



# Landbird Monitoring: 2016 results from Crater Lake National Park and Oregon Caves National Monument and Preserve

Natural Resource Data Series NPS/KLMN/NRDS—2017/1113



**ON THE COVER**

Mountain Chickadee

Photograph by: James Livaudais ©2017

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Jaime L. Stephens

Klamath Bird Observatory  
PO Box 758  
Ashland, OR 97520

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## **Abstract**

In 2016, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the ninth year of their long-term landbird monitoring protocol. Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and completed this ninth 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 2016, a third year of point counts were completed, along with corresponding species checklists and habitat surveys, at 35 locations within Crater Lake National Park and four locations within Oregon Caves National Monument and Preserve. 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 ninth 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 John Alexander, Kathryn Irvine, Sean Mohren, and Daniel Sarr for their contributions to the landbird monitoring protocol. Implementation of the monitoring program would not have been possible without the help of both network and park staff. Special thanks to Alice Chung-MacCoubrey, Sean Mohren, and John Roth for their logistical support in 2016. I would like to acknowledge Ellie Armstrong who oversaw the point count field season and completed analyses for 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 Genevieve Day, Steve Dougill, Luiza Figueira Rodrigues, Heather Kenny, Eva Leach, Janelle Lopez, Pedro Martins, Ingrid Tello López and Jaclyn Tolchin.



## Introduction

In 2016, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service implemented the ninth 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 2016 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 monitors natural resources in parks of southern Oregon and northern California, including Crater Lake National Park (CRLA), Lassen Volcanic National Park (LAVO), Lava Beds National Monument (LAVE), 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. 2016, Stephens et al. 2016, Stephens, Mohren, Barton et al. 2013, Stephens, Mohren, Newell et al. 2013).

## Methods

### Sampling Design

The KLMN landbird monitoring protocol incorporates multiple standard avian sampling methods (Ralph et al. 1993; Stephens, Mohren et al. 2010), including variable circular plot point counts, 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 and Preserve. Due to the relatively small size of the monument, monitoring includes a constant effort mist net station and four point count routes.

The sampling frames for Crater Lake National Park, Lassen Volcanic National Park, Lava Beds National Monument, and Redwood National and State Parks include locations between 100 m and 1000 m from a road or trail. The roads and trails within KLMN park units cross most environmental gradients. Further refinement of sampling frames considered three potential elevation and habitat-associated frames (high elevation; riparian; and matrix, which includes all non-high elevation and non-riparian areas) and varied by park (Sarr et al. 2007). At Whiskeytown National Recreation Area, the sampling frame was limited to roads, trails, and power lines for safety reasons. At Oregon Caves National Monument and Preserve we established sampling locations within 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.

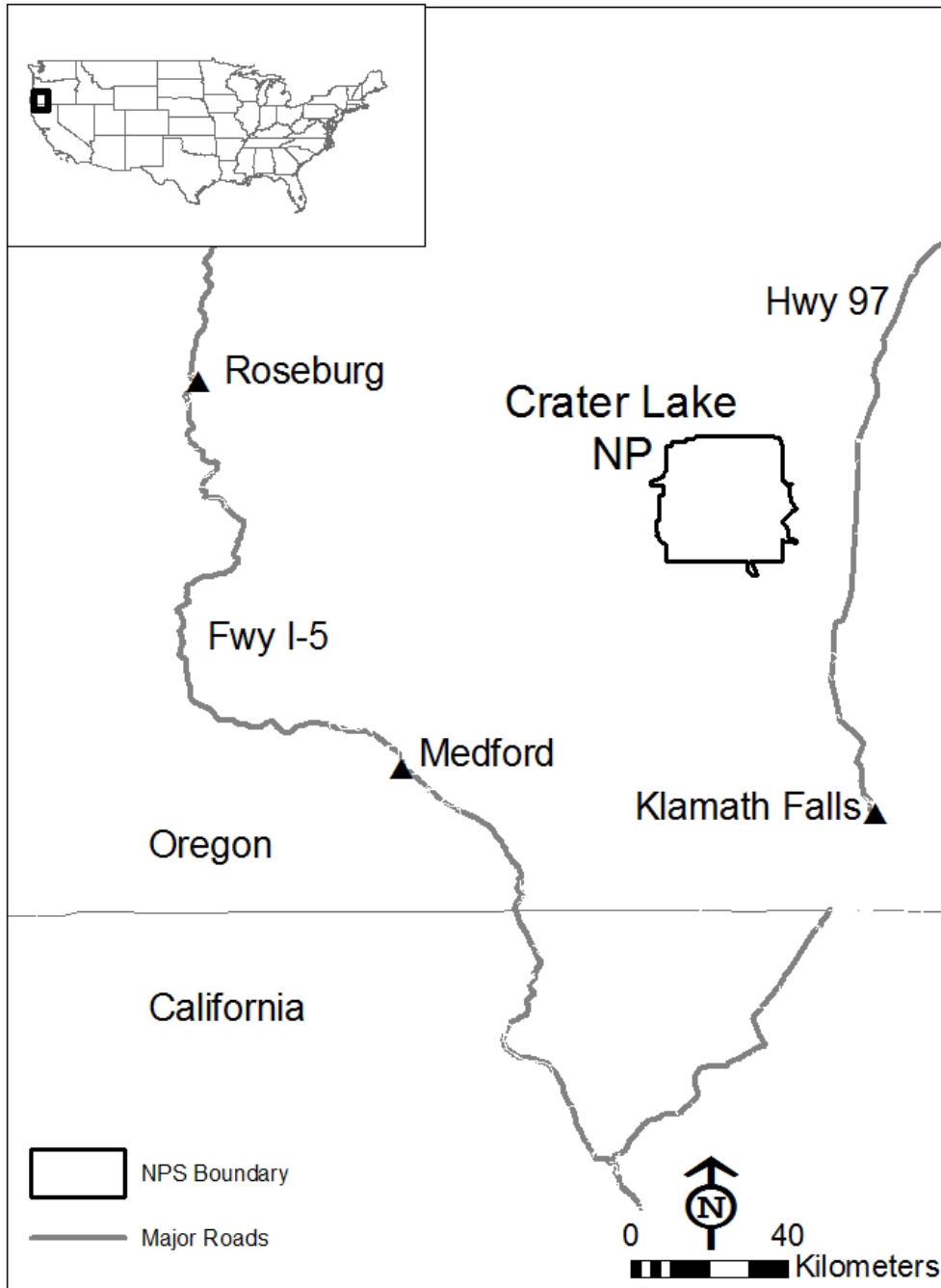
The number of point count sites varied by park and was based on park size: Crater Lake National Park (n=35), Lassen Volcanic National Park (n=25), Lava Beds National Monument (n=25), Oregon Caves National Monument and Preserve (n=4), Redwood National and State Parks (n=30), Whiskeytown National Recreation 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, an ongoing constant effort monitoring station is operated 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.

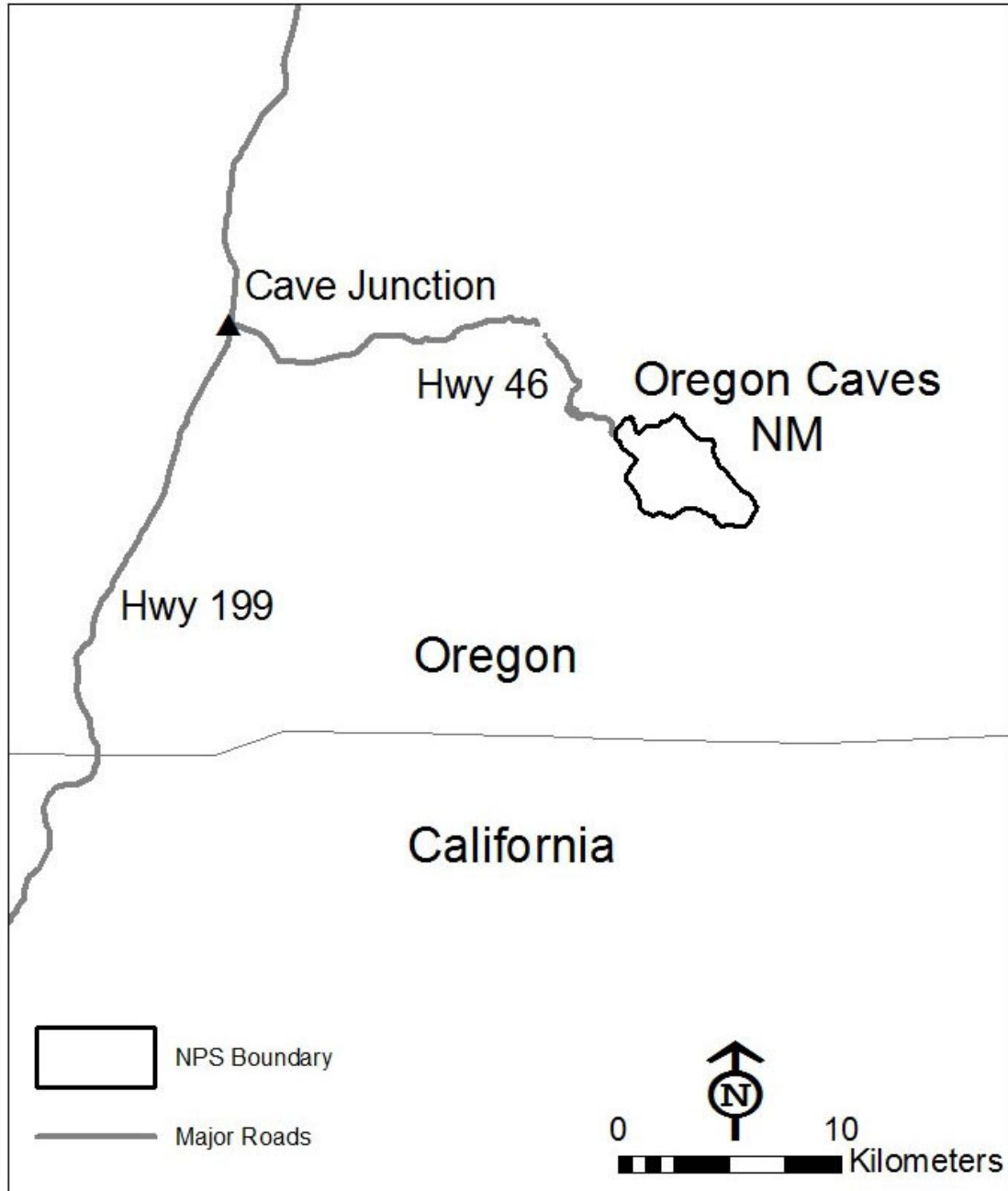
## **Field Surveys**

### ***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 2016, we completed the third round of visits at Crater Lake National Park and Oregon Caves National Monument and Preserve (Figure 1 and Figure 2). In addition, the constant effort monitoring station at Oregon Caves National Monument and Preserve was operated in 2016, and is operated annually.



**Figure 1.** Crater Lake National Park is located in southern Oregon.



**Figure 2.** Oregon Caves National Monument and Preserve is located in southern Oregon.

### ***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 previous 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 (e.g., 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***

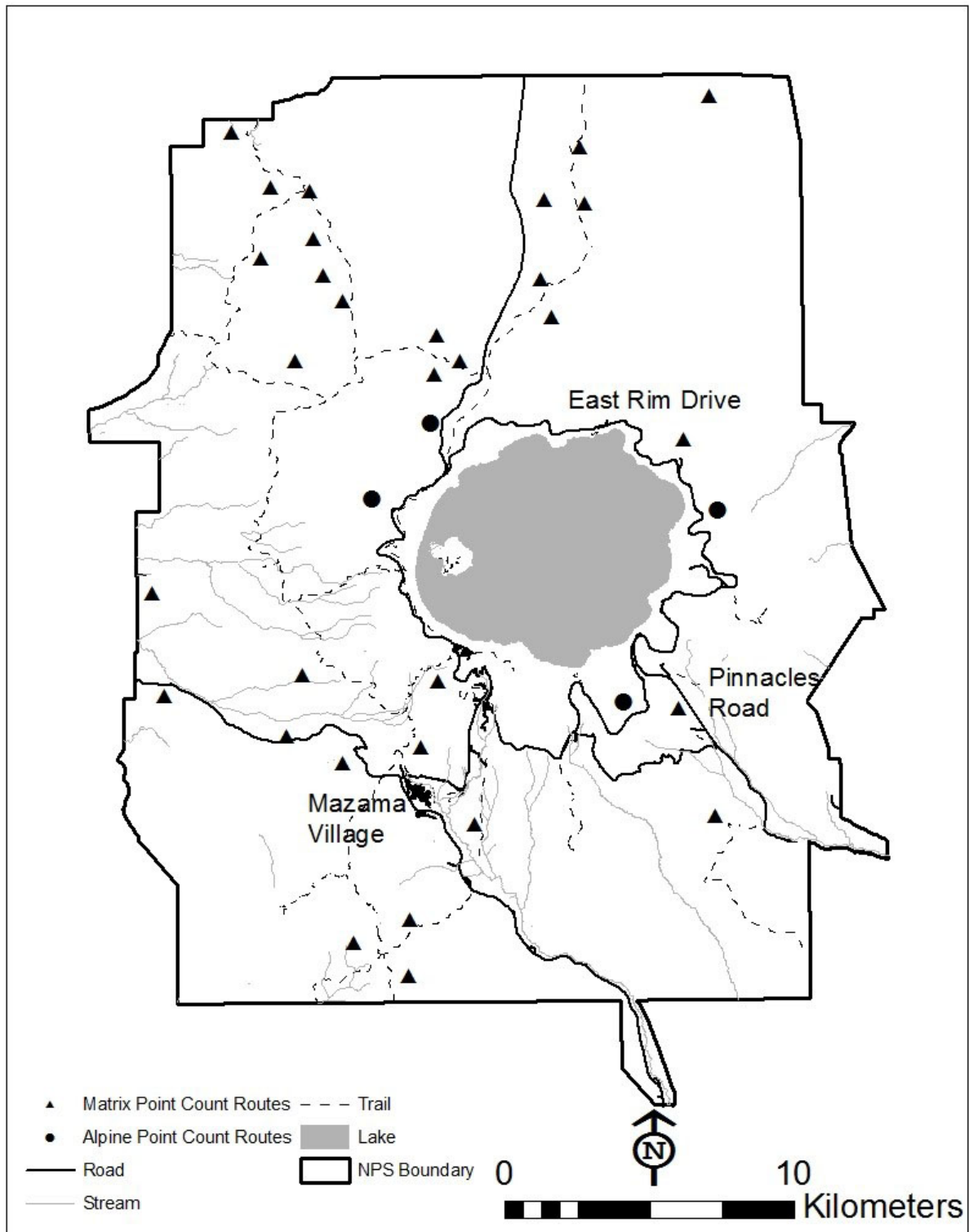
Relative abundance (birds/station), as measured by point counts and area search surveys, was calculated for all survey points combined within each park. Only species detected within 50 m of point count survey stations and within the established area search plot were included in abundance calculations. 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; Rosenberg. 2016), and conservation status from the Oregon and California State Wildlife Conservation Strategies (CDFW 2015; ODFW 2016) are highlighted in the results where applicable.



## Results

### Crater Lake National Park

In 2016 we surveyed 35 permanent point count survey routes at Crater Lake National Park, each consisting of 12 survey stations (Figure 3). The sampling frame at Crater Lake National Park includes both matrix (i.e., all non-high elevation and non-riparian areas, 31 routes) and alpine (4 routes) areas. Alpine areas are defined as elevation >2057 m. The 2016 point count surveys recorded 48 species within 50 m of the stations (Table 1). Surveys were completed from June 17<sup>th</sup> to July 19<sup>th</sup> by Frank Lospalluto and Jim Destaebler, the same surveyors that completed the point counts in 2013. An additional 17 species were recorded outside of 50 m during point count surveys or encountered between bird surveys or during vegetation surveys and accounted for on species checklists (Table 2).



**Figure 3.** Point count routes at long-term landbird monitoring sites in Crater Lake National Park.

**Table 1.** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2013 and 2016 point count surveys at Crater Lake National Park, and proportion of routes with detections for each species in 2016. We performed a data correction for a single observer in 2010 who appeared to consistently underestimate distance (Stephens, Mohren, Newell et al. 2013) by doubling all of this observer’s detection distances before analysis, thereby making the 2010 Crater Lake results more comparable to other years. Species are ordered in decreasing order of abundance for 2016 at the park unit; those detected in previous years, but not in 2016, 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	OR/WA PIF		Cont. PIF <sup>3, 7, 8</sup>		ODFW <sup>4</sup>	
		2010	2013	2016	2016	Conifer <sup>1</sup>	Eastslope <sup>2</sup>	Northern Pacific Rainforest	Great Basin	West Cascades	East Cascades
Oregon Junco	<i>Junco hyemalis oregonus</i>	0.373	0.331	0.519	0.829	–	–	–	–	–	–
Yellow-rumped Warbler	<i>Dendroica coronata</i>	0.275	0.212	0.333	0.914	–	–	–	–	–	–
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.223	0.179	0.240	0.829	–	–	–	–	–	–
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.181	0.188	0.224	0.714	–	–	–	–	–	–
Mountain Chickadee	<i>Poecile gambeli</i>	0.485	0.093	0.131	0.629	–	–	–	–	–	–
Hermit Thrush	<i>Catharus guttatus</i>	0.034	0.05	0.119	0.514	X	X	–	–	–	–
Brown Creeper	<i>Certhia americana</i>	0.26	0.057	0.093	0.514	X	X	–	–	–	–
Pine Siskin	<i>Spinus pinus</i>	2.674	0.11	0.090	0.486	–	–	D	D	–	–
Cassin’s Finch	<i>Carpodacus cassinii</i>	0.02	0.031	0.081	0.486	–	–	–	W	–	–
Gray Jay	<i>Perisoreus canadensis</i>	0.064	0.048	0.064	0.371	–	–	–	–	–	–
American Robin	<i>Turdus migratorius</i>	0.14	0.071	0.060	0.457	–	–	–	–	–	–
Black-backed Woodpecker	<i>Picooides arcticus</i>	0.025	0.029	0.055	0.343	–	X	–	–	–	X
Hairy Woodpecker	<i>Picooides villosus</i>	0.029	0.012	0.052	0.371	–	–	–	–	–	–
Western Tanager	<i>Piranga ludoviciana</i>	0.1	0.021	0.050	0.400	X	–	–	–	–	–
Chipping Sparrow	<i>Spizella passerina</i>	0.032	0.017	0.045	0.229	–	X	–	–	–	–
Mountain Bluebird	<i>Sialia currucoides</i>	0.044	0.007	0.038	0.200	–	–	–	–	–	–
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.02	0.024	0.038	0.314	–	–	–	–	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Altman 2000, <sup>3</sup>Rosenberg et. al. 2016, <sup>4</sup>ODFW 2016

<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)

<sup>7</sup>D are ‘Common Birds in Decline’ for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>8</sup>W are ‘Watch List Species’ (Rosenberg et al. 2016)

**Table 1 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2013 and 2016 point count surveys at Crater Lake National Park, and proportion of routes with detections for each species in 2016. We performed a data correction for a single observer in 2010 who appeared to consistently underestimate distance (Stephens, Mohren, Newell et al. 2013) by doubling all of this observer’s detection distances before analysis, thereby making the 2010 Crater Lake results more comparable to other years. Species are ordered in decreasing order of abundance for 2016 at the park unit; those detected in previous years, but not in 2016, 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	OR/WA PIF		Cont. PIF <sup>3, 7, 8</sup>		ODFW <sup>4</sup>	
		2010	2013	2016	2016	Conifer <sup>1</sup>	Eastslope <sup>2</sup>	Northern Pacific Rainforest	Great Basin	West Cascades	East Cascades
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	0	0.005	0.031	0.200	–	–	–	–	–	X
Clark’s Nutcracker	<i>Nucifraga columbiana</i>	0.098	0.014	0.026	0.171	–	X	–	–	–	–
Steller’s Jay	<i>Cyanocitta stelleri</i>	0.039	0.017	0.026	0.171	–	–	–	–	–	–
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.02	0	0.021	0.086	–	–	–	–	–	–
Townsend’s Solitaire	<i>Myadestes townsendi</i>	0.039	0.014	0.021	0.200	–	–	–	–	–	–
Hermit Warbler <sup>5</sup>	<i>Setophaga occidentalis</i>	0.066	0.007	0.012	0.057	–	–	–	–	–	–
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.025	0.005	0.012	0.086	X	–	W	–	–	–
Red Crossbill	<i>Loxia curvirostra</i>	0.331	0.026	0.010	0.114	–	–	–	–	–	–
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0	0.005	0.007	0.057	–	–	–	W	–	–
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>	0	0	0.007	0.029	–	–	–	–	–	–
Lazuli Bunting	<i>Passerina amoena</i>	0	0	0.007	0.029	–	–	–	–	–	–
Lincoln’s Sparrow	<i>Melospiza lincolnii</i>	0	0	0.007	0.029	X	–	–	–	–	–
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.002	0.002	0.007	0.057	X	–	–	–	–	–
Hammond’s Flycatcher	<i>Empidonax hammondii</i>	0	0	0.005	0.057	X	–	–	–	–	–
Nashville Warbler <sup>5</sup>	<i>Oreothlypis ruficapilla</i>	0	0	0.005	0.029	X	X	–	–	–	–
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.002	0.005	0.005	0.057	X	–	–	–	–	–
Varied Thrush	<i>Ixoreus naevius</i>	0	0.002	0.005	0.057	X	–	D	D	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Altman 2000, <sup>3</sup>Rosenberg et. al. 2016, <sup>4</sup>ODFW 2016

<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)

<sup>7</sup>D are ‘Common Birds in Decline’ for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>8</sup>W are ‘Watch List Species’ (Rosenberg et al. 2016)

**Table 1 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2013 and 2016 point count surveys at Crater Lake National Park, and proportion of routes with detections for each species in 2016. We performed a data correction for a single observer in 2010 who appeared to consistently underestimate distance (Stephens, Mohren, Newell et al. 2013) by doubling all of this observer’s detection distances before analysis, thereby making the 2010 Crater Lake results more comparable to other years. Species are ordered in decreasing order of abundance for 2016 at the park unit; those detected in previous years, but not in 2016, 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	OR/WA PIF		Cont. PIF <sup>3, 7, 8</sup>		ODFW <sup>4</sup>	
		2010	2013	2016	2016	Conifer <sup>1</sup>	Eastslope <sup>2</sup>	Northern Pacific Rainforest	Great Basin	West Cascades	East Cascades
White-headed Woodpecker	<i>Picoides albolarvatus</i>	0	0	0.005	0.029	–	X	–	–	–	X
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	0	0	0.002	0.029	–	–	W	–	–	–
Common Raven	<i>Corvus corax</i>	0	0	0.002	0.029	–	–	–	–	–	–
Fox Sparrow	<i>Passerella iliaca</i>	0	0	0.002	0.029	X	–	–	–	–	–
House Wren	<i>Troglodytes aedon</i>	0	0	0.002	0.029	–	–	–	–	–	–
MacGillivray's Warbler <sup>5</sup>	<i>Geothlypis tolmiei</i>	0	0	0.002	0.029	–	–	–	–	–	–
Northern Flicker	<i>Colaptes auratus</i>	0	0.002	0.002	0.029	X	–	–	–	–	–
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0	0	0.002	0.029	X	X	–	W	X	X
Orange-crowned Warbler <sup>5</sup>	<i>Oreothlypis celata</i>	0	0	0.002	0.029	X	–	–	–	–	–
Pacific Wren <sup>6</sup>	<i>Troglodytes pacificus</i>	0.002	0.002	0.002	0.029	X	–	–	–	–	–
Cassin's Vireo	<i>Vireo cassinii</i>	0.005	0	0	0	–	–	–	–	–	–
Horned Lark	<i>Eremophila alpestris</i>	0.039	0	0	0	–	–	–	–	–	–
House Finch	<i>Carpodacus mexicanus</i>	0.002	0	0	0	–	–	–	–	–	–
Lesser Goldfinch	<i>Spinus psaltria</i>	0.103	0	0	0	–	–	–	–	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Altman 2000, <sup>3</sup>Rosenberg et. al. 2016, <sup>4</sup>ODFW 2016

<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)

<sup>7</sup>D are ‘Common Birds in Decline’ for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>8</sup>W are ‘Watch List Species’ (Rosenberg et al. 2016)

**Table 2.** List of additional species detected at Crater Lake National Park in 2016 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name	Scientific Name	OR/WA PIF		Cont. PIF <sup>3, 5, 6</sup>		ODFW <sup>4</sup>	
		Conifer <sup>1</sup>	Eastslope <sup>2</sup>	Northern Pacific Rainforest	Great Basin	West Cascades	East Cascades
American Goldfinch	<i>Spinus tristis</i>	-	-	-	-	-	-
American Kestrel	<i>Falco sparverius</i>	-	-	-	-	-	-
Black-capped Chickadee	<i>Poecile atricapillus</i>	-	-	-	-	-	-
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	-	-	-	-	-	-
Calliope Hummingbird	<i>Selasphorus calliope</i>	-	-	-	-	-	-
Cassin's Vireo	<i>Carpodacus cassinii</i>	-	-	-	-	-	-
Common Nighthawk	<i>Chordeiles minor</i>	-	-	-	-	-	-
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	-	-	-	-	-	-
Northern Goshawk	<i>Accipiter gentilis</i>	-	-	-	-	X	X
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	-	-	-	-	-	-
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	X	-	-	-	-	-
Rock Wren	<i>Salpinctes obsoletus</i>	-	-	-	-	-	-
Sharp-shinned Hawk	<i>Accipiter striatus</i>	-	-	-	-	-	-
Sooty Grouse	<i>Dendragapus fuliginosus</i>	-	-	W	-	-	-
Turkey Vulture	<i>Cathartes aura</i>	-	-	-	-	-	-
Violet-green Swallow	<i>Tachycineta thalassina</i>	-	-	-	-	-	-
Western Wood-Pewee	<i>Contopus sordidulus</i>	-	-	-	-	-	-

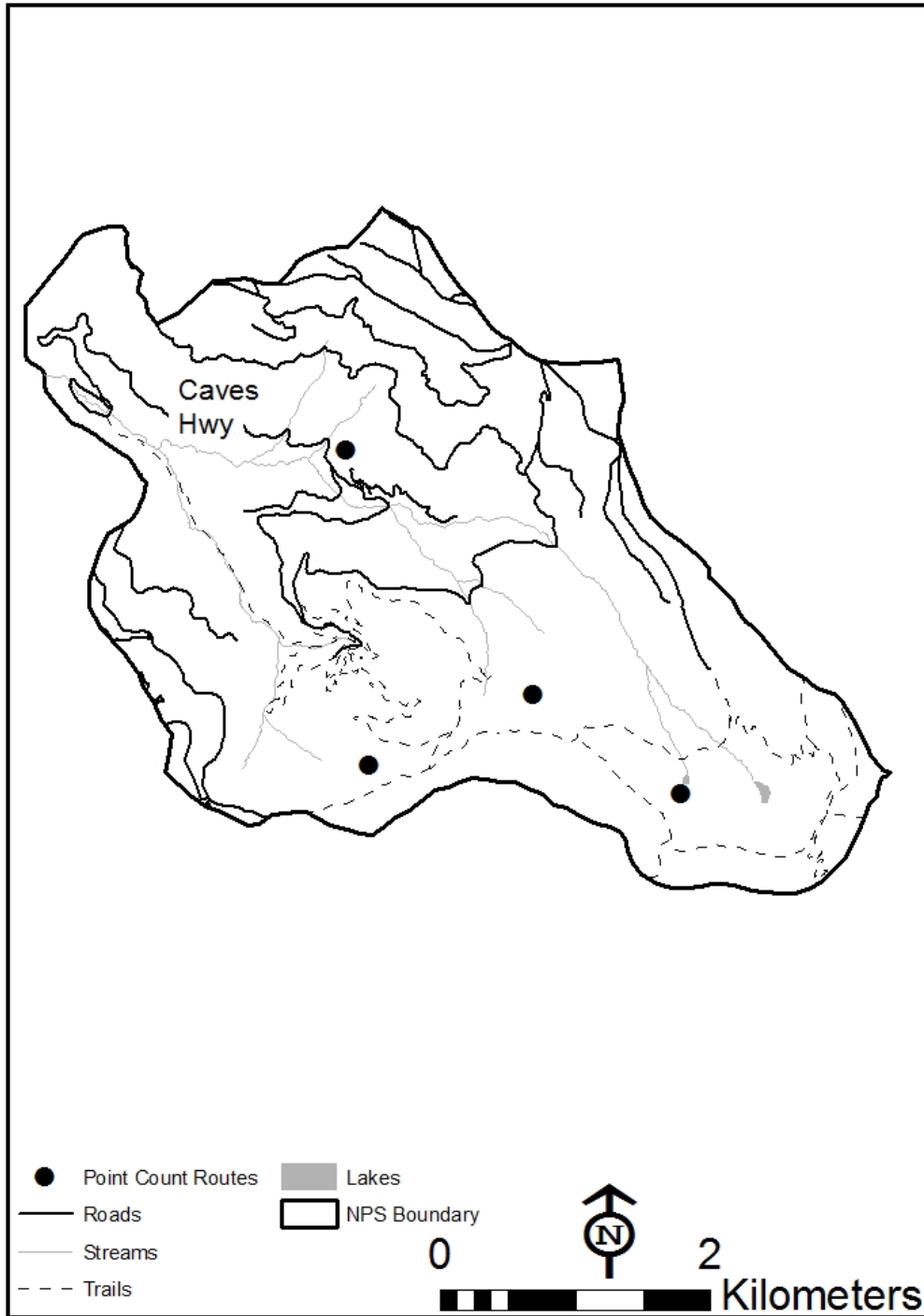
<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Altman 2000, <sup>3</sup>Rosenberg et al. 2016, <sup>4</sup>ODFW 2016

<sup>5</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>6</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

### **Oregon Caves National Monument and Preserve Point Counts**

In 2016 we surveyed 4 permanent point count survey routes at Oregon Caves National Monument and Preserve, each consisting of 12 survey stations (Figure 4). The sampling frame at Oregon Caves National Monument and Preserve included matrix areas (i.e., all non-high elevation and non-riparian areas). Surveys were completed from June 16<sup>th</sup> to June 19<sup>th</sup> by Jim Destabler, the same surveyor that completed the point counts in 2010. The 2016 point count surveys recorded 42 species within 50 m of the stations (Table 3). An additional 23 species were detected outside of 50 m during point count surveys or encountered between bird surveys or during vegetation surveys and accounted for on species checklists (Table 4).



**Figure 4.** Point count routes at long-term landbird monitoring sites in Oregon Caves National Monument and Preserve.



**Table 3.** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2013, and 2016 point count surveys at Oregon Caves National Monument and Preserve, and proportion of routes with detections for each species in 2016. Species are ordered in decreasing order of abundance for 2016 at the park unit; those detected in previous years, but not in 2016, 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	OR/WA PIF	Cont. PIF <sup>3, 6, 7</sup>		ODFW <sup>4</sup>
		2010	2013	2016	2016	Conifer	Northern Pacific Rainforest	Great Basin	Klamath Mountains
Oregon Junco	<i>Junco hyemalis oregonus</i>	0.25	0	0.208	0.75	–	–	–	–
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	0	0.292	0.188	1	X	–	–	–
Hermit Warbler	<i>Setophaga occidentalis</i>	0.229	0.438	0.146	0.75	–	–	–	–
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.292	0.375	0.104	0.75	–	–	–	–
Yellow-rumped Warbler	<i>Dendroica coronata</i>	0.229	0.167	0.083	0.5	–	–	–	–
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	0.188	0.271	0.083	0.75	–	W	–	–
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.188	0.271	0.083	0.5	–	–	–	–
Pacific Wren <sup>5</sup>	<i>Troglodytes pacificus</i>	0.021	0.021	0.063	0.5	X	–	–	–
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.063	0.104	0.063	0.5	X	W	–	–
Steller's Jay	<i>Cyanocitta stelleri</i>	0.104	0.104	0.063	0.75	–	–	–	–
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.063	0.083	0.042	0.25	–	–	–	–
Gray Jay	<i>Perisoreus canadensis</i>	0.021	0.042	0.042	0.25	–	–	–	–
Hermit Thrush	<i>Catharus guttatus</i>	0.063	0.125	0.042	0.25	X	–	–	–
Mountain Quail	<i>Oreortyx pictus</i>	0.021	0	0.042	0.25	–	W	–	–
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.042	0.104	0.042	0.5	–	–	–	–
American Robin	<i>Turdus migratorius</i>	0.021	0.125	0.021	0.25	–	–	–	–
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0	0.063	0.021	0.25	–	–	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Rosenberg et al. 2016, <sup>3</sup>ODFW 2016

<sup>4</sup>Classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>5</sup>Previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

<sup>6</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>7</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

**Table 3 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2013, and 2016 point count surveys at Oregon Caves National Monument and Preserve, and proportion of routes with detections for each species in 2016. Species are ordered in decreasing order of abundance for 2016 at the park unit; those detected in previous years, but not in 2016, 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	OR/WA PIF	Cont. PIF <sup>3, 6, 7</sup>		ODFW <sup>4</sup>
		2010	2013	2016	2016	Conifer	Northern Pacific Rainforest	Great Basin	Klamath Mountains
Brown Creeper	<i>Certhia americana</i>	0.104	0.188	0.021	0.25	X	–	–	–
Bushtit	<i>Psaltriparus minimus</i>	0	0.021	0.021	0.25		–	–	–
Fox Sparrow	<i>Passerella iliaca</i>	0.104	0.063	0.021	0.25	X	–	–	–
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0	0.042	0.021	0.25		–	–	–
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	0.042	0.021	0.021	0.25	X	–	–	–
MacGillivray's Warbler <sup>4</sup>	<i>Geothlypis tolmiei</i>	0.021	0.042	0.021	0.25	–	–	–	–
Orange-crowned Warbler	<i>Vermivora celata</i>	0	0	0.021	0.25	–	–	–	–
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.042	0.25	0.021	0.25	X	–	–	–
Warbling Vireo	<i>Vireo gilvus</i>	0	0.063	0.021	0.25	–	–	–	–
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	0	0	0.021	0.25	–	–	–	–
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	0.167	0	0	0	–	–	–	–
Chipping Sparrow	<i>Spizella passerina</i>	0	0.021	0	0	–	–	–	–
Hairy Woodpecker	<i>Picoides villosus</i>	0.042	0.063	0	0	–	–	–	–
Hammond's Flycatcher	<i>Empidonax hammondi</i>	0	0.167	0	0	X	–	–	–
Lazuli Bunting	<i>Passerina amoena</i>	0	0.146	0	0	X	–	–	–
Mountain Chickadee	<i>Poecile gambeli</i>	0.042	0.104	0	0	–	–	–	–
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0	0.021	0	0	X	–	–	–
Pileated Woodpecker	<i>Dryocopus pileatus</i>	0.021	0	0	0	X	–	–	–
Pine Siskin	<i>Spinus pinus</i>	0.125	0.25	0	0	–	D	D	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Rosenberg et al. 2016, <sup>3</sup>ODFW 2016

<sup>4</sup>Classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>5</sup>Previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

<sup>6</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>7</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

**Table 3 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010, 2013, and 2016 point count surveys at Oregon Caves National Monument and Preserve, and proportion of routes with detections for each species in 2016. Species are ordered in decreasing order of abundance for 2016 at the park unit; those detected in previous years, but not in 2016, 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	OR/WA PIF	Cont. PIF <sup>3, 6, 7</sup>		ODFW <sup>4</sup>
		2010	2013	2016	2016	Conifer	Northern Pacific Rainforest	Great Basin	Klamath Mountains
Purple Finch	<i>Carpodacus purpureus</i>	0	0.021	0	0	X	–	–	–
Red Crossbill	<i>Loxia curvirostra</i>	0.083	0.021	0	0	–	–	–	–
Northern Flicker	<i>Colaptes auratus</i>	0.021	0	0	0	X	–	–	–
Sooty Grouse	<i>Dendragapus fuliginosus</i>	0.021	0.042	0	0	–	W	–	–
Varied Thrush	<i>Ixoreus naevius</i>	0	0.104	0	0	X	D	D	
Western Wood-Pewee	<i>Contopus sordidulus</i>	0	0.042	0	0	–	–	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Rosenberg et al. 2016, <sup>3</sup>ODFW 2016

<sup>4</sup>Classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>5</sup>Previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

<sup>6</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>7</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

**Table 4.** List of additional species detected at Oregon Caves National Monument and Preserve in 2016 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name	Scientific Name	OR/WA PIF	Cont. PIF <sup>2, 4, 5</sup>		ODFW <sup>3</sup>
		Conifer <sup>1</sup>	Northern Pacific Rainforest	Great Basin	Klamath Mountains
American Dipper	<i>Cinclus mexicanus</i>	–	–	–	–
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	–	W	–	–
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	–	–	–	–
Chipping Sparrow	<i>Spizella passerina</i>	–	–	–	–
Great Gray Owl	<i>Strix nebulosa</i>	–	–	–	X
Hairy Woodpecker	<i>Leuconotopicus villosus</i>	–	–	–	–
Hammond's Flycatcher	<i>Empidonax hammondii</i>	–	–	–	–
Lazuli Bunting	<i>Passerina amoena</i>	–	–	–	–
Mallard	<i>Anas platyrhynchos</i>	–	–	–	–
Mountain Chickadee	<i>Poecile gambeli</i>	–	–	–	–
Northern Flicker	<i>Colaptes auratus</i>	–	–	–	–
Olive-sided Flycatcher	<i>Contopus cooperi</i>	–	–	W	–
Pileated Woodpecker	<i>Dryocopus pileatus</i>	–	–	–	–
Pine Siskin	<i>Spinus pinus</i>	–	–	–	–
Purple Finch	<i>Haemorhous purpureus</i>	–	–	–	–
Red Crossbill	<i>Loxia curvirostra</i>	–	–	–	–
Ruby-crowned Kinglet	<i>Regulus calendula</i>	–	–	–	–
Sooty Grouse	<i>Dendragapus fuliginosus</i>	–	W	–	–
Townsend's Solitaire	<i>Myadestes townsendi</i>	–	–	–	–
Varied Thrush	<i>Ixoreus naevius</i>	–	–	–	–
Western Tanager	<i>Piranga ludoviciana</i>	–	–	–	–
Western Wood-Pewee	<i>Contopus sordidulus</i>	–	–	–	–
Wilson's Warbler	<i>Cardellina pusilla</i>	–	D	D	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Rosenberg et al. 2016, <sup>3</sup>ODFW 2016

<sup>4</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>5</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

### **Oregon Caves National Monument and Preserve Ecological Monitoring Station**

The ecological monitoring station at Oregon Caves National Monument and Preserve was run 14 times during 2016. Nine visits occurred during the breeding season (5 June to 20 August) and 5 visits during the fall dispersal and migration season (9 September to 12 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: Genevieve Day, Steve Dougill, Luiza Figueira, Heather Kenny, Eva Leach, Janelle Lopez, Pedro Martins, and Jaclyn Tolchin.

In 2016, 43 species were detected at Oregon Caves National Monument and Preserve at the ecological monitoring station (Table 5). Twenty-five species were captured during mist-netting, 18 during the breeding season and 17 during the migration season. During area searches 28 species were detected, 21 during the breeding season and 17 during the migration season. Overall, the number of species surveyed aligns with past efforts, with a slightly decreased number of species captured during mist-netting. From 2008 through 2015, 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, Alexander et al. 2010; Stephens et al. 2011; Stephens and Mohren 2012; Stephens and Mohren 2013; Stephens 2014; Stephens 2015; Stephens 2016).

**Table 5.** Results from the constant effort monitoring station at Oregon Caves National Monument and Preserve in 2016, showing total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 20 August) and migration (9 September to 12 October), and 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	Cont PIF <sup>2, 7</sup>
						Conifer <sup>1</sup>	Pacific
American Robin	<i>Turdus migratorius</i>	–	1	0.278	–	–	–
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	–	–	–	–	–	–
Black-headed Grosbeak	<i>Patagioenas fasciata</i>	1	–	0.056	0.111	–	–
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	3	–	–	0.111	–	–
Brown Creeper	<i>Certhia americana</i>	1	2	0.556	0.333	X	–
Cassin's Vireo	<i>Carpodacus cassinii</i>	–	–	–	–	–	–
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	6	7	0.111	0.556	–	W
Common Raven	<i>Corvus corax</i>	–	–	–	–	–	–
Oregon Junco	<i>Junco hyemalis oregonus</i>	45	13	0.833	0.333	–	–
Downy Woodpecker	<i>Picoides pubescens</i>	–	1	0.056	–	–	–
Fox Sparrow	<i>Passerella iliaca</i>	–	12	–	0.222	X	–
Golden-crowned Kinglet	<i>Regulus satrapa</i>	8	2	0.611	1.889	–	–
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	–	5	–	0.111	–	–
Gray Jay	<i>Perisoreus canadensis</i>	–	–	0.389	0.222	–	–
Hammond's Flycatcher	<i>Empidonax hammondi</i>	2	–	–	–	X	–
Hairy Woodpecker	<i>Leuconotopicus villosus</i>	–	–	–	0.222	–	–
Hermit Thrush	<i>Catharus guttatus</i>	4	10	–	0.333	X	–
Hermit Warbler	<i>Setophaga occidentalis</i>	3	–	–	0.222	–	–
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	18	3	1.056	–	–	–
Mountain Chickadee	<i>Poecile gambeli</i>	–	–	0.111	–	–	–
Mourning Dove	<i>Zenaida macroura</i>	–	–	–	–	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Rosenberg et al 2016

<sup>4</sup>Classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>5</sup>Previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

<sup>6</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>7</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

**Table 5 (continued).** Results from the constant effort monitoring station at Oregon Caves National Monument and Preserve in 2016, showing total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 20 August) and migration (9 September to 12 October), and 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	Cont PIF <sup>2, 7</sup>
						Conifer <sup>1</sup>	Pacific
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	20	–	0.389	–	X	–
Northern Flicker	<i>Colaptes auratus</i>	–	–	–	–	X	–
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	–	–	–	–	–	–
Orange-crowned Warbler	<i>Orange-crowned Warbler</i>	4	3	0.167	–	X	–
Pacific Wren <sup>5</sup>	<i>Troglodytes pacificus</i>	–	–	0.500	0.778	X	–
Pileated Woodpecker	<i>Dryocopus pileatus</i>	–	–	0.056	–	–	–
Pileated Woodpecker	<i>Empidonax difficilis</i>	–	–	0.056	–	–	–
Red-breasted Nuthatch	<i>Sitta canadensis</i>	6	5	0.333	0.111	–	–
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	2	–	0.056	0.222	–	–
Ruby-crowned Kinglet	<i>Regulus calendula</i>	–	2	–	–	–	–
Rufous Hummingbird	<i>Selasphorus rufus</i>	9	–	–	–	X	W
Steller's Jay	<i>Cyanocitta stelleri</i>	14	3	1.167	0.778	–	–
Swainson's Thrush	<i>Catharus ustulatus</i>	–	2	–	–	–	–
Sooty Grouse	<i>Dendragapus fuliginosus</i>	–	–	–	–	–	W
Varied Thrush	<i>Ixoreus naevius</i>	–	–	0.167	–	–	–
Western Flycatcher	<i>Empidonax difficilis/occidentalis</i>	11	–	–	–	–	–
Western Tanager	<i>Piranga ludoviciana</i>	–	–	–	–	–	–
Western Wood-Pewee	<i>Contopus sordidulus</i>	–	–	–	–	–	–
White-headed Woodpecker	<i>Picoides albolarvatus</i>	–	–	–	–	–	–
Wilson's Warbler	<i>Cardellina pusilla</i>	17	9	0.222	–	–	D
Yellow Warbler	<i>Setophaga petechia</i>	–	1	0.056	–	–	–
Yellow-rumped Warbler	<i>Dendroica coronata</i>	–	–	–	0.111	–	–

<sup>1</sup>Altman and Alexander 2012, <sup>2</sup>Rosenberg et al 2016

<sup>4</sup>Classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

<sup>5</sup>Previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

<sup>6</sup>D are 'Common Birds in Decline' for the Pacific Birds Habitat Joint Venture region in Rosenberg et al. (2016)

<sup>7</sup>W are 'Watch List Species' (Rosenberg et al. 2016)

## Summary

This ninth year of the KLMN landbird monitoring provided information on avian community composition and the status of landbirds at Crater Lake National Park and Oregon Caves National Monument and Preserve. 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 Crater Lake National Park, of the 10 most abundant species, two are Partners in Flight focal species (Table 1). Both of these species are coniferous forest focal species (Brown Creeper, Hermit Thrush) (Altman and Alexander 2012). One species is a common bird in decline (Pine Siskin) and another is on the Continental Partners in Flight Watch List (Cassin's Finch) (Rosenberg et al. 2016). Relative abundance appeared to be higher in 2016 compared with 2013 for many of the common species. Black-backed Woodpecker were likely more abundant due to a wildfire that burned after the 2013 survey season. Long-term monitoring will add to our understanding of relative abundance estimates in these first three years.

Of the ten most abundant species detected during point count surveys at Oregon Caves National Monument and Preserve, three are Partners in Flight focal species. Nashville Warbler, Pacific Wren, and Rufous Hummingbird are PIF focal species in coniferous forest (Altman and Alexander 2012). Additionally, two of the ten most abundant species are of continental importance. The Chestnut-backed Chickadee and Rufous Hummingbird are both on the Continental Partners in Flight Watch List (Rosenberg et al. 2016).

Golden-crowned Sparrow was the most frequently captured species at Oregon Caves National Monument and Preserve ecological monitoring station during the combined breeding and migration seasons in 2016. Of the ten most frequently captured species, Pacific Wren, Brown Creeper, and Nashville Warbler are PIF focal species in coniferous forest (Altman and Alexander 2012). The Chestnut-backed Chickadee, a Continental Partners in Flight Watch List species, was also among the top ten species captured (Rosenberg et al. 2016).

Implementation of the KLMN landbird monitoring protocol began in 2008. Landbird status and community composition results from this ninth year of monitoring will provide information to park managers at Crater Lake National Park and Oregon Caves National Monument and Preserve, 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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