



Klamath Network Landbird Monitoring Annual Report

2014 Results from Oregon Caves National Monument, Lava Beds National Monument, and Redwood National and State Parks

Natural Resource Data Series NPS/KLMN/NRDS—2015/816



ON THE COVER

Spotted Towhee

Photograph by James Livaudais ©2015

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Lava Beds National Monument, and Redwood National and
State Parks*

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This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data. Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

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Abstract

In 2014, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the seventh year of a long-term landbird monitoring protocol. Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and completed this seventh year effort. Multiple standard avian sampling methods were implemented, including variable circular plot point counts, area search surveys, mist netting, species checklists, and habitat surveys. In 2014, a third year of point counts were completed, along with corresponding species checklists and habitat surveys, at 25 locations within Lava Beds National Monument, and 30 locations within Redwood National and State Parks. The operation of an ongoing constant effort monitoring station, which included mist netting, point counts, area searches, species checklists, and habitat surveys, continued at Oregon Caves National Monument during the breeding and fall migration seasons. Relative abundance (birds/station), as measured by point count and area search methods, was calculated for all survey sites combined within each park. 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 state and continental plans and Oregon and California Wildlife Conservation Strategies. This seventh 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

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Introduction

In 2014, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the seventh 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 completed the monitoring since 2008. This annual report provides a summary of 2014 efforts, including (1) a summary of the monitoring protocol, (2) a summary of point count and area search surveys and constant effort monitoring efforts, and (3) a summary of birds detected at each of the park units where monitoring occurred.

The KLMN, located in southern Oregon and northern California, includes Crater Lake National Park (CRLA), Lassen Volcanic National Park (LAVO), Lava Beds National Monument (LAVE), Oregon Caves National Monument (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; Della Sala et al. 1999).

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, area search surveys, 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 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. We therefore 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.

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. *in review*; 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, area search surveys, 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. 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. 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 nonriparian 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 we established sampling locations within both the existing monument and the proposed expansion area and applied a slightly different sampling frame to each. Within the existing 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 existing monument. The sampling frame within the proposed expansion included locations between 100 m and 1000 m from a road or trail.

The number of point count sites varied by park and was 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 (n=4), Redwood National and State Parks (n=30), Whiskeytown National Recreation Area (n=30). 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. 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 Redwood National and State Parks. Because of the rugged terrain in this park, the number of established point count stations varied 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 were 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, operation of an ongoing constant effort monitoring station following standard protocols (Ralph et al. 2004; Stephens, Mohren et al. 2010)

continued during the breeding season (early May through late August) as well as during the fall dispersal and migration seasons (late August through mid-October). 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 and the second round from 2011 to 2013 at each park. The third round of visits began in 2014, and surveys were completed at Lava Beds National Monument, and Redwood National and State Parks (Figure 1 and Figure 2). In addition, the constant effort monitoring station at Oregon Caves National Monument was operated in 2014, and is operated annually.

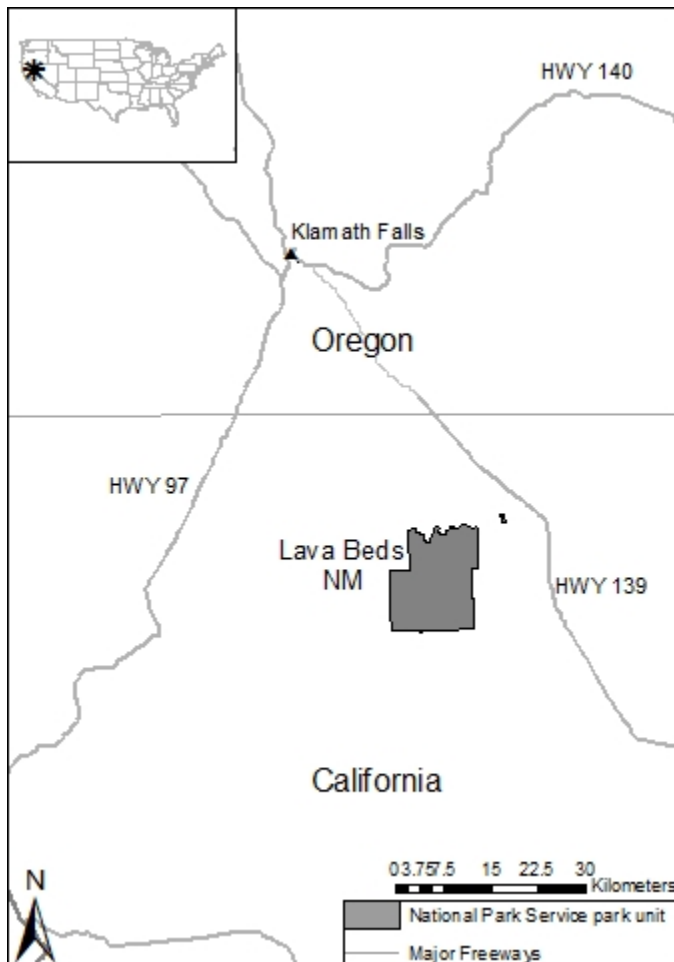


Figure 1. Lava Beds National Monument is located in northern California.

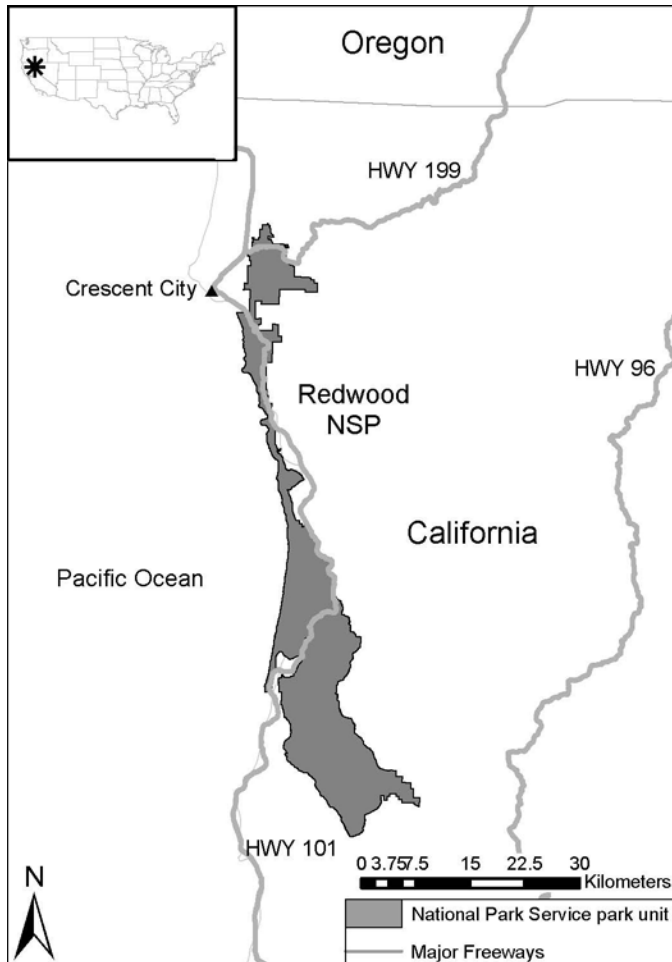


Figure 2. Redwood National and State Parks are located in northern California.

Training

Point count surveyors participated in a two to three day training session at the onset of the field season. Point count surveyors who had implemented the KLMN landbird monitoring protocol in previous years received two days of training and new surveyors received an additional training day. During this training, point count surveyors were instructed on protocol implementation. Training exercises included group calibration for distance estimation and simultaneous point count and vegetation surveys in the field. A certification test, which included various written and audio exercises, was implemented in 2014. Interns that operated the constant effort monitoring stations 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 begin within 15 minutes of sunrise. The observer uses 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 are 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 nearest minute), detection type (e.g., visual, song, call), and breeding status are also recorded. All point count stations along a given route (or as many stations as possible) are completed by a single surveyor within 4 hours of sunrise.

Constant Effort Monitoring Station

The constant effort monitoring station incorporates a variety of survey methods to sample avian species, including mist netting, area searches, point counts, species checklists, and habitat surveys. The mist netting station at Oregon Caves National Monument has 10 nets set in an array. This arrangement optimizes bird capture and meets logistical constraints. Mist nets are opened within 15 minutes of sunrise and operated for 5 hours. Nets are not operated during inclement weather conditions that might affect capture rates or bird safety. All birds that are captured are identified to species, aged and sexed according to Pyle (1997), and checked for signs of breeding condition (i.e., cloacal protuberances and brood patches); additional biometrics are collected. All captured birds, excluding hummingbirds and game birds, are banded with a U.S. Geological Survey Bird Banding Laboratory aluminum butt-end leg band.

Two area search surveys are completed at the mist net site on each day the site is operated. This method provides 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 moves around the designated area for a 20 minute period, recording all birds seen or heard.

Species Checklists

Species checklists are completed in conjunction with all bird monitoring efforts, including point count, habitat, and area search surveys and mist netting. Species checklists add value to survey data by documenting encounters of all species during an effort. Checklists enable 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 are completed at each point count station and at the constant effort monitoring station following a standard methodology (Ralph et al. 1993). The surveys are designed specifically to account for habitat aspects associated with the feeding and nesting requirement of birds. The habitat sampling is conducted using a vegetation relevé method that is suitable for any vegetation type and provides an efficient assessment of vegetation composition and structure. Ocular estimates of cover and height for all vegetation layers, tree and shrub species, and other plant forms are 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

Data were entered into relational databases to store the variety of information collected in the field. Six databases are used, each one associated with a survey methodology (Point Count, Mist Net, Mist Net Hours, Vegetation, Area Search, and Checklist), and an additional database is used to store location information for each site. The verified, validated, and certified data were submitted to the 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 area search 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 plot 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; Rich et al. 2004), and conservation status from the Oregon and California State Wildlife Conservation Strategies (CDFG 2005; ODFW 2005) are highlighted in the results where applicable.

Results

Lava Beds National Monument

In 2014, we surveyed all points (12 survey points/route) on all 25 permanent point count survey routes at Lava Beds National Monument (Figure 3). Surveys were completed from 15 May to 29 May by Jim DeStaebler and Frank Lospalluto. 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. The 2014 point count surveys recorded 54 species in the monument, five of which were not detected on point count surveys in 2008 or 2011 (Table 1). The 2014 species checklist identified an additional 29 species that were encountered during the season, but not detected during 2014 point counts (Table 2); while some of these were detected during previous years' point counts (and thus are listed in Table 1), others are new detections. The 2014 results are similar to 2008 and 2011, with 56 and 63 species detected on point count surveys, and 27 and 30 additional species recorded on species checklists, respectively. Brown-headed Cowbird was detected on the greatest proportion of routes (64%), followed by Spotted Towhee (60%) and Rock Wren (56%).

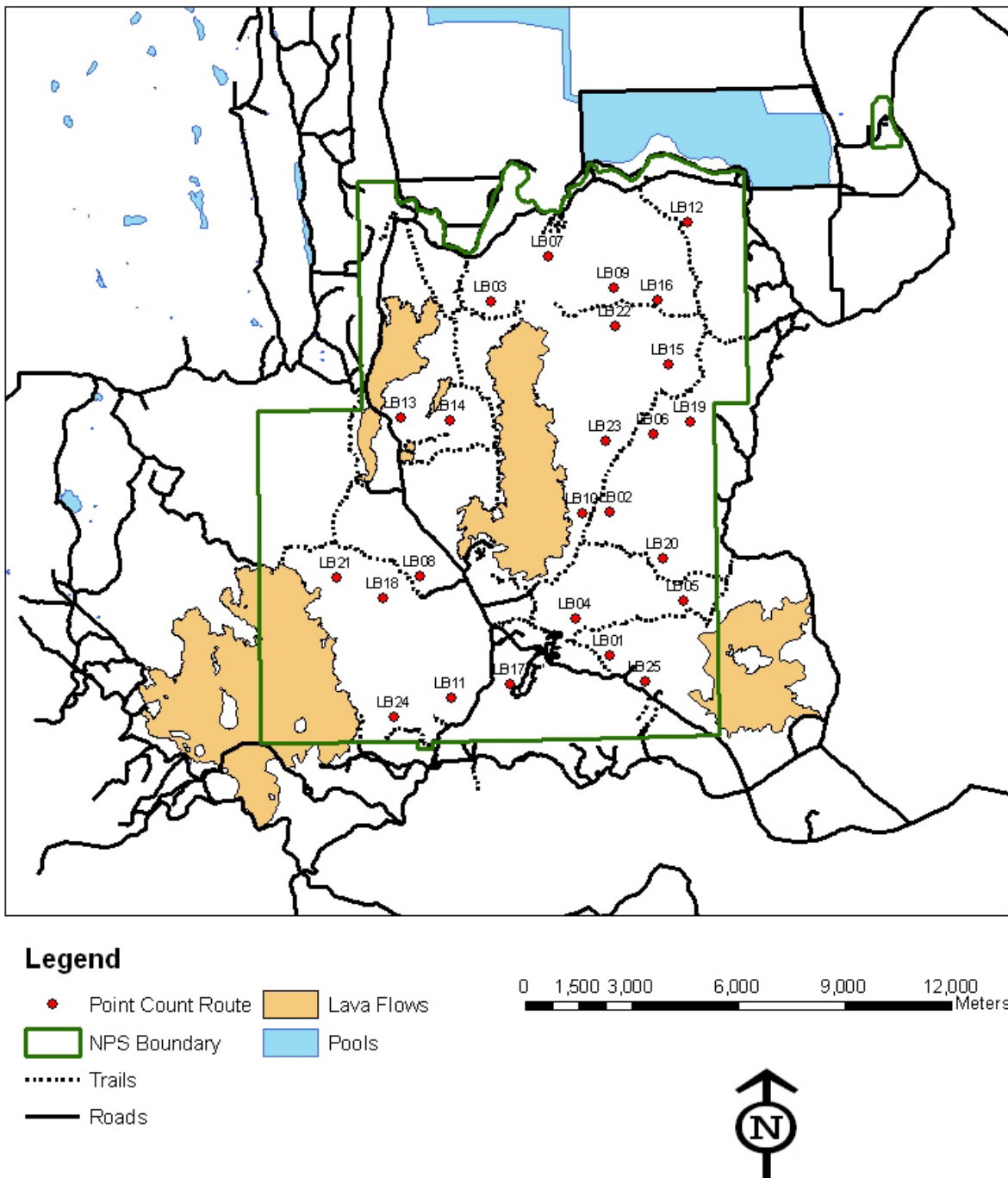


Figure 3. Point count routes at long-term landbird monitoring sites in Lava Beds National Monument.

Table 1. Mean relative abundance (birds within 50 m/point) for species detected during 2008, 2011, and 2014 point count surveys at Lava Beds National Monument, and proportion of routes with detections for each species in 2014. Species ordered in decreasing order of abundance for 2014 at the park; those detected in previous years, but not in 2014, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns.

Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF		Cont PIF ³	CDFG ⁴
		2008	2011	2014	2014	Conifer ¹	Sagebrush ²	Intermountain West	CA Wildlife: Cons. Strategy
Spotted Towhee	<i>Pipilo maculatus</i>	0.633	0.347	0.280	0.60				X
Chipping Sparrow	<i>Spizella passerina</i>	0.150	0.093	0.167	0.36	X			X
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.160	0.147	0.157	0.48				
Gray Flycatcher	<i>Empidonax wrightii</i>	0.067	0.043	0.150	0.28	X	X	X	
Brown-headed Cowbird	<i>Molothrus ater</i>	0.150	0.130	0.140	0.64				
Bewick's Wren	<i>Thryomanes bewickii</i>	0.020	0.053	0.127	0.52				
Rock Wren	<i>Salpinctes obsoletus</i>	0.073	0.150	0.097	0.56				
Lark Sparrow	<i>Chondestes grammacus</i>	0.077	0.090	0.073	0.36		X		X
Lazuli Bunting	<i>Passerina amoena</i>	0.170	0.120	0.063	0.36				
Bushtit	<i>Psaltiriparus minimus</i>	0.060	0.060	0.053	0.32				
Mourning Dove	<i>Zenaida macroura</i>	0.073	0.073	0.050	0.36				
Horned Lark	<i>Eremophila alpestris</i>	0.080	0.040	0.050	0.16				X
Brewer's Sparrow	<i>Spizella breweri</i>	0.040	0.080	0.043	0.32			X	X
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.013	0.027	0.043	0.28				
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.013	0.013	0.040	0.20				
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.060	0.080	0.037	0.16				X
Yellow-rumped Warbler	<i>Dendroica coronata</i>	0.007	0.127	0.030	0.08				
Dark-eyed Junco	<i>Junco hyemalis</i>	0.027	0.060	0.030	0.20	X			X
Western Kingbird	<i>Tyrannus verticalis</i>	0.000	0.003	0.027	0.04				
Western Meadowlark	<i>Sturnella neglecta</i>	0.140	0.087	0.023	0.16		X		
Oak/Juniper Titmouse sp.	<i>Baeolophus inornatus/ridgwayi</i>	0.033	0.020	0.023	0.20		X		
Wilson's Warbler	<i>Wilsonia pusilla</i>	0.030	0.010	0.023	0.12				
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	0.003	0.000	0.023	0.08			X	
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.007	0.070	0.020	0.12				
California Quail	<i>Callipepla californica</i>	0.013	0.017	0.020	0.20				
Townsend's Warbler	<i>Dendroica townsendi</i>	0.007	0.017	0.020	0.16				

Table 1 (continued)

Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF		Cont PIF ³	CDFG ⁴
		2008	2011	2014	2014	Conifer ¹	Sagebrush ²	Intermountain West	CA Wildlife: Cons. Strategy
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.007	0.007	0.020	0.08		X	X	
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.023	0.007	0.020	0.16			X	
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.000	0.003	0.017	0.16		X		X
Bullock's Oriole	<i>Icterus bullockii</i>	0.010	0.000	0.017	0.16				
Western Bluebird	<i>Sialia mexicana</i>	0.000	0.000	0.017	0.12				
American Robin	<i>Turdus migratorius</i>	0.020	0.037	0.013	0.12				
Northern Flicker	<i>Colaptes auratus</i>	0.010	0.020	0.013	0.12				
Lesser Goldfinch	<i>Spinus psaltria</i>	0.023	0.017	0.013	0.08				
Mountain Bluebird	<i>Sialia currucoides</i>	0.013	0.013	0.013	0.08			X	
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.003	0.000	0.013	0.08				X
Mountain Chickadee	<i>Poecile gambeli</i>	0.030	0.077	0.010	0.08				
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.003	0.020	0.010	0.04				
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.007	0.007	0.010	0.04				
Say's Phoebe	<i>Sayornis saya</i>	0.000	0.003	0.010	0.12				
Hairy Woodpecker	<i>Picoides villosus</i>	0.003	0.003	0.010	0.08				
Pine Siskin	<i>Spinus pinus</i>	0.000	0.023	0.007	0.04				
Turkey Vulture	<i>Cathartes aura</i>	0.000	0.010	0.007	0.04				
Western Tanager	<i>Piranga ludoviciana</i>	0.037	0.007	0.007	0.08	X			
Calliope Hummingbird	<i>Stellula calliope</i>	0.007	0.007	0.007	0.08			X	
Red Crossbill	<i>Loxia curvirostra</i>	0.000	0.000	0.007	0.08				
Cassin's Finch	<i>Carpodacus cassinii</i>	0.007	0.023	0.003	0.04	X		X	
Sage Thrasher	<i>Oreoscoptes montanus</i>	0.000	0.017	0.003	0.04		X	X	
House Wren	<i>Troglodytes aedon</i>	0.003	0.007	0.003	0.04				
Canyon Wren	<i>Catherpes mexicanus</i>	0.000	0.007	0.003	0.04				
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.007	0.000	0.003	0.04				
American Kestrel	<i>Falco sparverius</i>	0.000	0.000	0.003	0.04				
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0.000	0.000	0.003	0.04				
Purple Finch	<i>Carpodacus purpureus</i>	0.000	0.000	0.003	0.04	X			
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.000	0.050	0.000	0.00				

Table 1 (continued)

Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF		Cont PIF ³	CDFG ⁴
		2008	2011	2014	2014	Conifer ¹	Sagebrush ²	Intermountain West	CA Wildlife: Cons. Strategy
Orange-crowned Warbler	<i>Vermivora celata</i>	0.000	0.037	0.000	0.00				
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.007	0.010	0.000	0.00				X
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.003	0.010	0.000	0.00	X			
Mountain Quail	<i>Oreortyx pictus</i>	0.013	0.007	0.000	0.00	X			
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0.000	0.007	0.000	0.00	X		X	
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.000	0.007	0.000	0.00				
Barn Swallow	<i>Hirundo rustica</i>	0.003	0.003	0.000	0.00				
Pygmy Nuthatch	<i>Sitta pygmaea</i>	0.003	0.003	0.000	0.00				
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	0.003	0.003	0.000	0.00	X			
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.000	0.003	0.000	0.00				
Purple Martin	<i>Progne subis</i>	0.013	0.003	0.000	0.00				X
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.000	0.003	0.000	0.00				
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.000	0.003	0.000	0.00			X	X
Steller's Jay	<i>Cyanocitta stelleri</i>	0.003	0.003	0.000	0.00	X			
Prairie Falcon	<i>Falco mexicanus</i>	0.000	0.003	0.000	0.00				X
House Finch	<i>Carpodacus mexicanus</i>	0.000	0.003	0.000	0.00				
Common Raven	<i>Corvus corax</i>	0.000	0.003	0.000	0.00				
Warbling Vireo	<i>Vireo gilvus</i>	0.017	0.000	0.000	0.00				
Vesper Sparrow	<i>Pooecetes gramineus</i>	0.023	0.000	0.000	0.00		X		
Vaux's Swift	<i>Chaetura vauxi</i>	0.007	0.000	0.000	0.00	X			X
California Towhee	<i>Pipilo crissalis</i>	0.003	0.000	0.000	0.00				X
Cassin's Vireo	<i>Vireo cassinii</i>	0.003	0.000	0.000	0.00				
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.007	0.000	0.000	0.00	X		X	X

¹ CalPIF 2002a, ² CalPIF 2005, ³ Rich et al. 2004, ⁴ CDFG 2005

Table 2. List of additional species detected at Lava Beds National Monument in 2014 (not counted within 50 m during VCP point count surveys), and conservation status.

Common Name	Scientific Name	CalPIF Sagebrush ¹	CDFG ² CA Wildlife: Cons. Strategy
American Goldfinch	<i>Spinus tristis</i>		
Bald Eagle	<i>Haliaeetus leucocephalus</i>		X
Barn Swallow	<i>Hirundo rustica</i>		
Black-backed Woodpecker	<i>Picoides arcticus</i>		
Canada Goose	<i>Branta canadensis</i>		
Cassin's Vireo	<i>Vireo cassinii</i>		
Cedar Waxwing	<i>Bombycilla cedrorum</i>		
Clark's Nutcracker	<i>Nucifraga columbiana</i>		
Common Raven	<i>Corvus corax</i>		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>		
Golden Eagle	<i>Aquila chrysaetos</i>		X
House Finch	<i>Carpodacus mexicanus</i>		
Mallard	<i>Anas platyrhynchos</i>		
Mountain Quail	<i>Oreortyx pictus</i>		
Northern Harrier	<i>Circus cyaneus</i>		X
Olive-sided Flycatcher	<i>Contopus cooperi</i>		X
Prairie Falcon	<i>Falco mexicanus</i>		X
Pygmy Nuthatch	<i>Sitta pygmaea</i>		
Red-tailed Hawk	<i>Buteo jamaicensis</i>		
Rufous Hummingbird	<i>Selasphorus rufus</i>		X
Sooty Grouse	<i>Dendragapus fuliginosus</i>		X
Steller's Jay	<i>Cyanocitta stelleri</i>		
Swainson's Hawk	<i>Buteo swainsoni</i>		X
Townsend's Solitaire	<i>Myadestes townsendi</i>		
Vaux's Swift	<i>Chaetura vauxi</i>		X
Warbling Vireo	<i>Vireo gilvus</i>		
White-breasted Nuthatch	<i>Sitta carolinensis</i>		
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	X	
Yellow Warbler	<i>Dendroica petechia brewsteri</i>		X

¹ CalPIF 2005, ² CDFG 2005

Redwood National and State Parks

In 2014, we surveyed all of the 30 permanent point count survey routes at Redwood National and State Parks (Figure 4 and Figure 5). Because of the rugged terrain in this park, the number of established point count stations varied from six to eight for each route; all points were surveyed in 2014. In 2011 two points were added to RW02 (Redwoods 02), so that all routes consist of 6 to 9 survey points (Table 3). Surveys were completed from 5 June to 30 June by Jim DeStaebler and Frank Lospalluto. At Redwood National and State Parks, the matrix areas were sampled. The park does not contain high elevation areas but does contain riparian areas that were excluded from sampling. Results from 2014 point count surveys included 36 species, five of which were not detected during point count surveys in 2008 or 2011 (Table 4). The 2014 species checklist identified an additional 28 species that were encountered during the season, but not detected during 2014 point counts (Table 5); while some of these were detected during previous years' point counts (and thus are listed in Table 4), others are new detections. The 2014 results are similar to 2008 and 2011, with 41 and 42 species detected on point count surveys, and 43 and 28 additional species recorded on species checklists, respectively. The species detected on the greatest proportion of routes were Pacific-slope Flycatcher and Chestnut-backed Chickadee (both 77%), followed by Pacific Wren (70%) and Golden-crowned Kinglet (67%).

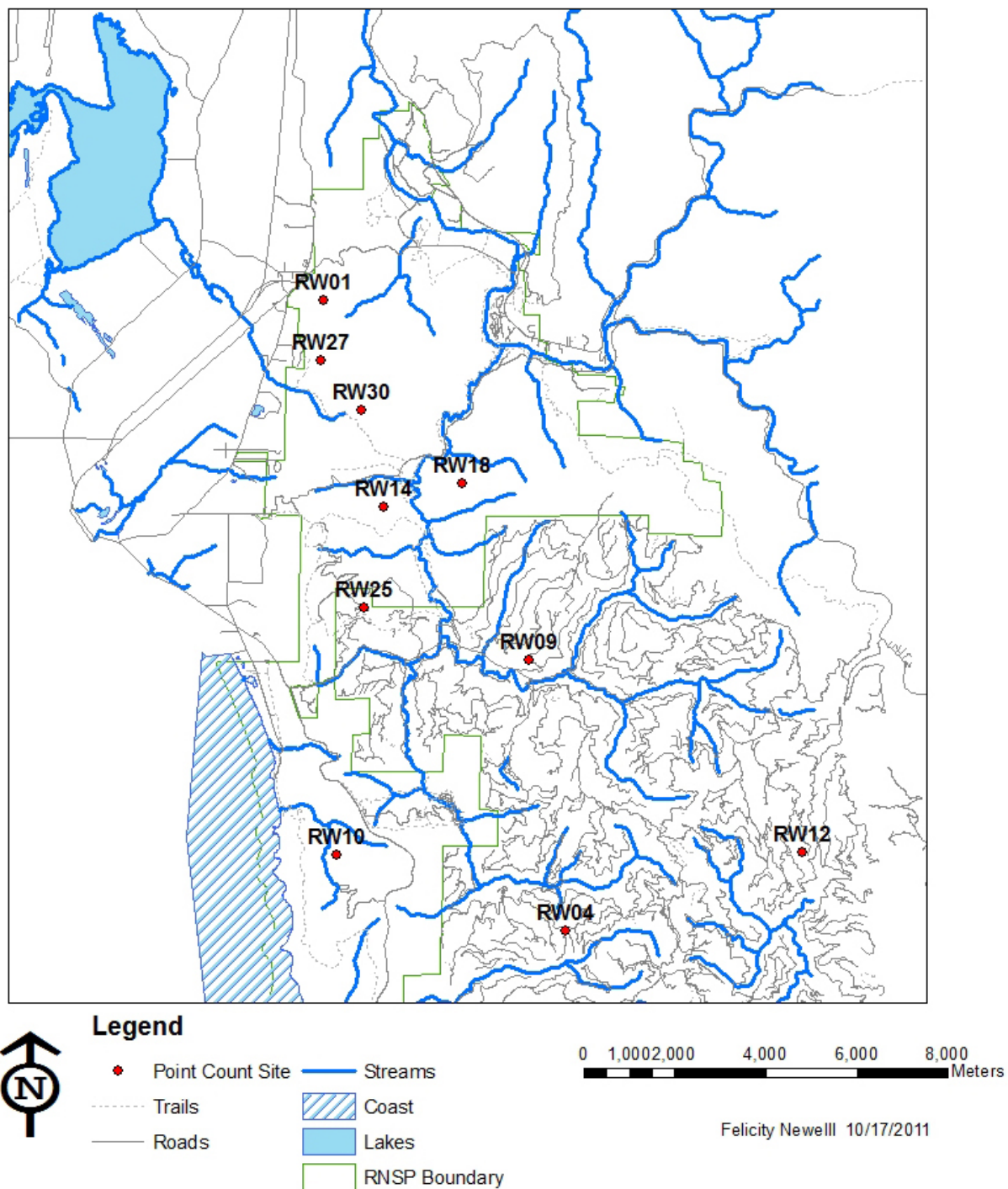


Figure 4. Point count routes at long-term landbird monitoring sites in the northern area of Redwood National and State Parks.

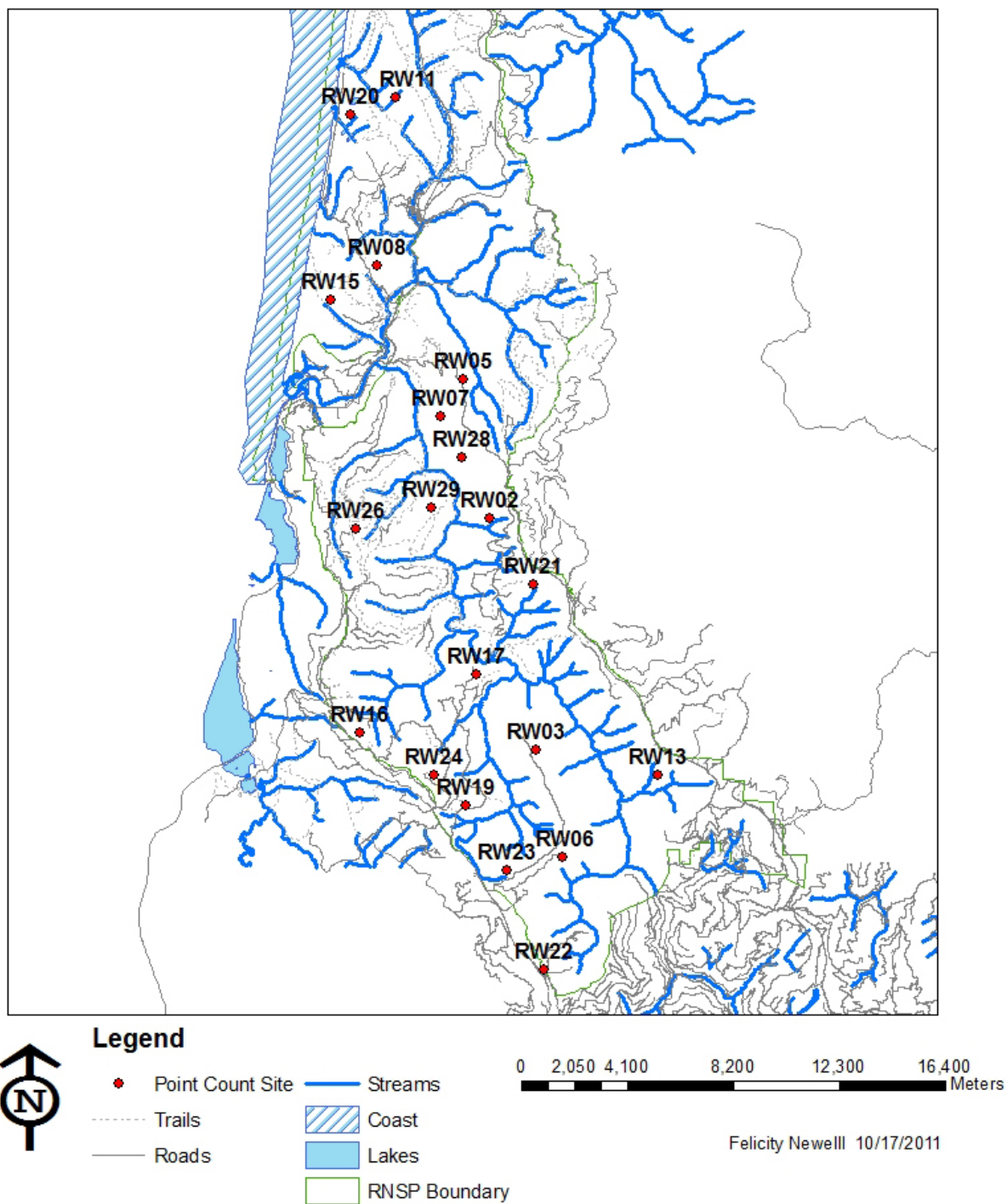


Figure 5. Point count routes at long-term landbird monitoring sites in the southern area of Redwood National and State Parks.

Table 3. Long-term landbird monitoring sites established at Redwood National and State Parks and the number of points at each site.

Site Code	Site Name	Survey Points
RW01	Redwoods 01	6
RW02 ¹	Redwoods 02	6
RW03	Redwoods 03	6
RW04	Redwoods 04	8
RW05	Redwoods 05	6
RW06	Redwoods 06	6
RW07	Redwoods 07	6
RW08	Redwoods 08	6
RW09	Redwoods 09	6
RW10	Redwoods 10	6
RW11	Redwoods 11	6
RW12	Redwoods 12	6
RW13	Redwoods 13	8
RW14	Redwoods 14	6
RW15	Redwoods 15	6
RW16	Redwoods 16	7
RW17	Redwoods 17	8
RW18	Redwoods 18	6
RW19	Redwoods 19	6
RW20	Redwoods 20	6
RW21	Redwoods 21	9
RW22	Redwoods 22	6
RW23	Redwoods 23	6
RW24	Redwoods 24	8
RW25	Redwoods 25	6
RW26	Redwoods 26	6
RW27	Redwoods 27	6
RW28	Redwoods 28	8
RW29	Redwoods 29	6
RW30	Redwoods 30	6
Total		194

¹ Two points added in 2011.

Table 4. Mean relative abundance (birds within 50 m/point) for species detected during 2008, 2011, and 2014 point count surveys at Redwood National and State Parks, and proportion of routes with detections for each species in 2014. Species ordered in decreasing order of abundance for 2014 at the park; those detected in previous years, but not in 2014, are listed at the end of the table. Conservation information available from selected plans is identified in rightmost columns.

Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF				Cont PIF ⁵	CDFG ⁶
		2008	2011	2014		Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴		
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.771	0.492	0.467	0.77					X	
Pacific Wren	<i>Troglodytes troglodytes</i>	0.354	0.287	0.338	0.70					X	
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	0.375	0.323	0.262	0.77					X	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.234	0.128	0.262	0.67			X			
Wilson's Warbler	<i>Wilsonia pusilla</i>	0.276	0.174	0.256	0.63	X					
Steller's Jay	<i>Cyanocitta stelleri</i>	0.162	0.164	0.133	0.50			X		X	
Varied Thrush	<i>Ixoreus naevius</i>	0.099	0.015	0.123	0.37					X	
Swainson's Thrush	<i>Catharus ustulatus</i>	0.094	0.123	0.118	0.47	X					
Brown Creeper	<i>Certhia americana</i>	0.135	0.159	0.097	0.33			X			
Vaux's Swift	<i>Chaetura vauxi</i>	0.094	0.067	0.092	0.27			X			X
Hermit Warbler	<i>Dendroica occidentalis</i>	0.057	0.056	0.062	0.23					X	X
Red Crossbill	<i>Loxia curvirostra</i>	0.031	0.067	0.056	0.20						
Wrentit	<i>Chamaea fasciata</i>	0.052	0.036	0.056	0.20				X	X	
Hutton's Vireo	<i>Vireo huttoni</i>	0.115	0.144	0.046	0.23		X				
Hermit Thrush	<i>Catharus guttatus</i>	0.026	0.046	0.046	0.17						
Gray Jay	<i>Perisoreus canadensis</i>	0.031	0.010	0.046	0.13						
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.052	0.067	0.041	0.27		X			X	
Song Sparrow	<i>Melospiza melodia</i>	0.010	0.041	0.021	0.07	X					X
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.000	0.000	0.021	0.13			X			
Allen's Hummingbird	<i>Selasphorus sasin</i>	0.000	0.021	0.015	0.10					X	X
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.000	0.015	0.015	0.03						
Spotted Towhee	<i>Pipilo maculatus</i>	0.000	0.015	0.015	0.03						X
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	0.000	0.000	0.015	0.03						X
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.010	0.087	0.010	0.07			X			
Hairy Woodpecker	<i>Picoides villosus</i>	0.021	0.031	0.010	0.03						
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	0.021	0.021	0.010	0.07			X		X	
Common Raven	<i>Corvus corax</i>	0.010	0.000	0.010	0.07						
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.000	0.000	0.010	0.03					X	X
Dark-eyed Junco	<i>Junco hyemalis</i>	0.021	0.031	0.005	0.03			X			X

Table 4 (continued)

Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF				Cont PIF ⁵	CDFG ⁶ CA Wildlife: Cons. Strategy
		2008	2011	2014		Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.005	0.010	0.005	0.03	X					
American Robin	<i>Turdus migratorius</i>	0.000	0.010	0.005	0.03						
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.005	0.010	0.005	0.03						
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	0.000	0.005	0.005	0.03		X				
Bushtit	<i>Psaltirius minimus</i>	0.005	0.000	0.005	0.03						
Purple Finch	<i>Carpodacus purpureus</i>	0.000	0.000	0.005	0.03			X			
Sooty Grouse	<i>Dendragapus fuliginosus</i>	0.000	0.000	0.005	0.03						X
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.005	0.031	0.000	0.00					X	X
Lazuli Bunting	<i>Passerina amoena</i>	0.010	0.021	0.000	0.00						
Pine Siskin	<i>Spinus pinus</i>	0.016	0.010	0.000	0.00						
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.010	0.010	0.000	0.00						X
Warbling Vireo	<i>Vireo gilvus</i>	0.000	0.005	0.000	0.00	X					
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.000	0.005	0.000	0.00			X		X	X
Mountain Quail	<i>Oreortyx pictus</i>	0.000	0.005	0.000	0.00			X	X	X	
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	0.000	0.005	0.000	0.00			X			
Chipping Sparrow	<i>Spizella passerina</i>	0.000	0.005	0.000	0.00			X			X
Downy Woodpecker	<i>Picoides pubescens</i>	0.005	0.005	0.000	0.00						
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	0.005	0.005	0.000	0.00						X
Northern Flicker	<i>Colaptes auratus</i>	0.010	0.005	0.000	0.00						
Cassin's Vireo	<i>Vireo cassinii</i>	0.000	0.005	0.000	0.00						
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.005	0.000	0.000	0.00		X			X	X
Anna's Hummingbird	<i>Calypte anna</i>	0.005	0.000	0.000	0.00						
Yellow-rumped Warbler	<i>Dendroica coronata</i>	0.010	0.000	0.000	0.00			X			
Ruffed Grouse	<i>Bonasa umbellus</i>	0.005	0.000	0.000	0.00						X
European Starling	<i>Sturnus vulgaris</i>	0.010	0.000	0.000	0.00		X				
Tree Swallow	<i>Tachycineta bicolor</i>	0.005	0.000	0.000	0.00	X					
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	0.005	0.000	0.000	0.00						
Orange-crowned Warbler	<i>Vermivora celata</i>	0.010	0.000	0.000	0.00						
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.005	0.000	0.000	0.00						X

¹RHJV 2004, ²CalPIF 2002b, ³CalPIF 2002a, ⁴CalPIF 2004, ⁵Rich et al. 2004, ⁶CDFG 2005

Table 5. List of additional species detected at Redwood National and State Parks 2014 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name		CalPIF			Cont PIF ⁴	CDFG ⁵
		Riparian ¹	Oak ²	Conifer ³	Pacific	CA Wildlife: Cons. Strategy
Bald Eagle	<i>Haliaeetus leucocephalus</i>				X	X
Barred Owl	<i>Strix varia</i>					
Black-capped Chickadee	<i>Poecile atricapillus</i>					X
California Quail	<i>Callipepla californica</i>		X			
Cedar Waxwing	<i>Bombycilla cedrorum</i>					
Downy Woodpecker	<i>Picoides pubescens</i>					
European Starling	<i>Sturnus vulgaris</i>		X			
Lazuli Bunting	<i>Passerina amoena</i>					
Lesser Goldfinch	<i>Spinus psaltria</i>					
MacGillivray's Warbler	<i>Oporornis tolmiei</i>			X		
Marbled Murrelet	<i>Brachyramphus marmoratus</i>					X
Mountain Quail	<i>Oreortyx pictus</i>			X	X	
Nashville Warbler	<i>Vermivora ruficapilla</i>					
Northern Flicker	<i>Colaptes auratus</i>					
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>		X			
Orange-crowned Warbler	<i>Vermivora celata</i>					
Osprey	<i>Pandion haliaetus</i>					X
Purple Martin	<i>Progne subis</i>					X
Red-tailed Hawk	<i>Buteo jamaicensis</i>					
Ruffed Grouse	<i>Bonasa umbellus</i>					X
Townsend's Warbler	<i>Dendroica townsendi</i>					
Turkey Vulture	<i>Cathartes aura</i>					
Warbling Vireo	<i>Vireo gilvus</i>	X				
Western Screech-Owl	<i>Megascops kennicottii</i>					
Western Scrub-Jay	<i>Aphelocoma californica</i>		X		X	X
Western Tanager	<i>Piranga ludoviciana</i>			X		
White-breasted Nuthatch	<i>Sitta carolinensis</i>		X			
Yellow-rumped Warbler	<i>Dendroica coronata</i>			X		

¹RHJV 2004, ²CalPIF 2002b, ³CalPIF 2002a, ⁴Rich et al. 2004, ⁵CDFG 2005

Oregon Caves National Monument

The constant effort monitoring station at Oregon Caves National Monument was run 15 times during 2014. Nine visits occurred during the breeding season (2 June to 25 August) and six visits during the fall dispersal and migration season (3 September to 9 October). On all visits, two area searches were completed. Monitoring was completed by Alexis Campo, Kaitlin Clark, Lucila Fernandez, Bob Frey, Aracely Guzman, Stephanie Loredó, Kendall Norcross, Kyran Nordal, Chris Taft, Nick Worley, and Ivan Yates.

In 2014, 42 species were detected at Oregon Caves National Monument at the constant effort monitoring station (Table 6). Twenty-eight species were captured during mist-netting, 24 during the breeding season and 18 during the migration season. During area searches 30 species were detected, 20 during the breeding season and 18 during the migration season. Seven additional species were recorded on species checklists only. Overall, the number of species detected aligns with past efforts. From 2008 through 2013, 38–59 total species were detected, 27–34 species were captured during mist-netting, and 17–31 species were detected during area search surveys annually (Stephens et al. 2009; Stephens et al. 2010; Stephens et al. 2011; Stephens and Mohren 2012; Stephens and Mohren 2013; Stephens 2014).

Table 6. Results from the constant effort monitoring station at Oregon Caves National Monument in 2014, showing total mist net captures and relative abundance (birds/area search plot) during breeding (2 June to 25 August) and migration (3 September to 9 October), and showing conservation status. Species included in this table with no capture or abundance values were detected at the site, but not during an area search or from mist-net captures.

Common Name	Scientific Name	Total Captures (breeding)	Total Captures (migration)	Rel. Abund. (breeding)	Rel. Abund. (migration)	OR/WA PIF Conifer ¹	Cont PIF ² Pacific
Allen's Hummingbird	<i>Selasphorus sasin</i>	1					
American Robin	<i>Turdus migratorius</i>	1		0.111			
Audubon's Warbler	<i>Dendroica coronata auduboni</i>			0.111			
Band-tailed Pigeon	<i>Patagioenas fasciata</i>					X	X
Black-capped Chickadee	<i>Poecile atricapillus</i>				0.166		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	2		0.056			
Brown Creeper	<i>Certhia americana</i>			0.333		X	
Canada Goose	<i>Branta canadensis</i>						
Cassin's Vireo	<i>Vireo cassinii</i>	4	1				
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	4	22		1.333		X
Common Raven	<i>Corvus corax</i>				0.167		
Downy Woodpecker	<i>Picoides pubescens</i>						
Dusky Flycatcher	<i>Empidonax oberholseri</i>		1				
Fox Sparrow	<i>Passerella iliaca</i>	1	5			X	X
Golden-crowned Kinglet	<i>Regulus satrapa</i>	3	4	0.556	0.333		
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		2				X
Gray Jay	<i>Perisoreus canadensis</i>	2	3	0.556	0.333		
Hairy Woodpecker	<i>Picoides villosus</i>			0.056			
Hermit Thrush	<i>Catharus guttatus</i>	1	14			X	
Hermit Warbler	<i>Dendroica occidentalis</i>	3				X	X
House Wren	<i>Troglodytes aedon</i>			0.056			
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	23	3	0.611			
Mountain Chickadee	<i>Poecile gambeli</i>			0.111	0.250		
Mountain Quail	<i>Oreortyx pictus</i>	1					X
Nashville Warbler	<i>Vermivora ruficapilla</i>	29		0.333		X	
Northern Flicker	<i>Colaptes auratus</i>				0.083	X	
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	1					
Olive-sided Flycatcher	<i>Contopus cooperi</i>					X	X
Orange-crowned Warbler	<i>Vermivora celata</i>	4				X	
Oregon Junco	<i>Junco hyemalis oregonus</i>	70	26	2.278	1.250		
Pacific Wren	<i>Troglodytes troglodytes</i>	6	1	0.333	0.500	X	
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	7				X	
Pileated Woodpecker	<i>Dryocopus pileatus</i>			0.056		X	

Table 6 (continued)

Common Name	Scientific Name	Total Captures (breeding)	Total Captures (migration)	Rel. Abund. (breeding)	Rel. Abund. (migration)	OR/WA PIF Conifer ¹	Cont PIF ² Pacific
Purple Finch	<i>Carpodacus purpureus</i>					X	X
Red-breasted Nuthatch	<i>Sitta canadensis</i>	2	17	0.111	1.083		
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	2	2				X
Ruby-crowned Kinglet	<i>Regulus calendula</i>		3		0.167		
Rufous Hummingbird	<i>Selasphorus rufus</i>	1		0.056		X	X
Song Sparrow	<i>Melospiza melodia</i>				0.083		
Sooty Grouse	<i>Dendragapus fuliginosus</i>					X	
Steller's Jay	<i>Cyanocitta stelleri</i>	9	3	0.611	0.750		X
Swainson's Thrush	<i>Catharus ustulatus</i>	9	6	0.056	0.083		
Varied Thrush	<i>Ixoreus naevius</i>		3		0.083	X	X
Vaux's Swift	<i>Chaetura vauxi</i>					X	
Western Tanager	<i>Piranga ludoviciana</i>				0.083	X	
Western Wood-Pewee	<i>Contopus sordidulus</i>			0.056			
Wilson's Warbler	<i>Wilsonia pusilla</i>	15	4	0.056		X	

¹ Altman and Alexander 2012, ² Rich et al. 2004

Discussion

This seventh 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 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, the Spotted Towhee was the most abundant species at the park in all survey years (2008, 2011, 2014) (Table 1). Of the species detected on more than 5% of the points, five are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 1). These included species that are indicators for both coniferous forest (Chipping Sparrow) and sagebrush (Horned Lark, Lark Sparrow) ecosystems. The Gray Flycatcher inhabits both conifer and sagebrush habitat and is a Stewardship Species in the Intermountain West Avifaunal Biome, where 96% of the breeding population occurs (Rich et al. 2004). Stewardship Species have a high proportion of their range within a given region and are highlighted for conservation action (Rich et al. 2004).

At Redwood National and State Parks, Pacific-slope Flycatcher, Chestnut-backed Chickadee, and Pacific Wren were the most abundant species at the park in all survey years (2008, 2011, 2014) (Table 4). Of the 13 species detected at greater than 5% of the points, 12 are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 4). This park unit has a diverse range of habitats; the most abundant species included indicators of riparian, conifer, and coastal scrub habitats. The three most abundant species, Pacific-slope Flycatcher, Chestnut-backed Chickadee, and Pacific Wren, are Stewardship Species in the Pacific Avifaunal Biome, where 91%, 90%, and 26% of their breeding populations, respectively, occur (Rich et al. 2004). These three species inhabit the coniferous forest at Redwood National and State Parks.

Oregon Junco was the most frequently captured species at the Oregon Caves National Monument constant effort monitoring station during both breeding and migration seasons. Nashville Warbler, a Partners in Flight focal species in coniferous forest, was the second most frequently captured species during the breeding and migration seasons, combined, in 2014 (CalPIF 2002a). Oregon Caves National Monument contains important forest ecosystems; in total, 23 conifer and mixed-forest Partners in Flight focal species and species of continental importance were detected at the constant effort monitoring station. In 2014, no Oregon Conservation Strategy species were detected (ODFW 2005).

Implementation of the KLMN landbird monitoring protocol began in 2008. Landbird status and community composition results from this seventh 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 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 KLMN.

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