Garry Oak Ecosystems Recovery Team

# COASTAL VESPER SPARROW STEWARDSHIP ACCOUNT

## For the Garry Oak Ecosystems of Southwestern British Columbia

**Photo: S.M. Beauchesne**


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## Executive Summary

Coastal Vesper Sparrows are at the northernmost extent of their range in southwestern British Columbia where they are currently known to breed at only a single location. In the Pacific Northwest states to the south, they are also considered to be at risk of extirpation. Throughout their range habitat loss or degradation is considered the greatest threat to the species continued survival. Coastal Vesper Sparrows require grassland or edge habitat with short, sparse grass or herbaceous cover as well as scattered or adjacent shrubs or trees. Stewardship of the habitat at the Nanaimo Airport, the known breeding site, is critical to the maintenance of the existing population. Protection and enhancement of other sites with suitable habitat is also necessary to help ensure the subspecies' survival in British Columbia by accommodating potential dispersing birds.

Even with suitable habitat, there are many hazards for this ground-nesting bird. Predators, poor weather and accidental destruction can reduce nesting success. Management recommendations for Vesper Sparrow stewardship therefore include: control feral cat populations in areas with nesting birds; time activities such as tilling, mowing, and pesticide and herbicide application to avoid the breeding season; and control the encroachment of shrubs and trees into open habitat areas but restrict treatments to non-breeding season.

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## 1. Introduction

The Garry Oak Ecosystems Recovery Team (GOERT) has established a list of plant, invertebrate and vertebrate species that are a priority for future research and recovery efforts in the Georgia Depression Ecoprovince (i.e., southeastern Vancouver Island and the lower Fraser River valley) of southwestern British Columbia. The species selected rely on the Garry oak (*Quercus garryana*) or related ecosystems (e.g., coastal bluffs, sparsely vegetated areas) for the majority or an important part of their lifecycle and are either in decline or are currently extirpated from the region.

The Coastal Vesper Sparrow (*Pooecetes gramineus affinis*), a priority vertebrate species as identified by GOERT, is critically imperiled in the Georgia Basin, with only one remaining breeding site known to exist. This stewardship account has been prepared for GOERT to summarize what is known about the Coastal Vesper Sparrow and to make recommendations as an initial step towards developing a recovery plan, with the long-term objective of restoring a viable population of this species to the ecosystem.

### a) Taxonomy

Three subspecies of Vesper Sparrow (*Pooecetes gramineus*) are recognized, two of which (*P. g. confinis* and *P. g. affinis*) occur in British Columbia (Cannings 1998). The Coastal Vesper Sparrow (*P. g. affinis*) occurs in the Georgia Basin and is the subspecies of interest for this stewardship account.

The Vesper Sparrow was originally known as Bay-winged Bunting (Rising 1996). Common names for subspecies are not formally recognized by the American Ornithologists Union, therefore different names may used in different localities. The Coastal Vesper Sparrow subspecies is also currently referred to as the Oregon Vesper Sparrow (Rising 1996; Rogers 2000). Former scientific names for the species found in the literature include *Poocaetes gramineus* and *Fringilla graminea* (AOU 1957).

## 2. Range and Known Distribution

### a) 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 the interior of British Columbia to Nova Scotia and south from California through to Virginia in the east (Jones and Cornely 2002). The Coastal Vesper Sparrow forms a disjunct population, breeding locally on southeastern Vancouver Island, south through western Washington and Oregon to extreme northwestern California. The Coastal Vesper Sparrow is the only subspecies found west of the Cascades (Cannings 1998; 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 Sparrow winters from central California west of the Sierra Nevada to northwestern Baja (AOU 1957).

b) Canadian range:

Within Canada, the Coastal Vesper Sparrow only occurs in southwestern British Columbia (see below).

c) Provincial range:

The only known extant breeding population of Coastal Vesper Sparrow is on southeastern Vancouver Island, about 10 km south of Nanaimo at the Nanaimo Airport, in Cassidy (see Fig. 1). Historically, it has been reported during the breeding season on Vancouver Island from the Englishman River estuary in the north to Cobble Meadows and Mill Bay to the south. It was also formerly a local breeder in the Fraser Lowland on the southwest mainland coast. The last breeding record for that area is from 1968. Currently, it is considered a very rare summer visitor in the Lower Mainland (Campbell et al. 2001; M. McNicholl, pers. comm.; R. Toochin, pers. comm).

The coastal breeding population is restricted to low elevation (Campbell et al. 2001; Beauchesne in prep.).

Outside of the breeding season, Vesper Sparrows have been recorded on Vancouver Island from Cortes Island (G. Sirk, pers. comm.) south to Victoria including Rocky Point (A. Nightingale pers. comm.) and the Victoria Airport area (Fraser et al. 1999; SMB unpublished records), although the origin of these birds is unknown.

d) Range changes:

On Vancouver Island, Vesper Sparrows have been documented during the breeding season as far north as the Englishman River estuary and as far south as Cobble Meadows. With the current population apparently restricted to the Cassidy area, a range contraction has occurred on Vancouver Island. On the mainland, evidence suggests that Vesper Sparrows may have expanded their range into the Fraser Lowland from adjacent Washington State, following the clearing of land and drainage of wetlands for pastures and farmlands in the early to mid 1900s. In recent decades, records of the species are few on the mainland and breeding populations are unknown, suggesting that the range there has subsequently contracted (Campbell et al. 2001).

Fig. 1: Distribution of the Coastal Vesper Sparrow on Vancouver Island, British Columbia. Base map from the Gazetteer of Canada, Vol. British Columbia, 1985.


## 3. Status of Species

a) Population size:

J. Cooper and M. Shepard estimated that there were five to ten breeding pairs per season on Vancouver Island in the late 1990's (in Fraser et al. 1999). Results from survey efforts in 2002 were consistent with this estimate, with five probable breeding territories

documented at the Nanaimo Airport. Searches were also conducted between Mill Bay and Nanaimo and on Gabriola and Saltspring Islands between May 2 and June 27, 2002. Thirty-five sites were selected for surveying due to apparent high habitat suitability, however no additional breeding localities were identified and the Nanaimo Airport remains the only known locality for this species on southeastern Vancouver Island (Beauchesne in prep).

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 or Christmas Bird Counts on the coast (Campbell et al. 2001).

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.

b) Population trends:

This subspecies was probably never 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 in one season was 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 dissappeared 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).

The availability of suitable breeding habitat would likely have always been a limiting factor. It is assumed that, prior to European settlement, sparsely vegetated open Garry oak and related ecosystems or 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, likely causing populations to have also declined.

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).

There is no available population trend data for the subspecies in Oregon or California.

c) Global, Canadian, and provincial rank:

The Vesper Sparrow is a widespread and abundant bird over much of its range (Jones and Cornely 2002), however the Coastal Vesper Sparrow subspecies is considered at risk in most jurisdictions (see Table 1). The Conservation Data Center ranks this subspecies as G5T3 (i.e. rare to uncommon) globally and S1B, SZN provincially (i.e. breeding populations are critically imperiled because of extreme rarity; Fraser et al. 1999).

**Table 1. Status of the Coastal Vesper Sparrow.**

| Jurisdiction | Rank | Qualifier |
|---|---|---|
| British Columbia | Red List | Considered "Threatened" |
| Washington | "Candidate" for Endangered Species List | |
| Oregon | State Sensitive Species | Critical status |
| COSEWIC | Not assessed | |
| Pacific Ecosystem Office, USFW | Species of Concern | |
| US Endangered Species Act | Not listed | |

d) Related forms threatened:

Other subspecies of Vesper Sparrow are considerably more widespread and common and are therefore not considered threatened.

e) Special scientific interest:

The Coastal Vesper Sparrow is one of the rarest vertebrates in British Columbia. Maintaining a viable breeding population, given the small population, restricted range and lack of remaining suitable habitat presents a great challenge for wildlife managers.

## 4. Life History

a) General:

Very little is known about the breeding ecology of the Coastal Vesper Sparrow in the Georgia Basin; therefore most of the following information is inferred from data available for other regions or other subspecies of Vesper Sparrow.

b) Diet and foraging behaviour:

The Vesper Sparrow 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 southeastern 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 seeds. Adults were observed carrying insects, presumably to feed to nestlings (Beauchesne in prep).

c) Reproduction:

Vesper Sparrows are considered seasonally monogamous (Jones and Cornely 2002). Males probably 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 (Baicich and Harrison 1997). In British Columbia, most clutches contain four eggs (53%, n=168: Campbell et al. 2001). 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 in British Columbia may raise a second brood in a single breeding season (Campbell et al. 2001). 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 early May to late June. 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 British Columbia, the Brown-headed Cowbird (*Molothrus ater*) occasionally parasitizes nests of the other subspecies of Vesper Sparrow. There are no records of parasitism for the Coastal Vesper Sparrow (Campbell et al. 2001).

d) Site fidelity:

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 in prep.).

e) Home range:

Calculated territory sizes range from 0.29 to 8.19 hectares (Jones and Cornely 2002). Both sexes forage almost exclusively within territories and territory size appears to be directly related to food availability (Jones and Cornely 2002).

f) Causes of mortality:

Nest failure may result from predation, bad weather or accidental destruction (Rodenhouse et al. 1993; Jones and Cornely 2002). Although there is little information documented for adults, it is speculated that they may also succumb to predation and accidental trampling by machinery or livestock, based on information for other grassland sparrows (N. Dawe, pers. comm.).

In the Georgia Basin, 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 et al. 2002; 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 in prep.).

Cold wet weather during the nestling period could effect abundance of insects available for food causing a reduction in nesting success, as is the case with other insectivorous species (J.C. Finlay pers. comm.).

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.

g) Migration:

Vespers 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).

## 5. Habitat Description

a) General habitat requirements:

Vesper Sparrows are grassland birds, preferring dry, open areas with short, sparse grass or herbaceous cover (Reed 1986; Dechante et al. 2000; Campbell et al. 2001). Diversity of structure is important with taller vegetation such as scattered shrubs or trees at the edge of a grassland used for cover and for singing perches (Davis and Duncan 1999). Fence posts, wire fences and other manmade structures are also used for singing perches (Beauchesne in prep.).

Several studies indicate that Vesper Sparrows avoid permanent pasture and hayfields (see Katrud 1981; 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 in prep.). Vesper Sparrows 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 they are currently found in large prairie areas, but not in small patches of similar habitat (Scott Pearson, pers. comm.).

On Vancouver Island, the plant community at the known breeding site includes both native and non-native flora. Birds were frequently seen using Scotch broom (*Cytisus scoparius*) for singing perches and escape cover and foraging on the ground in the adjacent open areas with gravely soil and sparse forb and grass cover (Beauchesne in prep.). This habitat is similar in structure to the sage shrub-steppe habitat used by Vesper Sparrows in the interior of British Columbia (J. Cooper pers. comm.). Other researchers have suggested that it is the structure of the habitat, rather than the species composition that is important (Davis and Duncan 1999).

Other species at risk that occur in the same habitat on Vancouver Island include Streaked Horned Lark (*Eremophilia alpestris*). Extirpated species that may have used this habitat include Western Meadowlark (*Sturnella neglecta*), Western Bluebird (*Sialia mexicanus*), and Lewis's Woodpecker (*Melanerpes lewis*).

b) Habitat availability and net trends in habitat change:

Historically, on Vancouver Island suitable habitat would have naturally been found in small pockets at xeric sites or disturbed areas created by fire or erosion events that left behind gravely, nutrient-poor soil. These naturally occurring sites with suitable habitat are currently very scarce. Fire suppression prevents 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 with subsequent alteration to vegetation structure (Fuchs 2001).

Ironically, the Nanaimo Airport is currently one of the few sites in the region with a large area of suitable habitat. 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).

On Vancouver Island, additional suitable habitat may occur north of Nanaimo (e.g., at Comox airfield and on Hornby Island; G. Sirk pers. comm.), although this area was not surveyed in 2002 due to time constraints and a lack of historic, breeding season Vesper Sparrow records (Beauchesne in prep.).

Across the border in Washington, available suitable habitat has also declined (Smith et al. 1997). Grassland habitat in the Puget sound region has been reduced by an estimated 98% in the last 100 years (Crawford and Hall 1997).

There is no habitat trend data available this subspecies in Oregon or California.

## 6. Threats to the Species

Loss or alteration of the limited available suitable habitat is the primary threat to Coastal Vesper Sparrows on Vancouver Island. The two activities that have the greatest impact on habitat availability are increasing the intensity of agricultural activities and urbanisation.

Agricultural practices that involve mechanical procedures (e.g., tilling, mowing) during the nesting season have obvious impacts on ground-nesting birds. The planting of different crops, and increasing the frequency of harvesting can render habitat unsuitable as well. When greater industrialization of agriculture involves the expansion of field size, the subsequent removal of shrubby fencerows eliminates important habitat features, reducing the suitability of habitat (Rodenhouse et al. 1993). Intensive grazing, where animals are concentrated in small enclosures, may also reduce the overall suitability of the habitat. Alternatively, when nesting is attempted in heavily grazed areas, reduced nesting success may result due to trampling (Bock et al. 1993).

Urbanisation permanently removes land base through the physical alteration of the footprint required for buildings, roads and other infrastructure. Most of the remaining area (e.g., backyard or city garden) is also dramatically altered such that it has little to no habitat suitability for Vesper Sparrows (Jones and Bock 2002).

Where seemingly suitable habitat is found within or adjacent to urban areas, Vesper Sparrows tend to occur in lower density than further away from the urban edges (Bock et al. 1999), indicating 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 well used

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. 2002).

Because Vesper Sparrows currently occur in very small numbers at a single site, survival of the species on Vancouver Island is especially vulnerable. A single event (e.g., an infrastructure development project on the airport grounds) could eliminate the entire population.

## 7. Management Recommendations

a) Habitat ownership and protection:

The only known breeding site for Coastal Vesper Sparrow on southeastern Vancouver Island is on the grounds of the Nanaimo Airport. This independent, not-for-profit airport is owned and managed by the Nanaimo Airport Commission (NAC 2001, 2002). The primary consideration for vegetation management at the site is compliance with Federal Aviation Authority regulations.

Other historic breeding sites on Vancouver Island are on private agricultural land, typically, management of which is at the discretion of the individual landowner. There is 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 additional suitable habitat will be created in the future (Campbell et al. 2001). Therefore stewardship of existing habitat is very important.

b) Current management policies and actions

Stewardship of the only known breeding location for the Coastal Vesper Sparrow is at the discretion of the airport manager of the Nanaimo Airport. Although grassland conservation is not the primary goal of this commercial enterprise, runway maintenance to date has been compatible with Vesper Sparrow breeding habitat requirements. In addition, the restricted access to the site affords breeding birds some level of protection from disturbance. However, further development of the airport grounds or a modification to the runway maintenance program could threaten this subspecies survival on Vancouver Island. The Commission's Vision Statement indicates a commitment to both "aggressively pursue development opportunities, and exercise responsible environmental stewardship" (NAC 2001). A stewardship plan is being prepared, in consultation with the airport management, with the goal of maintaining the current population levels.

c) Recommended prescriptions

A stewardship plan is being developed for the Nanaimo Airport. Should the existing population expand, alternative sites will be necessary for satellite populations. Therefore, location of potential additional sites with suitable habitat within the region should be

determined. Landowners of these sites should be approached and encouraged to adopt grassland stewardship objectives. Ideally, however, sites with suitable habitat should be acquired for long-term protection.

The following specific prescriptions are suggested for stewardship of Vesper Sparrow habitat:

- Hay making and other mechanical operations should be restricted in areas used by Vesper Sparrows. Ideally all preparatory field applications (e.g., tilling) should be completed by the end of April and crop removal should not begin until the end of July, to allow for the possibility of a second brood being reared. Reduced mechanical operations during the breeding season would also benefit other grassland species (e.g., Savannah Sparrows).

- Pesticide and herbicide use should be limited or avoided during the breeding season in areas used by Vesper Sparrows. Herbicide applications should be conducted on a spot-by-spot basis and all chemicals used should be rapidly degrading, low toxicity products that are applied at the lowest rates possible.

- Scotch broom and other invasive shrubs should be controlled to prevent encroachment into open areas. Removal may be accomplished through manual or mechanical cutting and/or pulling or controlled burning. Treatment should be undertaken in the late fall or winter to prevent disturbance to breeding birds. Where sparrows occur and invasive species provide the only available escape cover, removal should be done in patches creating a mosaic, with some plants left to maintain habitat structure. Ideally some of the removed, introduced plant would be replaced with native species that are less aggressive in colonizing open areas.

- On public land with suitable habitat, signs should be posted encouraging people not to disturb nesting birds. In particular, people and pets should be excluded from breeding sites during the breeding season.

- Landowners of should be encouraged to maintain fencerows with a mix of herbaceous and shrubby vegetation between fields in agricultural areas.

- A feral cat control program should be adopted in areas with suitable habitat possibly in conjunction with animal welfare agencies such as the SPCA.

d) <u>Potential to stabilise or reverse decline</u>

Reversing the decline will be a difficult task. Successful breeding at the extant site could produce “surplus” birds that could be available to colonize new areas. Young birds tend to disperse to new areas, but would have to encounter suitable habitat in order to breed successfully and establish an additional population. The biggest challenge facing wildlife managers is to establish and maintain other areas with suitable habitat while hoping for Vesper Sparrows to colonize the site.

e) Recommended further work

Broom control should be initiated at the Nanaimo Airport in a manner that is compatible with runway operation and Vesper Sparrow habitat requirements. In the subsequent breeding seasons, the Vesper Sparrow population should be monitored and breeding territory locations determined. Because there is no control population available, it will not be impossible to determine cause and effect. However, comparison with pre-treatment baseline data will at least allow population fluctuations to be detected. The possibility of the benefit or adverse effect of management activities can be speculated upon at the point. An adaptive habitat management strategy may then evolve.

The potential to promote stewardship of habitat on other private land in the Cassidy area and surrounding region should be investigated.

Suitable areas not surveyed in 2002 should be searched in an effort to locate other localities for this species.

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