Oregon Vesper Sparrow - PSR

220-610-110

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Fish and Wildlife Commission Presentation Summary Sheet

Meeting date:

2/12/2021

Agenda item:

Periodic Status Review – Oregon Vesper Sparrow

Presenter(s):

Derek Stinson, Wildlife Biologist and Taylor Cotton, Wildlife Program

Background summary:

Department staff briefed the commission on the proposal to classify the Oregon Vesper Sparrow as Endangered in the state of Washington under WAC 220-610-010. Anticipated effects include the additional regulation and enforcement of wildlife classified as endangered identified in RCW 77.15.120 and initiate work on a recovery plan for the species according to WAC 220-610-110.

Staff recommendation:

The estimated population of Oregon Vesper Sparrows in Washington is approximately 300 birds, with most (~75%) of them on a single site, JBLM's 91st Division Prairie. There have been several recent local extirpations at sites that supported a few pairs, the remaining sites with a few pairs are at great risk, and there has been no recent establishment of populations at sites with remnant prairie or savannah or with ongoing restoration.

The factors of habitat loss and degradation that historically precipitated population declines continue, but populations are now likely affected by demographic and genetic factors related to their small numbers (e.g., isolation of subpopulations, reduced genetic variability, and greater susceptibility to stochastic events). Nest predation has a greater impact in fragmented habitat, and seeds coated with neonicotinoid pesticides may be affecting Washington birds during migration and at wintering sites. Land use and disturbance activities are variable and sometimes intense during the breeding season depending on the site; thus, potentially negatively affecting reproductive success and putting small populations at extreme risk of extirpation.

Research recently initiated on limiting factors will provide essential direction for appropriate conservation actions. However, given the extremely small population size in Washington, the predominance of that population at one location, the many recent local extirpations or near-extirpations, and a variety of habitat, disturbance, and potentially demographic factors that continue to negatively affect them, it is recommended that Oregon Vesper Sparrow be classified as an endangered species in Washington.

Policy issue(s) and expected outcome:

-Protect and conserve Washington's native wildlife.
-Additional recognition to the conservation need of the species.

Fiscal impacts of agency implementation:

None

Public involvement process used and what you learned:

In February 2020, the agency sent out a press release and posted a request on our website to solicit information from the public to be included in the PSRs. In accordance with WAC regulations, individuals and organizations had one year to contribute information for the reviews. Washington Department of Fish and Wildlife (WDFW) staff included this information as applicable in the status review documents. The documents were then reviewed by WDFW staff and external species experts before 90-day public comment periods on the document and our findings. Staff also presented a briefing to the Commission on January 29, 2021, where the public had the opportunity to testify with their public comments.

Action requested and/or proposed next steps:

The Department will request the rule change be approved as presented.

Draft motion language:

Motion: I move to adopt WAC 220-610-010 as presented by staff.

Is there a "second"?

Post decision communications plan:

Website update, News Release.

Form revised 1-20-21

AMENDATORY SECTION (Amending WSR 19-13-013, filed 6/7/19, effective 7/8/19)

WAC 220-610-010 Wildlife classified as endangered species.

Endangered species include:

Common Name	Scientific Name
Oregon vesper sparrow	*Pooecetes gramineus affinis*
pygmy rabbit	*Brachylagus idahoensis*
fisher	*Pekania pennanti*
gray wolf	*Canis lupus*
grizzly bear	*Ursus arctos*
killer whale	*Orcinus orca*
sei whale	*Balaenoptera borealis*
fin whale	*Balaenoptera physalus*
blue whale	*Balaenoptera musculus*
humpback whale	*Megaptera novaeangliae*
North Pacific right whale	*Eubalaena japonica*
sperm whale	*Physeter macrocephalus*
Columbian white-tailed deer	*Odocoileus virginianus leucurus*
woodland caribou	*Rangifer tarandus caribou*
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*
sandhill crane	*Grus canadensis*
snowy plover	*Charadrius nivosus*
upland sandpiper	*Bartramia longicauda*
spotted owl	*Strix occidentalis*
western pond turtle	*Clemmys marmorata*
leatherback sea turtle	*Dermochelys coriacea*
mardon skipper	*Polites mardon*
Oregon silverspot butterfly	*Speyeria zerene hippolyta*
Oregon spotted frog	*Rana pretiosa*
northern leopard frog	*Rana pipiens*
Taylor's checkerspot	*Euphydryas editha taylori*
Streaked horned lark	*Eremophila alpestris strigata*

Common Name	Scientific Name
Tufted puffin	*Fratercula cirrhata*
North American lynx	*Lynx canadensis*
marbled murrelet	*Brachyramphus marmoratus*
Loggerhead sea turtle	*Caretta caretta*
Yellow-billed cuckoo	*Coccyzus americanus*
Pinto abalone	*Haliotis kamtschatkana*

[Statutory Authority: RCW 77.04.012, 77.04.013, 77.04.055, 77.12.020, and 77.12.047. WSR 19-13-013 (Order 18-120), § 220-610-010, filed 6/7/19, effective 7/8/19; WSR 18-17-153 (Order 18-207), § 220-610-010, filed 8/21/18, effective 9/21/18. Statutory Authority: RCW 77.04.012, 77.04.055, 77.12.020, and 77.12.047. WSR 17-20-030 (Order 17-254), § 220-610-010, filed 9/27/17, effective 10/28/17. Statutory Authority: RCW 77.04.012, 77.04.013, 77.04.020, 77.04.055, and 77.12.047. WSR 17-05-112 (Order 17-04), recodified as § 220-610-010, filed 2/15/17, effective 3/18/17. Statutory Authority: RCW 77.04.012, 77.04.055, 77.12.020, and 77.12.047. WSR 17-02-084 (Order 17-02), § 232-12-014, filed 1/4/17, effective 2/4/17; WSR 16-11-023 (Order 16-84), § 232-12-014, filed 5/6/16, effective 6/6/16; WSR 15-10-022 (Order 14-95), § 232-12-014, filed 4/27/15, effective 5/28/15. Statutory Authority: RCW 77.12.047, 77.12.020. WSR 06-04-066 (Order 06-09), § 232-12-014, filed 1/30/06, effective 3/2/06; WSR 04-11-036 (Order 04-98), § 232-12-014, filed 5/12/04, effective 6/12/04. Statutory Authority: RCW 77.12.047, 77.12.655, 77.12.020. WSR 02-11-069 (Order 02-98), § 232-12-014, filed

5/10/02, effective 6/10/02. Statutory Authority: RCW 77.12.040, 77.12.010, 77.12.020, 77.12.770, 77.12.780. WSR 00-04-017 (Order 00-05), § 232-12-014, filed 1/24/00, effective 2/24/00. Statutory Authority: RCW 77.12.020. WSR 98-23-013 (Order 98-232), § 232-12-014, filed 11/6/98, effective 12/7/98; WSR 97-18-019 (Order 97-167), § 232-12-014, filed 8/25/97, effective 9/25/97; WSR 93-21-026 (Order 616), § 232-12-014, filed 10/14/93, effective 11/14/93. Statutory Authority: RCW 77.12.020(6). WSR 88-05-032 (Order 305), § 232-12-014, filed 2/12/88. Statutory Authority: RCW 77.12.040. WSR 82-19-026 (Order 192), § 232-12-014, filed 9/9/82; WSR 81-22-002 (Order 174), § 232-12-014, filed 10/22/81; WSR 81-12-029 (Order 165), § 232-12-014, filed 6/1/81.]

Summary of Public Comments Received During the Official Comment Period and WDFW Response:

WAC 220-610-010 Wildlife classified as endangered species.

We received six comment letters during the 90 Periodic Status Review public comment period as well as 12 comments during the three week rule making public comment period.

Written Supporting Comments:
Seven of the 18 comments signed in favor of our recommendation.

Written Opposing, Neutral, and Other Comments:
Five of the 12 comments were neutral, with one of the five commenting that livestock grazing should not be allowed in areas where the vesper sparrow is know to inhabit. and six of the 12 were opposed to the proposed rule change. Two of the five commented with opposition, two referring to use of agency fund and priority, not necessarily on the topic, and the other stating the proposal is extremely vague.

Fish and Wildlife Commission Hearing, Public Comments:
There was one public comment during the commission presentation in favor of listing the Oregon Vesper Sparrow and highlighting the conservation concern surrounding other prairie species in Washington.

Rationale-Agency Action Regarding Comments:
There will be no direct response action taken with this Periodic Status Review (PSR). WDFW will continue to promote and work on conservation around prairie species and work to recover the listed prairie species.

PROPOSED RULE MAKING

CR-102 (December 2017)
(Implements RCW 34.05.320)
Do **NOT** use for expedited rule making

CODE REVISER USE ONLY

OFFICE OF THE CODE REVISER
STATE OF WASHINGTON
FILED

DATE: December 21, 2020
TIME: 4:12 PM

WSR 21-01-187

Agency: Washington Department of Fish and Wildlife (WDFW Order 20-265)

☒ **Original Notice**
☐ **Supplemental Notice to WSR**
☐ **Continuance of WSR** _____

☒ **Preproposal Statement of Inquiry was filed as WSR** 20-21-058 filed on October 14, 2020**; or**
☐ **Expedited Rule Making--Proposed notice was filed as WSR** _____**; or**
☐ **Proposal is exempt under RCW 34.05.310(4) or 34.05.330(1); or**
☐ **Proposal is exempt under RCW** _____**.**

Title of rule and other identifying information: (describe subject) WAC 220-610-010 Wildlife classified as endangered species.

Hearing location(s):

Date:	**Time:**	**Location:** (be specific)	**Comment:**
January 28-30, 2021	8 a.m.	Webinar	This meeting will take place by webinar. The public may participate in the meeting. Visit our website at http://wdfw.wa.gov/about/commisssion/meetings or contact the Commission office at (360) 902-2267 or commission@dfw.wa.gov for instructions on how to join the meeting.

Date of intended adoption: February 12, 2021 (Note: This is **NOT** the **effective** date)

Submit written comments to:
Name: Wildlife Program
Address: PO Box 43200, Olympia, WA. 98504
Email: rules.coordinator@dfw.wa.gov
Fax: (360) 902-2162
Other: Rule Comments: https://www.surveymonkey.com/r/VesperSparrow
SEPA Comments: Email SEPADesk2@dfw.wa.gov

By (date) January 19, 2021

Assistance for persons with disabilities:
Contact Dolores Noyes
Phone: (360) 902-2346
Fax:
TTY: (360) 902-2207
Email: dolores.noyes@dfw.wa.gov
Other:
By (date) January 21, 2020

Purpose of the proposal and its anticipated effects, including any changes in existing rules: We are proposing to classify the Oregon vesper sparrow as endangered in the state of Washington under WAC 220-610-010. Anticipated effects include the additional regulation and enforcement of wildlife classified as endangered identified in RCW 77.15.120. WDFW will initiate work on a recovery plan for the species according to WAC 220-610-110.

Reasons supporting proposal: The estimated population of Oregon Vesper Sparrows in Washington is approximately 300 birds, with most (~75%) of them on a single site, Joint Base Lewis-McChord's 91st Division Prairie. There have been several recent local extirpations at sites that supported a few pairs, the remaining sites with a few pairs are at great risk, and there has been no recent establishment of populations at sites with remnant prairie or savannah or with ongoing restoration.

The factors of habitat loss and degradation that historically precipitated population declines continue, but populations are now likely affected by demographic and genetic factors related to their small numbers (e.g., isolation of subpopulations, reduced genetic variability, and greater susceptibility to stochastic events). Nest predation has a greater impact in fragmented habitat, and seeds coated with neonicotinoid pesticides may be affecting Washington birds during migration and at wintering sites. Land use and disturbance activities are variable and sometimes intense during the breeding season depending on the site; thus, potentially negatively affecting reproductive success and putting small populations at extreme risk of extirpation.

Research recently initiated on limiting factors will provide essential direction for appropriate conservation actions. However, given the extremely small population size in Washington, the majority of that population at one location, the many recent local extirpations or near-extirpations, and a variety of habitat, disturbance, and potentially demographic factors that continue to negatively affect them, it is recommended that Oregon vesper sparrow be classified as an endangered species in Washington.

Statutory authority for adoption: RCWs 77.04.012, 77.04.013, 77.04.055, and 77.12.020.

Statute being implemented: RCWs 77.04.012, 77.04.013, 77.04.055, and 77.12.020.

Is rule necessary because of a:

Federal Law?	☐ Yes	☒ No
Federal Court Decision?	☐ Yes	☒ No
State Court Decision?	☐ Yes	☒ No

If yes, CITATION:

Agency comments or recommendations, if any, as to statutory language, implementation, enforcement, and fiscal matters:

Name of proponent: (person or organization) Washington Department of Fish and Wildlife

☐ Private
☐ Public
☒ Governmental

Name of agency personnel responsible for:

	Name	Office Location	Phone
Drafting:	Eric Gardner	1111 Washington St. SE Olympia, WA. 98501	(360) 902-2515
Implementation:	Eric Gardner	1111 Washington St. SE Olympia, WA. 98501	(360) 902-2515
Enforcement:	Steve Bear	1111 Washington St. SE Olympia, WA. 98501	(360) 902-2373

Is a school district fiscal impact statement required under RCW 28A.305.135? ☐ Yes ☒ No

If yes, insert statement here:

The public may obtain a copy of the school district fiscal impact statement by contacting:

Name:
Address:
Phone:
Fax:
TTY:
Email:
Other:

Is a cost-benefit analysis required under RCW 34.05.328?

☐ Yes: A preliminary cost-benefit analysis may be obtained by contacting:

Name:
Address:
Phone:
Fax:
TTY:
Email:
Other:

☒ No: Please explain:

Regulatory Fairness Act Cost Considerations for a Small Business Economic Impact Statement:

This rule proposal, or portions of the proposal, **may be exempt** from requirements of the Regulatory Fairness Act (see chapter 19.85 RCW). Please check the box for any applicable exemption(s):

☐ This rule proposal, or portions of the proposal, is exempt under RCW 19.85.061 because this rule making is being adopted solely to conform and/or comply with federal statute or regulations. Please cite the specific federal statute or regulation this rule is being adopted to conform or comply with and describe the consequences to the state if the rule is not adopted.

Citation and description:

☐ This rule proposal, or portions of the proposal, is exempt because the agency has completed the pilot rule process defined by RCW 34.05.313 before filing the notice of this proposed rule.

☐ This rule proposal, or portions of the proposal, is exempt under the provisions of RCW 15.65.570(2) because it was adopted by a referendum.

☒ This rule proposal, or portions of the proposal, is exempt under RCW 19.85.025(3). Check all that apply:

- ☒ RCW 34.05.310 (4)(b) (Internal government operations)
- ☐ RCW 34.05.310 (4)(c) (Incorporation by reference)
- ☐ RCW 34.05.310 (4)(d) (Correct or clarify language)
- ☐ RCW 34.05.310 (4)(e) (Dictated by statute)
- ☐ RCW 34.05.310 (4)(f) (Set or adjust fees)
- ☐ RCW 34.05.310 (4)(g) ((i) Relating to agency hearings; or (ii) process requirements for applying to an agency for a license or permit)

☐ This rule proposal, or portions of the proposal, is exempt under RCW _____.

Explanation of exemptions, if necessary:

COMPLETE THIS SECTION ONLY IF NO EXEMPTION APPLIES

If the proposed rule is **not exempt**, does it impose more-than-minor costs (as defined by RCW 19.85.020(2)) on businesses?

☐ No Briefly summarize the agency's analysis showing how costs were calculated. _____

☐ Yes, Calculations show the rule proposal likely imposes more-than-minor cost to businesses, and a small business economic impact statement is required. Insert statement here:

The public may obtain a copy of the small business economic impact statement or the detailed cost calculations by contacting:

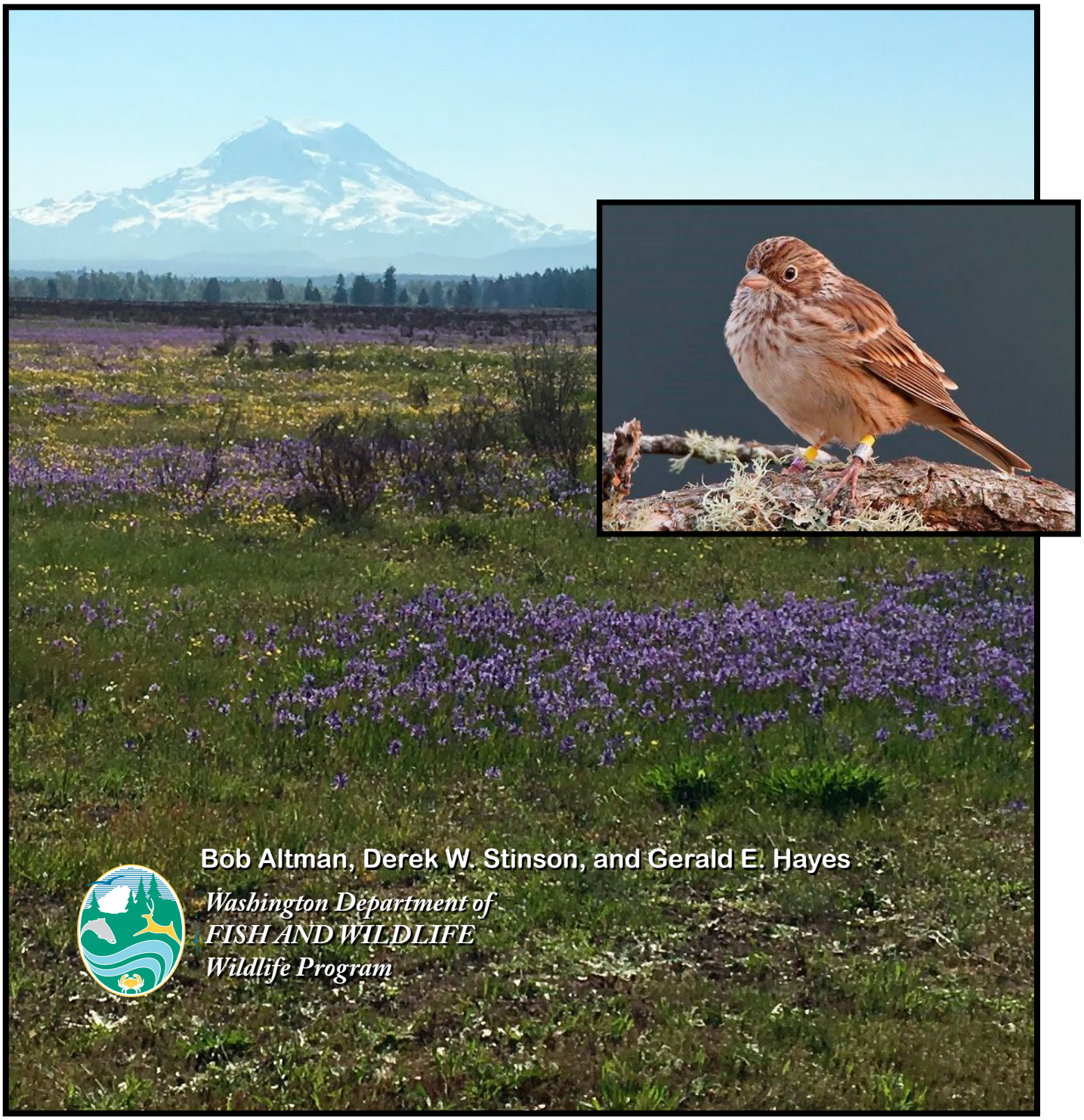
Name:
Address:
Phone:
Fax:
TTY:
Email:
Other:

Date: December 21, 2020	**Signature:** 
Name: Ben Power	
Title: DWF Rules Coordinator	

Revised draft for Commission consideration

STATE OF WASHINGTON **January 2021**

Status Report for the
Oregon Vesper Sparrow



Bob Altman, Derek W. Stinson, and Gerald E. Hayes

Washington Department of
FISH AND WILDLIFE
Wildlife Program

The Washington Department of Fish and Wildlife maintains a list of endangered, threatened, and sensitive species (Washington Administrative Codes 220-610-010 and 220-200-100). In 1990, the Washington Wildlife Commission adopted listing procedures developed by a group of citizens, interest groups, and state and federal agencies (Washington Administrative Code 220-610-110). These procedures include how species listings will be initiated, criteria for listing and delisting, a requirement for public review, the development of recovery or management plans, and the periodic review of listed species.

The first step in the process is to develop a preliminary species status report. The report includes a review of information relevant to the species' status in Washington and addresses factors affecting its status. The procedures then provide for a 90-day public review opportunity for interested parties to submit new scientific data relevant to the draft status report and classification recommendation. At the close of the comment period, the Department incorporates new information and prepares the final status report and listing recommendation for presentation to the Washington Fish and Wildlife Commission. The final report and recommendations are then released for public review 30 days prior to the Commission presentation.

This revised draft status report for the Oregon Vesper Sparrow was reviewed by species experts and was available for a 90-day public comment period from 19 May to 17 August 2020. All comments received were considered during the preparation of this revised draft. The Department intends to present the results of this periodic status review to the Fish and Wildlife Commission for action at the meeting on 29 January 2021.

This report should be cited as:

Altman, B., D.W. Stinson, and G.E. Hayes. 2020. Revised Draft Status Report for the Oregon Vesper Sparrow in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 33+ iii pp

On the cover: photo of Oregon Vesper Sparrow by Matt Lee; background photo of 13th Division Prairie in May 2019 by Karla Kelly; inside cover page sparrow from photo by Matt Lee.

This work was supported in part by personalized and endangered species license plates

Status Report for the Oregon Vesper Sparrow in Washington

Bob Altman
American Bird Conservancy
311 NE Mistletoe
Corvallis, OR 97330

Derek W. Stinson and Gerald E. Hayes
Washington Department of Fish and Wildlife

Washington Department of Fish and Wildlife
Wildlife Program
P.O. Box 43141
Olympia, WA 98504-3200

January 2021

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LIST OF TABLES AND FIGURES

ACKNOWLEDGMENTS

A special thanks to Gary Slater, Adrian Wolf, and Karla Kelly, CNLM who provided significant unpublished recent data on Oregon Vesper Sparrow in Washington. Recent unpublished data were also made available from Jaime Stephens of Klamath Bird Observatory. Peer review that greatly improved the draft was kindly provided by Gary Slater, Jaime Stephens, and Joe Liebezeit. Additional comments were provided by Kevin White, Nancy Lee, Hannah Anderson and Eric Gardner. Funding for the preparation of this periodic status review came from Washington background license plates for endangered wildlife and Washington personalized license plates.

EXECUTIVE SUMMARY

The Oregon Vesper Sparrow (*Pooecetes gramineus affinus*), a subspecies of the widespread Vesper Sparrow, had an historical breeding range of southwestern British Columbia, western Washington, western Oregon and extreme northwestern California. Historical accounts suggest it was locally uncommon to abundant in the disjunct distribution of grassland and savannah habitat in western Washington. It has experienced range-wide population declines and range contractions, and many local extirpations. In Washington, this includes 20th century extirpations from Vashon Island of the north Puget lowlands, and the Dungeness area of the Olympic Peninsula; and extirpation from San Juan Island appears likely. Approximately 90% of the population occurs in the south Puget lowlands, predominantly on Joint Base Lewis-McChord. The current range-wide population estimate is <3,000 birds with approximately 300 of those occurring in Washington. The Oregon Vesper Sparrow was petitioned for listing under the Federal Endangered Species Act in October 2017. In June 2018, the U. S. Fish and Wildlife Service determined that it may be warranted for listing and initiated a 12-month status review. It has been a candidate for state listing in Washington since 1998.

Oregon Vesper Sparrows are present in western Washington primarily from early April through late September, and they migrate to winter in central and southern California. They feed on a wide variety of insects during the breeding season supplemented with seeds during migration and winter. They are a ground-nesting bird that matures to breed in one year and maintains monogamous pair bonds. They will re-nest after failures and can produce two broods in one year. They exhibit relatively high annual site fidelity to nesting areas and defend small territories during the breeding season.

Oregon Vesper Sparrow breeding habitats in Washington include herbaceous-dominated, open upland landscapes such as prairie and savannahs, pastures, airfields, Christmas tree farms, and vegetated dredged-material sites. Within these habitat types, desired habitat conditions can be characterized as moderately short and structurally diverse grass and forb cover with some patchy bare ground and sparsely vegetated areas, low to moderate shrub or tall forb cover, and low tree cover.

Historical population declines were likely the consequence of the extensive loss of prairie and savannah habitats. Loss and degradation of habitat continues to be a factor in both breeding and wintering areas, but current threats likely include demographic and genetic issues associated with small and isolated subpopulations, and predation and disturbances during the nesting season. Another potential threat is exposure to pesticide-treated seeds, especially in agricultural habitats during migration and winter.

Restoration of prairie and savannah habitats, particularly for the endangered Streaked Horned Lark and other prairie butterfly and plant species, has been a conservation emphasis in Washington in the last 20 years. This has the potential to benefit Oregon Vesper Sparrow populations if specific habitat conditions are created or maintained. However, where complete removal of trees and shrubs has occurred, Oregon Vesper Sparrow populations may have been negatively affected.

Given the small population size, numerous local extirpations or near-extirpations, the variety of nesting disturbance factors that may negatively affect them, and the lack of species-specific regulatory protections, it is recommended that the Oregon Vesper Sparrow be classified as an endangered species in Washington.

INTRODUCTION

This status report summarizes the biology, population and habitat status, and factors likely affecting the Oregon Vesper Sparrow (*Pooecetes gramineus affinis*) in Washington to assess whether this bird should be listed as endangered, threatened, or sensitive (WAC 220-610-110). Although the Vesper Sparrow is a widespread grassland sparrow, the Oregon Vesper Sparrow is a subspecies that is being considered for listing under the federal Endangered Species Act.

Figure 1. Oregon Vesper Sparrow (*photo by Frank Lospalluto*).

DESCRIPTION, TAXONOMY, AND LEGAL STATUS

The Vesper Sparrow *(Pooecetes gramineus*) is a medium to large-sized sparrow (Family *Emberizidae*) with three distinguishing characteristics - a chestnut or rufous shoulder patch, white-edged outer tail feathers, and a white eye-ring (Sibley 2000). It also has a narrowly streaked breast, whitish belly, notched brown tail, and pinkish legs, and the bill is dusky brown with a pinkish lower mandible (Rising 1996). Sexes are similar in plumage, and juveniles are similar to adults but duller, and usually lack the chestnut shoulder patch (Pyle 1997). Compared with other similar looking sparrows, it is relatively larger and longer-tailed (Jones and Cornely 2002).

Differences between the four recognized subspecies of Vesper Sparrow (*P. g. confinis*, *P. g. gramineus, P. g. altus*, and *P. g. affinis*) are limited to slight differences in shading of the plumage and variation in morphological measurements, and they cannot be reliably distinguished in the field (American Ornithological Union 1957, Paynter 1970, Browning 1990, Rising 1996, Pyle 1997, Jones and Cornely 2002). The Oregon Vesper Sparrow (*P. g. affinis*) has medium grayish-brown upperparts and white underparts with a buff tinge (Figure 1). The nearest subspecies, the Great Basin Vesper Sparrow (*P. g. confinis*), is slightly larger with a longer tail than *P. g. affinis* and has pale grayish-brown upperparts and creamy underparts (Pyle 1997, Jones and Cornely 2002).

First described by Miller (1888), the Oregon Vesper Sparrow is accepted as a taxonomically distinct unit based on morphological measurements (Ridgeway 1901, American Ornithological Union 1957, Paynter 1970, Pyle 1997). Jones and Cornely (2002) noted in general terms that there is weak to moderately distinct differentiation among subspecies, but no genetic assessment has been conducted of the Vesper Sparrow subspecies. Pyle (1997) considers the subspecies distinctions moderately well-established with some clinal differences where ranges meet. Common names for subspecies are not formally recognized by the American Ornithologist's Union, but *P. g. affinis* is typically referred to as the Oregon Vesper Sparrow throughout most of its range, except for British Columbia where it is known as Coastal Vesper Sparrow (COSEWIC 2006).

In Washington, the Oregon Vesper Sparrow became a state candidate species in 1998. The Washington

Natural Heritage Program considers it critically imperiled in the state. Elsewhere in its range, the subspecies has also received conservation attention. In British Columbia, the 'Coastal Vesper Sparrow,' was listed as endangered in April 2006 (COSEWIC 2006) and has likely been extirpated as a breeding species (S. Beauchesne, pers. comm.). The subspecies is considered a Species of Greatest Conservation Need (SGCN) in Oregon (ODFW 2016) and Washington (WDFW 2015). The U.S. Fish and Wildlife Service (USFWS) considers it to be a Bird of Conservation Concern (USFWS 2008). The USFWS was petitioned to list the Oregon Vesper Sparrow under the federal Endangered Species Act (ESA) in 2017 (American Bird Conservancy 2017). They subsequently issued a 90-day finding on June 27, 2018, which concluded that the Oregon Vesper Sparrow may be warranted for listing and initiated a 12-month status review (USFWS 2018).

DISTRIBUTION

The Oregon Vesper Sparrow is the only breeding subspecies of Vesper Sparrow west of the Cascade Mountains (American Ornithological Union 1957, Pyle 1997, Cannings 1998, Jones and Cornely 2002). Its breeding range includes western Washington, western Oregon, and at least formerly the northwestern corner of California and southwestern British Columbia (Campbell et al. 2001, Jones and Cornely 2002, Altman 2003, Erickson 2008). Within that breeding range, it is further restricted to grassland and savannah habitats in lowland valleys and foothills, except for the Klamath Mountains ecoregion where it occurs in montane meadows.

Although nesting records are few in Washington, the historical breeding range is believed to have extended from northern Skagit County, the San Juan Islands, and Clallam County (Dungeness and Sol Duc), south through the southern Puget lowlands into Clark County (Camas and Vancouver) (Jewett et al. 1953, Smith et al. 1997, Mlodinow 2005; Figure 2). The vicinity of Yelm, in Thurston County, was once considered a prime area for the subspecies (Jewett et al. 1953), but neither Rogers (2000), nor Altman (pers. obs.) detected any there, and there are no recent records. The current known breeding population is predominantly on remnant prairies and airports in Thurston and Pierce counties, especially on Joint Base Lewis-McChord (JBLM). Elsewhere, a few birds may remain on San Juan Island (S. Vernon, pers. comm.; K. Foley, pers. comm.), and on islands in the lower Columbia River (S. Pearson, pers. comm.).

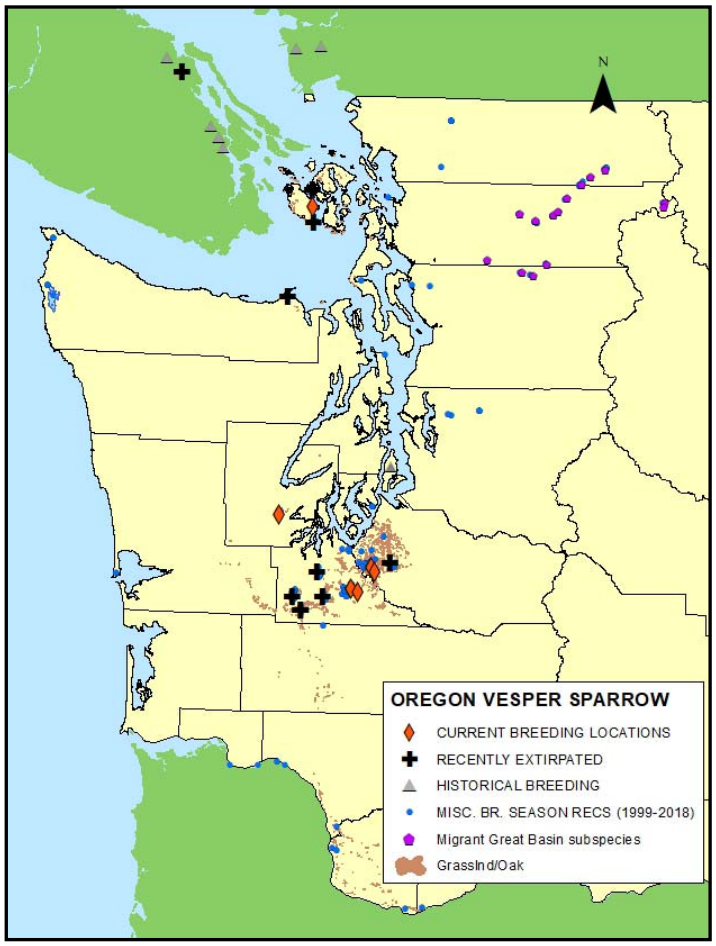

Figure 2. Historical and current breeding locations in Washington and British Columbia, and miscellaneous records (see discussion and Appendix A for sources).

Oregon Vesper Sparrows are migratory and overwinter in California, west of the Sierra Nevada Mountains and south of San Francisco Bay, and historically into northwestern Baja California, Mexico (Erickson 2008). Regular wintering areas extend from Sutter County southward, primarily through the low foothills surrounding the Sacramento and San Joaquin valleys, to the foothills and valleys of southwestern California (Erickson 2008).

Detections of Vesper Sparrows during spring migration in western Washington are scattered throughout the Puget lowlands, however many of these records are believed to be the Great Basin subspecies (*P.g. confinis*; Rogers 2000, R. Merrill, pers. comm.).

NATURAL HISTORY

Habitat requirements. Oregon Vesper Sparrows typically nest in dry, herbaceous-dominated, open landscapes, with moderately short and structurally diverse grass and forb cover with some patchy bare ground and sparsely vegetated areas, low to moderate shrub or tall forb cover, and low tree cover (Altman 1999, Rogers 2000, Campbell et al. 2001). They generally avoid wet areas or sites with tall, dense herbaceous vegetation (B. Altman, pers. obs.). Structural diversity of herbaceous vegetation appears to be an important factor in site selection. A mix of bare ground and short vegetation is chosen for foraging, moderate structured vegetation for nesting, and scattered taller vegetation, including shrubs and scattered trees, is used for cover and singing perches (Rogers 2000, COSEWIC 2006). Fence posts, fences and other man-made structures are often used for singing perches (Altman 1999, Beauchesne 2002).

In the south Puget lowlands, suitable breeding habitat is prairies, airports, and occasionally pastureland (Rogers 2000, G. Slater, pers. comm.). In the Willamette Valley of Oregon, most detections are in light to moderately grazed pastures, often with scattered shrubs and variable grass heights but mostly <2 feet (61 centimeters) high; and to a lesser extent young Christmas tree farms (i.e., 2–5 years after planting) with a mix of bare ground, grass, and weedy forb cover (Altman 1999). In the Klamath Mountains of Oregon, breeding habitat is almost exclusively light to moderately grazed pastures; they also use fallow fields in the Umpqua Valley, and montane meadows in the Rogue Basin, some of which are grazed (B. Altman pers. obs.). Along the south coast of Oregon, habitat for the only known breeding population is steeply-sloped pastureland, with occasional records in flat, sandy coastal floodplains, coastal balds and headlands (T. Rodenkirk, pers. comm.). In northwestern California, historic breeding habitat included the coastal dune system dominated by sandy soils, wet meadows, and low-statured herbaceous vegetation and bare ground mixed with some shrubland (native and invasive) (Erickson 2008). Other subspecies of Vesper Sparrows often nest in croplands (Jones and Cornely 2002), but with the exceptions of Christmas tree farms and the edges of hay fields, Oregon Vesper Sparrows generally avoid cultivated croplands during the breeding season (Altman 1999, Beauchesne 2002).

On its wintering grounds in California, Oregon Vesper Sparrows are found on "open ground with little vegetation or else areas grown to short grass and low annuals," including stubble fields, meadows, and road edges (Grinnell and Miller 1944). Grinnell (1898) and Willett (1933) reported Oregon Vesper Sparrows wintering with Great Basin Vesper Sparrows, but they were more numerous on "damp meadows of the lowlands," whereas the Great Basin Vesper Sparrow was more typical of "stubble fields, washes, and especially dry mesas." Vesper Sparrows in the Cuyama Valley of California winter in semidesert scrub as well as grasslands, weedy agricultural fields, and alfalfa (Lehman 1994). Garrett and Dunn (1981) reported that wintering Vesper Sparrows often occur in areas with sandy substrates. Habitat used during migration is poorly described, but anecdotal observations suggest habitats similar to breeding and wintering seasons are used; migrants in western Washington occur in various grassy vegetation types (Mlodinow 2005).

In recent years, the Oregon Vesper Sparrow is generally found in large grasslands (e.g. >~40 ac) in Washington, but not in small patches of similar habitat (S. Pearson, pers. comm.). In the Willamette Valley, they have been recorded breeding in relatively small areas of 20 acres (8 hectares), but are also absent from many more areas of suitable habitat of that same-size (B. Altman, pers. obs.). Breeding territory size throughout its range averaged 3.6 acres (1.45 hectares; n=88; Altman 2016), and likely varies with habitat quality (Jones and Cornely 2002, Altman 2016). On JBLM, average territory size was 2.5 acres (1 hectare; n=4) in 2013, and 3.3 acres (1.3 hectares; n=7) in 2015 (Altman 2015, 2016). Minimum patch size of grassland has been noted as an important factor in site selection for Vesper Sparrows (Kershner and Bollinger 1996, Vickery et al. 1994).

Diet and foraging. Vesper Sparrows primarily forage while walking on the ground (Beauchesne 2002, B. Altman pers. obs.), but will hop and hover to glean invertebrates from vegetation (Rodenhouse and Best 1994). They forage on a wide variety of available insects (especially grasshoppers, beetles, and caterpillars) and other arthropods during the breeding season, supplemented with grass and forb seeds year-round, including crop waste grains in winter (Berger 1968, Rotenberry 1980, Zeiner et al. 1990, Adams et al. 1994). On Vancouver Island, they glean insects from low forbs and eat dandelion (*Taraxacum officinale*) seeds (Beauschesne 2002). Adults provide nestlings with invertebrates and rarely seeds (Jones and Cornely 2002).

Migration, dispersal, and site fidelity. Spring migration in Washington occurs from early April to early May (Mlodinow 2005) and fall migration primarily from mid-August to late September (WSDM 2018). Among multiple sites in the Willamette Valley in 2016-2019, there were 21 examples (9%) of between-season movement to a different site among the 228 documented returns of banded individuals (175 birds banded as adults AHY [birds in at least second calendar year] and 53 banded as hatch-year birds; B. Altman, unpubl. data). Within the study area, which has a maximum distance between primary sites of 22.5 miles, the longest dispersal distance was 16.5 miles. Among the 447 banded birds, there were 20 examples (5%) of within-season movement to a different site (14 adult breeding birds and 6 fledglings with natal dispersal). The longest distance was 8.4 miles for both adults and fledglings. In the Klamath Mountains, a single second-year bird was opportunistically re-sighted in a nearby meadow (~1 mile away) (Stephens and Rockwell 2019). There are no data on Oregon Vesper Sparrow winter site fidelity. In the Klamath Mountains, 16 adults (44.4%) and 1 (2.3%) returning second year bird banded in 2018, were re-sighted at the same study site in 2019, but habitat on nearby private lands in the area were not searched (36 birds were banded as adults and 43 as hatch-year birds; Stephens and Rockwell 2019). In the south Puget lowlands, data on site fidelity are limited; of 19 individuals (4 nestlings, 1 juvenile, and 15 adults/AHY) banded during 2016-2018 and detected in a subsequent year, none had dispersed to a new site (G. Slater, pers. comm.).

Reproduction. Vesper Sparrows breed when one year old and are seasonally monogamous (Jones and Cornely 2002, B. Altman, pers. obs.). Males arrive at their breeding sites 1–2 weeks earlier than females and begin singing to establish their territory (B. Altman, pers. obs.). When the female arrives, she constructs a nest of grasses and rootlets in a shallow depression on the ground next to a clump of vegetation or at the base of a shrub or small tree (Berger 1968, Krueger 1981, Rising 1996, Jones and Cornely 2002, Altman 2003). Clutch initiation for Oregon Vesper Sparrow in Washington is from early May to mid-July (Bowles 1921; S. Pearson, pers. comm.). The female alone incubates the clutch of 3 or 4 eggs (range 2–6) for 12–13 days (Berger 1968, Jones and Cornely 2002, Altman 2016), but both parents feed the nestlings (Berger 1968). The altricial chicks open their eyes by day five (Dawson and Evans 1960), and leave the nest after 9–10 days, but remain dependent on the parents for another 20–29 days (Perry and Perry 1918, Dawson and Evans 1960). If a nest fails, they may re-nest up to two times (Wray

et al. 1982), and Oregon Vesper Sparrows may have a second brood after a successful first nesting (B. Altman, unpubl. data).

The egg hatch rate in the south Puget lowlands was 67% in 1997 (n=9 eggs; S. Pearson, pers. comm.), and 86% in 2018-2019 (n=28 eggs; G. Slater, pers. comm.). In the Willamette Valley, egg hatch rates were 74% (n=27 eggs) in 1997, and 86% in 2016-2019 (n=109 eggs; B. Altman, unpubl. data). All of these are lower than the mean hatch rate of slightly >90% typical for other ground ground-nesting passerine species (Koenig 1982). In contrast, in the Klamath Mountains, the egg hatch rate was 94% in 2018-2019 (n=49 eggs; Stephens and Rockwell 2019).

Apparent nest success (i.e., percent successful of known outcome nests monitored) was 47% (n=34) in the south Puget lowlands in 2017-2019 (CNLM and JBLM, unpublished data), 56% (n=96) in the Willamette Valley in 2016-2019 (B. Altman, unpubl. data), 66% (n=56) in the Klamath Mountains in 2018-2019 (Stephens and Rockwell 2019). Nest success values reported for Vesper Sparrows varied widely from 26% (n=113) in sagebrush-steppe in eastern Washington (Vander Haegen 2007), to 77% (n=31) in grasslands in North Dakota (Adams et al. 1994), but typically ranged from 29–53% (Wray et al. 1982, Rodenhouse and Best 1983, Paterson and Best 1996, Harrison et al. 2011, VanBeek 2012, Ludlow et al. 2014, Sadoti et al. 2014). The daily nest survival rate, assuming constant survival, in south Puget Lowlands was 0.944 (n=34; 95% CI: 0.911, 0.966), which translates to a cumulative nest success value over a 24 day nesting period of 28.1% (CNLM, unpublished data). Mayfield estimates of nest success, which attempt to correct for biases in when nests are found, were 24.3% (n=96) in the Willamette Valley in 2016-2019.

Fledging rates were 2.8 young/successful nest and 2.2 young/active nest in the south Puget lowlands in 1996 (n=6 nests; S. Pearson pers. comm.), and 3.4 young/successful nest and 1.6 young/active nest in the south Puget lowlands in 2017-2019 (n=34 nests; G. Slater, pers. comm.). In the Willamette Valley in 2016-2019, fledging rates were 3.1 young/successful nest and 1.6 young/active nest (n=96; B. Altman, unpubl. data). In the Klamath Mountains in 2018-2019, fledging rates were 3.4 young/successful nest and 2.2 young/active nest (n=56 nests; Stephens and Rockwell 2019). For comparison, fledging rates for Vesper Sparrow nests in West Virginia were 3.0 young/successful nest and 1.0 young/active nest (n=70; Wray et al. 1982).

Predation is the most frequent cause of nest failure, accounting for 89% of nest failures in the south Puget lowlands in 2017-2019 (18 of 34 nests failed; 16 predation events, 7 during the egg stage, 9 during the nestling stage; G. Slater, pers. comm.). Predation accounted for 78% of the nest failures in the Willamette Valley in 2016-2019 (26 of 36, 78% of those during the egg stage; B. Altman, unpubl. data), and 79% in the Klamath Mountains (15 of 19, 66% of those during the egg stage; Stephens and Rockwell 2019).

Survivorship. Survivorship of Oregon Vesper Sparrows seems to be reasonably high. Return rates of second year birds exceeded the assumption often used when data is unavailable of at least half that of adults (Greenberg 1980, Donovan et al. 1995). Banded bird return rates are used to estimate survival but are considered minimal annual survival estimates because not every bird that returns to the site where it was banded is actually detected, and not every bird that survives to the next breeding season returns to the same site. In the south Puget lowlands, mean annual return rate from 2016-2018 at two sites on JBLM was 65% for adults (n =13), with males (65%, n=11) similar to females (67%, n=2) (G. Slater pers. comm.). Among second-year birds, annual return rates were 2.9% of birds banded as nestlings (1 of 35), and 25% of birds banded as fledglings (1 of 4). In the Willamette Valley in 2016-2019, return rates were 64.4% (n=179) for adults (ASY, birds in at least their second breeding season), and 37.9% (n=58) for second-year birds (B. Altman, unpubl. data). Return rates were higher for adult males (68.5% [n=159]) than females (54.8%, [n=17]). Among second-year birds, return rates were 36.8% (n=42) for birds

banded as nestlings, and 41.0% (n=16) for birds banded as fledglings. The second-year return rates (37.9%) are the highest ever reported for a migratory passerine bird (Weatherhead and Forbes 1994).

In the Klamath Mountains in 2019, return rates were 44.4% (n=36) for adults, and 4.7% (n=43) for first-year birds. Return rates were higher for adult females (80.0% [n=5]) than males (48.0% [n=25]) (Stephens and Rockwell 2019). At Nanaimo Airport on Vancouver Island from 2005-2008, among 22 color-banded birds (14 adults, 8 young of the year) annual return rates varied from 29–100% (L. Blight, pers. comm.).

The only data on Oregon Vesper Sparrow post-fledging survivorship prior to migration are from one site with intensive effort in the Willamette Valley. At Soap Creek Ranch with three years of data, there was 72.6% survivorship of fledglings through three weeks post-fledging, and 63.0% survivorship through six weeks (n=62 fledglings from 19 nests) (B. Altman unpubl. data). At least one fledgling survived for six weeks from 18 of 19 nests; the nest with no surviving fledgling had only one nestling color-banded and available for resight.

Elsewhere, banding results from several studies of Vesper Sparrow in the midwestern United States have reported an average adult (ASY) return rate of approximately 50% to the same site the following year (Best and Rodenhouse 1984). Vesper Sparrow return rates to wintering sites in southeast Arizona was only 3% (n=420) (Gordon 2000). This is not unexpected because both food and habitat condition are likely limiting in winter and can be highly variable between and within winter seasons, especially due to rainfall amounts which affect vegetation structure and food availability (Gordon 2000).

In addition to the color-banding studies referenced above, data from the USGS Bird Banding Lab indicate that from 1931-2016, there were 79 Vesper Sparrows banded within the range of Oregon Vesper Sparrow, with 54 of those during the breeding season (D. Bystrak, pers. comm.). This included only two birds banded in Washington, one at Roy in 1997 and one at Gate in 1998. No returns or recoveries of those birds were reported. Average lifespan of Vesper Sparrows is unknown (Jones and Cornely 2002). A maximum of 7.1 years has been recorded for a banded individual in the wild (Klimkiewicz and Futcher 1989).

POPULATION STATUS

Rangewide. Historically, anecdotal records indicate that Oregon Vesper Sparrow was locally an uncommon to common breeding bird in the disjunct areas of grassland and savannah habitats in western Washington and Oregon, and extreme northwestern California (Altman 2011), and bred in small numbers in southwestern British Columbia (Campbell et al. 2001).

The Breeding Bird Survey is the only systematic range-wide source of population trend data for landbirds (Robbins et al. 1986). Although the Oregon Vesper Sparrow data suffers from low numbers per route and presence on a small number of routes (n=18 routes), the range-wide data indicate a decline of 2.92%/year for the most recent 10 year period (2005-2015), and a decline of 5.48%/year from 1968-2015 (Sauer et al. 2017). Indicative of this decline was a 79% drop in detections between 1996 and 2008 during 544 point counts in the Willamette Valley (Myers and Kreager 2010). This decline has also been evident in the extirpation of the small breeding populations at the edges of the subspecies range, including extirpations from British Columbia (S. Beauchesne, pers. comm.) and California (B. Altman, pers. obs.). Winter range contractions have also been observed in Baja (Patten et al. 2003), and southern California (Erickson 2008). A range-wide inventory in 2013, in conjunction with more recent surveys

and anecdotal data, suggest that the population of Oregon Vesper Sparrow is <3,000 birds (Altman 2015, B. Altman, unpubl. data).

Washington: historical populations

The Oregon Vesper Sparrow may have been slowly declining in Washington for a long time as the post-glacial grassland landscape slowly succeeded to forest with a shift to a moister climate. This general trend may have been suspended while Native Americans maintained the prairies with fire during the last ~4,000–6,000 years (Storm and Shebitz 2006). Some habitat was apparently later created by forest-clearing and Euro-American agriculture in the 19th-20th century.

In the north Puget lowlands, the Oregon Vesper Sparrow was likely uncommon and distributed on small and scattered sites. In Whatcom County, it was considered an uncommon migrant or accidental, with no historical breeding records (Edson 1908, Wick 1958, Wahl 1995). However, Dawson and Bowles (1909) and Jewett et al. (1953) indicated they bred in the agricultural lands of the Skagit Valley based on sightings in the early breeding season. On San Juan Island in the early 1930s, Oregon Vesper Sparrow was "not a common summer resident" observed only in fields near Friday Harbor and near Cattle Point (Miller et al. 1935), although it was considered a "common summer resident" in the early 1960s, mostly in the drier "southwest half of the island" (Bakus 1965). In the 1980s, they were considered a "common" bird with "small nesting colonies found throughout the islands" (Lewis and Sharpe 1987).

In the south Puget lowlands in the 1850s, Oregon Vesper Sparrows were "rather abundant on the Nisqually plains" and "common in summer on the prairies" (Suckley and Cooper 1860), and Rathbun (1902) observed it in the late 1800s "on several occasions during the summer" near Seattle in meadows, pastures, and agricultural lands (Rathburn 1902 actually lists *P.g. confinus,* but in summer was probably *P.g. affinus*). It was generally considered a common summer resident of the south Puget prairies and cultivated valleys until the 1960s (Bowles 1906, Dawson and Bowles 1909, Burleigh 1930, Kitchin 1934, Larrison and Sonnenberg 1968). They also apparently colonized Vashon Island in the early 20th century after the forest was cleared for farms where Larrison (1952) noted that in the 1940s it was "commonly found." In the Puget Sound region in the 1940s, Jewett et al. (1953) stated it was still "quite numerous about pastures and prairies…more common in the vicinity of Yelm than elsewhere in the Puget Sound region." By the mid-1960s it was "found in limited numbers and areas" (Larrison and Sonnenberg 1968). In the 1990s it was "rare and local…in remnant prairie areas" in western Washington (Smith et al. 1997). There are no historical reports of Oregon Vesper Sparrow on islands in the lower Columbia River, but few published bird records for the islands exist.

On the Olympic Peninsula in the early 1900s, Oregon Vesper Sparrow was found "in numbers at Dungeness" (Dawson and Bowles 1909), and during the 1940s it was "rather common at Dungeness," and also "on the open prairie country east and west of Shelton" (Kitchin 1949). However, it declined at Dungeness in the 1970s and 1980s (B. Boekelheide, pers. comm.), although it was still breeding in the Dungeness/Port Angeles area into the early 1990s (Sharpe 1993). The last breeding season record was a single bird in 1999 (B. Boekelheide, pers. comm.). They may have bred at Ocean Shores, Grays Harbor County, in the early to mid-1970's based on observations of two singing males, one of which remained through the breeding season (Rogers 2000).

Washington: current population status

Recent survey efforts. A range-wide survey of historically occupied sites and likely suitable areas was undertaken during 2013-2014 (Altman 2015). These efforts included:

- 665 roadside point count stations covering approximately 11,611 acres and 124 miles;
- 41 off-road point count stations at 9 sites covering approximately 716 acres;
- 12 off-road transects covering approximately 1,046 acres and 9.15 miles;
- 26 off-road area searches at 28 sites covering approximately 4,423 acres.

There were no detections during roadside point counts at the 139 stations in Washington (67 in north Puget lowlands, 72 in south Puget lowlands), despite locating point count stations where Oregon Vesper Sparrows were reported to occur recently or in potential habitat nearby throughout the region (Altman 2015). There was only one detection during 31 off-road point counts (Tenalquot Prairie), and one detection during four off-road transects (total 3.29 mi) conducted at American Camp, San Juan Island National Park.

During off-road area searches totaling 2,835 ac at 9 locations in Washington, there were only small populations (1–5 pairs) at a few sites outside JBLM including San Juan Island, Mima Mounds Natural Area Preserve, Glacial Heritage Preserve, West Rocky Prairie Wildlife Area, Tenalquot Prairie, and Shelton Airport. Off-road area searches at a few accessible sites on JBLM (e.g., Weir Prairies, Training Area 14, parts of Range 76 of the 91st Division Prairie) there were <20 singing males; there were also a few incidental and opportunistic detections reported by others at these sites. The Center for Natural Lands Management (CNLM) conducted more comprehensive surveys on JBLM and surrounding conservation lands during 2015-2019 (*see* South Puget lowlands *below*).

Passage migrants of Great Basin Vesper Sparrow. The population status of Oregon Vesper Sparrow in Washington is potentially confounded by the seasonal migration of some individuals of the Great Basin subspecies *P. g. confinus* through western Washington. There are annual spring and early breeding season records in the Skagit and Sauk river valleys that are likely migrants of the Great Basin subspecies moving through and upslope along the Skagit River to cross the Cascade Mountains and drop into the Great Basin (R. Merrill pers. comm.). This speculation is based on several factors including the linear string of Vesper Sparrow records all the way up and across the mountains and the absence of breeding behaviors associated with these detections (i.e., singing and/or relocation on subsequent visits) (R. Merrill pers. comm.). There are also no known historical records or confirmed current reports of breeding in this heavily observed area (R. Merrill, pers. comm.), and there were no detections during the range-wide breeding season inventory in 2013 (Altman 2015). Since these birds would also be passing through the south Puget lowlands, they may account for some of the detections in April and early May. This is of particular concern for sites that only have a few regular and/or occasional detections such as Mima Mounds Natural Area Preserve, Glacial Heritage Preserve, Scatter Creek Wildlife Area, and West Rocky Prairie Wildlife Area (D. Canning, field notes). Some of the detections reported in early May suggest breeding, but there has often been a lack of persistent occupation of these sites during the breeding season when regular survey visits are made (B. Altman, pers. obs.).

San Juan Island. In 2002, there were detections at four adjacent point count stations (some double counting may have occurred) on San Juan Island during complete coverage of American Camp (Siegel et al. 2009). Surveys from 2007-2013 during other studies identified 3–4 pairs at Friday Harbor quarry and American Camp (B. Altman, unpubl. data). In 2016, multiple surveys at those two locations detected two singing males at Friday Harbor quarry, but only one singing male in late April and no birds in May and June at American Camp (K. Foley and R. Milner, pers. comm.). In 2017, two singing males were present again at Friday Harbor quarry (S. Vernon, pers. comm.), but none were reported at American Camp (K. Foley pers. comm.), and none have been observed at American Camp since 2017

(S. Vernon, pers. comm.); a singing male was observed at the Friday Harbor site in June 2020 (K. Foley, pers. comm.)

North Puget lowlands. Although the anecdotal records in the early 20th century suggest that there may have been a breeding population in agricultural lands in Skagit County (Dawson and Bowles 1909), no breeding birds have been reported in recent decades, and the annual records of passage migrants discussed above also may cast some doubt on the assumption of historical breeding there without confirmed nest records.

South Puget lowlands. During extensive surveys in western Washington in 1998, Rogers (2000) estimated that there were approximately 125 singing males with 100 on 91st Division Prairie and only 10 outside of Fort Lewis. Mlodinow (2005) suggested that the Puget lowland population was "in danger of extirpation". From 2015-2017, CNLM and JBLM Fish and Wildlife conducted comprehensive surveys on JBLM (G. Slater, pers. comm.), establishing 110, 250-meter line transects across three major prairie complexes (91st Division, 13th Division, and on Weir and Johnson prairies in the Rainer Training Area (southwestern portion of JBLM in Fig. 3). Transects were surveyed three times each breeding season, and Oregon Vesper Sparrows were detected on two of the three prairies. Some of the 91st Division Prairie is not accessible due to unexploded ordnance. Density estimates of singing males on the 91st Division (0.04 males/hectares; 95% CI: 0.03 – 0.06) was significantly higher than on the Rainier Training Area (0.008 males/hectares; 95% CI: 0.004 – 0.02). Using the density estimates for the Rainier Training Area yielded a slightly lower population estimates (8 pairs) than intensive nest monitoring (11 pairs). Using information from density estimates, nest monitoring, and other survey information, 91st Division prairie was estimated to host 150–225 individuals (J. Lynch, G. Slater, pers. comm.). Overall, based on recent records, the range-wide inventory in 2013 (Altman 2015), and surveys on JBLM (Fig. 3; G. Slater, pers. comm.), the current population estimate for the south Puget lowlands is ~270 birds.

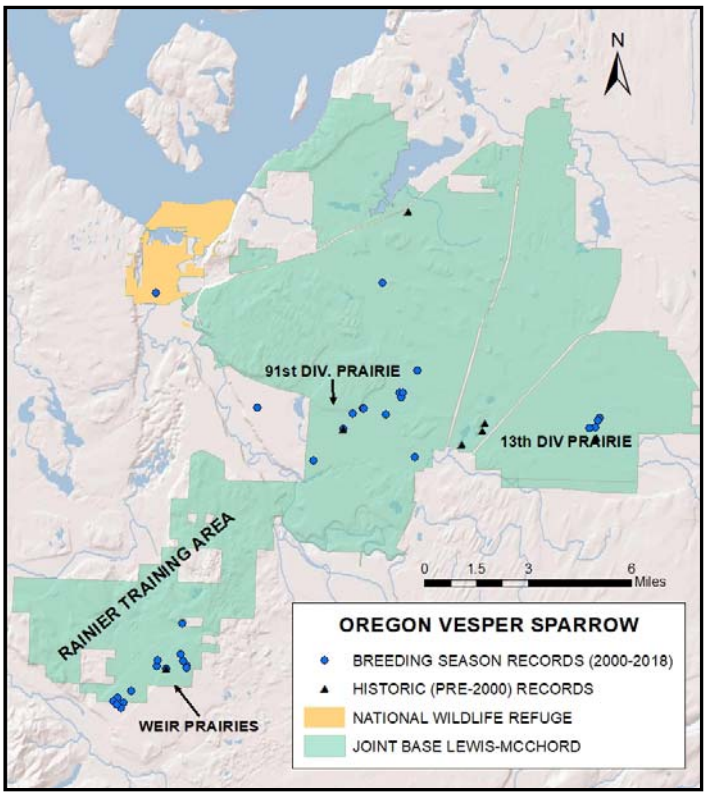

Figure 3. Oregon Vesper Sparrow records on and near Joint Base Lewis McChord (WSDM 2018, CNLM data, and eBird).

Olympic Peninsula. The last breeding record in the Dungeness area of Clallam County was in 1999 (Appendix A). A few birds still nested at Sanderson Field (Shelton airport), Mason County through 2010 (S. Pearson, pers. comm.) and in 2013 (Altman 2015). During Streaked Horned Lark surveys on the airport, there were no detections of Vesper Sparrows in 2017, and a single pair was detected in 2018 and 2019 (G. Slater, pers. comm.).

Lower Columbia River. During surveys for Streaked Horned Larks from 2005-2010, small numbers of

Oregon Vesper Sparrows were present annually on seven of 20 dredged material deposition sites along the Columbia River (island and associated mainland; Crims, Hump, Lord, Browns/White's, Miller Sands, Sandy, and Wallace) (S. Pearson, pers. comm.). This included 13 detections on four of those islands in 2008, with six of the detections on Wallace Island (WSDM 2018). Since 2014, with surveyors trained in Oregon Vesper Sparrow identification, Streaked Horned Lark surveys have continued over twenty deposition sites (Slater and Treadwell 2018). There was one detection of an Oregon Vesper Sparrow on Hump Island in July 2015 that was probably a dispersing bird (i.e., was not present in May and June surveys; A. Martin, pers. comm.), but there were otherwise no detections during lark surveys during 2015-2018 on the islands visited (CNLM, unpub. data). Regular surveys did not continue at Wallace and Lord Islands and thus the occurrence of Vesper Sparrows on those islands is unknown. Altman (2011) estimated 50–100 birds on islands in the lower Columbia River based on detections through 2010 and suitable habitat present on unsurveyed islands. Following the listing of the Streaked Horned Lark in 2013, recent deposition management by the U.S. Army Corp of Engineers has focused on maintaining early successional habitat through frequent deposition. Because Vesper Sparrows require more diverse vegetation cover and heights than larks, this focus on early succession habitat may not be particularly attractive to Vesper Sparrows. The recent absence on several islands where they were present up to 2010, even as survey efforts continue, suggests a downward trend in abundance. The current population of Oregon Vesper Sparrow in this region likely numbers <30 individuals.

Extirpations and range contractions. The only sites north of the south Puget lowlands still hosting Oregon Vesper Sparrows are, possibly, the Friday Harbor site on San Juan Island and Sanderson Field (Shelton airport). There were none present in the most recent survey in British Columbia (Beauchesne, pers. comm.). The range of Oregon Vesper Sparrow has retracted southward approximately 63 miles from Nanaimo to San Juan Island. If the San Juan Island and Shelton populations disappear, the range will have retreated ~150 miles.

Contractions from the 'edge of range' are an oft-reported pattern in declining species, especially for birds (Rodriguez 2002). Population density also tends to decline, and distribution may be patchier towards the edge of species ranges (Maurer and Villard 1994). Populations on the edge of a species range are often affected by low immigration rates and genetic diversity, as a result of limited connectivity and isolation (Bahn et al. 2006). Cornutt et al. (1996) investigated the changes in populations of nine grassland sparrow species, and they reported that peripheral populations were typically small and more variable and more readily extirpated. They suggested that grassland sparrow populations seem to exhibit 'source-sink' dynamics, in which core populations generally feed the peripheral areas. Rodriguez (2002) reported that of 22 North American bird species with significant range contractions, 19 exhibited a large decline in core high abundance areas. This suggests that extirpations of peripheral populations may result from issues in the core/high abundance areas, and not necessarily at the edges of the range such as habitat loss or degradation. Current breeding areas are limited to the 91st Division Prairie (AIA), and Rainier Training Area (RTA), on JBLM, the Tenalquot Prairie Preserve adjacent to the RTA, a small number of locations (1–2) on San Juan Island, Shelton Airport, and perhaps a few islands in the lower Columbia River.

Current population estimate. The Washington population is estimated to be approximately 300 birds, including 270 birds in the Puget lowlands, <30 birds on islands in the Columbia River, and a few birds on San Juan Island (Table 1). Greater than 90% of the estimated population in the Puget lowlands occurs on JBLM, where comprehensive bird surveys from 2015-2017 indicated a population of approximately 250 birds (G. Slater, pers. comm., J. Lynch, pers. comm.). It is noteworthy that this population estimate for JBLM is the same as in 1998 (Rogers 2000), suggesting stability of the population on JBLM. Outside of JBLM, there is a small population estimated at <10 birds on Tenalquot Prairie Preserve and private pastureland on the south end of Tenalquot Prairie immediately adjacent to JBLM (G. Slater, pers. comm., B. Altman, pers. obs.).

Table 1. Oregon Vesper Sparrow breeding population estimates in Washington.

Location	Site estimate[1]	Recent surveys and sources
San Juan Island	4	2017: 2 singing males (S. Vernon, pers. comm.) 2018-2019: 0 observed (S. Vernon, pers. comm.) 2020: 1 singing male (K. Foley, pers. comm.)
Sanderson Field/Shelton Airport	2	2013: 4 birds (Altman 2015); 2017: 0 (G. Slater pers. comm.) 2018: 1 pair (G. Slater pers. comm.)
91st Division Prairie, JBLM	225	2015-2018: surveys and analysis (G. Slater, pers. comm.)
Weir Prairies, JBLM	20–25	Surveys since 2013; 2017: 11 singing males (some unpaired); 2018:12 singing males (4 unpaired; G. Slater, pers. comm.)
Tenalquot Prairie (South Weir), JBLM	4–6	2017: 2 singing males (G. Slater, pers. comm.) 2018: 3 singing males (G. Slater, pers. comm.)
Tenalquot Prairie Preserve, private	<10	2017: estimate based on multiple singing males (G. Slater, pers. comm.) and area of habitat (B. Altman, pers. obs.)
Mima Mounds Natural Area Preserve	0–2	2013: 1 bird (WSDM 2018) 2017: 1 bird (eBird); 2018: 0 birds (G. Slater, pers. comm.)
Columbia River islands	<30	Estimate based on unsurveyed islands and history of occurrence; 2005-2009: some detections made each year during surveys of 7 islands. 2010:1 bird 2010-2019: 0 during surveys of ~7 islands among 20 islands (G. Slater, pers. comm.)
Total (approximate)	**~300**	

[1]Number of birds assumes paired status of singing males; only May and June records included to minimize possible inclusion of passing migrants (see Appendix A for a map and more complete list of sites and records).

HABITAT STATUS

Prehistoric and historical habitat loss in Washington. The availability of suitable habitat for Oregon Vesper Sparrow has been substantially reduced over time and was likely the major factor in historical population declines. The south Puget lowlands historically had extensive prairies on glacial outwash plains with flat or small-hilled Mima mound topography originating about 12,000 years ago from the retreat of the Vashon glacier (Kruckeberg 1991, Leopold and Boyd 1999). The assemblage of plants and animals that make up these prairies today may have become established during a period from about 10,000 years ago until 7,000-5,000 years ago, a time considered warmer and drier than today (Hansen 1947, Washburn 1988, Crawford and Hall 1997). Prairie and oak habitats may have been much more extensive during this period than they were at European contact, based on evidence that grass, oak, Douglas-fir, and alder pollen declined and Western Redcedar (*Thuja plicata*) and Western Hemlock (*Tsuga heterophylla*) pollen increased approximately 6,000 years ago (Brubaker 1991). Subsequent to the dry period, droughty, infertile soil and a high frequency of low intensity fires, most set by Native Americans, maintained the prairies, although the climate otherwise would have produced forest (Crawford and Hall 1997). Prairies were very important in the economies of Salish peoples, who periodically burned the prairies to encourage food plants (Boyd 1986, Perdue 1997, Leopold and Boyd 1999), and to maintain deer and elk numbers (Peter 2001).

With Euro-American settlement in the late 1800s, grasslands were initially converted to agriculture, some of which may have been compatible for use by Vesper Sparrows, and there may have been some initial increased availability of habitat through clearing of lowland forests and draining of wetlands for agricultural purposes, including pastureland. The infertility of south Puget lowland prairie soils prevented the complete conversion to agriculture with Euro-American settlement, as occurred on the prairies further south, and the establishment of Fort Lewis in 1917 precluded residential development that would otherwise have occurred. Combined with grazing by up to 13,000 head of stock, disturbance for agriculture, military activity, and successive waves of introduced Eurasian plants, all prairie sites have been altered to some degree.

The post-settlement alteration of native grasslands and savannahs resulted in varying degrees of potential habitat suitability for Oregon Vesper Sparrow. In the south Puget lowlands in the early 1900s, it was a bird of "cultivated land and open pastures" (Jewett et al. 1953). In more recent times, however, agricultural lands are increasingly being converted to commercial and residential uses, and intensively managed or otherwise incompatible agricultural crops (Pearson and Altman 2005).

Recent habitat availability. No extensive area of prairie remains as it was prior to 1840 (del Moral and Deardorff 1976, Clampitt 1993). Crawford and Hall (1997) assessed 1,497,000 acres in the south Puget Sound area encompassing all or portions of Thurston, Pierce, Lewis, Grays Harbor, and Mason counties, and they identified a minimum of 150,000 acres of grassland soil types. The prairies that formed on this plateau of glacial gravels generally have sandy to gravelly, deep, and well-drained soils with low water-holding capacity (Crawford and Hall 1997). Their inventory found that of the original 150,000 acres with prairie soils, 12,500 acres (8%) remain that have >25% native vegetation, but only about 2,993 acres (3%) are dominated by native plant species (Crawford and Hall 1997). This included 29 prairie remnants with a mean patch size of 433 (±1,519) acres, but most of these (19, or 65.5%) were ≤100 acres. JBLM has 20,400 acres of the original 37,400 acres of grassland that existed on that area in 1870; only about 3,000 acres of south Puget prairie remains outside JBLM (ENSR 2000, Altman 2003b).

By the 1990s, Oregon Vesper Sparrows had become mostly restricted to the edges of open prairies and airports (Rogers 2000, Mlodinow 2005), with occasional birds in pastureland and Christmas tree farms (Rogers 2000). Clegg (1998, 1999) reported that all breeding territories (n=23) at JBLM were located near prairie edge in areas of high quality prairie supporting Idaho Fescue (*Festuca idahoensis*).

In addition to prairie on JBLM and conservation lands, some pasture and Christmas tree farms are still available. However, the only known occupied pastureland in the Puget lowlands is a private land parcel within Tenalquot Prairie where the birds are part of the population on adjacent JBLM and Tenalquot Prairie Preserve (G. Slater, pers. comm.). Christmas tree farms represent a limited land use, but Rogers (2000) noted the occurrence of Oregon Vesper Sparrow in this habitat type. Pastureland is a much reduced land use in the Puget lowlands relative to other ecoregions within the range of Oregon Vesper Sparrow. Christmas tree farms and pastures were targeted for surveys during the range-wide inventory in 2013, but there were no detections in these habitat types (Altman 2015). Trends in the human population suggest that these kinds of habitats may continue to decline.

Native grassland and savannah habitats have also been dramatically reduced elsewhere in the range of Oregon Vesper Sparrow. On Columbia River islands, they have been reported mostly on dredged-material sites dominated by sandy soils with scattered vegetation and much bare ground (S. Pearson, pers. comm.). Historical habitat loss in Oregon has also been dramatic. In the Willamette Valley, prairie and savannah habitat has been reduced from the most abundant vegetative community to <1% of the historical extent (Johannessen et al. 1971, Christy and Alverson 2011). In British Columbia, >95% of the prairie-

oak habitat has been lost (Lea 2002). In the Umpqua Valley of Oregon, there has been a 64% loss of prairie-savannah from 55% to 20% of the landscape (The Nature Conservancy 2013). Habitat loss in the winter range has also been dramatic, with native grassland loss in California estimated at 99% (Vickery et al. 1999). Areas of grassland loss include the Los Angeles basin, where the subspecies was once considered common (Erickson 2008).

Exotic invasions and forest succession. Even where suitable habitat for Oregon Vesper Sparrow has not been lost to development and unsuitable agriculture, habitat degradation has occurred primarily from extensive encroachment of invasive shrubs and trees into grasslands and savannahs, facilitated by suppression of fires historically used to maintain those ecosystems (Chappell and Kagan 2001). The cessation of maintenance burning by Native Americans allowed the prairies to be invaded by Douglas-fir beginning as early as 1850, and large portions of the original prairies were overgrown with forest by 1960 (Lang 1961). Disturbances such as grazing may accelerate invasion because Douglas-fir seed germination is enhanced by disturbance that increases mineral soil contact, while native plants may decline with the loss of the moss carpet. Fire suppression, however, may also allow an unusual build-up of fuels that can lead to very hot fires that harm the normally fire-tolerant native species (Tveten 1997). In addition to the natural succession that occurs with fire suppression, Fort Lewis had an active program to encourage a Douglas-fir monoculture from the mid-1960s until 1994 (Perdue 1997). The Fort Lewis portion of JBLM has about 16,300 ac of forest on areas that were formerly prairie (Foster and Shaff 2003). A low-level of native tree and shrub invasion (i.e., <15% cover) can maintain or even improve habitat suitability, but if invasive species are not managed, they will quickly exceed suitability thresholds for Oregon Vesper Sparrow, leading to elimination of breeding territories at that site. Many prairie sites have had some Douglas-fir removed to restore prairie and oak savannah in recent years (WDFW 2006, JBLM-DPW-ED 2017).

Most native grasslands are degraded by exotic grasses and forbs, or have been invaded by shrubs, especially exotic Scotch Broom (*Cytisus scoparius*) and Armenian Blackberry (*Rubus armeniacus*), and native Nootka Rose (*Rosa nutkana*) and Common Snowberry (*Symphoricarpos albus*) (Chappell et al. 2001). Scotch Broom is the most visible invasive species that can rapidly cover prairies (Parker 2002). Scotch Broom is a nitrogen fixer, which changes the normally low nitrogen content of the prairie soils and likely favors exotic species over native species that are not adapted to take advantage of the increased nutrient level (Parker et al. 1997). Moreover, it leaves behind allelopathic compounds in the soil that apparently decrease plant growth, inhibiting restoration efforts even after removal (Grove et al. 2012). Scotch Broom is killed through burning, hand pulling, or herbicide, but control requires an ongoing program because the plants produce an abundance of seeds that remain viable in the soil for several decades (Swift 1996).

Additional invaders include exotic grasses and forbs. Invasive non-native species such as Tall Oatgrass (*Arrhenatherum elatius*), and Colonial Bentgrass (*Agrostis capillaris*) can replace native short-statured grasses, or non-natives, such as Silver Hairgrass (*Aira caryophylla*) and Sheep's Sorel (*Rumex acetosella*) can dominate the interstitial spaces between bunchgrasses, which were formerly in bare or sparsely vegetated conditions. This type of habitat degradation results in the development of tall and dense herbaceous vegetation and absence of structural diversity and bare or sparsely vegetated ground, which compromises suitability of the habitat by physically interfering with movement and foraging.

FACTORS AFFECTING CONTINUED EXISTENCE

The primary factor responsible for historical declines in Oregon Vesper Sparrows in Washington is likely habitat loss and degradation. The primary factor(s) affecting continued existence are less certain. Habitat

degradation is probably still an issue, but several other potential factors include higher nest predation in fragmented habitat, human disturbance during the nesting season, genetic and demographic factors associated with small population size, and possibly neonicotinoid pesticides (Smith et al. 1997, Altman 1999, 2003, 2011, Rogers 2000, Beauchesne 2006, Eng et al. 2016, Frankham et al. 2017).

Adequacy of existing regulatory mechanisms. Although the Oregon Vesper Sparrow is 'protected' by some regulations, this has not prevented further decline. It is protected by the U.S. Federal Migratory Bird Treaty Act of 1918 (MBTA), which makes it illegal to kill the bird (e.g., take, possess, import, export, transport, sell, the parts, nests, or eggs of such birds). However, in the MBTA there are no provisions for addressing issues of habitat loss and degradation, which may continue to be a threat. The subspecies is being considered for listing under the federal Endangered Species Act (USFWS 2018).

WDFW designated the Oregon Vesper Sparrow as a candidate for state listing as endangered, threatened, or sensitive in 1998, and it therefore became a "priority species" under WDFW's Priority Habitat and Species (PHS) program. This provides occurrence and habitat information (and typically management recommendations) to agencies, landowners, municipalities, and consultants for land use planning. However, specific management recommendations have not been developed for Oregon Vesper Sparrow. Washington's Growth Management Act requires local governments to develop critical area ordinances that address development impacts to important wildlife and habitats. Counties generally include state-listed species as protected under critical area ordinances (CAOs). The specifics and implementation of CAOs vary somewhat by county, but, in general, if Oregon Vesper Sparrows are known to be, or discovered nesting, the habitat at that location would be protected through county or municipal critical area ordinances. These ordinances require environmental review and habitat management plans for development proposals that affect state-listed species. However, these protections are not relevant for most of the currently occupied area, which is on JBLM where the Growth Management Act would not apply. WDFW recognized the Oregon Vesper Sparrow as a Species of Greatest Conservation Need in the State Wildlife Action Plan (WDFW 2015). However, this designation does not provide any regulatory protection.

Under the National Environmental Policy Act (NEPA), federal agencies are required to consider the impacts of their actions on the environment, including Oregon Vesper Sparrow and its habitat. Although the percent of their range-wide population on federal lands is less than 20% (Altman 2016), in Washington it is >90% with nearly all individuals occurring on JBLM. At JBLM all environmental actions are vetted through a Record of Environmental Consideration which is intended to ensure NEPA compliance (J. Lynch, pers. comm.). In this process, if the JBLM Fish and Wildlife Program assesses potential impact, there are discussions to seek and implement an alternate option to the proposed action. However, NEPA, while requiring a "reasonable range of alternatives," would not require the selection of favorable alternatives to a species or its habitat where it conflicts with the training mission. As required by Army Regulation AR 200-1, JBLM completed an Integrated Natural Resource Management Plan in 2018 for the installation, and its Fish and Wildlife Management Plan discusses Oregon Vesper Sparrow and its habitat needs, and efforts to maintain habitat in suitable condition (JBLM-DPW-ED 2017).

Habitat loss and degradation. As discussed above, over 90% of the original grassland in the south Puget lowlands has been destroyed, with perhaps only 2–3% remaining that is not dominated by exotic vegetation. Range-wide, most native grasslands and shrublands have been converted to agriculture. Although some agriculture is compatible, such as grass seed and Christmas tree farms, farming practices that involve intensive tillage and greater use of chemicals are unlikely to support Oregon Vesper Sparrows (Jones and Cornely 2002). Grazing impacts on Vesper Sparrows vary with grazing intensity and soil type, but locations exposed to heavy grazing typically support lower breeding densities and

greater trampling of nests than sites with moderate and light grazing (Kantrud and Kologiski 1982, Altman 1999).

The causes of more recent extirpations are less clear, and potentially confounded where the population was already small and likely subject to other factors affecting population status. One potential factor, ironically, is that past prairie restoration for butterflies and Streaked Horned Lark that completely eliminated shrubs and trees may have resulted in less suitable conditions for Vesper Sparrows. In recent years, all species are considered in management planning, including Oregon Vesper Sparrows more explicitly. However, larks and sparrows coexist at Range 74/76 on the Artillery Impact Area of JBLM, along with the endangered Taylor's Checkerspot Butterfly, indicating substantial overlap in habitat needs. Nesting territories are typically in grassland with some bare ground and a shrub component (Jones and Cornely 2002, Altman 2017), and Vesper Sparrows may seek territories with song perches, such as a few small trees, shrubs, or tall herbaceous plants (Best and Rodenhouse 1984).

The main threat on the wintering grounds is likely human and agricultural development of relatively open, flat ground at low elevations (e.g., the development of the Los Angeles basin and San Fernando Valley) (Erickson 2008). This includes agricultural pressures, especially a proliferation of vineyards, and development particularly from Ventura County south. Chemically treated seed in existing cropland in wintering areas may also be an important potential threat.

Significant restoration of grassland and savannah habitats has occurred during the last 15-20 years within the range of Oregon Vesper Sparrow. Vesper Sparrows generally respond quickly to new areas when habitat becomes suitable (Jones and Cornely 2002). However, for Oregon Vesper Sparrow there have been only occasional detections and no known population establishment into previously unoccupied sites restored to suitable habitat (B. Altman, pers. obs.). They have high breeding site fidelity (Altman 2017, G. Slater pers. comm.), which also challenges their ability to expand into new areas or recolonize old areas where they have been locally extirpated. Colonization of these areas is likely dependent on the proximity of source populations with the potential to provide surplus birds if the distance is not too great (Holmes and Sherry 1988, Telleria and Santos 1999).

Small subpopulation size and isolation. Small population size and isolation of subpopulations is evident throughout Washington for Oregon Vesper Sparrow. The only two recently known occupied sites in the north Puget lowlands on San Juan Island both had <3 pairs and are approximately 4 miles (6.4 kilometers) apart. These sites are approximately 110 miles (177 kilometers) from the nearest population at JBLM in the south Puget lowlands.

In the south Puget lowlands, >80% of the estimated population occurs on the large prairie of the AIA of JBLM (Table 1). The only other population is on two adjacent sites, the Weir Prairies on JBLM and Tenalquot Prairie, supporting 13–15 pairs approximately 8 miles (13 kilometers) from the AIA. Of the remaining known occupied sites elsewhere in the south Puget lowlands, all have <5 pairs. One of these sites is immediately adjacent to the Tenalquot Prairie population on JBLM. Other sites with recent breeding season records, West Rocky Prairie Wildlife Area and Mima Mounds Natural Area Preserve, are approximately 6 miles (10 kilometers) and 15 miles (24 kilometers) respectively from the nearest population on JBLM (i.e., Tenalquot Prairie). Perhaps more significantly than the distances, most if not all of the intervening area between any of the occupied sites in the south Puget lowlands is not suitable habitat.

Oregon Vesper Sparrow can maintain a breeding presence in relatively small areas of suitable habitat (e.g., 15–20 acres [6–8 hectares]) (B. Altman, pers. obs.). At the Nanaimo airport on Vancouver Island, a population of 5–10 pairs was maintained for at least 15 years in an area less than 25 acres (10 hectares)

(Beauchesne 2002). However, that population was recently extirpated after a 2–3 year population decline (S. Beauchesne, pers. comm.).

The persistence of small populations can be affected by environmental, demographic, and genetic factors. The natural fragmentation of Oregon Vesper Sparrow populations, exacerbated by human-induced fragmentation or degradation of habitat, has created greater potential spatial barriers to dispersal and recruitment between populations. High fidelity to breeding locations of Vesper Sparrows limits the demographic and genetic interchange between sites. Cornutt et al. (1996) described grassland sparrow populations as exhibiting a 'source-sink' dynamic in which the core of the range sustains the less productive peripheral areas, and small peripheral populations are more variable, and often go extinct due to the vagaries of their highly uncertain environment. Environmental events, such as severe droughts, fires, or disease can decimate small populations. Genetic problems can occur with small isolated populations and can interact with demographic and habitat problems, leading to a population's extinction (Frankham et al. 2017). Inbreeding and poor genetic diversity can result in weak immune systems (Allendorf and Ryman 2002), reduced reproductive fitness (Höglund et al. 2002), low hatchability of eggs (Briskie and Mackintosh 2004), and the reduced ability to adapt, all of which increases extinction risk (Brook et al. 2002, Frankham et al. 2017). Also, chance shifts in sex ratios or age distributions can affect breeding and recruitment (Foose et al. 1995). Preliminary data on low egg hatch rates in the Puget lowlands (S. Pearson, pers. comm., G. Slater, pers. comm.) and Willamette Valley (B. Altman, unpubl. data) suggest cause for concern.

Predation in altered ecological landscapes. Predation is the primary cause of nest failure for ground-nesting birds including Vesper Sparrows (Jones and Cornely 2002, B. Altman, unpubl. data, G. Slater, pers. comm., Stephens and Rockwell 2019). The primary nest predators of Oregon Vesper Sparrows have not been identified but may include several that are site-specific (Altman 1999, Rogers 2000, COSEWIC 2006). Domestic Cats (*Felis catus*) were suggested as the greatest predation threat on the recently extirpated population at Nanaimo Airport on Vancouver Island, British Columbia, where they were frequently observed (Beauchesne 2002). Siegel et al. (2009) suggested that the relatively large population of feral cats and introduced Red Foxes (*Vulpes vulpes*) may have contributed to the decline of a population at American Camp on San Juan Island. Loss et al. (2013) estimate that free-ranging domestic cats kill 1.4–3.7 billion birds annually in the United States. Oregon Vesper Sparrows also may be experiencing increased predation from other species associated with semi-urban, residential, and agricultural areas such Raccoons (*Procyon lotor*), American Crows (*Corvus brachyrhynchos*), and Opossums (*Didelphis virginiana*) (Altman 1999, Rogers 2000, Stinson 2005, Beauchesne 2006). Population declines in many bird species have been attributed to higher rates of nest predation in fragmented habitats (Chalfoun et al. 2002), and several studies of simulated or real nests report higher nest predation rates in smaller habitat patches of grassland or shrubland (Burger et al. 1994, Vander Haegen et al. 2002, Herkert et al. 2003). When available habitat is comprised of small patches, it limits the search area for predators to find nests (Phillips et al. 2003); this may limit reproductive success and cause local populations to become sinks (Pulliam 1988). Vander Haegen et al. (2002) and Vander Haegen (2007) reported that real and simulated songbird nests in a fragmented landscape in Washington were nine times more likely to be depredated than those in continuous landscapes.

Disturbance during the nesting season. Some Oregon Vesper Sparrow nesting sites are subject to extensive recreational uses with potential negative effects on reproduction, especially in high-traffic areas for people or domestic dogs (Altman 1999, Rogers 2000, COSEWIC 2006). At San Juan Island National Park human disturbance may affect nesting, and at the gravel pit near Friday Harbor, off leash dogs are problematic (R. Milner, pers. comm.). On public lands in the south Puget lowlands, potential disturbances mentioned by Rogers (2000) included dog field trials, off-leash dog walking and training,

horseback riding, bicycling, hiking, model airplane and drone flying, and school field trips. Additionally, military training exercises at JBLM, where most Oregon Vesper Sparrows occur in Washington, have the potential to disturb nesting birds and negatively affect reproduction. Habitat restoration or management in grassland (e.g., mowing, invasive vegetation control, prescribed burning, woody vegetation removal), can be harmful to populations if conducted during the breeding season (i.e., disturbance leading to abandonment, destroying nests) (Rogers 2000). The negative impacts of these types of activities would be much more significant at sites where there is a small population that is vulnerable to extirpation.

Mowing of nesting habitat. Mowing and other vegetation management practices represent a significant hazard for nesting Vesper Sparrows (Jones and Cornely 2002). This topic has not been studied specifically for Oregon Vesper Sparrows, but there are studies of the negative impacts to ground-nesting birds of vegetation management during the breeding season, including Vesper Sparrows (Dechant et al. 2002). Vesper Sparrows nested in hayfields in southern Michigan, but avoided thick stands of hay and populations were not reduced markedly by mowing (George 1952, *cited in* Dechant etal. 2002). Also in Michigan, Vesper Sparrows continued breeding activities following mowing of an alfalfa field in late June (Harrison 1974, *cited in* Dechant etal. 2002).

Airports provide some of the largest remaining open grasslands and can provide important habitat if nesting birds are considered during airport operations (Kershner and Bolinger 1996, Tsipoura et al. 2014). But airports can be population sinks for grassland bird species, likely due to mowing practices (Kershner and Bolinger 1996). Airfields are not mentioned as habitat used by Vesper Sparrows by Jones and Corneley (2012), but Oregon Vesper Sparrows occupy, or did occur on Olympia and Shelton airports. Airfields likely do not provide optimal habitat due to the shortage of singing perches, and they are generally mowed regularly to maintain 7–14 inch vegetation. Relatively little is known regarding reproductive success on airfields, and whether they act as population sources or sinks (Tsipouro et al. 2014). Tsipouro et al. (2014) conducted a 3-year study of nesting success and productivity of ground-nesting passerines on three military airfields, one each in Massachusetts, New Jersey, and Maryland. On the mowed areas, an estimated 8–11% of Grasshopper Sparrow nests and 15–19% of Eastern Meadowlark nests failed as a direct result of mowing (e.g., due to crushing or desertion immediately following mowing); nests in mowed areas fledged fewer young per successful nest than those in non-mowed areas due to a combination of lower hatching success and higher partial brood mortality (Tsipouro et al. 2014). However, nest survival for Grasshopper Sparrows and Eastern Meadowlarks on the airfields was high, and even on the mowed areas was comparable to studies in other habitats (Tsipouro et al. 2014).

Pesticides. Some recent studies suggest the widespread use of neonicotinoids is correlated with declines in grassland birds (Mineau and Palmer 2013, Mineau and Whiteside 2013, Hallmann et al. 2014, Li et al. 2020). Turfgrass seed and oil seeds are produced on substantial acreage in the Willamette Valley which has also seen a dramatic decline in Oregon Vesper Sparrows (Myers and Kreager 2010). Seeds of canola, corn, wheat, and turf grasses are routinely treated with neonicotinoid insecticides and/or fungicides, and some neonicotinoids are sufficiently toxic to small birds such that ingestion of a few treated seeds can cause death, inhibit normal reproduction, or affect migratory ability (Goulson 2013, Mineau and Palmer 2013, Gibbons et al. 2015, Eng et al. 2017). Eng et al. (2017) reported that during captive trials, White-crown Sparrows (*Zonotrichia leaucophrys*) consuming the equivalent of four imidacloprid-treated canola seeds per day over three days suffered significant weight loss and failed to orient normally for migration.

Grain treated with zinc phosphide is used by farmers in the Willamette Valley to control Gray-tailed Vole (*Microtus canicaudus*) when populations are extraordinarily high. During 2014, a sample combined from four dead Streaked Horned Larks found at Corvallis Airport in Oregon tested positive for exposure to zinc phosphide, indicating at least one, and perhaps all of the birds probably ingested treated grain. Reducing or eliminating the hazard to small birds may entail using a larger pelletized form too large for small birds

like sparrows and larks to ingest. The use of zinc phosphide may not be an issue for Oregon Vesper Sparrows in Washington, because Gray-tailed Voles only occur in Clark County, but it may be an issue during migration, or other parts of the breeding range (e.g. Willamette Valley).

Climate change. The future impacts of climate change on Oregon Vesper Sparrows and their habitats in Washington are uncertain. In general, the stresses and instability associated with climate change are predicted to have greater impact on small isolated populations. Recent models generally predict a modest increase in precipitation in the winter and a modest decrease in summer in western Washington (Littel et al. 2009, Mote and Salathe 2009). Projected higher temperatures will decrease summer soil moisture up to 25% (Bachelet et al. 2011). Many prairie plant species are adapted to summer drought, so reduced summer soil moisture and an increase in wildfire frequency may help keep Douglas-fir and other woody species out of grassland habitats (Bachelet et al. 2011). However, increased CO_2 in the atmosphere may affect plant growth and chemical and nutrient composition and affect wildlife in ways that are not yet understood. National Audubon's report on climate change and birds indicated a high vulnerability to a 3° C change for summer habitat of Vesper Sparrows due to fires and high temperatures (Audubon 2019), but it isn't clear to what extent the range-wide prediction applies to the Oregon subspecies.

MANAGEMENT ACTIVITIES

Habitat management and restoration. Oregon Vesper Sparrows potentially benefit from ongoing grassland and savannah restoration work (e.g., control of Scotch Broom and exotic grasses, re-establishment of native grasses and forbs, release of oak trees from competition) being conducted to benefit several listed species or ecological values. However, the benefit is dependent on the degree of maintenance of specific conditions including variable herbaceous heights and densities, some sparsely vegetated areas, and scattered woody cover. Further, the benefit is most likely to be realized if the location is in close proximity to an existing population where there is the potential for surplus birds to be recruited to the restored site. San Juan Island National Park started a prairie restoration planning process several years ago, that has been 'on hold' (R. Milner, pers. comm.); preliminary work did not specifically address the Oregon Vesper Sparrow, but future efforts may include them.

In the south Puget lowlands, habitat restoration outside JBLM is ongoing at several sites including Mima Mounds Natural Area Preserve, Scatter Creek Wildlife Area, West Rocky Prairie Wildlife Area, and Glacial Heritage Preserve. However, these sites either lack a population (i.e., Scatter Creek Wildlife Area and Glacial Heritage Preserve) or had a small population that existed recently (Mima Mounds Natural Area Preserve and West Rocky Prairie Wildlife Area). There has been no indication at these or any other sites of population establishment or enhancement after the initiation of habitat restoration that changed the site or parts of the site from unsuitable to apparently suitable condition. However, a rigorous assessment of habitat suitability for Oregon Vesper Sparrow has not been conducted at these sites.

On JBLM, habitat suitability for Oregon Vesper Sparrow is considered as part of the decision-making process for prairie and endangered species management (J. Lynch, pers. comm.). They also benefit from the nature of the JBLM mission of ground-based training, which requires open landscapes and results in extensive land management that supports suitable habitat conditions (J. Lynch, pers. comm.). Further, grassland habitat is maintained on the AIA by fires from exploding ordnance.

Many of the islands in the Columbia River where Oregon Vesper Sparrow occur or were recently detected have existing agreements and/or mandates as Columbia River dredged material deposition sites (H. Anderson pers. comm.). These sites can provide habitat a few years after deposition when

vegetative succession reaches suitable conditions. However, subsequent depositions can remove the habitat from suitability for several years until sufficient vegetation is reestablished again; thus, challenging the persistence of populations. Further, the timing of the deposition can conflict with the nesting season (H. Anderson pers. comm.), which potentially affects annual reproductive success.

Monitoring and research. Prior to 2013, the only targeted monitoring or research efforts for Oregon Vesper Sparrow were surveys, territory-mapping, habitat associations, and nesting in the Willamette Valley in 1996-1997 (Altman 1999); surveys and foraging habitat associations in the south Puget lowlands in 1998 (Rogers 2000); and surveys and nesting on Vancouver Island in British Columbia in 2002-2012 (Environment Canada 2014). Since 2013, there has been an increase in Oregon Vesper Sparrow monitoring and research. This started with a range-wide inventory, territory-mapping, and habitat associations (Altman 2015), and most recently expanded with the initiation of a range-wide research effort to evaluate potential limiting factors on population status (Altman 2017). CNLM and JBLM also have been concurrently conducting comprehensive surveys from 2015-2019 on JBLM to document the abundance and distribution of Oregon Vesper Sparrow (G. Slater, pers. comm.).

An investigation of limiting factors was initiated in 2016 by the American Bird Conservancy in the Willamette Valley of Oregon and by CNLM in Washington on JBLM. Klamath Bird Observatory initiated the project in the Klamath Mountains of Oregon in 2018. The primary objective is to assess productivity, survivorship, dispersal, recruitment, and habitat, in order to identify where within the annual life cycle conservation actions would be most effective (Altman 2017).

CONCLUSIONS AND RECOMMENDATION

The estimated population of Oregon Vesper Sparrows in Washington is approximately 300 birds, with most (~75%) of them on a single site, JBLM's 91st Division Prairie. There have been several recent local extirpations at sites that supported a few pairs, the remaining sites with a few pairs are at great risk, and there has been no recent establishment of populations at sites with remnant prairie or savannah or with ongoing restoration.

The factors of habitat loss and degradation that historically precipitated population declines continue, but populations are now likely affected by demographic and genetic factors related to their small numbers (e.g., isolation of subpopulations, reduced genetic variability, and greater susceptibility to stochastic events). Nest predation has a greater impact in fragmented habitat, and seeds coated with neonicotinoid pesticides may be affecting Washington birds during migration and at wintering sites. Land use and disturbance activities are variable and sometimes intense during the breeding season depending on the site; thus, potentially negatively affecting reproductive success and putting small populations at extreme risk of extirpation.

Research recently initiated on limiting factors will provide essential direction for appropriate conservation actions. However, given the extremely small population size in Washington, the predominance of that population at one location, the many recent local extirpations or near-extirpations, and a variety of habitat, disturbance, and potentially demographic factors that continue to negatively affect them, it is recommended that Oregon Vesper Sparrow be classified as an endangered species in Washington.

LITERATURE CITED

The references cited in the *Status Review for the Oregon Vesper Sparrow* are categorized for their level of peer review pursuant to section 34.05.271 RCW, which is the codification of Substitute House Bill 2661 that passed the Washington Legislature in 2014. A key to the review categories under section 34.05.271 RCW is provided in Table A. References were categorized by the author in October 2015.

Table A. Key to 34.05.271 RCW Categories:

34.05.271(1)(c) RCW	Category Code
(i) Independent peer review: review is overseen by an independent third party.	i
(ii) Internal peer review: review by staff internal to the department of fish and wildlife.	ii
(iii) External peer review: review by persons that are external to and selected by the department of fish and wildlife.	iii
(iv) Open review: documented open public review process that is not limited to invited organizations or individuals.	iv
(v) Legal and policy document: documents related to the legal framework for significant agency action including but not limited to: (A) federal and state statutes; (B) court and hearings board decisions; (C) federal and state administrative rules and regulations; and (D) policy and regulatory documents adopted by local governments.	v
(vi) Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under the processes described in (c)(i), (ii), (iii), and (iv) of this subsection.	vi
(vii) Records of the best professional judgment of department of fish and wildlife employees or other individuals.	vii
(viii) Other: Sources of information that do not fit into one of the categories identified in this subsection (1)(c).	viii

Reference	Category Code
Adams, J. S., R. L. Knight, L. C. McEwen, and T. L. George. 1994. Survival and growth of nestling Vesper Sparrows exposed to experimental food reductions. The Condor 96:739-748.	i
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San Juan Island, Washington

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APPENDIX A. Recent records and data sources for Oregon Vesper Sparrows in Washington and British Columbia.

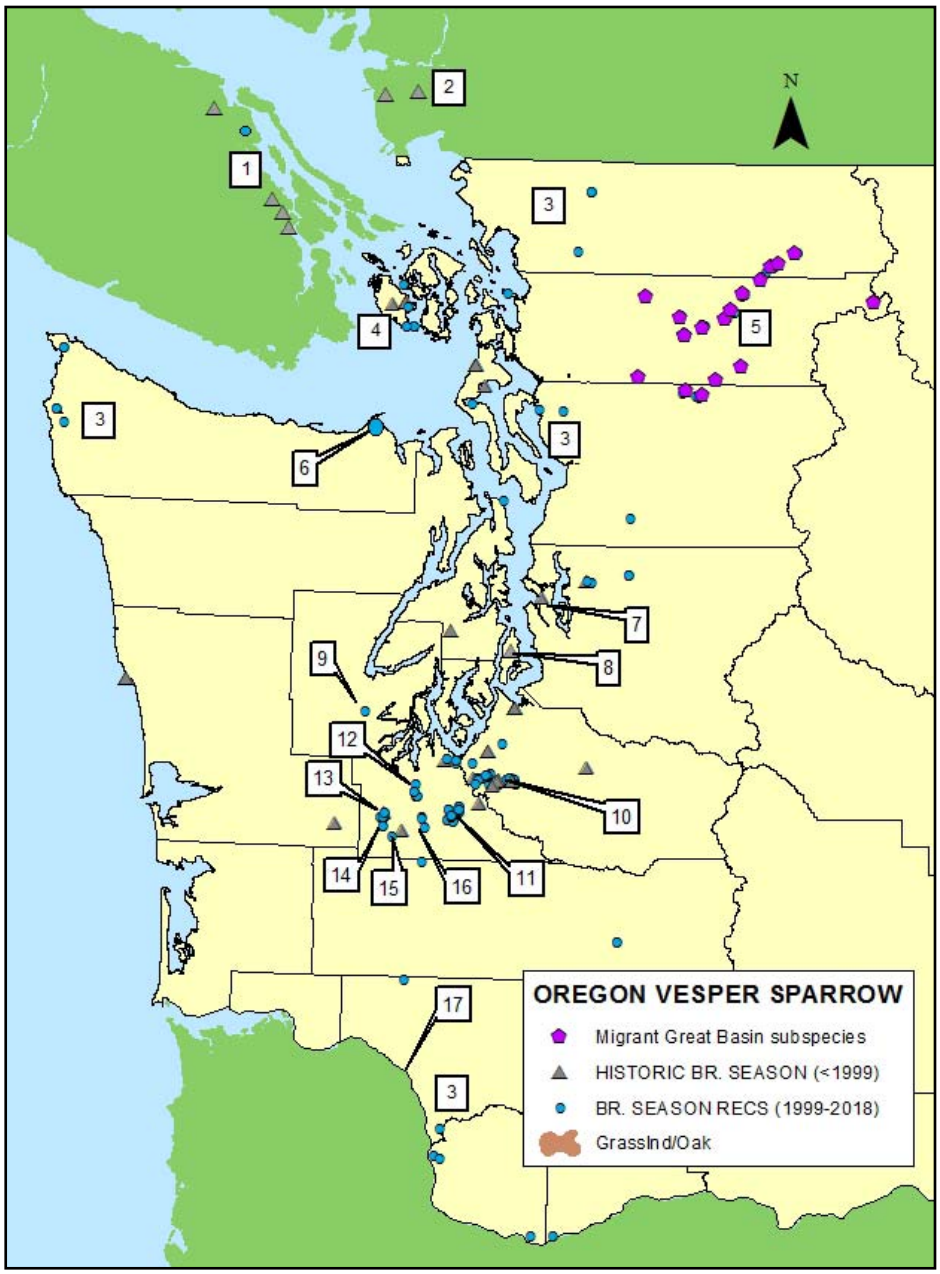

Figure 4. Locations of recent and historical breeding season (May-July) records of Vesper Sparrows in western Washington and southwestern British Columbia (numbered locations have information in Table 2 below).

Table 2. Oregon Vesper Sparrow records from known recently or historically occupied breeding locations (Fig. 4) in western Washington and soutwestern British Columbia, Canada.

Location/year	Records[1]	Source
1.Vancouver Island		
1971-1985	Englishman River estuary, Cobble Meadows to Mill Bay	Campbell et al. (2001)
1990-2013	Nanaimo Airport	Chatwin (2004), Beauchesne (2006), S. Beauchesne (pers. comm.)
2017	0 birds	S. Beauchesne, pers. comm.
2. Fraser River lowland		
1930s-1960s	Nesting at New Westminster (1938), Iona Island (1968)	Nested in farm fields/pastures (Campbell et al. 2001)
3. Misc. breeding season (May – July) records		
1992-2018	Generally single birds, mostly May records	WSDM (from eBird, Washington Ornithological Society, etc.)
4. San Juan Island, San Juan County[2]		
1978	7 males	eBird
1994	6 birds	eBird
1999	2 males Lime Kiln Point	Rogers (2000)
2002	4 birds American Camp	Siegel et al. (2009)
2008	1 bird American Camp	WSDM (2018)
2010:	1 bird American Camp	WSDM (2018)
2013	3 males, American Camp	Altman (2015)
2016	2 males	R. Milner (pers. comm.)
2017	2 males Friday Harbor quarry	S. Vernon (pers. comm.)
2018-2019	0 birds	S. Vernon (pers. comm.)
2020	1 male Friday Harbor quarry	K. Foley (pers. comm.)
5. Skagit and Sauk River valleys		
Early 1900s	*P.g. affinis* may have bred in Skagit lowland farm lands	Dawson and Bowles (1909), Jewett et al. (1953)
2000-2018	No territorial behavior, likely migrants	R. Merrill (pers. comm.)
6. Dungeness, Clallam County[3]		
up to 1980s	nesting commonly	Rogers (2000)
1995	singing males	Rogers (2000)
1999	1 bird, last breeding season record	B. Boekelheide (pers. comm.)
7. Seattle	Museum specimen collected April 1894 by S. F. Rathbun.	
8. Vashon Island, King County[4]		
1940s	uncommon summer resident	Larrison (1952)
1985-2015	0 birds	E. Swan (pers. comm.)
9. Sanderson Field/Shelton Airport, Mason County[5]		
2010	a few birds nesting	S. Pearson (pers. comm.)
2013	2 males	Altman (2015)
2017	0 birds	G. Slater (pers. comm.)
2018	1 breeding pair	G. Slater (pers. comm.)
10. 91st Division Prairie (AIA) (JBLM), Pierce County		
1998	~100 (estim.)	Rogers (2000)
2015-2018	225 birds (estimate)	G. Slater (pers. comm.)
13th Division Prairie (JBLM), Pierce County[6]		
1998	5 birds	Rogers (2000)

Location/year	Records[1]	Source
2007	3+ birds	S. Pearson (pers. comm.)
2009	3 birds	S. Pearson (pers. comm.)
2011-2012	1-3 birds	A. Wolf (pers. comm.)
2012-2016	0 birds	A. Wolf (pers. comm.)
2017-2018	0 birds	G. Slater (pers. comm.)
11. Rainier Training Area/Weir Prairies (JBLM), Thurston County		
2017	11 males (some unpaired)	Surveys since 2013 (G. Slater, pers. comm.)
2018	12 males (4 unpaired)	
South Weir/Tenalquot Prairie (JBLM)		
2017	2 males	Surveys since 2013 (G. Slater, pers. comm.)
2018	3 males	
Tenalquot Prairie Preserve, Thurston County[7]		
2013	5 males	Altman (2015)
2014	3 birds	eBird
2015	3 males	A. Martin (pers. comm.)
2016	1 male	G. Slater (pers. comm.)
2017	2 males	G. Slater (pers. comm.)
2018	3 males	G. Slater (pers. comm.)
12. Olympia Airport, Thurston County[8]		
1980s	birds reliably present at north end	J. Skriletz, in WSDM (2018)
1999	4-5 birds	WSDM (2018)
2000	1 bird	WSDM (2018)
2011	2 birds	eBird
2015	1 bird	eBird
2017-2018	0 birds	G. Slater (pers. comm.)
13. Mima Mounds Natural Area Preserve, Thurston County[11]		
2004	2 birds	WSDM (2018)
2008-2011	1-3 birds	WSDM (2018)
2013	1 bird	WSDM (2018)
2013-2014	0 birds	B. Altman (unpubl
2017	1 bird	eBird
2018	0 birds	G. Slater (pers. comm.)
14. Glacial Heritage Preserve, Thurston County[9]		
1998	3 pairs	Rogers (2000)
2013	1 male	Altman (2015)
2014	0 birds	A. Martin (pers. comm.)
2015	1 bird	eBird
2015-2018	0 birds	A. Martin (pers. comm.)
15. Scatter Creek Wildlife Area, Thurston County		
2011	1 bird	D. Canning (pers. comm.)
16. West Rocky Prairie Wildlife Area, Thurston County[10]		
2006	1 bird	"Tenino", eBird
2011-2012	1-2 birds	D. Canning (pers. comm.)
2013	2 males	Altman (2015)
2014	1 male	A. Martin (pers. comm.)
2015-2018	0 birds	A. Martin (pers. comm.), G. Slater (pers. comm.)
17. Lower Columbia River islands[12]		
2005-2010	few birds annually on seven islands	S. Pearson (pers. comm.)
2010-2015	1 bird on one island, July	A. Martin (pers. comm.)

Location/year	Records[1]	Source
2018	0 birds on 14 islands and 5 shore sites during Streaked Horned Lark surveys (including 5 of 7 islands with past ORVS records)	Slater and Treadwell (2019)

[1]Only considers May-June records to avoid most migrants
[2]Intensive island-wide Western Bluebird survey effort since 2006
[3]High birder efforts.
[4] High birder efforts; fields succeeded to shrub thickets and forest over last 70-80 years (E. Swan, pers. comm.).
[5]Surveys for Streaked Horned Lark and Oregon Vesper Sparrow, 2017-2018.
[6]Intensive surveys for Streaked Horned Lark since 2011 and annual bird surveys 2015-2018; habitat restoration for part of prairie removed most/all shrubs (A. Wolf, pers. comm.).
[7]Annual surveys since 2010; intensive Oregon Vesper Sparrow surveys since 2013.
[8]Intensive surveys for Streaked Horned Lark and Oregon Vesper Sparrow in 2017-2018.
[9]Annual bird surveys since 2000, and surveys for Oregon Vesper Sparrow in 2018.
[10]Annual bird surveys since 2013 and intensive surveys for Oregon Vesper Sparrow initiated in 2018.
[11]2008-2011 regular surveys (D. Canning, pers. comm.); shrub removal occurred over the last 10 years (B. Altman, pers. obs.).
[12]Islands surveyed for Streaked Horned Lark, 2010-2018.

APPENDIX A. PUBLIC COMMENTS.

WDFW received public comments during the 90-day public review period for the draft *Status Review for the Oregon Vesper Sparrow*. WDFW received 6 individual comment letters from citizens; 5 of the 6 response letters indicated support for WDFW's status recommendation to list the Oregon Vesper Sparrow as an endangered species in Washington. One response letter did not support listing.

Washington State Status Reports, Periodic Status Reviews, Recovery Plans, and Conservation Plans

Periodic Status Reviews

2020 Mazama Pocket Gopher
2019 Tufted Puffin
2019 Oregon Silverspot
2018 Grizzly Bear
2018 Sea Otter
2018 Pygmy Rabbit
2017 Fisher
2017 Blue, Fin, Sei, North Pacific Right, and Sperm Whales
2017 Woodland Caribou
2017 Sandhill Crane
2017 Western Pond Turtle
2017 Green and Loggerhead Sea Turtles
2017 Leatherback Sea Turtle
2016 American White Pelican
2016 Canada Lynx
2016 Marbled Murrelet
2016 Peregrine Falcon
2016 Bald Eagle
2016 Taylor's Checkerspot
2016 Columbian White-tailed Deer
2016 Streaked Horned Lark
2016 Killer Whale
2016 Western Gray Squirrel
2016 Northern Spotted Owl
2016 Greater Sage-grouse
2016 Snowy Plover
2015 Steller Sea Lion

Conservation Plans

2013 Bats

Status Reports

2019 Pinto Abalone
2017 Yellow-billed Cuckoo
2015 Tufted Puffin
2007 Bald Eagle
2005 Mazama Pocket Gopher, Streaked Horned Lark, and Taylor's Checkerspot
2005 Aleutian Canada Goose
1999 Northern Leopard Frog
1999 Mardon Skipper
1999 Olympic Mudminnow
1998 Margined Sculpin
1998 Pygmy Whitefish
1997 Aleutian Canada Goose
1997 Gray Whale
1997 Olive Ridley Sea Turtle
1997 Oregon Spotted Frog

Recovery Plans

2020 Mazama Pocket gopher
2019 Tufted Puffin
2012 Columbian Sharp-tailed Grouse
2011 Gray Wolf
2011 Pygmy Rabbit: Addendum
2007 Western Gray Squirrel
2006 Fisher
2004 Sea Otter
2004 Greater Sage-Grouse
2003 Pygmy Rabbit: Addendum
2002 Sandhill Crane
2001 Pygmy Rabbit: Addendum
2001 Lynx
1999 Western Pond Turtle
1996 Ferruginous Hawk
1995 Snowy Plover

Status reports and plans are available on the WDFW website at:
http://wdfw.wa.gov/publications/search.php