrow, is found in Canada only in coastal grasslands in the extreme southwestern corner of British Columbia, where it now breeds only at one site with a population of about 5 pairs. The taxon is declining in the United States as well, where it has a restricted distribution in western Washington and Oregon. Habitat loss is the greatest threat, both through direct destruction of habitat for urban development and through invasion by alien plant species.

Occurrence
British Columbia

Status history
Designated Endangered in April 2006. Assessment based on a new status report.

COSEWIC
Executive Summary

Vesper Sparrow *affinis* subspecies
Pooecetes gramineus affinis

Species information

Three subspecies of Vesper Sparrows breed in Canada. The Vesper Sparrow *affinis* subspecies, *Pooecetes gramineus affinis*, is the rarest subspecies, with a disjunct population and a restricted range. The other recognized subspecies have much larger, stable populations. The Vesper Sparrow is a relatively large sparrow with distinctive chestnut wing coverts, white outer tail feathers and a white eye ring.

Distribution

The Vesper Sparrow *affinis* subspecies, also called Coastal Vesper Sparrow, occurs west of the Cascade mountain range in southwestern British Columbia, western Washington, Oregon, and northwestern California. In British Columbia, its historic distribution was restricted to the lower Fraser River valley and southeastern Vancouver Island. There is currently only one known site where it continues to breed in British Columbia. Based on proximity to the *affinis* population in Washington State, it is accepted by most authorities that Vesper Sparrows breeding in the Georgia Depression region of southwestern British Columbia are a continuation of that population. Vesper Sparrow breeding season records in the Georgia Depression date from 1890.

Habitat

The Vesper Sparrow breeds in sparsely vegetated, grassland habitats with scattered trees or shrubs. Structural diversity is important because these sparrows use the taller perches for singing whereas open areas are used for foraging.

Biology

Vesper Sparrows nest on the ground. The breeding season of Coastal Vesper Sparrows in British Columbia is approximately late April to mid-July. Breeding site fidelity is likely strong. During the breeding season, the diet consists primarily of insects, although seeds are also taken. Vesper Sparrows can adapt to modified habitats. However, there is potentially a greater risk of nest failure as these areas are often mowed or have other human induced disturbance issues.

Population sizes and trends

The Canadian breeding population of the Coastal Vesper Sparrow is currently estimated at five to ten breeding pairs. Although historic population estimates are not available, the population has probably declined based on the fact that fewer localities are now occupied. Populations have also declined in Washington and Oregon.

Limiting factors and threats

Loss or alteration of habitat is the primary threat to Vesper Sparrows throughout the species' range. Modern agricultural practices and urban development have both contributed to habitat alteration. Vesper Sparrow habitat is currently very scarce on south eastern Vancouver Island and in the lower mainland. Other threats include predation by domestic and feral cats, a predator that occurs in higher densities in urbanized areas. Due to population declines in adjacent Washington State, it is increasingly unlikely that there will be a source of dispersing birds from that jurisdiction, to augment the existing population on Vancouver Island.

Special significance of the species

The distribution of the Coastal Vesper Sparrow is disjunct from populations of other subspecies and therefore has a genetic diversity that is important to conserve. The Coastal Vesper Sparrow is considered a priority species for recovery efforts by the Garry Oak Ecosystems Recovery Team, Vertebrates at Risk Recovery Implementation Group. Improvements to the habitat that benefit this species will also likely benefit other, lesser known species in this rare ecosystem.

Existing protection or other status designations

The Coastal Vesper Sparrow is on the Red List in British Columbia. It is a candidate for the endangered species list In Washington and in Oregon is considered a 'state sensitive species'.

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. Species designated at meetings of the full committee are added to the list. On June 5th 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 for 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 entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2006)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and it is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* 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. Definition of the (DD) category revised in 2006.

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SPECIES INFORMATION

Name and classification

The Vesper Sparrow, *Pooecetes gramineus*, is one of 49 species of Emberezine sparrows that breed in North America (Sibley 2000). The species was originally known as Bay-winged Bunting (Rising 1996). Former scientific names for the species found in the literature include *Poocaetes gramineus* and *Fringilla graminea* (AOU 1957).

Four subspecies of Vesper Sparrow are recognized, three of which breed in Canada (*P. g. confinis*, *P. g. gramineus* and *P. g. affinis*); the fourth, *P. g. altus*, breeds in the southwestern United States (Jones and Cornely 2002). *P. g. affinis* was described in 1888 and is well accepted as a taxonomically distinct unit (AOU 1957; Rising 1996; Cannings 1998; Rogers 2000; Jones and Cornely 2002), and is the subspecies of interest for this account.

Common names for subspecies are not formally recognized by the American Ornithological Union; therefore different subspecies names are often used in different localities. *P. g. affinis* is sometimes referred to as the Oregon Vesper Sparrow or Coastal Vesper Sparrow (Rising 1996; Rogers 2000; Beauchesne 2002b). Throughout this status report, Coastal Vesper Sparrow will be used to refer to the *affinis* subspecies.

While the physical differences between *P. g. affinis* and *P. g. confinis* (its nearest geographical neighbour) are slight, their breeding ranges are separated by broad ranges of high mountains with unsuitable habitat. They also breed in different National Ecological Areas; *P. g. affinis* in the Pacific EA and *P. g. confinis* in the Southern Mountain and Prairie EAs.

Description

The Vesper Sparrow is a medium-sized sparrow (length approximately 16 cm) with a chestnut shoulder patch (lesser coverts), white outer tail feathers, and a whitish eye-ring (Sibley 2000). Sexes are similar. Juveniles are similar to adults but duller, and usually lack chestnut coverts (Pyle 1997).

The four subspecies are similar in appearance and cannot reliably be separated in the field. Visible differences between the subspecies are limited to shading and variation in measurements. *P. g. affinis* has medium grayish-brown upperparts and white underparts with a buff tinge. In comparison, *P. g. confinis*, the nearest subspecies geographically, has pale grayish-brown upperparts and creamy underparts. *P. g. affinis* is slightly smaller overall than *P. g. confinis*; it is also has a relatively short tail in comparison with other subspecies, while *P. g. confinis* has a relatively long tail (Pyle 1997, Jones and Cornely 2002).

DISTRIBUTION

Global range

Vesper Sparrows are widespread across North America. They reach the northern extent of their breeding range in the southern Northwest Territories, and are found from British Columbia to Nova Scotia south to California, Arizona and Virginia (Figure 1; Jones and Cornely 2002).

The Coastal Vesper Sparrow, *P. g. affinis,* forms a disjunct population in the Pacific Northwest, separated from the core population (i.e., of *P. g. gramineus, P. g. confinis,* and *P. g. altus*) by the densely forested Cascade Mountain Range. This subspecies breeds locally on southeastern Vancouver Island, and in the lower Fraser River valley (at least formerly), south through western Washington and Oregon to extreme northwestern California (Figure 1). It is accepted by most authorities that the Coastal Vesper Sparrow is the only subspecies found west of the Cascades (AOU 1957; Pyle 1997; Cannings 1998; Rogers 2000; Campbell *et al*. 2001; Jones and Cornely 2002; Altman 2003).

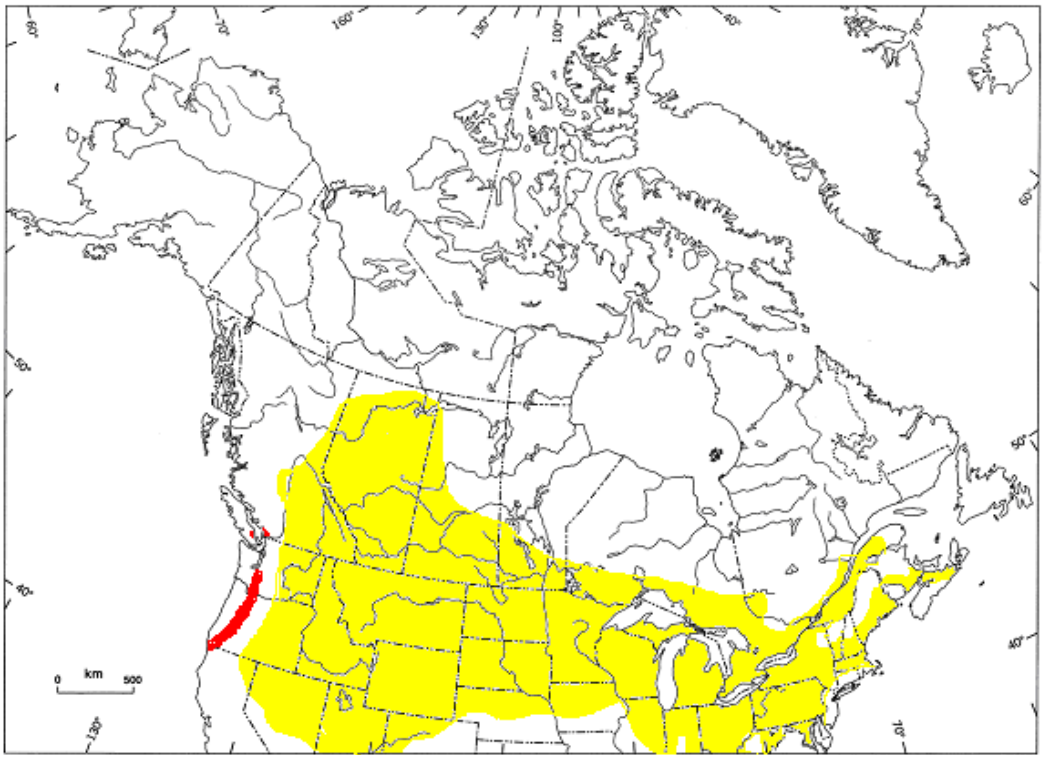

Figure 1. The breeding range of the Coastal Vesper Sparrow, *P. g. affinis* (red) and other subspecies (*P. g. gramineus, P. g. confinis, and P. g. altus,* yellow); adapted from Jones and Cornely (2002).

Although taxonomic work has not been done on the breeding population in coastal British Columbia, it is accepted that these birds are *P. g. affinis* (Fraser *et al*. 1999), based on the known distribution of that race in Washington and Oregon (Campbell *et al*.

2001). Coastal Vesper Sparrows breed on San Juan Island, Washington, less than 20 km from southern Vancouver Island (Rogers 2000), while the nearest *P. g. confinis* population is several hundred kilometres to the east on the other side of the Cascade Range and Coast Mountains (Campbell *et al*. 2001; Jones and Cornely 2002).

Vesper Sparrows winter across the southern United States, south through Mexico to central Guatemala (Jones and Cornely 2002). The Coastal Vesper Sparrows winters from central California west of the Sierra Nevadas to northwestern Baja California (AOU 1957).

Canadian range

All subspecies

The Vesper Sparrow breeds in grassland habitats from British Columbia east to Nova Scotia. The subspecies *P. g. confinis* breeds from the interior of British Columbia, east of the Cascades and Coast Mountains north through the Chilcotin and Cariboo Plateaus to the Peace Lowlands, across Alberta, and into the southern extreme of the Northwest Territories. Further east the range dips to the south across southern Saskatchewan and Manitoba to southwestern Ontario. Further east, Vesper Sparrows of the *gramineus* subspecies breed across southern Ontario through southern Quebec, including the Gaspé Peninsula, and in parts of New Brunswick, Nova Scotia and Prince Edward Island (Jones and Cornely 2002).

Coastal Vesper Sparrow

Within Canada, the Coastal Vesper Sparrow has been found only on southeastern Vancouver Island and in the lower Fraser River valley. Historically, Vesper Sparrows have been reported during the breeding season on Vancouver Island from the Englishman River estuary in the north to Cobble Meadows and Mill Bay in the south and locally in the Fraser Lowland on the southwest mainland coast (Campbell *et al*. 2001; Beauchesne 2002b). Although records of this species were sporadic through the early 1900s, the following occurrence data suggest that this species has been present in the region for more than 50 years: breeding season records on Vancouver Island from 1890, 1891, and 1892; nesting in New Westminster, 1938; breeding season observations in the Chilliwack region, 1944 (Campbell *et al*. 2001). Additional records in the last 50 years include: breeding season observations on Vancouver Island, 1957; breeding season observations in the Chilliwack region, 1961, 1962, and 1968; nesting on Iona Island (Fraser Delta), 1968; consistent breeding season records for Vancouver Island from 1971 to present; additional sporadic records from the Fraser Valley from the 1970s to present (Campbell *et al*. 2001; Beauchesne 2002b).

Currently, the Coastal Vesper Sparrow is considered a very rare summer visitor in the Fraser Lowlands (M. McNicholl, pers. comm.). The only known extant breeding population is located on Vancouver Island about 20 km south of Nanaimo at the Nanaimo Airport (Beauchesne 2002a, 2003, 2004).

Figure 2. Breeding range of the Coastal Vesper Sparrow, shown in light green; Nanaimo airport site shown as red dot. The interior subspecies of the Vesper Sparrow (*P. g. confinis*) breeds in grassland areas shown in the satellite image as a buff colour, separated from the coastal grasslands by high mountains (dark green and white).

Outside of the breeding season, Vesper Sparrows have been recorded on Vancouver Island and the Gulf Islands from Cortes Island south to Victoria including Rocky Point and the Victoria Airport area (Fraser *et al*. 1999; Beauchesne 2002b). The origin of these birds is unknown.

HABITAT

Habitat requirements

Vesper Sparrows are grassland birds, preferring dry, open areas with short, sparse grass or herbaceous cover (Reed 1986; Dechante *et al*. 2001; Campbell *et al*. 2001). Structural diversity is important; taller vegetation such as scattered shrubs or trees at the edge of grasslands is used for cover and for singing perches while areas with shorter vegetation are used for foraging (Davis and Duncan 1999). In western Washington, Rogers (2000) determined that foraging Vesper Sparrows used sites with a mean cover of 32% bare ground, with the remainder grasses and forbs. Fence posts, wire fences and other man-made structures are also used for singing perches (Beauchesne 2002b).

Several studies indicate that Vesper Sparrows avoid permanent pasture and hayfields (see Kantrud 1981; Prescott *et al*. 1995 in Jones and Cornely 2002; Campbell *et al*. 2001). This was consistent with results from inventory work on southeastern Vancouver Island where breeding territories were found in areas adjacent to, but not within, areas used for hay production (Beauchesne 2002a, 2003, 2004). Vesper Sparrows appear to prefer grassland away from urban edges (Bock *et al*. 1999; Jones and Bock 2002). Size of habitat patch may also be important (Kershner and Bollinger 1996; Rogers 2000). For example, in Washington Coastal Vesper Sparrows are currently found in large prairie areas, but not in small patches of similar habitat (Scott Pearson, pers. comm.). In eastern Oregon, however, they have been recorded breeding in areas of <4 ha (Jones and Cornely 2002) and on Vancouver Island, the extant population occurs in an area of suitable habitat of approximately 10 ha (Beauchesne 2002a).

On Vancouver Island, the plant community at the known breeding site includes both native and non-native flora. Birds were frequently seen using clumps of Scotch broom, *Cytisus scoparius,* for singing perches and escape cover. They foraged on the ground in the adjacent open areas with gravely soil and sparse forb and grass cover (Beauchesne 2002a, 2003, 2004).

Trends

All Subspecies

Across the range of the Vesper Sparrow, grassland habitats have been altered since the arrival of Europeans. In many areas, Vesper Sparrow habitat has declined in quality and quantity with development (urban and industrial) and modified farm practices (e.g., earlier and more frequent mowing; larger crop fields with subsequent reduction of hedgerows: Jones and Cornely 2002; Altman 2003).

Coastal Vesper Sparrow

Before European colonization, habitat for the Coastal Vesper Sparrow in British Columbia was likely restricted to xeric, sparsely vegetated areas within grassland and 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 habitat for Vesper Sparrows.

On Vancouver Island, Governor Douglas wrote of “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 Vesper Sparrows, they are currently very small.

European settlers probably initially increased available terrestrial habitat in southwestern British Columbia through clearing of forests and draining of wetlands for agricultural purposes. However, those habitat areas have subsequently declined in size and quality 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 Vesper Sparrow (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.

Decades of fire suppression have led to infilling of grassland and oak meadow habitat and have prevented the creation of new open areas. Most of the region has been modified for residential or agricultural purposes with dramatic changes to topsoil and water regimes and subsequent alteration to vegetation structure. In addition, alien species invasion is further altering vegetation structure in the remaining habitat (i.e., Scotch Broom and exotic tall grasses are replacing native short grasses and forbs). The reduction of naturally occurring terrestrial habitats in the region over the past 150 years, due to human modifications, has been estimated at 80% (Ward *et al*. 1998) and Fuchs (2001) estimates that Garry oak and associated ecosystems in British Columbia have declined in area by 95% (Fuchs 2001).

The Nanaimo Airport is currently one of the few sites in the region with a relatively large area of suitable habitat (Beauchesne 2002a; 2003). Topsoil removal for runway development has mimicked a natural erosion event, leaving behind a gravel base that has limited plant growth. Elsewhere, it has been noted that airports represent some of the largest remaining open grasslands and, if well managed, may provide critical refuges for many grassland species (Kershner and Bollinger 1996).

Elsewhere, declining populations in Washington and Oregon are linked with habitat loss (Rogers 2000; Altman 2003). Prairie habitat in western Washington has declined an estimated 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 (Crawford and Hall 1997; Smith *et al*. 1997; Rogers 2000). The Willamette Valley in western Oregon still supports a remnant population of Coastal Vesper Sparrows, but has undergone dramatic habitat changes since the arrival of Europeans (Altman 2003).

Protection/ownership

The only known breeding site for Coastal Vesper Sparrow on southeastern Vancouver Island is on the grounds of the Nanaimo Airport. This independent airport is owned and managed by the Nanaimo Airport Commission (NAC 2001, 2002, 2005). The primary consideration for vegetation management at the site is compliance with Federal Aviation Authority (FAA) regulations (B. Clark pers. comm.).

Other historic breeding sites on Vancouver Island are on private agricultural land, management of which is typically at the discretion of the individual landowner. There is also possibly some suitable habitat within regional parks and other protected areas, but the amount available has not been assessed. Given the development pressures on southeastern Vancouver Island and the lower mainland, it is unlikely that a substantial amount of additional suitable habitat will be created in the future (Dawe *et al*. 2001). Therefore stewardship of existing habitat is very important.

Recognizing the importance of the Nanaimo Airport to the survival of the Coastal Vesper Sparrow in Canada, the Vertebrates Recovery Implementation Group (RIG) of the Garry Oak Ecosystems Recovery Team (GOERT) adopted a formal Stewardship Agreement with the Nanaimo Airport (Beauchesne 2002c). Although grassland conservation has not been the primary goal of this commercial enterprise, runway maintenance to date has apparently been compatible with Vesper Sparrow breeding habitat requirements (Beauchesne 2002b). The Vertebrates RIG is now working with airport management, within the scope of Transport Canada regulations and other over-riding policies, to protect and further enhance the Vesper Sparrow breeding site. The agreement, covering issues such as the timing of mowing, timing and location of pesticide applications, control of invasive species and other vegetation management issues, has been in place from 2003 and is expected to continue in the future (Beauchesne 2002c).

However, further development of the airport grounds could threaten continued persistence of this subspecies in the region. The Airport Commission's Vision Statement indicates a commitment to both "aggressively pursue development opportunities, and exercise responsible environmental stewardship" (NAC 2001). The airport has a mandate to "generate and participate in economic development projects intended to expand air transportation facilities and to generate economic activity in all areas compatible with air transportation" (NAC 2005). Consequently the Stewardship Agreement includes a clause accepting that the airport may develop the area occupied by Vesper Sparrows, should an opportunity arise to generate economic activity (Beauchesne 2002c). Examples of land use options that have recently been entertained for the area are: storage of lumber, storage of heavy equipment, and development of more hangar sites, none of which are likely compatible with Vesper Sparrow breeding habitat requirements. Likewise, a modification of the runway maintenance program could be detrimental to Vesper Sparrow breeding habitat. Plans are currently being developed to upgrade the radar system at the airport, which in turn would require wider runway clearance (B. Clark pers. comm.). The ensuing mowing requirements would impact the Vesper Sparrow breeding site.

BIOLOGY

General

Vesper Sparrows are ground-nesting birds of sparsely vegetated, grassland habitats. Very little is known about the breeding ecology of the Coastal Vesper Sparrow in the Georgia Depression; therefore most of the following information is inferred from data available for other regions or other subspecies of Vesper Sparrow.

Reproduction

Vesper Sparrows are seasonally monogamous (Jones and Cornely 2002). Males typically arrive on the breeding grounds first with females following shortly after (Best and Rodenhouse 1984). The female alone builds the nest. Nests are usually on level ground or in a slight depression. Nests are usually placed beside a tuft of vegetation to help conceal the location from potential predators (Jones and Cornely 2002) as well as to help maintain optimal microclimate in the nest (Nelson and Martin 1999).

Clutches contain three to six eggs and are incubated for 11 to 14 days, primarily by the female. Both sexes feed the nestlings. Nestlings fledge after approximately 10 days and are dependent on the adults for another 20 to 30 days (Baicich and Harrison 1997). Vesper Sparrows may raise a second brood in a single breeding season. If the first brood has successfully fledged, the male typically cares for those young while the female tends the second nest (Jones and Cornely 2002).

In coastal British Columbia, the breeding season is estimated to extend from late April to mid-July (Beauchesne 2002a, 2003, 2004). If a second brood is reared, the breeding season could extend into early August (Campbell *et al*. 2001). No information exists on the timing of dispersal from breeding sites (Campbell *et al*. 2001; Jones and Cornely 2002).

In the interior, the Vesper Sparrow is a fairly common host of the Brown-headed Cowbird, *Molothrus ater* (Friedman 1963; Dechant *et al*. 2001). There are no records of parasitism for the Coastal Vesper Sparrow in Canada (Campbell *et al*. 2001).

Survival

In the Georgia Depression, potential predators of eggs, young birds and adults include birds of prey (e.g., Cooper's Hawk, *Accipiter cooperii* and Merlin, *Falco columbariu*), 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 on Vancouver Island. Cats are known to be competent predators of small to medium-sized birds (George 1974; Cooper 1993;

Coleman and Temple 1993; Coleman *et al*. undated; N. Dawe pers. comm.). On southeastern Vancouver Island domestic cats were frequently observed on the Nanaimo Airport grounds and at all other sites with suitable habitat, a result of close proximity to human habitation (Beauchesne 2002a).

Nests may also be destroyed by trampling, particularly in areas that are heavily grazed by livestock, or in high-traffic areas for people and domestic dogs (Rogers 2000). Mowing and other mechanical agricultural practices, however, probably represent the greatest hazard for this ground-nesting species (Rodenhouse *et al*. 1993). Mowing or mechanical harvesting of fields during the incubation and nestling period destroys most nests (Jones and Cornely 2002). Kershner and Bolinger (1996) evaluated the productivity of airport grassland habitats in the eastern United States and found many to be population sinks for grassland bird species, a situation they attributed to mowing practices.

Movements/dispersal

Vesper Sparrows are partial migrants. The northernmost breeding populations move south to winter in areas occupied by other populations during the summer (Jones and Cornely 2002). Birds from Vancouver Island probably winter in California. Breeding birds begin to arrive on Vancouver Island in early April and most depart in the fall by mid-October (Fraser *et al*. 1999; Campbell *et al*. 2001).

Migration is probably opportunistic, timed with changes in vegetation. Vesper Sparrows primarily migrate at night and move in small groups (Jones and Cornely 2002).

Banding studies have shown that breeding site fidelity is strong for adults, with an average return rate of approximately 50% (Best and Rodenhouse 1984). The repeated use of a single site on Vancouver Island also suggests that birds are returning to the same breeding territories (Beauchesne 2002b.).

Nutrition and interspecific interactions

The Vesper Sparrow's diet consists of insects and the seeds of native and introduced grasses and forbs. During the breeding season, insects, particularly grasshoppers, were found to form the bulk of the diet in research conducted in south eastern Washington, Montana, and North Dakota (Adams *et al*. 1994; Jones and Cornely 2002).

This ground-dwelling sparrow primarily forages in low vegetation while walking or hopping. It will also hop and hover to glean insects from higher vegetation (Jones and Cornely 2002). On Vancouver Island, Vesper Sparrows were observed gleaning insects from low forbs and eating dandelion (*Taraxacum officinale*) seeds. Adults were observed carrying insects, presumably to feed to nestlings (Beauchesne 2002a).

Behaviour/adaptability

In British Columbia, Vesper Sparrow have adapted to sites that have been modified by humans. Other researchers, however, have suggested that Vesper Sparrows avoid areas with high human population concentrations (Bock *et al*. 1999). They also avoid areas with intensive agricultural practices (e.g., hayfields: Campbell *et al*. 2001; Beauchesne 2002b).

POPULATION SIZES AND TRENDS

All subspecies

Of the total breeding population of Vesper Sparrows in Canada, Alberta supports an estimated 18%, Saskatchewan, 15%, and the rest of Canada, 14% (Wells and Rosenberg 1999). Using the Partners in Flight total population estimate of 30 million (Rich *et al*. 2004), there are approximately 14 million Vesper Sparrows breeding in Canada.

Breeding bird survey (BBS) data compiled over the last 40 years show significant declines in 11 states, 12 physiographic strata, the Eastern BBS Region, continental USA, and survey-wide; increases are limited to 3 states and 3 strata, while the other regional trends estimates are close to zero (Sauer *et al*. 2004). Continent-wide, BBS data indicate a significant annual decline of 0.6% from 1966 to 2003; Christmas bird count data show a similar decline (Sauer *et al*. 2004). In Canada, BBS data show a significant annual rate of decline of 0.9% from 1968 to 2002, steepening to 2.5% in the last decade. Recent (1993-2002) trends for all Canadian Bird Conservation Regions are negative, including significant annual declines of 6.7% in the Boreal Taiga Plains, 8.4% in the Northern Rockies and 7.2% in the Boreal Hardwood Transition. Vesper Sparrows have become so uncommon in Atlantic Canada that recent declines cannot be calculated, but the trend from 1968-2002 is a significant annual decline of 9.9%.

Coastal Vesper Sparrow

In the late 1990s, researchers estimated that the Canadian Coastal Vesper Sparrow population was five to ten breeding pairs (Fraser *et al*. 1999). Results from survey efforts in 2002, 2003, and 2004 were consistent with this estimate, with five probable breeding territories documented at the Nanaimo Airport during those years. Searches were also conducted between Mill Bay and Nanaimo and on Gabriola and Saltspring Islands in May and June, 2002 (Beauchesne 2002a) and between Cassidy and Campbell River, and adjacent Gulf Islands, from April to June, 2003 (Beauchesne 2003). No additional breeding localities were identified either year and the Nanaimo Airport remains the only known locality for this species on southeastern Vancouver Island (Beauchesne 2002). The entire historical range of the subspecies in Canada has a high density of keen birdwatchers who are quick to report any sightings of this rare species.

Coastal Vesper Sparrows are listed by other authors as casual breeders (Cannings 1998) and as occasional local breeders in British Columbia (Campbell *et al*. 2001). The species has never been recorded on Breeding Bird Surveys (BBS) or Christmas Bird Counts on the coast (Campbell *et al*. 2001), though BBS routes are not designed to look for rare birds and the species is rarely present in Canada in winter.

In Washington State, Rogers (2000) estimated that there were approximately 125 singing male Coastal Vesper Sparrows in 1998. However, on San Juan Island, the breeding site closest to British Columbia, only two Vesper Sparrows were located that year (Rogers 2000). No population size estimates could be found for Oregon or California.

This subspecies may never have been common in British Columbia as it was never recorded in large numbers or from more than a few localities. The maximum count of birds at one location during the breeding season is 13 birds in the Cobble Meadows/Cobble Hill region on Vancouver Island in 1978 (Campbell *et al*. 2001). Because formal surveys of Vesper Sparrow populations were not undertaken historically, trends are difficult to determine. However, the species has disappeared from some historic breeding locations (e.g., Cobble Meadows, Iona Island and the Fraser River valley), suggesting that the population is in decline (Fraser *et al*. 1999). Recent counts at the Nanaimo airport suggest the population is more or less stable at that one site.

In Washington State, a decrease in distribution and abundance of this subspecies has also been apparent, although precise historic population data is also lacking for that region (Rogers 2000). The Coastal Vesper Sparrow is currently considered in danger of extirpation in Washington due to habitat destruction (Smith *et al*. 1997; Rogers 2000).

In Oregon, anecdotal evidence suggests substantial population declines in Coastal Vesper Sparrow have occurred in the last 40-50 years (Altman 2003). There are no available population trend data for the subspecies in California.

Because of the declining population in Washington and the issue of habitat loss in British Columbia, rescue effect is likely minimal at best.

LIMITING FACTORS AND THREATS

Lack of suitable breeding habitat is the primary limiting factor for Coastal Vesper Sparrow populations. It is assumed that, prior to European settlement, sparsely vegetated Garry oak and related ecosystems or other burnt areas would have been the key open habitats used by this species. The clearing of land for farming and other human uses may have increased the amount of suitable habitat available on the coast in the early 20th century. During the last few decades significant amounts of farmlands and other open areas including Garry oak ecosystems have been converted to industrial, commercial and residential developments, or more intensive forms of

agriculture (Campbell *et al*. 2001). Therefore, it seems probable that availability of suitable habitat has subsequently declined (i.e., estimated 95% reduction: Fuchs 2001). The major cause of habitat loss for this species is intensification of agricultural practices and urbanization.

Agricultural practices that involve mechanical procedures (e.g., tilling, mowing) during the nesting season can destroy nests, having an obvious impact on reproductive success of ground-nesting birds. Modern crop “improvements” of more rapid growth with earlier and more frequent harvest exacerbates the risk to ground-nesting birds. When greater industrialization of agriculture involves the expansion of field size, the subsequent “clean farming” practices of removal of shrubby fencerows eliminates important habitat structural features, reducing the suitability of habitat (Rodenhouse *et al*. 1993; Sauer *et al*. 2004). Intensive grazing, where animals are concentrated in small enclosures, reduces the suitability of the habitat and when nesting is attempted in these situations, there is an increased likelihood of nests being trampled (Bock *et al*. 1993).

Urbanization permanently removes parts of the land base in the footprint required for buildings, roads and other infrastructure. Most of the remaining area (e.g., backyards or city gardens) is also dramatically altered such that it has little to no habitat suitability for Vesper Sparrows (Jones and Bock 2002). Although some habitat within or adjacent to urban areas may appear suitable, Vesper Sparrows tend to occur in lower density in these areas than further away from the urban edges. This indicates that there are factors such as increased disturbance or increased predation that adversely impact the habitat’s suitability (Bock *et. al*. 1999). On southeastern Vancouver Island, regional parks with potential habitat are often heavily frequented by visitors, which may be detrimental to this species. Within urban regions, the high concentration of domestic and feral cats also poses a threat to this species (George 1974; Cooper 1993; Coleman *et al*. undated).

Because Coastal Vesper Sparrows currently occur in very small numbers at a single site, the Canadian population is particularly vulnerable to extirpation. A single event (e.g., an infrastructure development project on the airport grounds), could eliminate the entire population.

SPECIAL SIGNIFICANCE OF THE SPECIES

The distribution of Coastal Vesper Sparrows is extremely restricted and populations in all jurisdictions are declining. This subspecies is separated from interior Vesper Sparrows by the coastal mountain ranges. As such, the subspecies forms a disjunct population. Disjunct populations contribute to the genetic diversity of the species and are important for the evolution of species (Hunter and Hutchinson 1994).

In Canada, Coastal Vesper Sparrows occur only in southwestern British Columbia where it is one of the few vertebrates that is associated with the rare Garry oak and

associated ecosystems. Suitable habitat in the region is very limited and development pressures continue at the remaining potential habitat. The Coastal Vesper Sparrow has been identified by GOERT as a priority vertebrate species for recovery efforts. Any success in maintaining and restoring habitat for Vesper Sparrows within the Garry oak and associated ecosystems will also benefit other, less well known species.

EXISTING PROTECTION OR OTHER STATUS DESIGNATIONS

The Vesper Sparrow 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 the east, the Vesper Sparrow, *P. g. gramineus,* is listed as Endangered in Rhode Island (where it is currently extirpated), Connecticut, and New Jersey. It is considered Threatened in Maryland, and a Species of Concern in New York and Maine. It has been assigned a Natural Heritage Status of “state significantly rare species breeding and wintering” in North Carolina (Jones and Cornely 2002).

In the west, the Vesper Sparrow, *P. g. confinis,* is a species of Concern in Washington, Oregon and Wisconsin and is a Priority Focus Species in Nevada (Jones and Cornely 2002).

The Coastal Vesper Sparrow, *P. g. affinis,* is on the Red-list in British Columbia (Fraser *et al*. 1999). It is considered at risk in all jurisdictions (Table 1) and is included on a list of “Birds of Conservation Concern” by the US Fish and Wildlife Services: this group includes all “species, subspecies and populations of migratory non-game birds that, without additional conservation effort are likely to become candidates for listing under the Endangered Species Act of 1973” (USFWS 2002).

Table 1. Status of the Coastal Vesper Sparrow in all jurisdictions within breeding range (Fraser *et al.* 1999; Rogers 2000).

Jurisdiction	Rank	Qualifier
British Columbia	Red List	Considered Threatened”
Washington	Candidate for Endangered Species List	
Oregon	State Sensitive Species	Critical status
Pacific Ecosystem Office, USFWS	Species of Concern	
US Endangered Species Act	Not listed	

TECHNICAL SUMMARY

Pooecetes gramineus affinis
Vesper Sparrow *affinis* subspecies
British Columbia

Bruant vespéral de la sous-espèce *affinis*

Extent and Area information	
• *extent of occurrence (EO)(km²)*	<2,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	Decline
• *are there extreme fluctuations in EO (> 1 order of magnitude)?*	No
• *area of occupancy (AO) (km²)*	<1 km^2
• *specify trend (decline, stable, increasing, unknown)*	Decline
• *are there extreme fluctuations in AO (> 1 order magnitude)?*	No
• *number of extant locations*	1
• *specify trend in # locations (decline, stable, increasing, unknown)*	Decline
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	No
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	Declining extent and quality
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	2-3 years
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	10-20
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	Probable decline
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	unknown
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	No
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	No
• *list each population and the number of mature individuals in each*	Not applicable
• *specify trend in number of populations (decline, stable, increasing, unknown)*	Not applicable
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	No
Threats (actual or imminent threats to populations or habitats)	
• Habitat loss and fragmentation from human development • Habitat loss from spread of invasive plants • Increased human disturbance at remaining habitat • Increased predation pressure associated with increasing urbanization	

Rescue Effect (immigration from an outside source)	Low
• *does species exist elsewhere (in Canada or outside)?*	Yes
• *status of the outside population(s)?*	Small, declining
• *is immigration known or possible?*	Possible
• *would immigrants be adapted to survive here?*	Yes
• *is there sufficient habitat for immigrants here?*	No
Quantitative Analysis	Not done
Current Status COSEWIC: Endangered (2006) British Columbia CDC: Blue-listed	

Status and Reasons for Designation

Status: Endangered	**Alpha-numeric code**: B1ab(i, ii, iii) +2ab(i, ii, iii); C2a(i, ii); D1

Reasons for Designation:

This songbird, a subspecies of the Vesper Sparrow, is found in Canada only in coastal grasslands in the extreme southwestern corner of British Columbia, where it now breeds only at one site with a population of about 5 pairs. The taxon is declining in the United States as well, where it has a restricted distribution in western Washington and Oregon. Habitat loss is the greatest threat, both through direct destruction of habitat for urban development and through invasion by alien plant species.

Applicability of Criteria

Criterion A: (Declining Total Population): Rate of decline unknown.

Criterion B: (Small Distribution, and Decline or Fluctuation): Met Endangered B1ab(i,ii,iii)+2ab(i,ii,iii) because of its very small extent of occurrence and area of occupancy - only one breeding site - and decline in the number of sites occupied and quality of habitat.

Criterion C: (Small Total Population Size and Decline): Met Endangered C2a(i,ii) because of its low breeding population (< 20 birds) and continuing decline of that population. All the birds occur in this one population.

Criterion D: (Very Small Population or Restricted Distribution): Endangered D1 (<250 individuals)

Criterion E: (Quantitative Analysis): Not done.

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