

Winter Abundance Trends for the Oregon Vesper Sparrow in California

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ABSTRACT

Christmas Bird Count data from California over the past three decades (1994 through 2023) show that the Oregon Vesper Sparrow (*Pooecetes gramineus affinis*) is likely in long term winter decline in this region. Considering that the bulk of the population of this taxon winters in California, and the documented declines within its breeding range, this negative winter region trend underscores the need for a concerted effort to conserve this subspecies. The winter range of this taxon overlaps with that of *P.g. confinis* in California. However, most of the Oregon Vesper Sparrow population winters north of Santa Barbara County with smaller numbers in southern California. We used Christmas Bird Count data to document a significant decline in wintering Vesper Sparrows throughout the state, with significant declines in northern portions of the state and apparently stable numbers in the south. Thus, our results are consistent with a declining winter population of the Oregon Vesper Sparrow. The decline in Vesper Sparrow numbers recorded in northern California CBCs is associated with a decline in grassland/open habitat within count circles, suggesting that winter habitat loss may be contributing to population decline.

The Oregon Vesper Sparrow (*Pooecetes gramineus affinis*) is a subspecies of conservation concern throughout its breeding and winter ranges. The subspecies is listed as Endangered (COSEWIC 2022) and likely extirpated (Altman 2015) in British Columbia, listed as Endangered in Washington (WDFW 2023), is considered Sensitive-Critical in Oregon (ODFW 2021), and is a Bird Species of Special Concern (Erickson 2008) and Species of Greatest Conservation Need (CDFW 2015) in California. Rosenberg et al. (2014) documented the continent-wide declines in most birds that share the Vesper Sparrows' grassland and open country habitats and included the Oregon Vesper Sparrow in their list of 22 subspecies considered to be of the highest

vulnerability to extirpation. The decline of breeding populations of the Oregon Vesper Sparrow has been well-documented (Altman 2015, Altman et al. 2020, Sauer et al. 2020); however, there is little or no documentation of trends within the wintering population.

Based on current eBird data, the winter range of the Vesper Sparrow in California remains as described by Jones and Cornely (2002), Leeman and Edson (2002), and Erickson (2008), encompassing open country (mainly grassland and open oak savanna) habitats of the lower foothills of the Sierra Nevada and Coast Ranges from central California south, and most of southwestern California (Figure 1). Vesper Sparrows wintering south of Santa Barbara County are mostly *P.g. confinis* (Grinnell and Miller 1944, Unitt 2004, Erickson 2008, Altman 2015, Altman et al. 2020). Those in southeastern California and east of the Sierra Nevada are also primarily *P.g. confinis* (Jones and Cornely 2002, Patten et al. 2003). Erickson's (2008) analysis of 251 Vesper Sparrow specimens from throughout California showed that most of the Vesper Sparrows wintering in southern California were *P.g. confinis* (ranging from 70% in Los Angeles County to 91% in San Diego County), confirming that *P.g. affinis* winters mainly to the north.

We used Christmas Bird Count (CBC) data to assess the status of the Oregon Vesper Sparrow wintering population over the most recent three decades. We also reviewed changes in land cover within the same northern California CBC circles used for our population trend analyses.

METHODS

We used data from the CBC (National Audubon Society 2020) for the most recent 30 years (Count Years 94 through 123, corresponding to the winters of 1993–94 through 2022–23) to evaluate population trends. We only used data from CBC circles that met the following two criteria: 1) were conducted during the majority of years of both the first and second halves of the 30-year period; and 2) averaged >1 Vesper Sparrow per year during either the first or second half of the 30-year period. Twenty-three circles met these criteria (Figure 2).

We used the 11 circles north of latitude 35° to analyze trends for the northern portion of the state, and the remaining 12 circles to analyze trends in the south (Table 1). We chose this dividing latitude based on the published data suggesting that the bulk of the population of *P.g. affinis* winters north of Santa Barbara County, while the Vesper Sparrows to the south were mostly *P.g. confinis*. Trends were evaluated based on linear regression using the Data Analysis Package in Microsoft Excel with year as the input variable and abundance (birds/party hr) as the response variable.

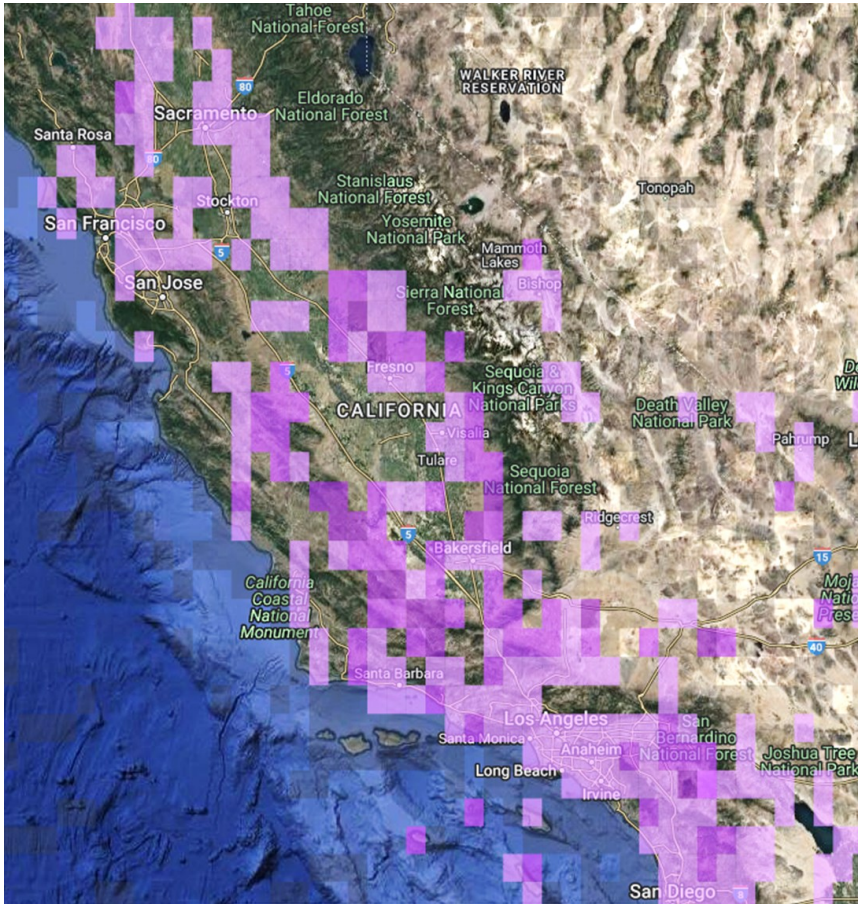


Figure 1. Winter (Dec–Feb) eBird data for the Vesper Sparrow (*P.g. affinis* and *confinis*).

We also assessed changes in the available habitat within northern circles where *P.g. affinis* occurs by comparing the National Land Cover Database between 2001 and 2021 (Yang et al. 2018, Dewitz 2023) using ArcGIS Pro 2.9.11. We included habitats mapped in the database as Grassland/Herbaceous and Pasture/Hay. Due to recent increases in wildfires, we removed the fire perimeters from 2016 to 2021 (CAL FIRE 2022) from the analysis.

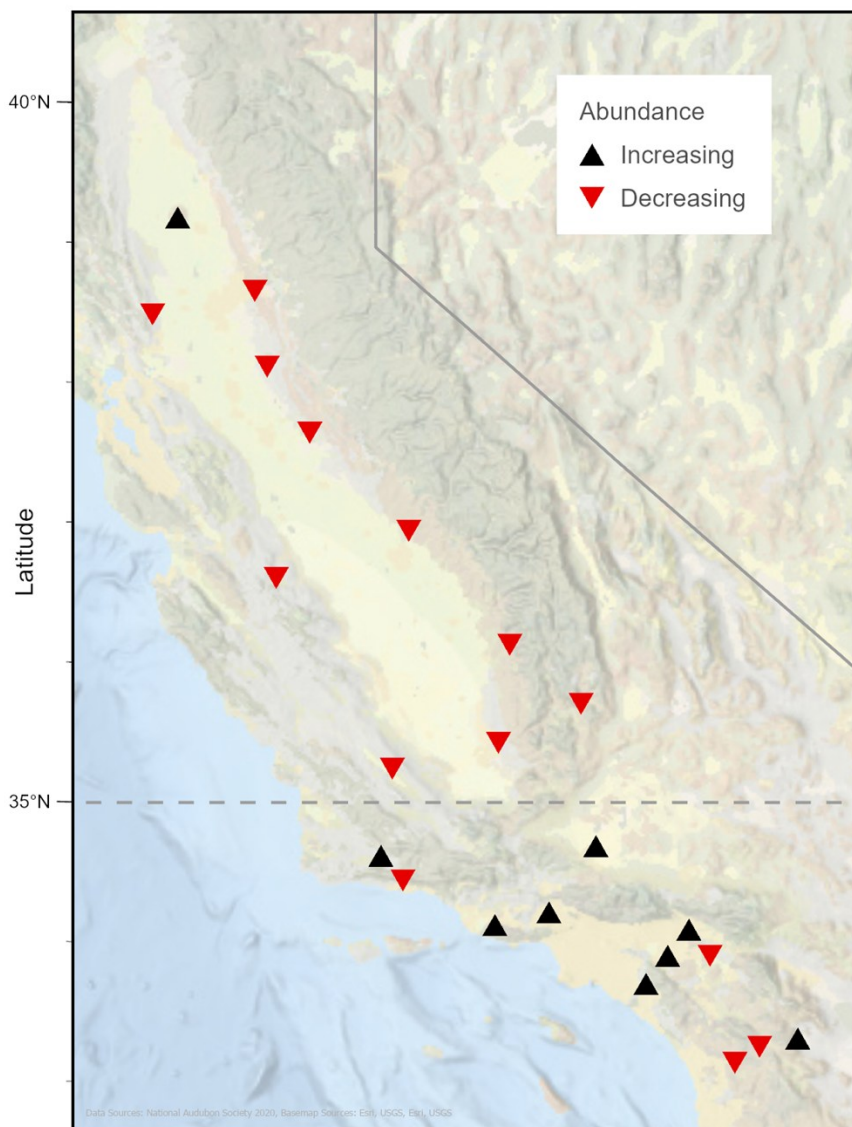


Figure 2. Locations of the 23 CBC circles used, with abundance trends at each.

Table 1. Names and locations of the CBC circles used.

Name	Latitude	Longitude
Northern Portion		
Peace Valley	39.2	-121.82
Folsom	38.66	-121.1
Putah Creek	38.48	-122.03
Wallace-Bellota	38.12	-120.98
LaGrange-Waterford	37.65	-120.59
Lost Lake-Fresno	36.95	-119.7
Panoche Valley	36.61	-120.88
Springville	36.13	-118.81
South Fork Valley	35.7	-118.19
Bakersfield	35.43	-118.92
Carrizo Plain	35.25	-119.85
Southern Portion		
Lancaster	34.7043	-118.086
Cachuma	34.6501	-119.952
Santa Barbara	34.45	-119.76
San Fernando Valley	34.2358	-118.503
Thousand Oaks	34.15	-118.97
San Bernardino Valley	34.09	-117.3
Santa Ana River Valley	33.9068	-117.489
San Jacinto Lake	33.8745	-117.124
Orange County (northeast)	33.71	-117.68
Anza-Borrego Desert	33.2841	-116.399
Lake Henshaw	33.2112	-116.726
Escondido	33.1025	-116.94

RESULTS

We found a significant decline (-1.5%/year; $p < 0.01$) in Vesper Sparrows using data pooled from all circles (Figure 3). The trend for Vesper Sparrow abundance in the northern portion of the state (Figure 4) was also significant (-2.3%/year; $p < 0.001$), while data from the southern portion (Figure 5) showed no significant trend (-0.02%/year, $p = 0.6$). These trends appear to be relatively consistent across each region, with 10 of 11 of the northern circles

(91%) showing declines, and most (8 of 12, 67%) of the southern circles showing increasing numbers.

Grassland/open county habitat within the northern CBC circles declined by 6% from 2001 to 2021. Nine (82%) of the 11 northern circles showed decreases in available habitat (Table 2).

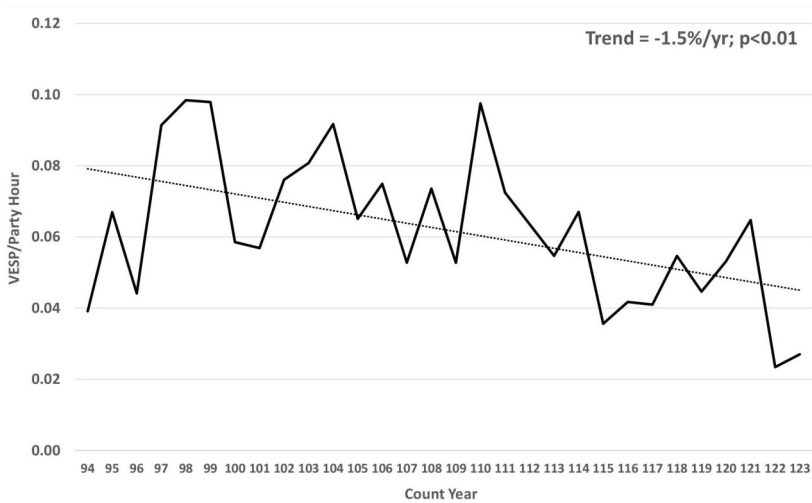


Figure 3. Trend for Vesper Sparrow winter abundance, 1993–2023, from all California CBC circles used. Trendline and statistics are from linear regression.



Figure 4. Trend for Vesper Sparrow winter abundance 1993–2023, from northern California CBC circles. Trendlines and statistics are from linear regression.

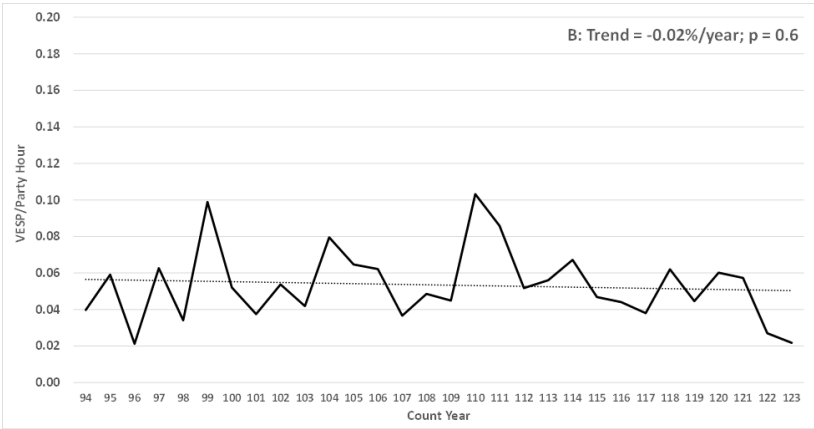


Figure 5. Trend for Vesper Sparrow winter abundance 1993–2023, from southern California CBC circles. Trendlines and statistics are from linear regression.

Table 2. Change in available grassland/open country habitat within the northern California CBC circles based on the National Land Cover Database.

Circle	Open Habitat (ha)		% change
	NLCD 2001	NLCD 2021	
Bakersfield	26,642	25,652	-4%
Carrizo Plain	37,806	37,478	-1%
Folsom	17,244	14,705	-15%
LaGrange-Waterford	30,607	23,373	-24%
Lost Lake-Fresno	30,613	30,174	-1%
Panoche Valley	32,009	32,046	0%
Peace Valley	8,535	8,207	-4%
Putah Creek	8,070	7,097	-12%
South Fork Valley	38,780	38,878	0%
Springville	23,726	23,191	-2%
Wallace-Bellota	29,062	26,533	-9%
TOTAL	283,096	267,335	-6%

DISCUSSION

Most sources (Grinnell and Miller 1944, Jones and Cornely 2002, Erickson 2008, Beedy and Pandolfino 2013) suggest that the Vesper Sparrows wintering north of Kern County and along the eastern and western fringes of the Central Valley are mostly Oregon Vesper Sparrows, and that most Vesper Sparrows wintering in southern California are *P.g. confinis*. Thus, our finding of a significant decline in northern CBC circles compared to no significant trend in the southern circles may reflect an overall decline in the wintering population of the Oregon Vesper Sparrow, a finding consistent with the observed declines of the subspecies in the breeding range.

The grassland habitats of California have been, and are still being, converted to intensive agriculture (chiefly vineyards and orchards) or human urban development (Vickery et al. 1999, Cameron et al. 2014, Pandolfino et al. 2021). Nearly all the of the bird species that winter in Central Valley grasslands are declining (Pandolfino and Handel 2018, Hammond et al. 2022, Pandolfino and Douglas 2022). This loss of appropriate habitat is mirrored within the northern CBC circles used for our analysis. Thus, it is likely that, in addition to any stressors that the Oregon Vesper Sparrow is experiencing in its breeding range, declining winter habitat may have an additive negative impact on this taxon.

These results are strongly suggestive of significant declines in wintering Oregon Vesper Sparrows but are not fully conclusive for several reasons. First, uncertainty about the exact winter range of *P.g. confinis* in California and the relative proportions of *P.g. confinis* vs. *affinis* in various areas make it difficult to assert that the observed trend of the Vesper Sparrows from the northern CBC circles is due mostly to declines of the Oregon subspecies. Also, CBC data are most useful with relatively common, widespread species that are easy to identify. Wintering Vesper Sparrows are not common in California and less-experienced birders may confuse them with the abundant Savannah Sparrow (Beadle and Rising 2002). Also, given their relative rarity on many counts, CBC participants may make special efforts to seek out this species by visiting sites where the species is expected or has been recently reported .

The presumed relative proportions of the two wintering subspecies in California are based on a fairly small number (251) of available specimens, most of which were collected in the early 20th century (Erickson 2008). In-hand evaluation and photographs of Vesper Sparrows captured in banding operations could help to quantify the predominance of Oregon Vesper Sparrows in the northern portions of the state. A review of photos from California eBird checklists may be useful, although, differentiation of these two subspecies may be difficult from those photographs.

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Vesper Sparrow (*Pooecetes gramineus*). 23 November 2023. White Rock Rd, Mariposa Co., California. *Photo by Daniel L. Brown.*