



Landbird Monitoring

*2023 Results from Oregon Caves National Monument and Preserve,
Lava Beds National Monument, and Redwood National and State
Parks*



Sage thrasher.

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Landbird monitoring: 2023 results from Oregon Caves National Monument and Preserve, Lava Beds National Monument, and Redwood National and State Parks

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Abstract

In 2023, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the 15th year of long-term landbird monitoring in partnership with the Klamath Bird Observatory. This partnership developed a monitoring framework using standard avian sampling methods including variable circular plot point counts, mist netting, species checklists, and habitat surveys. Point counts were conducted at two parks according to the three-year rotation schedule. In 2023, the sixth year of point counts was completed along with corresponding species checklists and habitat surveys at 25 locations within Lava Beds National Monument, and 15 (out of 30) locations within Redwood National and State Parks. The reduction in survey locations at Redwoods National and State Parks was implemented in 2021 to allow surveyors to work in pairs for safety reasons and is an ongoing change to the monitoring at the park. The operation of an ongoing constant effort monitoring station, which included mist netting and species checklists, continued at Oregon Caves National Monument and Preserve during the breeding and fall migration seasons. Relative abundance (birds/station) was modelled for all survey sites combined within each park from the point count data. Total captures, by season, were calculated using constant effort mist netting data. Species of conservation importance were among the most abundant species at each park. Results are presented along with conservation status of individual species based on Partners in Flight (PIF) state and continental plans and Oregon and California Wildlife Conservation Strategies. This 15th year of implementation of the KLMN landbird monitoring program continued to lay the groundwork for improved understanding of landbird status and long-term trends in each park. When analyzed in the framework of the Klamath Bird Monitoring Network, the contribution of KLMN parks to bird conservation in this region will help inform landbird conservation in the West.

Acknowledgments

We thank John Alexander, Kathryn Irvine, Sean Mohren, and Daniel Sarr for their contributions to the landbird monitoring protocol. Implementation of the monitoring program would not have been possible without the help of both network and park staff. Special thanks to Alice Chung-MacCoubrey, Eric Dinger, Keith Benson, David Hayes, Jason Walz, Amber Transou, and Mark Morrisette for their logistical support in 2023. We appreciate Allison Snyder's support for data management. The dedication of the field crews made this season successful. Point count surveys were completed by Ryan Ballard, Nick Ramsey, Fianna Wilde, and Samantha Webb. The constant effort monitoring station was run by KBO Banding Program Manager Lucinda Zawadzki, Lead Bander Martín López Aguilar, KBO Staff Samantha Webb, and student volunteer interns: Otávio Rocha, Alexandra Badeaux, Daveka Boodram, Eli Hersh, Giselle Ragoonanan, and Ché Marlon Ragoonanan. Additional thanks to Dr. Sarah Rockwell, acting Science Director at KBO for the 2023 field season.

Introduction

In 2023, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service (NPS) implemented the 15th year of their long-term landbird monitoring protocol (Stephens, Mohren et al. 2010). Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and has conducted the monitoring since 2008. This annual report provides a summary of 2023 efforts, including (1) a summary of the monitoring protocol, (2) a summary of point count and area search surveys and constant effort monitoring visits, and (3) a summary of birds detected at each of the park units where monitoring occurred.

The KLMN monitors natural resources in parks of southern Oregon and northern California, including Crater Lake National Park (CRLA), Lava Beds National Monument (LBE), Lassen Volcanic National Park (LAVO), Oregon Caves National Monument and Preserve (ORCA), Redwood National and State Parks (RNSP), and Whiskeytown National Recreation Area (WHIS). These park units fall within the Klamath Region. This region includes a broad range of topography, elevation, and corresponding climate and vegetation. The region is recognized for its rich biodiversity, which is represented by diverse avifauna (Trail et al. 1997; DellaSala et al. 1999; Stephens et al. 2016).

Landbird monitoring contributes to the vital signs monitoring program that has been developed by the KLMN (Sarr et al. 2007). A landbird monitoring protocol was designed to yield important information about avian community composition, status of landbirds in a given year, and long-term population trends of specific species for each KLMN park unit (Stephens, Mohren et al. 2010). The avian sampling methods incorporated in this protocol include point count surveys, constant effort mist netting, and a compilation of species checklists at specific sites. The methodology selected for each park was based on park unit size, habitat composition, and historical bird monitoring efforts (Stephens, Mohren et al. 2010).

KLMN landbird monitoring contributes to regional and continental bird monitoring programs and aligns with the U.S. North American Bird Conservation Initiative Monitoring Subcommittee recommendations for improving avian monitoring (US NABCI 2007). In addition, KLMN landbird monitoring is integrated with an extensive regional bird monitoring network. The Klamath Bird Monitoring Network is a bird monitoring partnership that extends across the Klamath-Siskiyou Bioregion (Alexander et al. 2004). It has been coordinated by the Klamath Bird Observatory and the U.S. Forest Service Redwood Sciences Laboratory for over 20 years. This effort has yielded a substantial regional dataset with information about landbird distribution, population trends, and population demographics (Alexander et al. 2004). Additionally, data are contributed to Avian Knowledge Northwest, a regional node of the Avian Knowledge Network. The KLMN landbird monitoring program also fits within continental monitoring programs, including the Landbird Monitoring Network of the Americas (Alexander and Ralph 2005) and the Monitoring Avian Productivity and Survivorship Program (DeSante et al. 2004).

The KLMN landbird monitoring effort is informed by and contributes to the Partners in Flight (PIF) landbird conservation initiative. Regional and continental PIF habitat-based bird conservation objectives are met through the implementation of the NPS mission to preserve natural resources unimpaired for future generations. Partners in Flight conservation plans and state wildlife conservation strategies provide a framework for understanding landbird status in the parks. Recently, long-term monitoring data from the six park units were applied to test the PIF focal species approach against site-specific empirical data (Stephens, Dinger, and Alexander 2019). We use these resources to frame the results of the KLMN landbird monitoring efforts.

The objectives of the *Klamath Network Landbird Monitoring Protocol* are to:

1. Monitor breeding landbird richness, relative abundance, and density.
2. Co-sample habitat parameters and integrate bird and vegetation monitoring to aid in interpretation of landbird status and trends.
3. Determine status and trends in demographic parameters (productivity, adult survival, and recruitment) for selected landbird species in a mixed-conifer and riparian habitat at Oregon Caves National Monument and Preserve.

This annual report provides an overview of methodology and implementation of yearly field surveys. Results presented in this report are limited to general information about bird presence and abundance. Additional analysis and synthesis reports are completed every third year, to include results of species detectability and density, community and habitat structure, and landbird status and trends (Rockwell et al. 2016; Stephens, Dinger, and Alexander 2019; Stephens et al. 2016; Stephens, Mohren, Barton et al. 2013; Stephens, Mohren, Newell et al. 2013).

Methods

Sampling Design

The KLMN landbird monitoring protocol incorporates multiple standard avian sampling methods (Ralph et al. 1993; Stephens, Mohren et al. 2010), including variable circular plot point counts, mist netting, species checklists, and habitat surveys. The use of these complementary methods, which gather information about multiple bird species, optimizes the amount of information gathered about birds in each park and includes information about each park's bird community as a whole. Twenty-five to 35 point count routes were established at each park unit corresponding to park unit size, with the exception of Oregon Caves National Monument and Preserve. Due to the relatively small size of the monument, monitoring includes a constant effort mist net station and four point count routes.

The sampling frames for Crater Lake National Park, Lassen Volcanic National Park, Lava Beds National Monument, and Redwood National and State Parks include locations between 100 m and 1000 m from a road or trail. The roads and trails within KLMN park units cross most environmental gradients. Further refinement of sampling frames considered three potential elevation and habitat-associated frames (high elevation; riparian; and matrix, which includes all non-high elevation and non-riparian areas) and varied by park (Sarr et al. 2007). At Whiskeytown National Recreation Area, the sampling frame was limited to roads, trails, and power lines for safety reasons. At Oregon Caves National Monument and Preserve we established sampling locations within the monument and the expanded area (the "preserve") and applied a slightly different sampling frame to each. Within the monument, the sampling frame included locations between 100 m and 1000 m from a road and within 1000 m of a trail (i.e., locations could be established within 100 m of a trail). Because of the high density of trails, this sampling frame was necessary in order to place a point count route within the monument. The sampling frame within the preserve included locations between 100 m and 1000 m from a road or trail.

We used the Generalized Random Tessellation Stratified (GRTS) method (Stevens and Olsen 2004) to develop spatially balanced sampling locations of point count sites within each sampling frame. The number of point count sites varies by park and is based on park size: Crater Lake National Park ($n = 35$), Lassen Volcanic National Park ($n = 25$), Lava Beds National Monument ($n = 25$), Oregon Caves National Monument and Preserve ($n = 4$), Redwood National and State Parks ($n = 30$), and Whiskeytown National Recreation Area ($n = 30$). Beginning in 2021, the sample size at Redwood National and State Parks was reduced from 30 sites to 15 because surveyors must work in pairs (rather than independently) for safety reasons. At each point count site, a series of stations are surveyed in a single morning, referred to as a point count route. The number of point count stations on a route is typically determined by time constraints; optimally, 12 stations are surveyed within each route, which is the case for all routes in all parks with the exception of Lassen Volcanic National Park and Redwood National and State Parks. At Lassen Volcanic National Park three points were dropped during the initial year of protocol implementation due to safety and time constraints. Because of the rugged terrain at Redwood National and State Parks, the number of established point count stations varies from six to eight for each route. Stations were placed 250 m apart, which nearly

eliminates the likelihood of double counting birds (Scott et al. 1981). Point count stations are sampled during the breeding season (early May through early July) using 5-minute count periods following the variable circular plot (VCP) methodology that incorporates distance sampling (Reynolds et al. 1980; Fancy 1997; Nelson and Fancy 1999).

At Oregon Caves National Monument and Preserve, an ongoing constant effort monitoring station is operated following standard protocols (Ralph et al. 2004; Stephens, Mohren et al. 2010) during the breeding season as well as during the fall dispersal and migration seasons. In previous years, we defined the breeding season as early May through late August and the migration season as late August through mid-October. In 2021 and beyond, we adjusted this framework to redefine breeding as May through August 9th and fall dispersal and migration as August 10th through October. This follows the definition from the Monitoring Avian Productivity and Survivorship (MAPS) program (DeSante et al. 2021) and better aligns with the life history of landbirds in our region. This change does not affect the total number of survey efforts. This is a sentinel site, which was selected subjectively as a location of special interest due to habitat characteristics. Specifically, this site was selected because of riparian habitat and accessibility by trail.

Field Surveys

Monitoring Schedule

In accord with the KLMN landbird monitoring protocol, each of the six park units is to be monitored every third year using point counts and associated methodologies. The first round of visits was completed from 2008 to 2010, the second round from 2011 to 2013, the third round from 2014 to 2016, the fourth round from 2017 to 2019, the fifth round from 2021 to 2022, and the sixth round of visits began in 2023. The parks are paired in a given survey year such that Redwood National and State Parks and Lava Beds National Monument are surveyed in year one, Lassen Volcanic National Park and Whiskeytown National Recreation Area in year two, and Crater Lake National Park and Oregon Caves National Monument and Preserve in year three. However, during the first round of surveys Lassen Volcanic National Park was completed in 2010 (year 3) rather than 2009 (year 2) due to logistical challenges with site establishment in 2009. Surveys were not implemented in 2020 due to the COVID-19 pandemic. In 2021, we completed the fifth round of visits at Lava Beds National Monument and Redwood National and State Parks (Figure 1 and Figure 2). Beginning in 2021, surveys at Redwood National and State Parks have been completed by pairs of observers for safety reasons. As a result, only 15 out of 30 established routes will be surveyed moving forward. In 2022, four national park units (Crater Lake National Park, Lassen Volcanic National Park, Oregon Caves National Monument, and Whiskeytown National Recreation Area) were surveyed instead of two to compensate for surveys missed in 2020 due to the emerging COVID-19 pandemic. In addition, in 2023 we continued the annual operation of the constant effort monitoring station at Oregon Caves National Monument and Preserve.

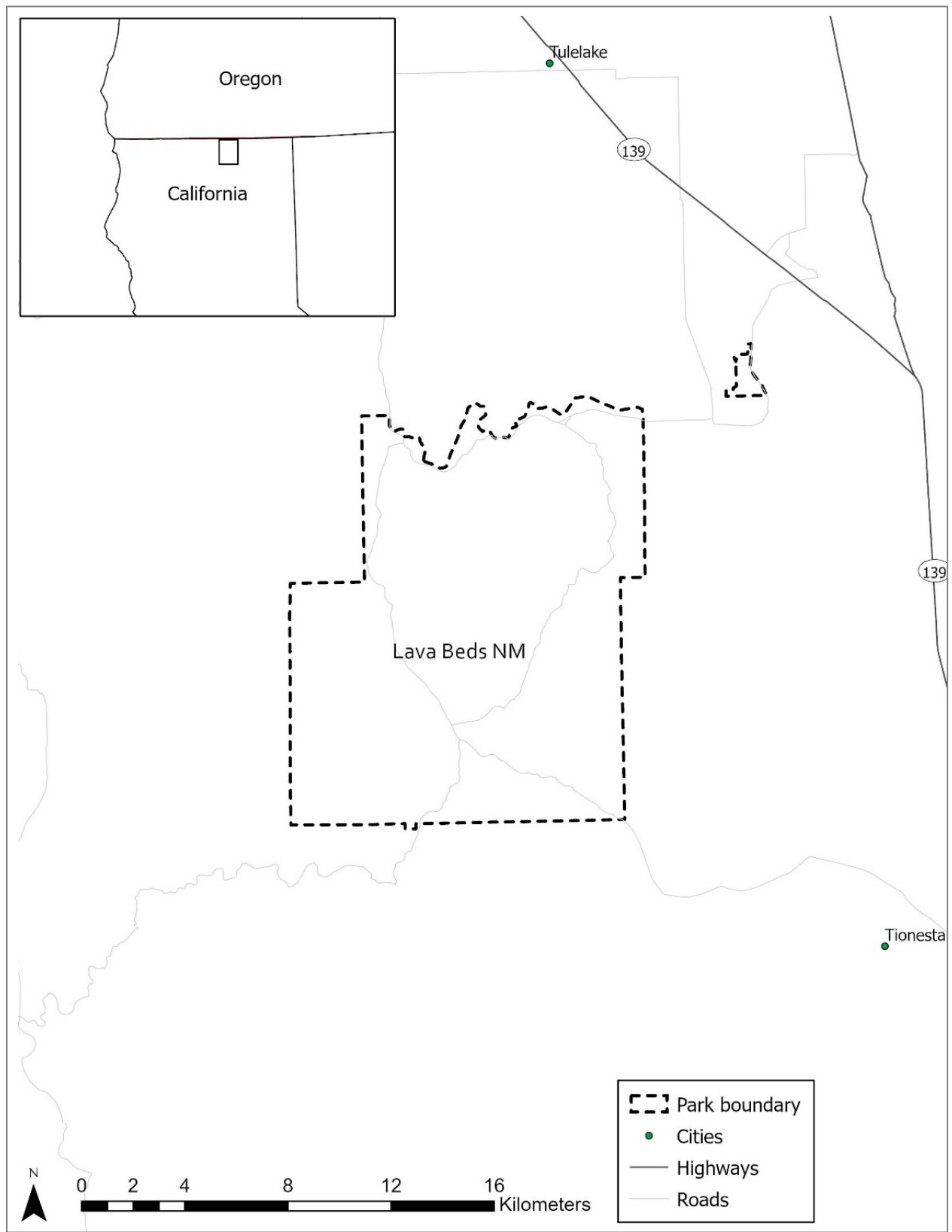


Figure 1. Lava Beds National Monument is located in northern California. NPS

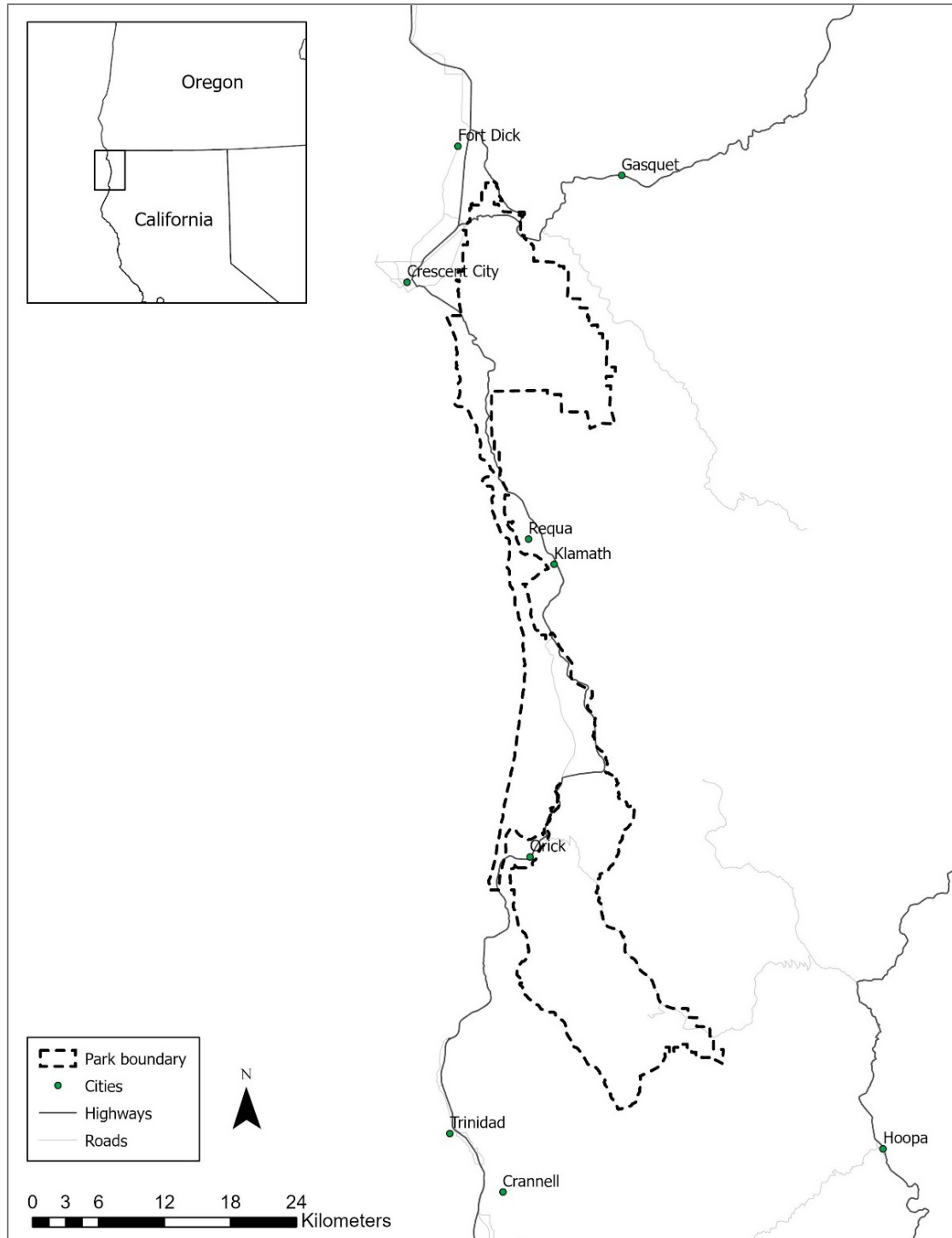


Figure 2. Redwood National and State Parks are located in northern California. NPS

Training

Point count surveyors all had previous experience with point count methodology and were proficient with western bird species identification by sight and sound. At the onset of the field season point count surveyors participated in a three-day to two-week long training session, depending on

experience. Training exercises included group calibration for distance estimation and simultaneous point count and vegetation surveys in the field. A certification test for bird species identification, which included various written and audio exercises, was completed by all point count surveyors. Interns that operated the constant effort monitoring station underwent ongoing training throughout the season. Benchmarks were noted for proficiency with bird extraction and handling, bird identification, and data collection. A primary bander who had undergone certification operated the station, with the assistance of interns who were at varying levels within the training program.

Variable Circular Plot Point Count

Point count surveys began within 15 minutes of sunrise. The observer used a digital rangefinder to establish distance reference points at each station prior to conducting the survey. During a 5-minute count period, all birds detected by sight or sound were identified to species and recorded on data forms, along with the horizontal distance to each bird, estimated as accurately as possible and rounded to the nearest meter. In addition, for each individual, the time of detection (rounded to the previous minute), detection type (e.g., visual, song, call), and breeding status were also recorded. All point count stations along a given route (or as many stations as possible) were completed by a single surveyor within 4 hours of sunrise.

Constant Effort Monitoring Station

The constant effort monitoring station incorporated a variety of survey methods to sample avian species, including mist netting, point counts, species checklists, and habitat surveys. The mist netting station at Oregon Caves National Monument and Preserve had 10 nets set in an array. This arrangement optimized bird capture and met logistical constraints. Mist nets were opened within 15 minutes of sunrise and operated for 5 hours. Nets were not operated during inclement weather conditions that might affect capture rates or bird safety. All birds that were captured were identified to species, aged and sexed according to Pyle (2022), and checked for signs of breeding condition (e.g., cloacal protuberances and brood patches); additional biometrics were collected. All captured birds, excluding hummingbirds and game birds, were banded with a U.S. Geological Survey Bird Banding Laboratory aluminum butt-end leg band.

Two area search surveys were completed annually at the mist net site on each day the site was operated until 2022. This method provided additional information, such as presence and breeding status of most of the birds occurring at the site, including those not often captured in the nets (e.g., canopy dwelling warblers). During an area search, the surveyor moved around the designated area for a 20-minute period, recording all birds seen or heard. The two area search plots at Oregon Caves National Monument and Preserve were approximately 0.4 and 0.6 ha in size. Area searches were discontinued in 2023 because species tally checklists were determined to provide a more complete reflection of birds present at the site.

Species Checklists

Species checklists were completed in conjunction with all bird monitoring efforts, including point count, habitat, and mist netting. Species checklists added value to survey data by documenting encounters of all species during an effort, as well as breeding status and detection/detectability

information. Checklists enabled surveyors to record information on common and rare species that may or may not have been detected using the other survey techniques.

Habitat Surveys

In addition to avian surveys, habitat surveys were completed at each point count station following a standard methodology (Ralph et al. 1993). The surveys were designed specifically to account for habitat aspects associated with the feeding and nesting requirements of birds. The habitat sampling was conducted using a vegetation relevé method that was suitable for any vegetation type and provided an efficient assessment of vegetation composition and structure. Visual estimates of cover and height for all vegetation layers, tree and shrub species, and other plant forms were recorded, along with snag counts, presence of water, evidence of burns, and tree size and height. Habitat data will be used as part of several larger analyses as described in the KLMN landbird monitoring protocol (Stephens, Mohren et al. 2010).

Data

Data Delivery

Mist Net, Mist Net Hours, and Vegetation data were entered into relational Access databases. Point Count and Checklist data were entered directly into Avian Knowledge Network's online interface and were later downloaded and brought into an Access database for delivery to KLMN. The verified, validated, and certified data were submitted to KLMN, where they were uploaded into one relational database designed using the NPS natural resource database template.

Data Analysis

Relative abundance (birds/station), as measured by point counts and species checklist surveys, was calculated for all survey points combined within each park. Only species detected within 50 m of point count survey stations and within the established area search plots were included in abundance calculations. We also calculated the proportion of point count routes on which a given species was detected, out of the total number of routes surveyed in each park. Total captures, by season, were calculated using constant effort mist net data. Partners in Flight focal species, which are indicative of a variety of ecosystem components (Altman and Alexander 2012; CalPIF 2002a, 2002b, 2004, 2005; RHJV 2004; Rosenberg et al. 2016; Rockwell et al. 2022), and conservation status from the Oregon and California State Wildlife Conservation Strategies (CDFW 2015; ODFW 2016) are highlighted in the results where applicable.

Results

Lava Beds National Monument

In 2023 we surveyed 25 permanent point count survey routes at Lava Beds National Monument, each consisting of 12 survey stations (Figure 3). Lava Beds National Monument does not contain any high elevation or riparian areas, so the sampling frame for this park unit included matrix lands, which encompass the entire park except for lava flow areas. Surveys were completed from May 16th to June 2nd by Ryan Ballard and Samantha Webb. The 2023 point count surveys recorded 56 species within 50 m of the stations (Table 1). An additional 26 species were recorded outside of 50 m during point count surveys or encountered between bird surveys or during vegetation surveys and accounted for on species checklists (Table 2). Sixty-five species have been detected within 50 m of the stations during at least 1 of 5 survey years, and a total of 22 species have been detected within 50 m of the stations throughout all 5 years of surveys. Species detected at Lava Beds within 50 m of the stations for the first time in 2023 include Common Nighthawk, Song Sparrow, Eurasian Collared Dove, Cliff Swallow, Marsh Wren, Rock Pigeon, and Ring-necked Pheasant.

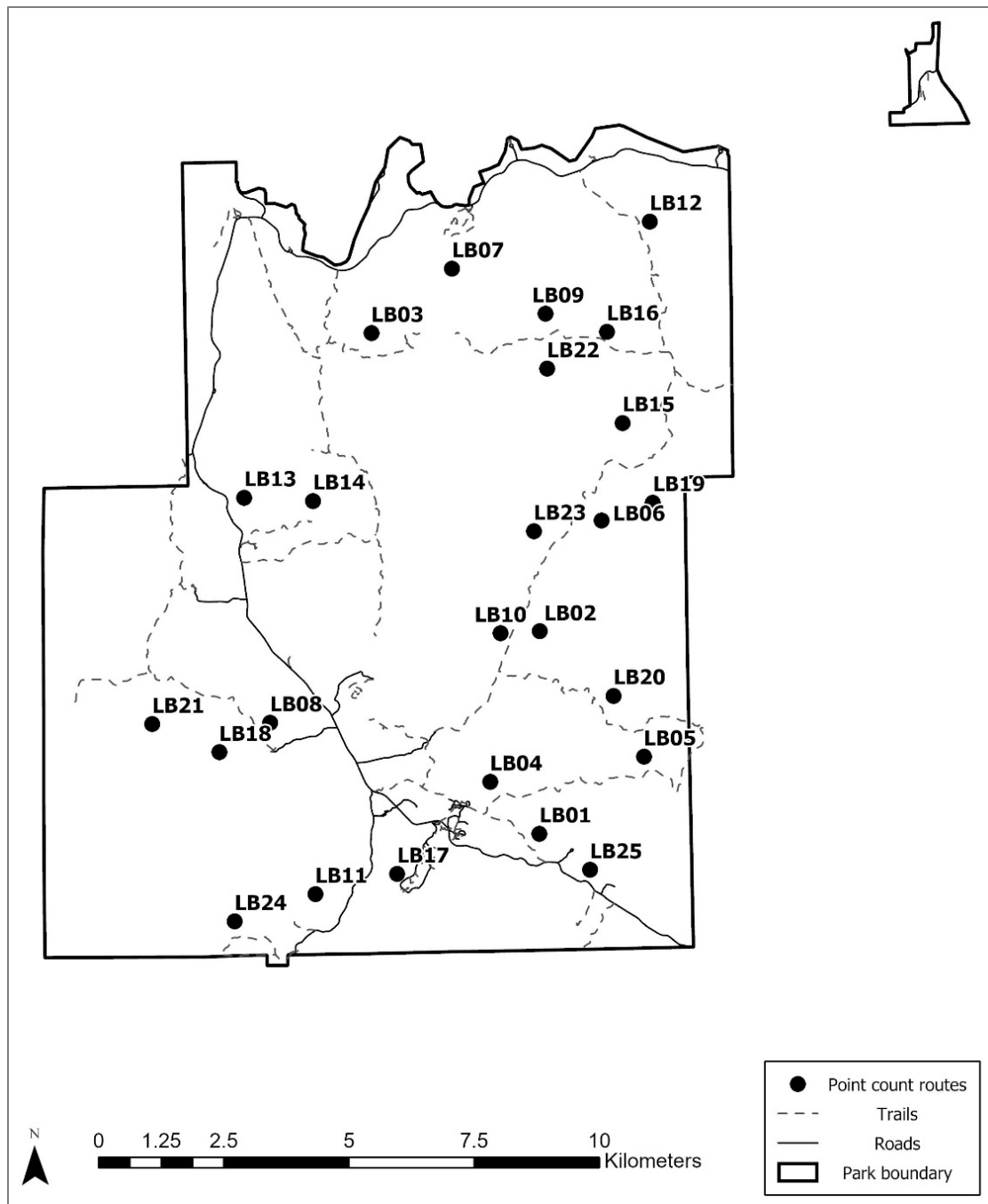


Figure 3. Point count routes at long-term landbird monitoring sites in Lava Beds National Monument. NPS

Table 1. Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Lava Beds National Monument and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Conifer ^A	CalPIF Sage-brush ^B	ContPIF Northern Pacific Rain-forest ^C	ContPIF Great Basin ^C	CDFW Modoc Plateau ^D
Rock Wren	<i>Salpinctes obsoletus</i>	0.073	0.150	0.097	0.143	0.027	0.380	0.76	–	–	–	–	–
Lark Sparrow	<i>Chondestes grammacus</i>	0.077	0.090	0.073	0.099	0.027	0.277	0.64	–	X	–	–	X
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.013	0.027	0.043	0.056	0.023	0.153	0.52	–	–	–	–	–
Mountain Bluebird	<i>Sialia currucoides</i>	0.013	0.013	0.013	0.004	0.017	0.103	0.48	–	–	–	–	–
Mourning Dove	<i>Zenaida macroura</i>	0.073	0.073	0.050	0.028	0.013	0.090	0.44	–	–	–	–	–
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.007	0.070	0.020	0.004	0.000	0.087	0.32	–	–	–	D	–
Brown-headed Cowbird	<i>Molothrus ater</i>	0.150	0.130	0.140	0.139	0.073	0.067	0.40	–	–	–	–	–
Brewer's Sparrow	<i>Spizella breweri</i>	0.040	0.080	0.043	0.060	0.000	0.063	0.32	–	X	–	–	X
Chipping Sparrow	<i>Spizella passerina</i>	0.150	0.093	0.167	0.067	0.017	0.063	0.32	X	–	–	–	–
Horned Lark	<i>Eremophila alpestris</i>	0.080	0.040	0.050	0.095	0.000	0.050	0.28	–	–	–	W	–
Western Kingbird	<i>Tyrannus verticalis</i>	0.000	0.003	0.027	0.008	0.010	0.047	0.28	–	–	–	–	–
Say's Phoebe	<i>Sayornis saya</i>	0.000	0.003	0.010	0.008	0.003	0.040	0.32	–	–	–	–	–
Gray Flycatcher	<i>Empidonax wrightii</i>	0.067	0.043	0.150	0.075	0.060	0.037	0.28	X	X	–	–	X
Spotted Towhee	<i>Pipilo maculatus</i>	0.633	0.347	0.280	0.655	0.073	0.033	0.12	–	–	–	–	–
Western Wood- Pewee	<i>Contopus sordidulus</i>	0.007	0.000	0.003	0.024	0.003	0.033	0.16	–	–	–	–	–
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.013	0.013	0.040	0.028	0.017	0.027	0.08	–	–	–	–	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).

^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^D California Department of Fish and Wildlife action plan (CDFW 2015).

Table 1 (continued). Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Lava Beds National Monument and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Conifer ^A	CalPIF Sage-brush ^B	ContPIF Northern Pacific Rain-forest ^C	ContPIF Great Basin ^C	CDFW Modoc Plateau ^D
Tree Swallow	<i>Tachycineta bicolor</i>	0.000	0.000	0.000	0.000	0.007	0.027	0.16	–	–	–	–	–
American Robin	<i>Turdus migratorius</i>	0.020	0.037	0.013	0.004	0.020	0.023	0.08	–	–	–	–	–
Bewick's Wren	<i>Thryomanes bewickii</i>	0.020	0.053	0.127	0.278	0.077	0.023	0.28	–	–	–	–	–
California Scrub- Jay	<i>Aphelocoma californica</i>	0.060	0.080	0.037	0.079	0.083	0.023	0.16	–	–	–	–	–
Rock Pigeon	<i>Columba livia</i>	0.000	0.000	0.000	0.000	0.000	0.023	0.12	–	–	–	–	–
Western Meadowlark	<i>Sturnella neglecta</i>	0.140	0.087	0.023	0.095	0.047	0.023	0.20	–	X	–	–	X
Western Tanager	<i>Piranga ludoviciana</i>	0.037	0.007	0.007	0.012	0.003	0.023	0.12	X	–	–	–	–
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.160	0.147	0.157	0.206	0.033	0.020	0.12	–	–	–	–	–
Cassin's Vireo	<i>Vireo cassinii</i>	0.003	0.000	0.000	0.000	0.007	0.020	0.12	–	–	–	–	–
Mountain Chickadee	<i>Poecile gambeli</i>	0.030	0.077	0.010	0.024	0.027	0.020	0.16	–	–	–	–	–
Oak/Juniper Titmouse sp.	<i>Baeolophus inornatus/ridgwayi</i>	0.033	0.020	0.023	0.044	0.083	0.020	0.12	–	X	–	–	–
California Quail	<i>Callipepla californica</i>	0.013	0.017	0.020	0.052	0.000	0.017	0.16	–	–	–	–	–
House Finch	<i>Carpodacus mexicanus</i>	0.000	0.003	0.000	0.012	0.027	0.017	0.08	–	–	–	–	–
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.023	0.007	0.020	0.044	0.017	0.013	0.08	–	–	–	–	–
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.003	0.020	0.010	0.008	0.000	0.013	0.08	–	–	–	–	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).

^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^D California Department of Fish and Wildlife action plan (CDFW 2015).

Table 1 (continued). Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Lava Beds National Monument and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Conifer ^A	CalPIF Sage-brush ^B	ContPIF Northern Pacific Rain-forest ^C	ContPIF Great Basin ^C	CDFW Modoc Plateau ^D
Common Nighthawk	<i>Chordeiles minor</i>	0.000	0.000	0.000	0.000	0.000	0.010	0.08	–	–	–	D	–
Lazuli Bunting	<i>Passerina amoena</i>	0.170	0.120	0.063	0.056	0.017	0.010	0.04	–	–	–	–	–
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.007	0.000	0.000	0.000	0.003	0.010	0.12	X	–	W	W	–
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.007	0.010	0.000	0.000	0.003	0.010	0.08	–	–	–	–	X
Song Sparrow	<i>Melospiza melodia</i>	0.000	0.000	0.000	0.000	0.000	0.010	0.12	–	–	–	–	–
Anna's Hummingbird	<i>Calypte anna</i>	0.000	0.000	0.000	0.004	0.000	0.007	0.04	–	–	–	–	–
Barn Swallow	<i>Hirundo rustica</i>	0.003	0.003	0.000	0.000	0.000	0.007	0.08	–	–	–	–	–
Dark-eyed Junco	<i>Junco hyemalis</i>	0.027	0.060	0.030	0.044	0.017	0.007	0.04	X	–	–	–	–
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	0.000	0.000	0.000	0.000	0.000	0.007	0.04	–	–	–	–	–
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.007	0.007	0.020	0.020	0.000	0.007	0.08	–	X	–	–	X
Lesser Goldfinch	<i>Spinus psaltria</i>	0.023	0.017	0.013	0.000	0.043	0.007	0.04	–	–	–	–	–
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.000	0.003	0.017	0.028	0.003	0.007	0.04	–	X	–	D	X
Northern Harrier	<i>Circus hudsonius</i>	0.000	0.000	0.000	0.004	0.000	0.007	0.08	–	–	–	–	X
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	0.003	0.000	0.023	0.000	0.003	0.007	0.04	–	–	–	W	–
American Kestrel	<i>Falco sparverius</i>	0.000	0.000	0.003	0.004	0.000	0.003	0.04	–	–	–	–	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).

^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^D California Department of Fish and Wildlife action plan (CDFW 2015).

Table 1 (continued). Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Lava Beds National Monument and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Conifer ^A	CalPIF Sage-brush ^B	ContPIF Northern Pacific Rain-forest ^C	ContPIF Great Basin ^C	CDFW Modoc Plateau ^D
Bullock's Oriole	<i>Icterus bullockii</i>	0.010	0.000	0.017	0.000	0.003	0.003	0.04	–	–	–	–	–
Cassin's Finch	<i>Haemorhous cassinii</i>	0.007	0.023	0.003	0.000	0.003	0.003	0.04	X	–	–	W	–
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.000	0.000	0.000	0.000	0.000	0.003	0.04	–	–	–	–	–
Marsh Wren	<i>Cistothorus palustris</i>	0.000	0.000	0.000	0.000	0.000	0.003	0.04	–	–	–	–	–
Mountain Quail	<i>Oreortyx pictus</i>	0.013	0.007	0.000	0.008	0.000	0.003	0.04	X	–	–	W	–
Northern Flicker	<i>Colaptes auratus</i>	0.010	0.020	0.013	0.012	0.007	0.003	0.04	–	–	–	–	–
Ring-necked Pheasant	<i>Phasianus colchicus</i>	0.000	0.000	0.000	0.000	0.000	0.003	0.04	–	–	–	–	–
Sage Thrasher	<i>Oreoscoptes montanus</i>	0.000	0.017	0.003	0.004	0.000	0.003	0.04	–	X	–	–	–
Steller's Jay	<i>Cyanocitta stelleri</i>	0.003	0.003	0.000	0.004	0.003	0.003	0.04	X	–	–	–	–
Townsend's Warbler	<i>Setophaga townsendi</i>	0.007	0.017	0.020	0.008	0.000	0.003	0.04	–	–	–	–	–
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.000	0.000	0.000	0.000	0.003	0.000	0.00	–	–	–	–	–
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	0.003	0.003	0.000	0.000	0.000	0.000	0.00	X	–	–	–	–
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.007	0.007	0.010	0.012	0.000	0.000	0.00	–	–	–	–	–
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0.000	0.000	0.003	0.000	0.000	0.000	0.00	–	–	–	–	–
Bushtit	<i>Psaltiriparus minimus</i>	0.060	0.060	0.053	0.083	0.000	0.000	0.00	–	–	–	–	–
California Towhee	<i>Melospiza crissalis</i>	0.003	0.000	0.000	0.012	0.007	0.000	0.00	–	–	–	–	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).

^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

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Table 1 (continued). Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Lava Beds National Monument and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Conifer ^A	CalPIF Sage-brush ^B	ContPIF Northern Pacific Rain-forest ^C	ContPIF Great Basin ^C	CDFW Modoc Plateau ^D
Calliope Hummingbird	<i>Stellula calliope</i>	0.007	0.007	0.007	0.000	0.000	0.000	0.00	–	–	–	–	–
Canyon Wren	<i>Catherpes mexicanus</i>	0.000	0.007	0.003	0.024	0.000	0.000	0.00	–	–	–	–	–
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.000	0.050	0.000	0.000	0.037	0.000	0.00	–	–	–	–	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).
^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).
^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).
^D California Department of Fish and Wildlife action plan (CDFW 2015).

Table 2. List of additional species detected at Lava Beds National Monument in 2023 (not counted within 50 m during variable circular plot point count surveys) and conservation status. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	CalPIF Conifer^A	CalPIF Sage- brush^B	ContPIF Northern Pacific Rain- forest^C	ContPIF Great Basin^C	CDFW Modoc Plateau^D
American Crow	<i>Corvus brachyrhynchos</i>	–	–	–	–	–
American Goldfinch	<i>Spinus tristis</i>	–	–	–	–	–
Bald Eagle	<i>Haliaeetus leucocephalus</i>	–	–	–	–	–
Black-billed Magpie	<i>Pica hudsonia</i>	–	–	–	–	–
Black-capped Chickadee	<i>Poecile atricapillus</i>	–	–	–	–	–
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	–	–	–	–	–
Bushtit	<i>Psaltiriparus minimus</i>	–	–	–	–	–
Canada Goose	<i>Branta canadensis</i>	–	–	–	–	–
Canyon Wren	<i>Catherpes mexicanus</i>	–	–	–	–	–
Clark's Nutcracker	<i>Nucifraga columbiana</i>	X	–	–	–	–
Common Raven	<i>Corvus corax</i>	–	–	–	–	–
European Starling	<i>Sturnus vulgaris</i>	–	–	–	–	–
Gadwall	<i>Mareca strepera</i>	–	–	–	–	–
Great Blue Heron	<i>Ardea herodias</i>	–	–	–	–	–
Hairy Woodpecker	<i>Leuconotopicus villosus</i>	–	–	–	–	–
House Wren	<i>Troglodytes aedon</i>	–	–	–	–	–
Lewis's Woodpecker	<i>Melanerpes lewis</i>	–	–	W	W	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).

^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^D California Department of Fish and Wildlife action plan (CDFW 2015).

Table 2 (continued). List of additional species detected at Lava Beds National Monument in 2023 (not counted within 50 m during variable circular plot point count surveys) and conservation status. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	CalPIF Conifer ^A	CalPIF Sagebrush ^B	ContPIF Northern Pacific Rainforest ^C	ContPIF Great Basin ^C	CDFW Modoc Plateau ^D
Mallard	<i>Anas platyrhynchos</i>	–	–	–	–	–
Red-tailed Hawk	<i>Buteo jamaicensis</i>	–	–	–	–	–
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	–	–	–	–	–
Ruby-crowned Kinglet	<i>Regulus calendula</i>	–	–	–	–	–
Sooty Grouse	<i>Dendragapus fuliginosus</i>	–	–	W	–	–
Turkey Vulture	<i>Cathartes aura</i>	–	–	–	–	–
Western Bluebird	<i>Sialia mexicana</i>	–	–	–	–	–
Wilson's Warbler	<i>Cardellina pusilla</i>	–	–	D	–	–
Yellow-rumped Warbler	<i>Setophaga coronata</i>	X	–	–	–	–

^A California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^B California Partners in Flight Sagebrush bird conservation plan (CalPIF 2005).

^C Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^D California Department of Fish and Wildlife action plan (CDFW 2015).

Redwood National and State Parks

At Redwood National and State Parks, the matrix areas were sampled using point count and species checklist methods. The park does not contain high elevation areas but does contain riparian areas that were excluded from sampling. Because of the rugged terrain in these parks, the number of established point count stations varied from six to eight for each route. In 2021, it was determined that surveyors in these parks would work in pairs for safety purposes. For that reason, we surveyed only 15 of the 30 permanent point count survey routes (Figure 4 and Figure 5). We attempted to survey the first 15 routes in the original GRTS (Generalized Random Tessellation Stratified) design to best achieve spatial balance, but several of the routes were inaccessible (Table 3) and were replaced with sites from the GRTS oversample. All points in each of the 15 routes completed were surveyed in 2023 except for some points in routes RW11, RW12, RW13, RW15, and RW17 due to difficulty accessing all points within the survey time period. Surveys were completed from June 8th to July 4th by Fianna Wilde, Ryan Ballard, and Nick Ramsey. The 2023 point count surveys recorded 34 species within 50 m of the stations (Table 4). An additional 27 species were recorded outside of 50 m during point count surveys or encountered between bird surveys or during vegetation surveys and accounted for on species checklists (Table 5). Sixty-six species have been detected within 50 m of the stations during at least 1 of 5 survey years, and a total of 14 species have been detected within 50 m of the stations throughout all 5 years of surveys. Species detected at Redwoods within 50 m of the stations for the first time in 2023 include Barn Swallow, Lark Sparrow, Merlin, and White-breasted Nuthatch.

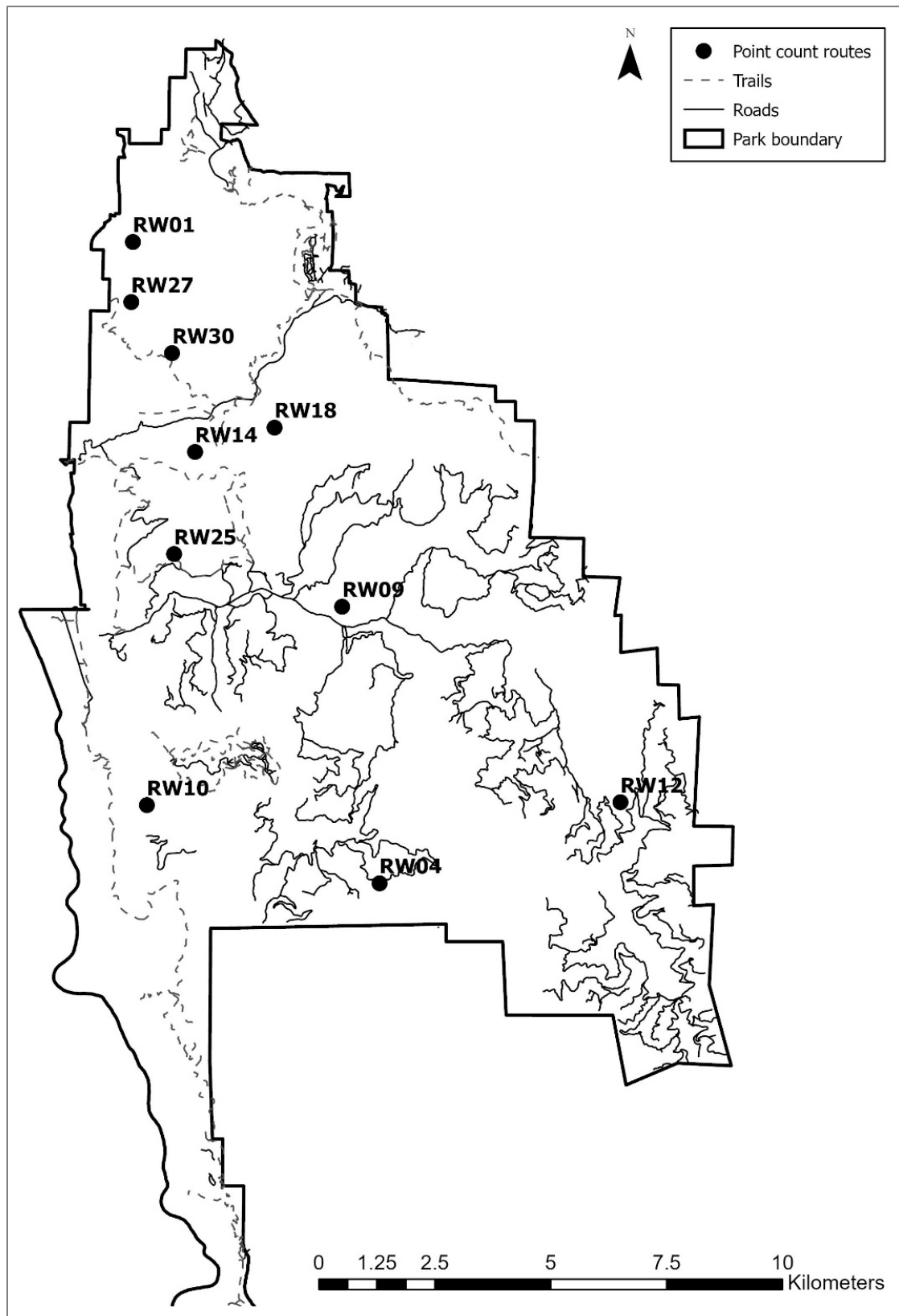


Figure 4. Point count routes at long-term landbird monitoring sites in the northern area of Redwood National and State Parks. NPS

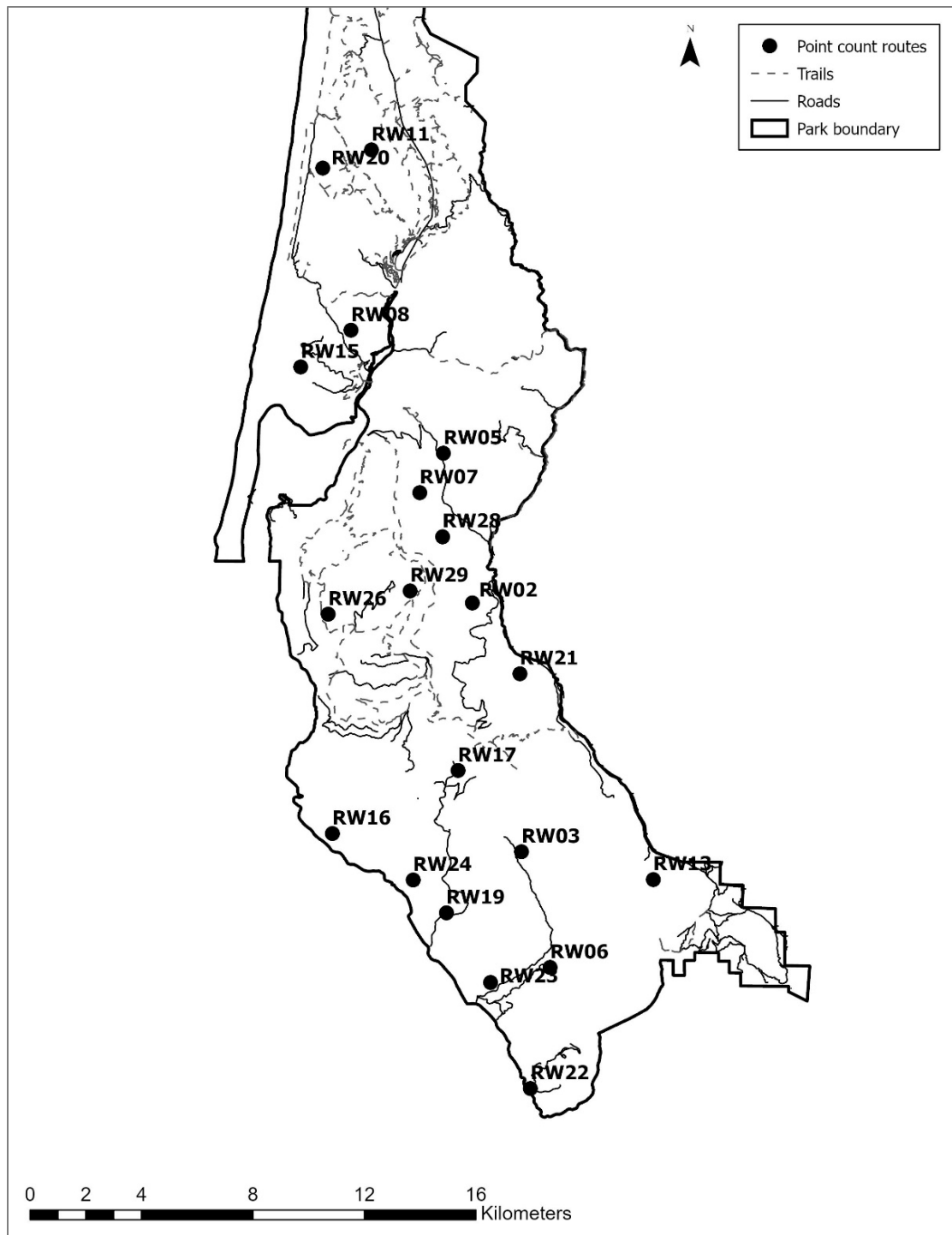


Figure 5. Point count routes at long-term landbird monitoring sites in the southern area of Redwood National and State Parks. NPS

Table 3. Redwood National and State Parks long-term landbird monitoring sites, listed in GRTS (Generalized Random Tessellation Stratified) order, indicating which 15 out of 30 monitoring sites were sampled in 2023. We attempted to survey the first 15 routes in the original GRTS design to best achieve spatial balance, but several of the routes were inaccessible, which forced us to survey sites drawn from the oversample (RW16 and up).

Site Code	Site Name	Sampled in 2023?
RW01	Redwoods 01	Yes
RW02	Redwoods 02	Yes
RW03	Redwoods 03	No
RW04	Redwoods 04	No
RW05	Redwoods 05	Yes
RW06	Redwoods 06	No
RW07	Redwoods 07	Yes
RW08	Redwoods 08	Yes
RW09	Redwoods 09	Yes
RW10	Redwoods 10	Yes
RW11	Redwoods 11	Yes
RW12	Redwoods 12	Yes
RW13	Redwoods 13	Yes
RW14	Redwoods 14	Yes
RW15	Redwoods 15	Yes
RW16	Redwoods 16	Yes
RW17	Redwoods 17	Yes
RW18	Redwoods 18	Yes
RW19	Redwoods 19	No
RW20	Redwoods 20	No
RW21	Redwoods 21	Yes
RW22	Redwoods 22	No
RW23	Redwoods 23	No
RW24	Redwoods 24	No
RW25	Redwoods 25	No
RW26	Redwoods 26	No
RW27	Redwoods 27	No
RW28	Redwoods 28	No
RW29	Redwoods 29	No
RW30	Redwoods 30	No

Table 4. Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Redwood National and State Parks and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Riparian ^A	CalPIF Oak ^B	CalPIF Conifer ^C	CalPIF Coastal Scrub ^D	ContPIF N. Pacific Rainforest ^E	CDFW N. Coast and Klamath Province ^F
Pacific-slope Flycatcher ^G	<i>Empidonax difficilis</i>	0.771	0.492	0.467	0.752	0.560	0.561	0.88	–	–	–	–	–	–
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.234	0.128	0.262	0.255	0.140	0.408	0.56	–	–	X	–	–	–
Pacific Wren ^H	<i>Troglodytes pacificus</i>	0.354	0.287	0.338	0.391	0.250	0.388	0.94	–	–	–	–	–	–
Chestnut -backed Chickadee	<i>Poecile rufescens</i>	0.375	0.323	0.262	0.342	0.450	0.347	0.44	–	–	–	–	W	–
Brown Creeper	<i>Certhia americana</i>	0.135	0.159	0.097	0.211	0.220	0.316	0.88	–	–	X	–	–	–
Wilson's Warbler	<i>Cardellina pusilla</i>	0.276	0.174	0.256	0.379	0.057	0.316	0.81	X	–	–	–	D	–
Steller's Jay	<i>Cyanocitta stelleri</i>	0.162	0.164	0.133	0.087	0.180	0.112	0.44	–	–	X	–	–	–
Hutton's Vireo	<i>Vireo huttoni</i>	0.115	0.144	0.046	0.155	0.020	0.092	0.31	–	X	–	–	–	X
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.000	0.000	0.000	0.000	0.014	0.071	0.25	–	–	–	–	–	–
Hermit Thrush	<i>Catharus guttatus</i>	0.026	0.046	0.046	0.056	0.010	0.071	0.38	–	–	–	–	–	–
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.010	0.087	0.010	0.037	0.020	0.061	0.25	–	–	X	–	–	–
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.052	0.067	0.041	0.043	0.000	0.051	0.25	–	X	–	–	W	–
Swainson's Thrush	<i>Catharus ustulatus</i>	0.094	0.123	0.118	0.149	0.080	0.051	0.13	X	–	–	–	–	–
Western Scrub- Jay	<i>Aphelocoma californica</i>	0.005	0.000	0.000	0.000	0.000	0.051	0.13	–	X	–	–	–	–
Lazuli Bunting	<i>Passerina amoena</i>	0.010	0.021	0.000	0.019	0.010	0.041	0.19	–	–	–	–	–	–
Hermit Warbler	<i>Setophaga occidentalis</i>	0.057	0.056	0.062	0.087	0.220	0.031	0.19	–	–	–	–	–	–
Song Sparrow	<i>Melospiza melodia</i>	0.010	0.041	0.021	0.019	0.010	0.031	0.13	X	–	–	–	–	–
Varied Thrush	<i>Ixoreus naevius</i>	0.099	0.015	0.123	0.143	0.000	0.031	0.13	–	–	–	–	D	–
American Robin	<i>Turdus migratorius</i>	0.000	0.010	0.005	0.006	0.000	0.020	0.13	–	–	–	–	–	–
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.005	0.010	0.005	0.012	0.010	0.020	0.06	X	–	–	–	–	–
Common Raven	<i>Corvus corax</i>	0.010	0.000	0.010	0.000	0.000	0.020	0.13	–	–	–	–	–	–
Northern Flicker	<i>Colaptes auratus</i>	0.010	0.005	0.000	0.000	0.000	0.020	0.13	–	–	–	–	–	–
Vaux's Swift	<i>Chaetura vauxi</i>	0.094	0.067	0.092	0.093	0.000	0.020	0.06	–	–	X	–	–	X

^A California Partners in Flight riparian bird conservation plan (RHJV 2004).

^B California Partners in Flight oak bird conservation plan (CalPIF 2002b).

^C California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^D California Partners in Flight coastal scrub bird conservation plan (CalPIF 2004).

^E Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^F California Department of Fish and Wildlife action plan, 2015 update (CDFW 2015).

^G Pacific-slope Flycatcher and Cordilleran Flycatcher were combined under Western Flycatcher in 2023 (Chesser et al. 2023).

^H Previously grouped with eastern North American and Eurasian species as the Winter Wren, Troglodytes (Chesser et al. 2011).

Table 4 (continued). Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Redwood National and State Parks and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Riparian ^A	CalPIF Oak ^B	CalPIF Conifer ^C	CalPIF Coastal Scrub ^D	ContPIF N. Pacific Rainforest ^E	CDFW N. Coast and Klamath Province ^F
Anna's Hummingbird	<i>Calypte anna</i>	0.005	0.000	0.000	0.000	0.000	0.010	0.06	–	–	–	–	–	–
Barn Swallow	<i>Hirundo rustica</i>	0.000	0.000	0.000	0.000	0.000	0.010	0.06	–	–	–	–	–	–
Canada Jay	<i>Perisoreus canadensis</i>	0.031	0.010	0.046	0.025	0.000	0.010	0.06	–	–	X	–	–	–
Hairy Woodpecker	<i>Dryobates villosus</i>	0.021	0.031	0.010	0.037	0.000	0.010	0.06	–	–	–	–	–	–
Lark Sparrow	<i>Chondestes grammacus</i>	0.000	0.000	0.000	0.000	0.000	0.010	0.06	–	X	–	–	–	–
Merlin	<i>Falco columbarius</i>	0.000	0.000	0.000	0.000	0.000	0.010	0.06	–	–	–	–	–	–
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.000	0.000	0.021	0.012	0.000	0.010	0.06	–	–	X	–	–	X
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.010	0.010	0.000	0.000	0.000	0.010	0.06	–	–	–	–	–	–
Spotted Towhee	<i>Pipilo maculatus</i>	0.000	0.015	0.015	0.000	0.000	0.010	0.06	–	–	–	–	–	X
Western Tanager	<i>Piranga ludoviciana</i>	0.000	0.000	0.000	0.000	0.010	0.010	0.06	–	–	X	–	–	–
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.000	0.000	0.000	0.000	0.000	0.010	0.06	–	X	–	–	–	–
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	0.000	0.005	0.005	0.012	0.080	0.000	0.00	–	X	–	–	–	–
Allen's Hummingbird	<i>Selasphorus sasin</i>	0.000	0.021	0.015	0.031	0.000	0.000	0.00	–	–	–	–	D	–
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	0.021	0.021	0.010	0.000	0.000	0.000	0.00	–	–	X	–	–	–
Bushtit	<i>Psaltirparus minimus</i>	0.005	0.000	0.005	0.012	0.000	0.000	0.00	–	–	–	–	–	–
Cassin's Vireo	<i>Vireo cassinii</i>	0.000	0.005	0.000	0.000	0.000	0.000	0.00	–	–	–	–	–	–
Chipping Sparrow	<i>Spizella passerina</i>	0.000	0.005	0.000	0.000	0.000	0.000	0.00	–	–	X	–	–	–
Dark-eyed Junco	<i>Junco hyemalis</i>	0.021	0.031	0.005	0.000	0.000	0.000	0.00	–	–	X	–	–	–
Downy Woodpecker	<i>Dryobates pubescens</i>	0.005	0.005	0.000	0.000	0.000	0.000	0.00	–	–	–	–	–	–
European Starling	<i>Sturnus vulgaris</i>	0.010	0.000	0.000	0.000	0.000	0.000	0.00	–	X	–	–	–	–
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.000	0.000	0.015	0.000	0.010	0.000	0.00	–	–	–	–	–	–
Lesser Goldfinch	<i>Spinus psaltria</i>	0.000	0.000	0.000	0.006	0.000	0.000	0.00	–	–	–	–	–	–
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	0.000	0.005	0.000	0.000	0.000	0.000	0.00	–	–	X	–	–	–
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	0.005	0.005	0.000	0.000	0.000	0.000	0.00	–	–	–	–	–	–

^A California Partners in Flight riparian bird conservation plan (RHJV 2004).

^B California Partners in Flight oak bird conservation plan (CalPIF 2002b).

^C California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^D California Partners in Flight coastal scrub bird conservation plan (CalPIF 2004).

^E Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^F California Department of Fish and Wildlife action plan, 2015 update (CDFW 2015).

^G Pacific-slope Flycatcher and Cordilleran Flycatcher were combined under Western Flycatcher in 2023 (Chesser et al. 2023).

^H Previously grouped with eastern North American and Eurasian species as the Winter Wren, Troglodytes (Chesser et al. 2011).

Table 4 (continued). Mean relative abundance (RA, birds within 50 m/point) for species detected during 2008, 2011, 2014, 2017, 2021, and 2023 point count surveys at Redwood National and State Parks and proportion of routes with detections for each species in 2023. Species are ordered in decreasing order of abundance for 2023 at the park unit; those detected in previous years, but not in 2023, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	RA 2008	RA 2011	RA 2014	RA 2017	RA 2021	RA 2023	Proportion of Routes 2023	CalPIF Riparian ^A	CalPIF Oak ^B	CalPIF Conifer ^C	CalPIF Coastal Scrub ^D	ContPIF N. Pacific Rainforest ^E	CDFW N. Coast and Klamath Province ^F
Mountain Quail	<i>Oreortyx pictus</i>	0.000	0.005	0.000	0.000	0.000	0.000	0.00	–	–	X	X	W	–
Northern Saw- whet Owl	<i>Aegolius acadicus</i>	0.005	0.000	0.000	0.000	0.000	0.000	0.00	–	–	–	–	–	–
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.000	0.005	0.000	0.000	0.000	0.000	0.00	–	–	X	–	W	–
Orange-crowned Warbler	<i>Leiothlypis celata</i>	0.010	0.000	0.000	0.006	0.000	0.000	0.00	–	–	–	–	–	–
Pine Siskin	<i>Spinus pinus</i>	0.016	0.010	0.000	0.000	0.000	0.000	0.00	–	–	–	–	D	–
Purple Finch	<i>Haemorhous purpureus</i>	0.000	0.000	0.005	0.000	0.000	0.000	0.00	–	–	X	–	–	–
Purple Martin	<i>Progne subis</i>	0.000	0.000	0.000	0.025	0.000	0.000	0.00	–	–	–	–	–	X
Red Crossbill	<i>Loxia curvirostra</i>	0.031	0.067	0.056	0.031	0.010	0.000	0.00	–	–	–	–	–	–
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.000	0.000	0.010	0.012	0.000	0.000	0.00	–	–	–	–	–	–
Ruffed Grouse	<i>Bonasa umbellus</i>	0.005	0.000	0.000	0.000	0.000	0.000	0.00	–	–	–	–	–	–
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.005	0.031	0.000	0.000	0.000	0.000	0.00	–	–	–	–	W	–
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.005	0.000	0.000	0.000	0.000	0.000	0.00	–	–	–	–	–	–
Sooty Grouse	<i>Dendragapus fuliginosus</i>	0.000	0.000	0.005	0.000	0.000	0.000	0.00	–	–	–	–	W	–
Tree Swallow	<i>Tachycineta bicolor</i>	0.005	0.000	0.000	0.000	0.020	0.000	0.00	X	–	–	–	–	–
Warbling Vireo	<i>Vireo gilvus</i>	0.000	0.005	0.000	0.000	0.000	0.000	0.00	X	–	–	–	–	–
Western Wood- Pewee	<i>Contopus sordidulus</i>	0.005	0.010	0.005	0.000	0.010	0.000	0.00	–	–	–	–	–	–
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.000	0.015	0.015	0.000	0.000	0.000	0.00	–	–	–	–	–	–
Wrentit	<i>Chamaea fasciata</i>	0.052	0.036	0.056	0.031	0.020	0.000	0.00	–	–	–	X	D	–
Yellow-rumped Warbler	<i>Setophaga coronata</i>	0.010	0.000	0.000	0.000	0.000	0.000	0.00	–	–	X	–	–	–

^A California Partners in Flight riparian bird conservation plan (RHJV 2004).

^B California Partners in Flight oak bird conservation plan (CalPIF 2002b).

^C California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^D California Partners in Flight coastal scrub bird conservation plan (CalPIF 2004).

^E Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^F California Department of Fish and Wildlife action plan, 2015 update (CDFW 2015).

^G Pacific-slope Flycatcher and Cordilleran Flycatcher were combined under Western Flycatcher in 2023 (Chesser et al. 2023).

^H Previously grouped with eastern North American and Eurasian species as the Winter Wren, Troglodytes (Chesser et al. 2011).

Table 5. List of additional species detected at Redwood National and State Parks in 2023 (not counted within 50 m during variable circular plot point count surveys), and conservation status. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Birds in Decline’ for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	CalPIF Riparian ^A	CalPIF Oak ^B	CalPIF Conifer ^C	CalPIF Coastal Scrub ^D	ContPIF N. Pacific Rainforest ^E	CDFW N. Coast and Klamath Province ^F
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	–	X	–	–	–	–
Bald Eagle	<i>Haliaeetus leucocephalus</i>	–	–	–	–	–	–
Barred Owl	<i>Strix varia</i>	–	–	–	–	–	–
Bushtit	<i>Psaltirparus minimus</i>	–	–	–	–	–	–
California Quail	<i>Callipepla californica</i>	–	X	–	–	–	X
Cassin's Vireo	<i>Vireo cassinii</i>	–	–	–	–	–	–
Cedar Waxwing	<i>Bombycilla cedrorum</i>	–	–	–	–	–	–
Chipping Sparrow	<i>Spizella passerina</i>	–	–	X	–	–	–
Common Merganser	<i>Mergus merganser</i>	–	–	–	–	–	–
Downy Woodpecker	<i>Picoides pubescens</i>	–	–	–	–	–	–
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	–	–	–	–	–	–
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	–	–	–	–	W	–
Fox Sparrow	<i>Passerella iliaca</i>	–	–	X	–	–	–
Lesser Goldfinch	<i>Spinus psaltria</i>	–	–	–	–	–	–
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	–	–	–	–	–	–
Mountain Chickadee	<i>Poecile gambeli</i>	–	–	–	–	–	–

^A California Partners in Flight riparian bird conservation plan (RHJV 2004).

^B California Partners in Flight oak bird conservation plan (CalPIF 2002b).

^C California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^D California Partners in Flight coastal scrub bird conservation plan (CalPIF 2004).

^E Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^F California Department of Fish and Wildlife action plan, 2015 update (CDFW 2015).

Table 5 (continued). List of additional species detected at Redwood National and State Parks in 2023 (not counted within 50 m during variable circular plot point count surveys), and conservation status. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Birds in Decline’ for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	CalPIF Riparian ^A	CalPIF Oak ^B	CalPIF Conifer ^C	CalPIF Coastal Scrub ^D	ContPIF N. Pacific Rainforest ^E	CDFW N. Coast and Klamath Province ^F
Mountain Quail	<i>Oreortyx pictus</i>	–	–	X	X	W	–
Dark-eyed Junco	<i>Junco hyemalis</i>	–	–	X	–	–	–
Osprey	<i>Pandion haliaetus</i>	–	–	–	–	–	X
Purple Finch	<i>Haemorhous purpureus</i>	–	–	X	–	–	–
Red Crossbill	<i>Loxia curvirostra</i>	–	–	–	–	–	–
Red-tailed Hawk	<i>Buteo jamaicensis</i>	–	–	–	–	–	–
Ruby-crowned Kinglet	<i>Regulus calendula</i>	–	–	–	–	–	–
Sooty Grouse	<i>Dendragapus fuliginosus</i>	–	–	–	–	W	X
Spotted Sandpiper	<i>Actitis macularius</i>	X	–	–	–	–	–
Turkey Vulture	<i>Cathartes aura</i>	–	–	–	–	–	–
Wrentit	<i>Chamaea fasciata</i>	–	–	–	X	D	–

^A California Partners in Flight riparian bird conservation plan (RHJV 2004).

^B California Partners in Flight oak bird conservation plan (CalPIF 2002b).

^C California Partners in Flight coniferous forest bird conservation plan (CalPIF 2002a).

^D California Partners in Flight coastal scrub bird conservation plan (CalPIF 2004).

^E Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^F California Department of Fish and Wildlife action plan, 2015 update (CDFW 2015).

Oregon Caves National Monument and Preserve Ecological Monitoring Station

The ecological monitoring station at Oregon Caves National Monument and Preserve was run 15 times during 2023. Seven visits occurred during the breeding season (June 1st to August 9th) and eight visits during the fall dispersal and migration season (August 10th to October 13th). On all visits, one species checklist survey was completed. The banding crew was led by KBO staff Lucinda Zawadzki and Martín López Aguilar and monitoring was completed with the assistance of student volunteers Otávio Rocha, Alexandra Badeaux, Daveka Boodram, Eli Hersh, Giselle Ragoonanan, Ché Marlon Ragoonanan, and permanent field technician, Samantha Webb.

In 2023, 45 species were detected at Oregon Caves National Monument and Preserve at the ecological monitoring station (Table 6). Thirty species were captured during mist-netting, 20 during the breeding season and 25 during the migration season. During species checklist surveys, 45 species were detected, 31 during the breeding season and 38 during the migration season. Fifteen species were detected on species checklist surveys alone. Overall, the number of species surveyed aligns with past efforts. From 2008 through 2022, 38–59 total species were detected, 27–36 species were captured during mist-netting, and 17–31 species were detected during area search surveys annually (Stephens et al. 2009, 2011, 2022; Stephens, Alexander, and Mohren 2010; Stephens and Mohren 2012, 2013; Stephens 2014, 2015, 2016, 2017; Stephens and Armstrong 2018, 2021; Stephens and Gillespie 2021).

Table 6. Results from the constant effort bird monitoring station at Oregon Caves National Monument and Preserve in 2023, showing total mist net captures, relative abundance (birds/area search plot), and conservation status. Surveys occurred during breeding (1 June to 9 August) and migration (10 August to 13 October). Species are in alphabetical order by common name. Species included in this table with no capture or abundance values were detected at the site, but not during the species checklist survey or from mist-net captures. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	Total Captures (breeding)	Total Captures (migration)	Relative Abundance (breeding)	Relative Abundance (migration)	OR-WA PIF Conifer ^A	Cont. PIF Pacific Birds ^B
American Robin	<i>Turdus migratorius</i>	1	0	1.000	0.250	–	–
Black-capped Chickadee	<i>Poecile atricapillus</i>	–	–	–	0.375	–	–
Bewick’s Wren	<i>Thryomanes bewickii</i>	–	–	–	0.125	–	–
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	7	1	2.571	0.250	–	–
Brown Creeper	<i>Certhia americana</i>	2	0	1.714	0.500	X	–
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	–	–	1.143	3.750	X	W
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	0	1	–	0.125	X	–
Canada Jay	<i>Perisoreus canadensis</i>	0	3	0.429	2.375	–	–
California Quail	<i>Callipepla californica</i>	1	0	0.143	–	–	–
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	3	5	4.000	4.625	–	W
Common Raven	<i>Corvus corax</i>	–	–	–	0.375	–	–
Dark-eyed Junco	<i>Junco hyemalis</i>	18	42	5.714	7.25	–	–
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0	1	–	0.125	–	–
Fox Sparrow	<i>Passerella iliaca</i>	0	7	–	1.375	X	–
Golden-crowned Kinglet	<i>Regulus satrapa</i>	1	3	1.143	1.125	–	–
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	0	2	–	0.250	–	–
Hairy Woodpecker	<i>Dryobates villosus</i>	–	–	1.000	0.625	–	–

^A Oregon-Washington Partners in Flight habitat conservation plan for landbirds in coniferous forests (Altman and Alexander 2012).

^B Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^C Pacific-slope Flycatcher and Cordilleran Flycatcher were combined under Western Flycatcher in 2023 (Chesser et al. 2023).

Table 6 (continued). Results from the constant effort bird monitoring station at Oregon Caves National Monument and Preserve in 2023, showing total mist net captures, relative abundance (birds/area search plot), and conservation status. Surveys occurred during breeding (1 June to 9 August) and migration (10 August to 13 October). Species are in alphabetical order by common name. Species included in this table with no capture or abundance values were detected at the site, but not during the species checklist survey or from mist-net captures. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	Total Captures (breeding)	Total Captures (migration)	Relative Abundance (breeding)	Relative Abundance (migration)	OR-WA PIF Conifer ^A	Cont. PIF Pacific Birds ^B
Hermit Thrush	<i>Catharus guttatus</i>	0	16	–	2.250	X	–
Hermit Warbler	<i>Setophaga occidentalis</i>	14	2	3.000	0.250	X	–
Lazuli Bunting	<i>Passerina amoena</i>	1	0	0.714	–	X	–
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	2	3	0.857	0.375	–	–
Nashville Warbler	<i>Leiothlypis ruficapilla</i>	25	9	4.571	1.375	X	–
Northern Flicker	<i>Colaptes auratus</i>	–	–	0.857	0.500	X	–
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	–	–	–	0.375	–	–
Orange-crowned Warbler	<i>Leiothlypis celata</i>	3	6	0.429	0.750	X	–
Olive-sided Flycatcher	<i>Contopus cooperi</i>	–	–	0.143	–	–	W
Pacific Wren	<i>Troglodytes pacificus</i>	0	1	0.143	0.750	X	–
Pine Siskin	<i>Spinus pinus</i>	–	–	–	4.125	–	D
Pileated Woodpecker	<i>Dryocopus pileatus</i>	–	–	0.286	0.250	X	–
Pacific-slope Flycatcher ^C	<i>Empidonax difficilis</i>	2	3	1.714	0.375	X	–
Red-breasted Nuthatch	<i>Sitta canadensis</i>	8	3	3.429	1.500	–	–
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	11	3	3.714	1.250	–	–
Ruby-crowned Kinglet	<i>Corthylio calendula</i>	0	2	0.286	0.500	–	–

^A Oregon-Washington Partners in Flight habitat conservation plan for landbirds in coniferous forests (Altman and Alexander 2012).

^B Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^C Pacific-slope Flycatcher and Cordilleran Flycatcher were combined under Western Flycatcher in 2023 (Chesser et al. 2023).

Table 6 (continued). Results from the constant effort bird monitoring station at Oregon Caves National Monument and Preserve in 2023, showing total mist net captures, relative abundance (birds/area search plot), and conservation status. Surveys occurred during breeding (1 June to 9 August) and migration (10 August to 13 October). Species are in alphabetical order by common name. Species included in this table with no capture or abundance values were detected at the site, but not during the species checklist survey or from mist-net captures. X are species in the conservation plan; – are species not in the conservation plan; D are ‘Common Bird in Decline’ for the Pacific Birds Joint Venture region in Rosenberg et al. (2016); W are ‘Watch List Species’ (Rosenberg et al. 2016).

Common Name	Scientific Name	Total Captures (breeding)	Total Captures (migration)	Relative Abundance (breeding)	Relative Abundance (migration)	OR-WA PIF Conifer ^A	Cont. PIF Pacific Birds ^B
Red Crossbill	<i>Loxia curvirostra</i>	–	–	–	1.375	–	–
Red-tailed Hawk	<i>Buteo jamaicensis</i>	–	–	–	0.125	–	–
Rufous Hummingbird	<i>Selasphorus rufus</i>	4	0	0.857	–	X	W
Sooty Grouse	<i>Dendragapus fuliginosus</i>	–	–	0.571	–	–	W
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0	1	–	0.375	–	–
Steller's Jay	<i>Cyanocitta stelleri</i>	9	2	6.714	4.375	–	–
Swainson's Thrush	<i>Catharus ustulatus</i>	3	3	0.857	0.500	–	–
Townsend's Warbler	<i>Setophaga townsendi</i>	0	1	–	0.125	X	–
Vaux's Swift	<i>Chaetura vauxi</i>	–	–	1.429	–	X	–
Varied Thrush	<i>Ixoreus naevius</i>	1	5	0.857	1.375	X	D
Western Wood-Pee-wee	<i>Contopus sordidulus</i>	–	–	0.286	–	–	–
Wilson's Warbler	<i>Cardellina pusilla</i>	11	10	1.571	1.500	–	D

^A Oregon-Washington Partners in Flight habitat conservation plan for landbirds in coniferous forests (Altman and Alexander 2012).

^B Partners in Flight landbird conservation plan, revised in 2016 for Canada and the continental U.S. (Rosenberg et al. 2016).

^C Pacific-slope Flycatcher and Cordilleran Flycatcher were combined under Western Flycatcher in 2023 (Chesser et al. 2023).

Summary

This 15th year of the KLMN landbird monitoring provided information on avian community composition and the status of landbirds at Lava Beds National Monument and Redwood National and State Parks. In addition, the monitoring at Oregon Caves National Monument and Preserve contributed to the long-term demographic information that has been gathered at this park unit since 2002. Over time, the KLMN landbird monitoring program will yield important information about avian community composition shifts and long-term population trends of specific species for each KLMN park. These monitoring efforts contribute to both Oregon-Washington and California Partners in Flight long-term monitoring programs and align with both Oregon and California State Wildlife Conservation Strategies.

At Lava Beds National Monument, of the 10 most abundant species, two are Partners in Flight focal species for sagebrush habitat (Lark Sparrow and Brewer's Sparrow), one is a Partners in Flight focal species for conifer habitat (Chipping Sparrow), two are a 'Common Bird in Decline' for the Pacific Birds Joint Venture Pacific Rainforest region and Great Basin region (Brewer's Blackbird and Horned Lark), and two are California Wildlife Conservation Strategy focal species for the Modoc Plateau region (Lark Sparrow and Brewer's Sparrow) (CalPIF 2005; CalPIF 2002a; Rosenberg et al. 2016; CDFW 2015). (Table 1). After the Caldwell Fire that burned much of the park in 2020, continued long-term monitoring will add to our understanding of bird community responses to disturbance and landscape recovery.

At Redwood National and State Parks, Pacific-slope Flycatcher was the most abundant species in the park in 2023 (Table 4). Of the 10 most abundant species detected during point count surveys, five (Golden-crowned Kinglet, Brown Creeper, Wilson's Warbler, Steller's Jay, Hutton's Vireo) are Partners in Flight focal species for riparian, oak, or conifer habitat, one is a 'Common Bird in Decline' species (Wilson's Warbler), one is a 'Watch List Species' species (Chestnut-backed Chickadee) and one is a California Wildlife Conservation Strategy focal species for the North Coast and Klamath Province region (Hutton's Vireo) (RHJV 2004; CalPIF 2002b; CalPIF 2002a; CalPIF 2004; Rosenberg et al. 2016; CDFW 2015). In 2021, we reduced the number of survey locations at Redwood National and State Parks to allow surveyors to work in pairs for safety reasons and will continue to complete surveys in the park using this modified procedure in the future.

Dark-eyed Junco was the most frequently captured species at the Oregon Caves National Monument and Preserve ecological monitoring station during the combined breeding and migration seasons in 2023. Of the 10 most frequently captured species, Hermit Thrush, Nashville Warbler, Wilson's Warbler, Hermit Warbler, and Orange-crowned Warbler are Partners in Flight focal species in coniferous forest (Altman and Alexander 2012). Wilson's Warbler is also a common bird in steep decline (Rosenberg et al. 2016).

Implementation of the KLMN landbird monitoring protocol began in 2008. Landbird status and community composition results from this 15th year of monitoring will provide information to park managers at Lava Beds National Monument and Redwood National and State Parks and will

contribute to avian trend monitoring in the parks. In addition, continuation of the constant effort monitoring station at Oregon Caves National Monument and Preserve contributes to long-term avian demographic information for that park. This information will inform management decisions at the parks and over time will yield important information on the status and trends of birds in the Klamath Network.

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