



# Landbird Monitoring: 2015 results from Lassen Volcanic National Park, Oregon Caves National Monument and Preserve, and Whiskeytown National Recreation Area

Natural Resource Data Series NPS/KLMN/NRDS—2016/1043



**ON THE COVER**

Lincoln Sparrow

Photograph by: James Livaudais ©2016

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# **Landbird Monitoring: 2015 results from Lassen Volcanic National Park, Oregon Caves National Monument and Preserve, and Whiskeytown National Recreation Area**

Natural Resource Data Series NPS/KLMN/NRDS—2016/1043

Jaime L. Stephens

Klamath Bird Observatory  
PO Box 758  
Ashland, OR 97520

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## **Abstract**

In 2015, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the eighth year of a long-term landbird monitoring protocol. Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and completed this eight 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 2015, a third year of point counts were completed, along with corresponding species checklists and habitat surveys, at 25 locations within Lassen Volcanic National Park, and 28 locations within Whiskeytown National Recreation Area; where two sites were not able to be surveyed because of safety concerns. 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 and Preserve 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 eighth 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**

I would like to thank Sean Mohren, John Alexander, Daniel Sarr, and Kathryn Irvine 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, Sean Denniston, Tricia Ford, Steve Gibbons, Jennifer Gibson, Michael Magnuson, John Roth, and Lynne Stokes for their logistical support in 2015. I would like to acknowledge Kate Halstead who oversaw the point count field season and Ellie Armstrong for assistance with this report. The dedication of the field crews made this season successful. Point count surveys were completed by Jim DeStaebler and Frank Lospalluto. The Constant Effort Monitoring Station was run by Robert Frey, KBO Biologist and Banding Project Lead; KBO Student Volunteer Interns Jasmine Buries, Liliana Calderón, Kaitlin Clark, Luiza Figueira, Erica Gaeta, Oscar Garzon, Jr., Daniel Gomez, Pater Hamming, Eva Leach, Pedro Martins, James Moore, Wesley Shinsato, and Jaclyn Tolchin; and Oregon Caves National Monument and Preserve Interpretive Center Interns Nick Worley and Iven Yates.

## Introduction

In 2015, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the eighth 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 an overview of 2015 efforts, including a summary of (1) the monitoring protocol, (2) point count and area search surveys and constant effort monitoring efforts, and (3) 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 (LBE), 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; 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 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. *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 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 both the existing monument and the now expanded 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 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 and Preserve (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 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 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 and Preserve, operation of an ongoing constant effort monitoring station following standard protocols (Ralph et al. 2004; Stephens, Mohren et al. 2010) 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 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 Monument 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 Monument was completed in 2010 (year 3) rather than 2009 (year 2) due to logistical challenges with site establishment in 2009. The third round of visits began in 2014. In 2015, we completed the third round of visits at Lassen Volcanic National Monument and Whiskeytown National Recreation Area (Figure 1 and Figure 2). In addition, the constant effort monitoring station at Oregon Caves National Monument and Preserve was operated in 2015, and is operated annually.

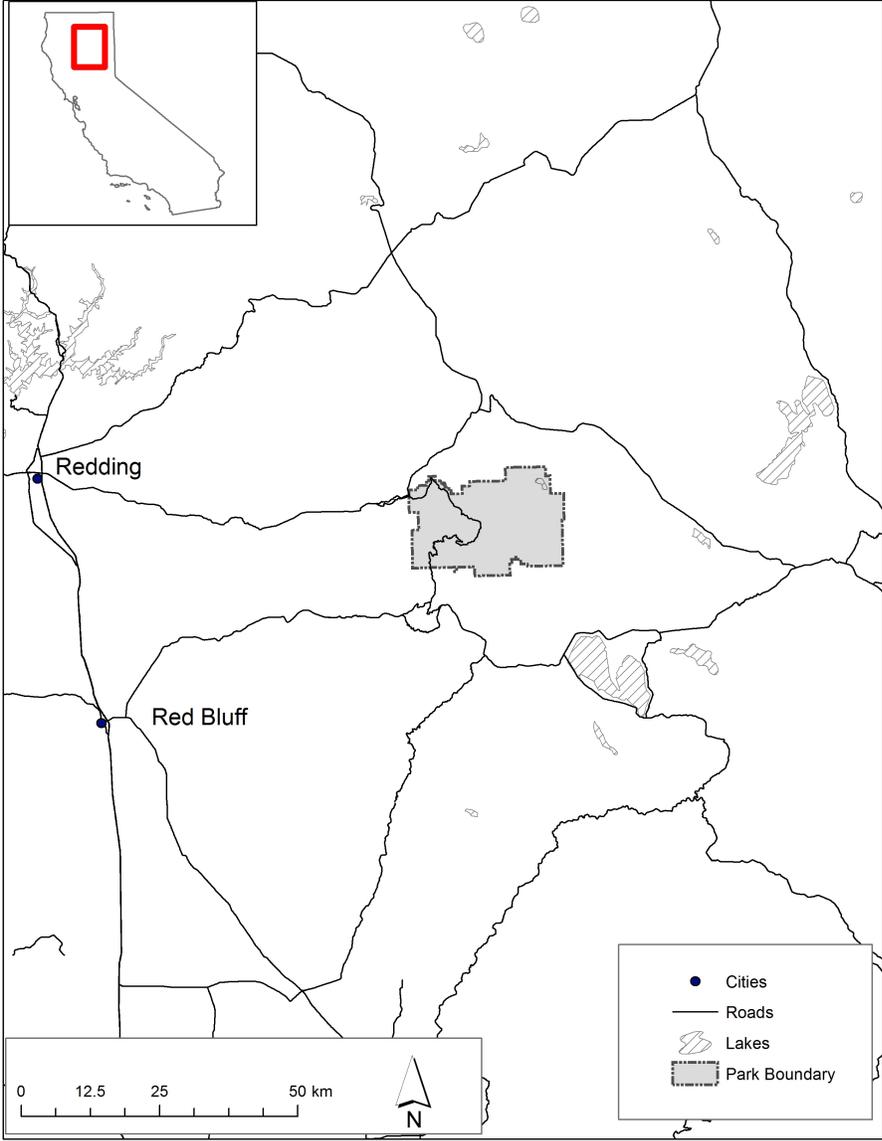


Figure 1. Lassen Volcanic National Park is located in northern California.



**Figure 2.** Whiskeytown National Recreation Area is located in northern California.

### ***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 training session on protocol implementation. 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 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 and Preserve 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. The two area search plots at Oregon Caves National Monument and Preserve are approximately 0.4 and 0.6 hectares in size.

### ***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 2015; ODFW 2005) are highlighted in the results where applicable.

## Results

### Lassen Volcanic National Park

In 2015 we surveyed all points (10-12 survey points/route) on all 25 permanent point count survey routes at Lassen Volcanic National Park (Figure 3). All survey routes were originally established with 12 survey stations, but during the initial year of protocol implementation three points were dropped due to safety and time constraints (LV01 and LV19 have 11 and 10 stations respectively, all other routes have 12 stations). Surveys were completed from 22 June to 5 July by Jim DeStaebler and Frank Lospalluto, the same surveyors that completed the point counts in 2010 and 2012. The sampling frame at Lassen Volcanic National Park is riparian, including both streams and wetlands. The 2015 point count surveys recorded 68 species within 50 m of the stations (Table 1). An additional 16 species were detected. These 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). The 2015 results are similar to 2010 and 2012 in total diversity but slightly greater in the number of species detected on point counts; with 54 and 59 species detected on point count surveys in 2010 and 2012, respectively, and 24 and 29 additional species recorded on species checklists, respectively. Dark-eyed Junco was detected on the greatest proportion of routes (100%), followed by American Robin, Golden-crowned Kinglet, Mountain Chickadee, Yellow-rumped Warbler, and Rufous Hummingbird (84%).



**Table 1.** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2012, and 2015 point count surveys at Lassen Volcanic National Park, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park; those detected in previous years, but not in 2015, 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 <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012	2015	2015	Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Dark-eyed Junco	<i>Junco hyemalis</i>	0.640	0.529	0.791	1.000	--	X	--	X
Lincoln's Sparrow	<i>Melospiza lincolni</i>	0.229	0.168	0.502	0.800	--	--	--	--
Wilson's Warbler <sup>5</sup>	<i>Cardellina pusilla</i>	0.293	0.205	0.300	0.800	X	--	--	--
Yellow-rumped Warbler	<i>Dendroica coronata</i>	0.158	0.414	0.266	0.840	--	X	--	--
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.047	0.061	0.236	0.760	--	X	--	--
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.051	0.017	0.232	0.840	--	--	X	--
American Robin	<i>Turdus migratorius</i>	0.242	0.263	0.226	0.840	--	--	--	--
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.216	0.253	0.215	0.840	--	X	--	--
Mountain Chickadee	<i>Poecile gambeli</i>	0.212	0.212	0.162	0.840	--	--	--	--
Nashville Warbler <sup>5</sup>	<i>Oreothlypis ruficapilla</i>	0.017	0.114	0.152	0.520	--	--	--	--
Brown Creeper	<i>Certhia americana</i>	0.125	0.098	0.141	0.560	--	X	--	--
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.074	0.125	0.121	0.640	--	--	--	--
Pine Siskin	<i>Spinus pinus</i>	0.266	0.677	0.111	0.440	--	--	--	--
Lazuli Bunting	<i>Passerina amoena</i>	0	0.013	0.104	0.440	--	--	--	--
Warbling Vireo	<i>Vireo gilvus</i>	0.125	0.088	0.101	0.640	X	--	--	--
Steller's Jay	<i>Cyanocitta stelleri</i>	0.104	0.074	0.094	0.560	--	X	X	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002

<sup>3</sup>Rich 2004

<sup>4</sup>CDFG 2015

<sup>5</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>6</sup> previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

**Table 1 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2012, and 2015 point count surveys at Lassen Volcanic National Park, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park; those detected in previous years, but not in 2015, 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 <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012	2015	2015	Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Cassin's Finch	<i>Carpodacus cassinii</i>	0.094	0.145	0.091	0.480	--	X	--	--
Chipping Sparrow	<i>Spizella passerina</i>	0.020	0.010	0.088	0.400	--	--	--	--
House Wren	<i>Troglodytes aedon</i>	0.003	0.010	0.084	0.520	--	--	--	--
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.014	0.061	0.084	0.440	--	--	X	--
Orange-crowned Warbler <sup>5</sup>	<i>Oreothlypis celata</i>	0.040	0.061	0.081	0.400	--	--	--	--
MacGillivray's Warbler <sup>5</sup>	<i>Geothlypis tolmiei</i>	0.047	0.017	0.071	0.440	--	X	--	--
Song Sparrow	<i>Melospiza melodia</i>	0.044	0.027	0.057	0.200	X	--	--	--
Pacific Wren <sup>6</sup>	<i>Troglodytes pacificus</i>	0.061	0.057	0.054	0.480	--	--	X	--
Mountain Quail	<i>Oreortyx pictus</i>	0.024	0.007	0.047	0.080	--	--	X	--
Hairy Woodpecker	<i>Picoides villosus</i>	0.020	0.013	0.044	0.360	--	--	--	--
American Dipper	<i>Cinclus mexicanus</i>	0.014	0.04	0.040	0.360	--	--	--	--
Black-backed Woodpecker	<i>Picoides arcticus</i>	0.003	0.003	0.040	0.320	--	X	--	--
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.014	0.003	0.037	0.200	--	--	--	--
Western Tanager	<i>Piranga ludoviciana</i>	0.024	0.101	0.037	0.320	--	X	--	--
Cassin's Vireo	<i>Vireo cassinii</i>	0	0.003	0.034	0.320	--	--	--	--
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.017	0.098	0.027	0.240	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002

<sup>3</sup>Rich 2004

<sup>4</sup>CDFG 2015

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**Table 1 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2012, and 2015 point count surveys at Lassen Volcanic National Park, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park; those detected in previous years, but not in 2015, 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 <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012	2015	2015	Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Sooty Grouse	<i>Dendragapus fuliginosus</i>	0.007	0.007	0.027	0.160	--	--	X	--
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.010	0.013	0.027	0.120	--	--		--
Tree Swallow	<i>Tachycineta bicolor</i>	0.017	0.013	0.024	0.120	X	--		--
White-headed Woodpecker	<i>Picoides albolarvatus</i>	0.017	0.013	0.024	0.200	--	--	X	--
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0	0.024	0.020	0.200	--	X	X	X
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.003	0.034	0.020	0.160	--	--	--	--
Hermit Warbler <sup>5</sup>	<i>Setophaga occidentalis</i>	0.007	0.010	0.017	0.160	--	--	X	--
Western Flycatcher	<i>Empidonax difficilis/occidentalis</i>	0.044	0.010	0.017	0.080	--	--	X	--
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0	0	0.017	0.160	--	--		--
Fox Sparrow	<i>Passerella iliaca</i>	0.014	0.024	0.013	0.080	--	X	X	--
Hammond's Flycatcher	<i>Empidonax hammondii</i>	0.003	0.003	0.013	0.160	--	--	--	--
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.007	0	0.013	0.160	--	--	--	--
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	0	0.007	0.010	0.080	--	--	--	--
Gray Jay	<i>Perisoreus canadensis</i>	0	0.017	0.010	0.120	--	X	--	--
Northern Flicker	<i>Colaptes auratus</i>	0.003	0.010	0.010	0.040	--	--	--	--
Yellow Warbler	<i>Setophaga petechia</i>	0.007	0	0.010	0.120	X	--	--	X

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002

<sup>3</sup>Rich 2004

<sup>4</sup>CDFG 2015

<sup>5</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>6</sup> previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

**Table 1 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2012, and 2015 point count surveys at Lassen Volcanic National Park, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park; those detected in previous years, but not in 2015, 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 <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012	2015	2015	Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Downy Woodpecker	<i>Picoides pubescens</i>	0	0	0.010	0.040	--	--	--	--
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.003	0	0.007	0.080	--	--	X	--
Red Crossbill	<i>Loxia curvirostra</i>	0	0.024	0.007	0.080	--	--	--	--
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.003	0.010	0.007	0.080	--	--	--	--
Swainson's Thrush	<i>Catharus ustulatus</i>	0	0.010	0.007	0.040	X	--	--	--
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	0	0.003	0.007	0.080	--	--	--	--
Northern Goshawk	<i>Accipiter gentilis</i>	0	0	0.007	0.080	--	--	--	X
Anna's Hummingbird	<i>Calypte anna</i>	0	0.007	0.003	0.040	--	--	--	--
Calliope Hummingbird	<i>Stellula calliope</i>	0.003	0.017	0.003	0.040	--	--	--	--
Mountain Bluebird	<i>Sialia currucoides</i>	0.007	0.017	0.003	0.040	--	--	--	--
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0	0.007	0.003	0.040	--	--	X	--
Rock Wren	<i>Salpinctes obsoletus</i>	0.003	0	0.003	0.040	--	--	--	--
Spotted Sandpiper	<i>Actitis macularius</i>	0.027	0	0.003	0.040	X	--	--	--
Great Horned Owl	<i>Bubo virginianus</i>	0	0	0.003	0.040	--	--	--	--
Hermit Thrush	<i>Catharus guttatus</i>	0	0	0.003	0.040	--	--	--	--
Cooper's Hawk	<i>Accipiter cooperii</i>	0	0	0.003	0.040	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002

<sup>3</sup>Rich 2004

<sup>4</sup>CDFG 2015

<sup>5</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>6</sup> previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

**Table 1 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2012, and 2015 point count surveys at Lassen Volcanic National Park, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park; those detected in previous years, but not in 2015, 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 <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012	2015	2015	Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Gray Flycatcher	<i>Empidonax wrightii</i>	0	0	0.003	0.040	--	x		
Great Blue Heron	<i>Ardea herodias</i>	0	0	0.003	0.040	--	--	--	x
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	0	0	0.003	0.040	--	--	--	--
Belted Kingfisher	<i>Megaceryle alcyon</i>	0	0	0.003	0.040	--	--	--	--
Barn Swallow	<i>Hirundo rustica</i>	0.003	0.013	0	0	--	--	--	--
Canada Goose	<i>Branta canadensis</i>	0.007	0	0	0	--	--	--	--
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0.007	0	0	0	--	X		--
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.003	0.007	0	0	--	--		--
Killdeer	<i>Charadrius vociferus</i>	0	0.003	0	0	--	--		--
Lesser Goldfinch	<i>Spinus psaltria</i>	0	0.003	0	0	--	--		--
Varied Thrush	<i>Ixoreus naevius</i>	0.003	0	0	0	--	--	X	--
Vaux's Swift	<i>Chaetura vauxi</i>	0	0.003	0	0	--	X	--	X
Western Bluebird	<i>Sialia mexicana</i>	0	0.003	0	0	--	--	--	--
Wilson's Snipe	<i>Gallinago delicata</i>	0.003	0	0	0	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002

<sup>3</sup>Rich 2004

<sup>4</sup>CDFG 2015

<sup>5</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>6</sup> previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

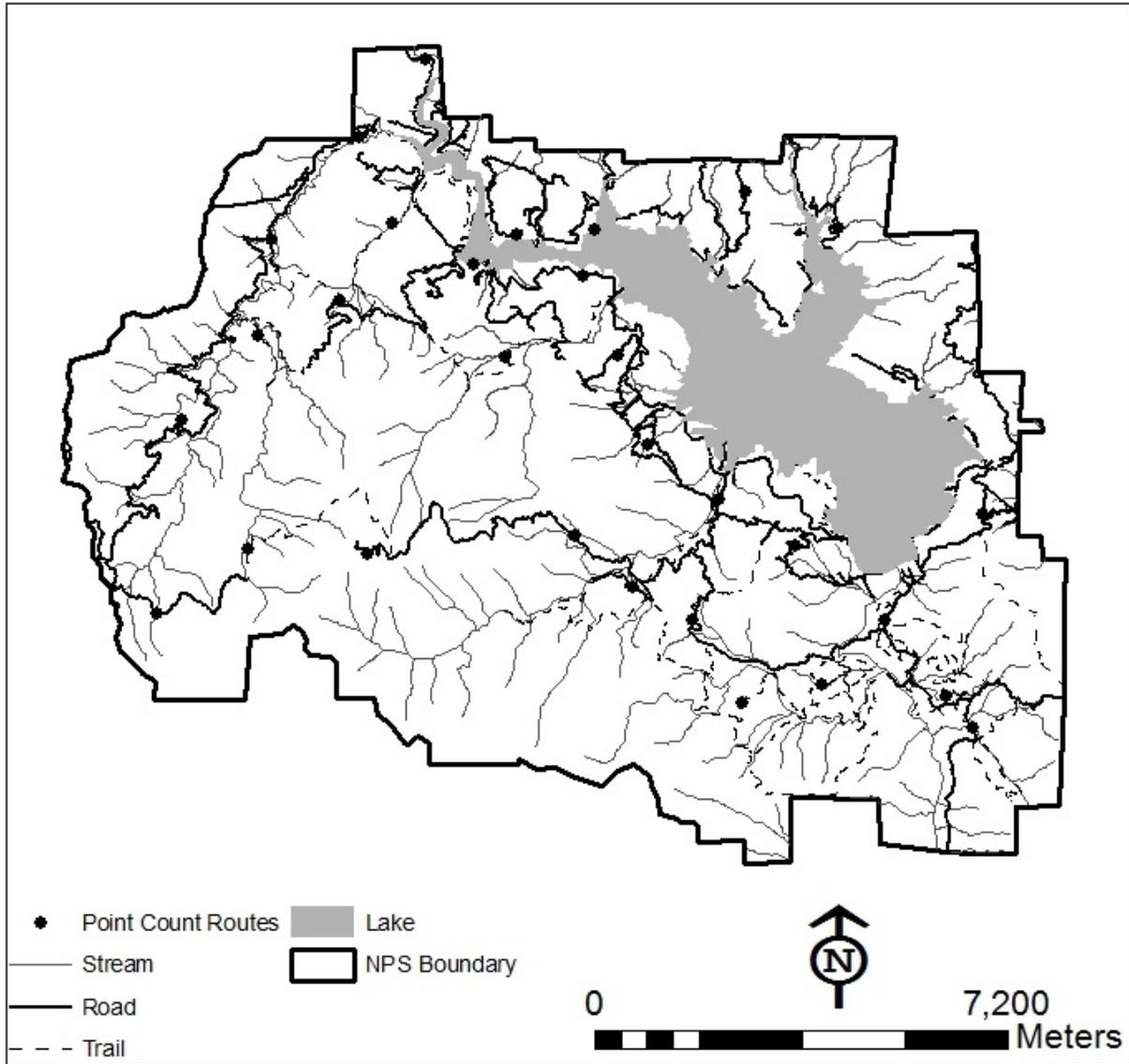
**Table 2.** List of additional species detected at Lassen Volcanic National Park in 2015 (not counted within 50 m during VCP point count surveys), and conservation status.

Common Name	ScientificName	CalPIF		Cont PIF <sup>3</sup>	CDFG <sup>4</sup>
		Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
American Kestrel	<i>Falco sparverius</i>	--	--	--	--
Brewer's Sparrow	<i>Spizella breweri</i>	--	--	--	X
Common Nighthawk	<i>Chordeiles minor</i>	--	--	--	--
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	--	--	--	--
Common Raven	<i>Corvus corax</i>	--	--	--	--
Dusky Grouse	<i>Dendragapus obscurus</i>	--	--	--	--
Mallard	<i>Anas platyrhynchos</i>	--	--	--	--
Osprey	<i>Phalaenoptilus nuttallii</i>	--	--	--	--
Pileated Woodpecker	<i>Dryocopus pileatus</i>	--	X	--	X
Pied-billed Grebe	<i>Podilymbus podiceps</i>	--	--	--	--
Purple Finch	<i>Carpodacus purpureus</i>	--	X	--	--
Red-shouldered Hawk	<i>Buteo lineatus</i>	--	--	--	--
Red-tailed Hawk	<i>Buteo jamaicensis</i>	--	--	--	--
Ruby-crowned Kinglet	<i>Regulus calendula</i>	--	--	--	--
Spotted Towhee	<i>Pipilo maculatus</i>	--	--	--	X
Willow Flycatcher	<i>Empidonax traillii</i>	X	--	X	X

<sup>1</sup>RHJV 2004<sup>2</sup>CalPIF 2002<sup>3</sup>Rich 2004, <sup>4</sup>CDFG 2015

### Whiskeytown National Recreation Area

In 2015 we surveyed all points on 28 of the 30 permanent point count survey routes (12 points/survey route) at Whiskeytown National Recreation Area (Figure 4). Two routes (WH13 and WH30) could not be surveyed due to safety concerns related to marijuana grows. Surveys were completed from 16 May to 3 June by Jim DeStaebler and Frank Lospalluto. Jim DeStaebler completed point counts, along with one other surveyor (Lyndia Hammer), in 2009 and Jim DeStaebler and Frank Lospalluto completed all point counts in 2012. The sampling frame at Whiskeytown National Recreation Area included all roads, trails, and power lines. The 2015 point count surveys recorded 67 species within 50 m of the stations (Table 3). An additional 28 species were detected. These were species recorded outside of 50 m during point count surveys, while walking between survey locations or during vegetation surveys and accounted for on species checklists (Table 4). The 2015 results are similar to 2009 and 2012, with 83 and 74 species detected on point count surveys, respectively, and 27 and 24 additional species recorded on species checklists, respectively. The species detected on the greatest proportion of routes were Black-throated Gray Warbler (83%), Spotted Towhee (80%), Black-headed Grosbeak (67%), and Orange-crowned Warbler (67%).



**Figure 4.** Point count routes at long-term landbird monitoring sites in Whiskeytown National Recreation Area.

**Table 3.** Mean relative abundance (birds within 50 m/point) for species detected during 2009, 2012, and 2015 point count surveys at Whiskeytown National Recreation Area, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park unit; those detected in previous years, but not in 2015, 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 <sup>4</sup>	CDFG <sup>5</sup>
		2009	2012	2015	2015	Riparian <sup>1</sup>	Oak <sup>2</sup>	Conifer <sup>3</sup>	Pacific	CA Wildlife: Cons. Strategy
Spotted Towhee	<i>Pipilo maculatus</i>	0.225	0.422	0.411	0.800	--	--	--	--	X
Black-throated Gray Warbler <sup>6</sup>	<i>Setophaga nigrescens</i>	0.439	0.284	0.336	0.833	--	--	X	X	--
Orange-crowned Warbler <sup>6</sup>	<i>Oreothlypis celata</i>	0.267	0.213	0.229	0.667	--	--	--	--	--
Dark-eyed Junco	<i>Junco hyemalis</i>	0.150	0.141	0.196	0.600	--	--	X	--	--
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.164	0.184	0.182	0.667	X	--	--	--	--
Bushtit	<i>Psaltirparus minimus</i>	0.172	0.138	0.131	0.567	--	--	--	--	--
Blue-gray Gnatcatcher	<i>Poliioptila caerulea</i>	0.103	0.098	0.113	0.367	--	X	--	--	--
Hutton's Vireo	<i>Vireo huttoni</i>	0.058	0.112	0.110	0.600	--	X	--	--	X
Steller's Jay	<i>Cyanocitta stelleri</i>	0.072	0.089	0.104	0.433	--	--	X	X	--
Lesser Goldfinch	<i>Spinus psaltria</i>	0.183	0.307	0.095	0.400	--	--	--	--	--
Wrentit	<i>Chamaea fasciata</i>	0.058	0.132	0.095	0.367	--	--	--	X	--
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.053	0.032	0.092	0.400	--	--	X	--	--
Cassin's Vireo	<i>Vireo cassinii</i>	0.150	0.069	0.086	0.433	--	--	--	--	--
Western Tanager	<i>Piranga ludoviciana</i>	0.086	0.112	0.083	0.467	--	--	X	--	--
Wilson's Warbler <sup>6</sup>	<i>Cardellina pusilla</i>	0.186	0.06	0.080	0.300	X	--	--	--	--
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.039	0.066	0.071	0.333	--	X	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002b

<sup>3</sup>CalPIF 2002a

<sup>4</sup>Rich 2004

<sup>5</sup>CDFG 2015

<sup>6</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

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**Table 3 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2009, 2012, and 2015 point count surveys at Whiskeytown National Recreation Area, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park unit; those detected in previous years, but not in 2015, 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 <sup>4</sup>	CDFG <sup>5</sup>
		2009	2012	2015		2009	2012	2015		
Brown-headed Cowbird	<i>Molothrus ater</i>	0.106	0.132	0.068	0.467	--	--	--	--	--
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.042	0.046	0.065	0.267	--	X	--	X	--
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.056	0.095	0.057	0.300	--	--	--	X	--
Yellow Warbler	<i>Setophaga petechia</i>	0.072	0.063	0.057	0.200	X	--	--	--	X
Warbling Vireo	<i>Vireo gilvus</i>	0.067	0.060	0.051	0.400	X	--	--	--	--
Bewick's Wren	<i>Thryomanes bewickii</i>	0.025	0.083	0.048	0.267	--	X	--	--	--
Oak Titmouse	<i>Baeolophus inornatus</i>	0.044	0.029	0.048	0.233	--	X	--	X	--
Hairy Woodpecker	<i>Picoides villosus</i>	0.031	0.049	0.042	0.333	--	--	--	--	--
Fox Sparrow	<i>Passerella iliaca</i>	0.036	0.109	0.039	0.100	--	--	X	X	--
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.011	0.017	0.039	0.333	--	--	--	--	--
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	0.039	0.052	0.033	0.167	--	X	--	--	--
Mountain Quail	<i>Oreortyx pictus</i>	0.003	0.057	0.033	0.300	--	--	X	X	--
Yellow-rumped Warbler	<i>Dendroica coronata</i>	0.042	0.075	0.033	0.167	--	--	X	--	--
Downy Woodpecker	<i>Picoides pubescens</i>	0	0.023	0.027	0.233	--	--	--	--	--
Lazuli Bunting	<i>Passerina amoena</i>	0.042	0.026	0.024	0.167	--	--	--	--	--
American Robin	<i>Turdus migratorius</i>	0.042	0.055	0.021	0.200	--	--	--	--	--
Pacific Wren <sup>7</sup>	<i>Troglodytes pacificus</i>	0.003	0.014	0.021	0.133	--	--	--	X	--
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.028	0.037	0.018	0.100	--	--	--	--	--
Purple Finch	<i>Carpodacus purpureus</i>	0.003	0.014	0.018	0.133	--	--	X	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002b

<sup>3</sup>CalPIF 2002a

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Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF			Cont PIF <sup>4</sup>	CDFG <sup>5</sup>
		2009	2012	2015		2009	2012	2015		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.011	0.017	0.018	0.033	--	--	--	--	--
Townsend's Warbler <sup>6</sup>	<i>Setophaga townsendi</i>	0.078	0.006	0.018	0.100	--	--	--	--	--
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.006	0.011	0.015	0.167	--	X	--	X	--
Mountain Chickadee	<i>Poecile gambeli</i>	0.025	0.014	0.015	0.100	--	--	--	--	--
Mourning Dove	<i>Zenaida macroura</i>	0.036	0.043	0.015	0.133	--	--	--	--	--
Northern Flicker	<i>Colaptes auratus</i>	0.017	0.023	0.015	0.167	--	--	--	--	--
Song Sparrow	<i>Melospiza melodia</i>	0.014	0.026	0.015	0.133	X	--	--	--	--
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0	0.003	0.015	0.100	--	--	--	--	--
Anna's Hummingbird	<i>Calypte anna</i>	0.086	0.060	0.012	0.133	--	--	--	--	--
California Quail	<i>Callipepla californica</i>	0.014	0.020	0.012	0.067	--	X	--	--	X
Brown Creeper	<i>Certhia americana</i>	0.008	0.011	0.009	0.100	--	--	X	--	--
Bullock's Oriole	<i>Icterus bullockii</i>	0.019	0.006	0.009	0.100	--	--	--	--	--
Nashville Warbler <sup>6</sup>	<i>Oreothlypis ruficapilla</i>	0.047	0.040	0.009	0.067	--	--	--	--	--
Osprey	<i>Pandion haliaetus</i>	0	0	0.009	0.067	--	--	--	--	X
Pine Siskin	<i>Spinus pinus</i>	0	0	0.009	0.067	--	--	--	--	--
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.003	0.009	0.009	0.100	--	--	--	X	--
Belted Kingfisher	<i>Megaceryle alcyon</i>	0	0	0.006	0.033	--	--	--	--	--
Common Merganser	<i>Mergus merganser</i>	0	0.029	0.006	0.067	--	--	--	--	--
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0	0	0.006	0.067	--	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002b

<sup>3</sup>CalPIF 2002a

<sup>4</sup>Rich 2004

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Common Name	Scientific Name	Relative Abundance			Proportion of Routes	CalPIF			Cont PIF <sup>4</sup>	CDFG <sup>5</sup>
MacGillivray's Warbler <sup>6</sup>	<i>Geothlypis tolmiei</i>	0.017	0.026	0.006	0.033	--	--	X	--	--
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.006	0.009	0.006	0.067	--	--	--	X	--
American Crow	<i>Corvus brachyrhynchos</i>	0	0	0.003	0.033	--	--	--	--	--
American Dipper	<i>Cinclus mexicanus</i>	0	0	0.003	0.033	--	--	--	--	--
Black Phoebe	<i>Sayornis nigricans</i>	0.006	0	0.003	0.033	--	--	--	--	--
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	0	0.003	0.003	0.033	--	--	--	--	--
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.006	0.003	0.003	0.033	--	--	--	--	--
Common Raven	<i>Corvus corax</i>	0.019	0.020	0.003	0.033	--	--	--	--	--
Mallard	<i>Anas platyrhynchos</i>	0	0	0.003	0.033	--	--	--	--	--
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0	0	0.003	0.033	--	--	X	X	X
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0	0	0.003	0.033	--	--	X	--	--
Spotted Sandpiper	<i>Actitis macularius</i>	0	0	0.003	0.033	X	--	--	--	--
Yellow-breasted Chat	<i>Icteria virens</i>	0.014	0.011	0.003	0.033	X	--	--	--	--
American Goldfinch	<i>Spinus tristis</i>	0.008	0	0	0.000	--	--	--	--	--
Barn Swallow	<i>Hirundo rustica</i>	0.025	0.006	0	0.000	--	--	--	--	--
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.008	0	0	0.000	--	--	--	--	--
California Thrasher	<i>Toxostoma redivivum</i>	0	0.003	0	0.000	--	X	--	X	--
California Towhee	<i>Melospiza crissalis</i>	0.014	0.003	0	0.000	--	X	--	X	--
Canada Goose	<i>Branta canadensis</i>	0.008	0	0	0.000	--	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002b

<sup>3</sup>CalPIF 2002a

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<sup>6</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>7</sup> previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

**Table 3 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2009, 2012, and 2015 point count surveys at Whiskeytown National Recreation Area, and proportion of routes with detections for each species in 2015. Species ordered in decreasing order of abundance for 2015 at the park unit; those detected in previous years, but not in 2015, 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 <sup>4</sup>	CDFG <sup>5</sup>
		2009	2012	2015		2009	2012	2015		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.003	0.103	0	0.000	--	--	--	--	--
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	0.003	0.003	0	0.000	--	--	--	X	--
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.389	0.445	0	0.000	--	--	--	--	--
European Starling	<i>Sturnus vulgaris</i>	0.006	0.006	0	0.000	--	--	--	--	--
Great Blue Heron	<i>Ardea herodias</i>	0.003	0.003	0	0.000	--	--	--	--	X
Hammond's Flycatcher	<i>Empidonax hammondi</i>	0.003	0.003	0	0.000	--	--	--	--	--
Hermit Thrush	<i>Catharus guttatus</i>	0	0.003	0	0.000	--	--	--	--	--
Hermit Warbler <sup>6</sup>	<i>Setophaga occidentalis</i>	0.028	0.003	0	0.000	--	--	--	X	--
House Wren	<i>Troglodytes aedon</i>	0.003	0.006	0	0.000	--	--	--	--	--
Lark Sparrow	<i>Chondestes grammacus</i>	0	0.003	0	0.000	--	X	--	--	--
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0	0.003	0	0.000	--	--	--	--	--
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.006	0.006	0	0.000	--	--	--	--	--
Tree Swallow	<i>Tachycineta bicolor</i>	0.019	0.009	0	0.000	X	--	--	--	--
Turkey Vulture	<i>Cathartes aura</i>	0.019	0.006	0	0.000	--	--	--	--	--
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.011	0.003	0	0.000	--	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002b

<sup>3</sup>CalPIF 2002a

<sup>4</sup>Rich 2004

<sup>5</sup>CDFG 2015

<sup>6</sup> classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>7</sup> previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

**Table 4.** List of additional species detected at Whiskeytown National Recreation Area 2015 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name	Scientific Name	CalPIF		Cont PIF <sup>3</sup>	CDFG <sup>4</sup>
		Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Bald Eagle	<i>Haliaeetus leucocephalus</i>	--	--	X	X
Barn Swallow	<i>Hirundo rustica</i>	--	--	--	--
California Thrasher	<i>Toxostoma redivivum</i>	--	--	X	--
California Towhee	<i>Melospiza crissalis</i>	--	--	X	--
Canada Goose	<i>Branta canadensis</i>	--	--	--	--
Cedar Waxwing	<i>Bombycilla cedrorum</i>	--	--	--	--
Chipping Sparrow	<i>Spizella passerina</i>	--	--	--	--
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	--	--	--	--
Common Loon	<i>Gavia immer</i>	--	--	--	--
Cooper's Hawk	<i>Accipiter cooperii</i>	--	--	--	--
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	--	--	--	--
European Starling	<i>Sturnus vulgaris</i>	--	--	--	--
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	--	--	--	--
Great Blue Heron	<i>Butorides virescens</i>	--	--	--	--
Hammond's Flycatcher	<i>Empidonax hammondii</i>	--	--	--	--
Hermit Warbler	<i>Setophaga occidentalis</i>	--	--	X	--
House Finch	<i>Carpodacus mexicanus</i>	--	--	--	--
Mountain Bluebird	<i>Sialia currucoides</i>	--	--	--	--
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	--	--	--	--
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	--	--	--	--
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	--	--	--	--
Red-shouldered Hawk	<i>Buteo lineatus</i>	--	--	--	--
Red-tailed Hawk	<i>Buteo jamaicensis</i>	--	--	--	--
Townsend's Solitaire	<i>Myadestes townsendi</i>	--	--	--	--
Tree Swallow	<i>Tachycineta bicolor</i>	X	--	--	--
Turkey Vulture	<i>Cathartes aura</i>	--	--	--	--
Violet-green Swallow	<i>Tachycineta thalassina</i>	--	--	--	--
Western Bluebird	<i>Sialia mexicana</i>	--	--	--	--

<sup>1</sup>RHJV 2004

<sup>2</sup>CalPIF 2002a

<sup>3</sup>Rich 2004

<sup>4</sup>CDFG 2015

### Oregon Caves National Monument and Preserve

The constant effort monitoring station at Oregon Caves National Monument and Preserve was run 15 times during 2015. Nine visits occurred during the breeding season (5 June to 22 August) and six

visits during the fall dispersal and migration season (4 September to 8 October). On all visits, two area searches were completed. Monitoring was completed by Robert Frey, KBO Biologist and Banding Project Lead; KBO Student Volunteer Interns Jasmine Buries, Liliana Calderón, Kaitlin Clark, Luiza Figueira, Erica Gaeta, Oscar Garzon, Jr., Daniel Gomez, Pater Hamming, Eva Leach, Pedro Martins, James Moore, Wesley Shinsato, and Jaclyn Tolchin; and Oregon Caves National Monument and Preserve Interpretive Center Interns Nick Worley and Ivan Yates.

In 2015, 51 species were detected at Oregon Caves National Monument and Preserve at the constant effort monitoring station (Table 5). Thirty-one species were captured during mist-netting, 24 during the breeding season and 21 during the migration season. During area searches 25 species were detected, 14 during the breeding season and 16 during the migration season. Thirteen additional species were recorded on species checklists only. Overall, the number of species detected aligns with past efforts. From 2008 through 2014, 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; Stephens 2015).

**Table 5.** Results from the constant effort monitoring station at Oregon Caves National Monument and Preserve in 2015, showing total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 22 August) and migration (4 September to 8 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 <sup>1</sup>	Cont PIF <sup>2</sup> Pacific
Allen's Hummingbird	<i>Selasphorus sasin</i>	1					
American Crow	<i>Corvus brachyrhynchos</i>						
American Robin	<i>Turdus migratorius</i>	2	1				
Audubon's Warbler	<i>Dendroica coronata auduboni</i>	1	0	0.056			
Band-tailed Pigeon	<i>Patagioenas fasciata</i>					X	X
Black-capped Chickadee	<i>Poecile atricapillus</i>				0.417		
Black Phoebe	<i>Sayornis nigricans</i>				0.083		
Brown Creeper	<i>Certhia americana</i>	0	1	0.333	0.667	X	
Cassin's Vireo	<i>Vireo cassinii</i>	6	0	0.056			
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	12	13	0.111	2.500		X
Chipping Sparrow	<i>Spizella passerina</i>			0.056			
Common Raven	<i>Corvus corax</i>				0.083		
Downy Woodpecker	<i>Picoides pubescens</i>						
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>						
Fox Sparrow	<i>Passerella iliaca</i>	0	27		1.083	X	X
Golden-crowned Kinglet	<i>Regulus satrapa</i>	2	10	0.611	0.750		
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	0	4		0.083		X
Gray Jay	<i>Perisoreus canadensis</i>	3	4		0.167		
Hairy Woodpecker	<i>Picoides villosus</i>						
Hermit Thrush	<i>Catharus guttatus</i>	1	15			X	
Hermit Warbler	<i>Dendroica occidentalis</i>	4	0			X	X

<sup>1</sup>Altman 2012

<sup>2</sup>Rich 2004

**Table 5 (continued).** Results from the constant effort monitoring station at Oregon Caves National Monument and Preserve in 2015, showing total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 22 August) and migration (4 September to 8 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 <sup>1</sup>	Cont PIF <sup>2</sup> Pacific
Hutton's Vireo	<i>Vireo huttoni</i>	0	2				
Lazuli Bunting	<i>Passerina amoena</i>	1	0				
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	21	3	0.444			
Mountain Chickadee	<i>Poecile gambeli</i>	0	1	0.056			
Nashville Warbler	<i>Vermivora ruficapilla</i>	21	0	0.167		X	
Northern Flicker	<i>Colaptes auratus</i>					X	
Orange-crowned Warbler	<i>Vermivora celata</i>	0	1			X	
Oregon Junco	<i>Junco hyemalis oregonus</i>	67	33	1.167	2.333		
Pacific Wren	<i>Troglodytes troglodytes</i>	4	1	0.167			
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>			0.111		X	X
Pileated Woodpecker	<i>Dryocopus pileatus</i>					X	
Red-breasted Nuthatch	<i>Sitta canadensis</i>	2	0		0.167		
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	8	3		0.083		X
Red-tailed Hawk	<i>Buteo jamaicensis</i>						
Ruby-crowned Kinglet	<i>Regulus calendula</i>	0	5		0.083		
Ruffed Grouse	<i>Bonasa umbellus</i>						
Rufous Hummingbird	<i>Selasphorus rufus</i>	3	0			X	X
Song Sparrow	<i>Melospiza melodia</i>	1	0		0.083		
Sooty Grouse	<i>Dendragapus fuliginosus</i>			0.056		X	X
Spotted Towhee	<i>Pipilo maculatus</i>				0.083		

<sup>1</sup>Altman 2012

<sup>2</sup>Rich 2004

**Table 5 (continued).** Results from the constant effort monitoring station at Oregon Caves National Monument and Preserve in 2015, showing total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 22 August) and migration (4 September to 8 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 <sup>1</sup>	Cont PIF <sup>2</sup> Pacific
Steller's Jay	<i>Cyanocitta stelleri</i>	7	2	0.722	0.667		X
Swainson's Thrush	<i>Catharus ustulatus</i>	1	8				
Townsend's Warbler	<i>Setophaga townsendi</i>	1	1			X	
Varied Thrush	<i>Ixoreus naevius</i>					X	X
Vaux's Swift	<i>Chaetura vauxi</i>					X	
Western Flycatcher	<i>Empidonax difficilis/occidentalis</i>						X
Western Tanager	<i>Piranga ludoviciana</i>	8	0			X	
White-headed Woodpecker	<i>Picoides albolarvatus</i>						X
Wilson's Warbler	<i>Wilsonia pusilla</i>	19	8			X	
Yellow Warbler	<i>Setophaga petechia</i>	1	1				

<sup>1</sup>Altman 2012

<sup>2</sup>Rich 2004

## Summary

This eighth year of the KLMN landbird monitoring provided information on avian community composition and the status of landbirds at Lassen Volcanic National Park and Whiskeytown National Recreation Area. 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 Lassen Volcanic National Park, the Dark-eyed Junco was the most abundant species in all survey years (2010, 2012, 2015) and was detected on every survey route in 2015 (Table 1). Of the 24 species detected on more than 5% of survey points 11 are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 1). These included species that are indicators for both coniferous forest (e.g. Dark-eyed Junco, Golden-crowned Kinglet, Red-breasted Nuthatch, Yellow-rumped Warbler) and riparian (e.g. Warbling Vireo, Wilson's Warbler) ecosystems. The Rufous Hummingbird associated with western shrublands is a Stewardship Species in the Pacific Avifaunal Biome, where 61% 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). Three other Stewardship Species were detected on greater than 5% of points: Steller's Jay, Red-breasted Sapsucker, and Pacific Wren.

At Whiskeytown National Recreation Area, Spotted Towhee, Black-throated Gray Warbler, and Orange-crowned Warbler were the most abundant species in all survey years (2009, 2012, 2015) (Table 3). Of the 21 species detected at greater than 5% of points, 13 are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 3). This park unit has a diverse range of habitats; the most abundant species included indicators of riparian, oak, and conifer habitats. The Black-throated Gray Warbler was the second most abundant species and detected on the highest proportion of routes (83%). This species is associated with mixed hardwood conifer forests and is a Stewardship Species in the Pacific Avifaunal Biome, where 69% of its breeding population occurs (Rich et al. 2004). Three other Stewardship Species were detected on greater than 5% of points: Steller's Jay, Western Scrub-jay, and Pacific-slope Flycatcher. The Wrentit, with a relative abundance just under 0.1 birds/point, detected on 37% of routes, and associated with western shrublands, is a species of conservation concern (Watchlist Species, Rich et al. 2004).

Dark-eyed Junco (subspecies Oregon Junco) was the most frequently captured species at the Oregon Caves National Monument and Preserve constant effort monitoring station during both breeding and migration seasons in 2015 (Table 5). Nashville Warbler, a Partners in Flight focal species in coniferous forest, and MacGillivray's Warbler were the second most frequently captured species during the breeding season (Table 5; CalPIF 2002a). Fox Sparrow, also a Partners in Flight focal species in coniferous forest, was the second most frequently captured species during migration

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(Table 5; CalPIF 2002a). Oregon Caves National Monument and Preserve contains important forest ecosystems; in total, 19 conifer and mixed-forest Partners in Flight focal species and species of continental importance were detected at the constant effort monitoring station. In 2015, 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 eighth year of monitoring will provide information to park managers at Lassen Volcanic National Park and Whiskeytown National Recreation Area, 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 KLMN.

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The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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**Natural Resource Stewardship and Science**  
1201 Oakridge Drive, Suite 150  
Fort Collins, CO 80525

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