Using Motus technology to track Oregon Vesper Sparrow post-fledging survival, juvenile annual survival, and dispersal

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Introduction

The Oregon Vesper Sparrow has been petitioned for listing under the Endangered Species Act because of its small population size and declining trend. Breeding Bird Surveys indicate a statistically significant declining population trend of ~5% per year (Sauer et al. 2017), and the estimated range-wide population size is just 2,000-3,000 birds (Altman 2011). Conservation action is needed in order to halt and reverse this trend, but factors limiting population size and causes of decline are not understood. To help inform conservation actions for this at-risk subspecies, Klamath Bird Observatory is participating in a range-wide study of Oregon Vesper Sparrow distribution, demography, and habitat associations led by the American Bird Conservancy, for which we conduct detailed research on a breeding population in the Rogue Basin in southern Oregon. A decade of research has focused on breeding habitat needs, nest success, and annual survival; more information is needed about the post-fledging period to complete a full conservation assessment. Previous data from the Rogue Basin are notable in the low juvenile return rates compared to the Willamette Valley (Stephens and Rockwell 2021), but it is unknown whether this is due to high dispersal or mortality rates. We are using Motus (www.motus.org) radio telemetry technology to increase detection probabilities, and better estimate post-fledging survival, juvenile annual survival, and natal dispersal patterns. To address this knowledge gap, we deployed Motus-compatible LifeTags on 15 late-stage nestlings in 2023, and color-banded an additional 31 nestlings to serve as controls to examine any potential negative effects of tagging. We aim to answer five questions: 1) what are post-fledging survival rates? 2) what are juvenile annual survival rates? 3) could these demographic rates be limiting population growth? 4) where do young from our main study site tend to disperse to the following spring? and 5) are survival rates different between Motus-tagged and control birds?

Methods and Effort Summary

The Rogue Basin population of Oregon Vesper Sparrow is centered at Lily Glen County Park, site of our ongoing research project, and the nearly adjacent Vesper Meadow Restoration Preserve (~20 miles east of Ashland, OR), where the main Motus station is located. With funding from OCRF, our field crew located and monitored 34 Oregon Vesper Sparrow nests in May-July 2023. We applied CTT LifeTags and color bands to 15 Oregon Vesper Sparrow nestlings when they reached an appropriate age for harness fit (7-8 days old). LifeTags with harnesses weighed ~0.6g, allowing us to place them on most late-stage nestlings while remaining under 4% of body mass as permitted to us by the USGS Bird Banding Lab for bird safety. Thirty-one additional nestlings were color-banded to serve as controls. We Motus-tagged half of the nestlings and

color-banded half from each nest when possible. If a nest only contained one nestling, it was color-banded only. We visited three study areas at Vesper Meadow and Lily Glen twice per week to attempt to resight both Motus-tagged and control birds, from fledging until departure on fall migration (mid-June to early October). We completed all goals from the field season as planned, exceeding sample size goals for number of nests found and control birds banded.

Future

Analysis of field data will be completed in 2024-2025 as part of a broader, range-wide analysis effort that includes data on juvenile and adult survival, nest success and productivity, nest site selection, and GPS migration tracking, using matching funds from the BLM and USFWS, and including partners at other field sites in Oregon and Washington. Our Motus research results, including post-fledging survival and habitat use, will be specifically included in reports we write with matching funds from BLM Title II. We will also incorporate fledgling survival results and future tagging recommendations into our own work, and our reporting to the Bird Banding Lab.

We will complete a thorough resighting effort in spring 2024, to estimate juvenile annual survival rates and explore where fledglings from Vesper Meadow may disperse to. We expect that a Motus node array, in combination with the use of a handheld radio telemetry antenna to search other nearby meadows, will increase our detection probabilities and improve our ability to estimate juvenile annual survival and dispersal compared to color-band resighting alone. In the past, this has proven to be difficult beyond the two primary study sites, due to property access issues and the large areas to cover, but will be easier with tagged birds and potential detection via Motus nodes and handheld antennas. This is a critical next step to identify limiting factors for this population: discovering whether juveniles are surviving and returning to the breeding grounds (but frequently dispersing to different meadows), or whether they are experiencing high mortality in the post-fledging period, during migration, and/or overwinter. Advancing our knowledge of demographic rates and potential factors limiting population growth of the Oregon Vesper Sparrow will contribute to full life cycle conservation of this imperiled bird. This work is especially timely to inform the USFWS Species Status Review that is currently taking place, with an Endangered Species Act listing decision expected in 2026.

References

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