



# Klamath Network Landbird Monitoring Annual Report

2012 results from Lassen Volcanic National Park, Oregon Caves  
National Monument, and Whiskeytown National Recreation  
Area

Natural Resource Data Series NPS/KLMN/NRDS—2013/536



**ON THE COVER**

Dark-eyed Junco

Photograph by: James Livaudais ©2012

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## 2012 results from Lassen Volcanic National Park, Oregon Caves National Monument, and Whiskeytown National Recreation Area

Natural Resource Data Series NPS/KLMN/NRDS—2013/536

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The Natural Resource Data Series is intended for timely release of basic data sets and data summaries. Care has been taken to assure accuracy of raw data values, but a thorough analysis and interpretation of the data has not been completed. Consequently, the initial analyses of data in this report are provisional and subject to change.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data. Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

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## **Abstract**

In 2012, the Klamath Inventory and Monitoring Network, in partnership with the Klamath Bird Observatory, implemented the fifth year of our long-term landbird monitoring protocol. Multiple standard avian sampling methods were employed, including variable circular plot point counts, area search surveys, mist netting, species checklists, and habitat surveys. In 2012, a second year of point counts were completed, along with corresponding species checklists and habitat surveys, at 25 locations within Lassen Volcanic National Park, and 29 locations within Whiskeytown National Recreation Area; where one site was 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 during the breeding and fall migration seasons. Relative abundance (birds/station), as measured by using point count and area search methods were calculated for all species at 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 fifth year of implementation continues to lay the groundwork for improved understanding of landbird status and long-term trends in each park. In addition, when the data is analyzed in the framework of the Klamath Bird Monitoring Network, the contribution of Network parks to bird conservation in this region will help to inform landbird conservation in the West.

## **Acknowledgments**

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## Introduction

In 2012, the Klamath Network Inventory and Monitoring Program (KLMN) of the National Park Service implemented the fifth year of its long-term landbird monitoring protocol (Stephens et al. 2010c). Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and has completed the monitoring since 2008. This annual report provides a summary of 2012 efforts, including (1) a summary of the monitoring protocol, (2) a summary of point count and area search surveys and constant effort monitoring efforts, and (3) a summary of birds detected at each of the park units where monitoring occurred.

The KLMN, located in southern Oregon and northern California, includes Crater Lake National Park (CRLA), Lassen Volcanic National Park (LAVO), Lava Beds National Monument (LABE), Oregon Caves National Monument (ORCA), Redwood National and State Parks (RNSP), and Whiskeytown National Recreation Area (WHIS). These park units fall within the Klamath Region which 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 et al. 2010c). 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, historic bird monitoring efforts, and logistical and budget constraints (Stephens et al. 2010c).

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 help develop our landbird protocol and to frame the results of the KLMN landbird monitoring efforts.

The 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 (Frey and Stephens 2013, Stephens and Alexander 2012). 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 15 years. This effort has yielded a substantial regional dataset with information about landbird distribution, population trends, and population demographics (Alexander et al. 2004). 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 objectives of the Klamath Network Landbird Monitoring Protocol are to:

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

This annual report provides an overview of methodology and implementation of yearly field surveys. Results presented in this report are limited to general information about bird presence and abundance. Additional analysis and synthesis reports will be completed every third year beginning in 2012, to include results of species detectability and density, community and habitat structure, and landbird status and trends (Stephens et al. *In Review*, Stephens et al. 2013).

## Methods

### Sampling Design

The KLMN Landbird Monitoring Protocol incorporates multiple standard avian sampling methods (Ralph et al. 1993), 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 (Stephens et al. 2010a).

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 bisect 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, the sampling frame included locations between 100 m and 1000 m from a road or trail within the proposed expansion. 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 (Stephens et al. 2010a).

We used the Generalized Random Tessellation Stratified 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. Stations were placed 250 m apart, which nearly eliminates the likelihood of double counting birds (Scott et al. 1981). Point count stations were sampled during the breeding season (early May through early July) using 5-minute count periods following the variable circular plot (VCP) methodology that incorporates distance sampling (Reynolds et al. 1980, Fancy 1997, Nelson and Fancy 1999). At Oregon Caves National Monument, operation of an ongoing constant effort monitoring station following standard protocols (Ralph et al. 2004) continued during the breeding season (early May through early August) as well as during the fall dispersal and migration seasons (mid 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 (Stephens et al. 2010a).

## **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. From 2008–2010 the first round of visits was completed at each park. The second round of visits began in 2011, when surveys were completed at Lava Beds National Monument and Redwood National and State Parks. In 2012, we completed the second round of visits at Lassen Volcanic National Monument and Whiskeytown National Recreation Area. In addition, the constant effort monitoring station, which is operated annually at Oregon Caves National Monument, was operated again in 2012.

### ***Training***

Point count surveyors participated in a two to three day training session at the onset of the field season. Point count surveyors who had implemented the KLMN Landbird Monitoring Protocol in previous years received two days of training and new surveyors received an additional training day. During this training, point count surveyors were instructed on protocol implementation. Training exercises included group calibration for distance estimation and simultaneous point count and vegetation surveys in the field. A certification test, which included both a visual and aural bird identification quiz and review of the protocol, was implemented in 2012. Interns that operated the constant effort monitoring stations underwent ongoing training throughout the season. Benchmarks were noted for proficiency with bird extraction and handling, bird identification, and data collection. A primary bander who had undergone certification operated the station, with the assistance of interns who were at varying levels within the training program.

### ***Variable Circular Plot Point Count***

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

### ***Constant Effort Monitoring Station***

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

Two area search surveys are completed at the mist net site on each day the site is operated. This method provides additional information, such as presence and breeding status of most of the birds occurring at the site, including those not often captured in the nets (e.g., canopy dwelling warblers). During an area search, the surveyor moves around the designated area for a 20 minute period, recording all birds seen or heard.

### ***Species Checklists***

Species checklists are completed in conjunction with all bird monitoring efforts, including point count, habitat, and area search surveys and mist netting. Species checklists add value to survey data by documenting encounters of all species during an effort. Checklists enable surveyors to record information on common and rare species that may or may not have been detected using the other survey techniques.

### ***Habitat Surveys***

In addition to avian surveys, habitat surveys are completed at each point count station and at the constant effort monitoring station following a standard methodology (Ralph et al. 1993). The surveys are designed specifically to account for habitat aspects associated with the feeding and nesting requirement of birds. The habitat sampling is conducted using a vegetation relevé method that is suitable for any vegetation type and provides an efficient assessment of vegetation composition and structure. Ocular estimates of cover and height for all vegetation layers, tree and shrub species, and other plant forms are recorded, along with snag counts, presence of water, evidence of burns, and tree size and height.

### **Protocol Updates**

While this monitoring protocol was developed using standardized methodologies, all long-term monitoring projects must be adaptable. As new technologies and methods become available this protocol may be updated as appropriate. In addition, a long-term monitoring project will inevitably undergo improvements that do not compromise the consistency of past and future data. In 2011 and 2012, a few changes were made to help ensure the collection of accurate and high quality data. Changes to the protocol include:

- A new breeding status code was added as an option to be used during area search and point count surveys and on species checklists. A code of “Y” was added to represent local young that are incapable of sustained flight. This change is reflected on the area search, species checklist, and point count survey forms.
- Datasheets for the point count and area search surveys were updated to allow for easier data recording.
- Vegetation categorical cover variables previously collected as (0 to 5%, 5 to 25%, 25 to 50%, 50 to 75% and 75 to 100%) are now collected in 5% increments to increase precision of ocular estimates.
- Minor edits were made to mist-netting procedure and data collection to improve clarity and captured bird safety. For example, these included details on how to recognize and treat capture-related stress and how to record data for juvenal plumage. The Daily Mist Netting Journal form was revised to improve data accuracy.

The standard operating procedures (SOPs) in the landbird monitoring protocol have been revised to reflect these changes.

## **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 and 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. The data and reports for this project are made available by going to the KLMN landbird project record in the NPS Integrated Resource Management Applications (IRMA) portal at:

<https://irma.nps.gov/App/Reference/Profile/2171791>

### ***Data Analysis***

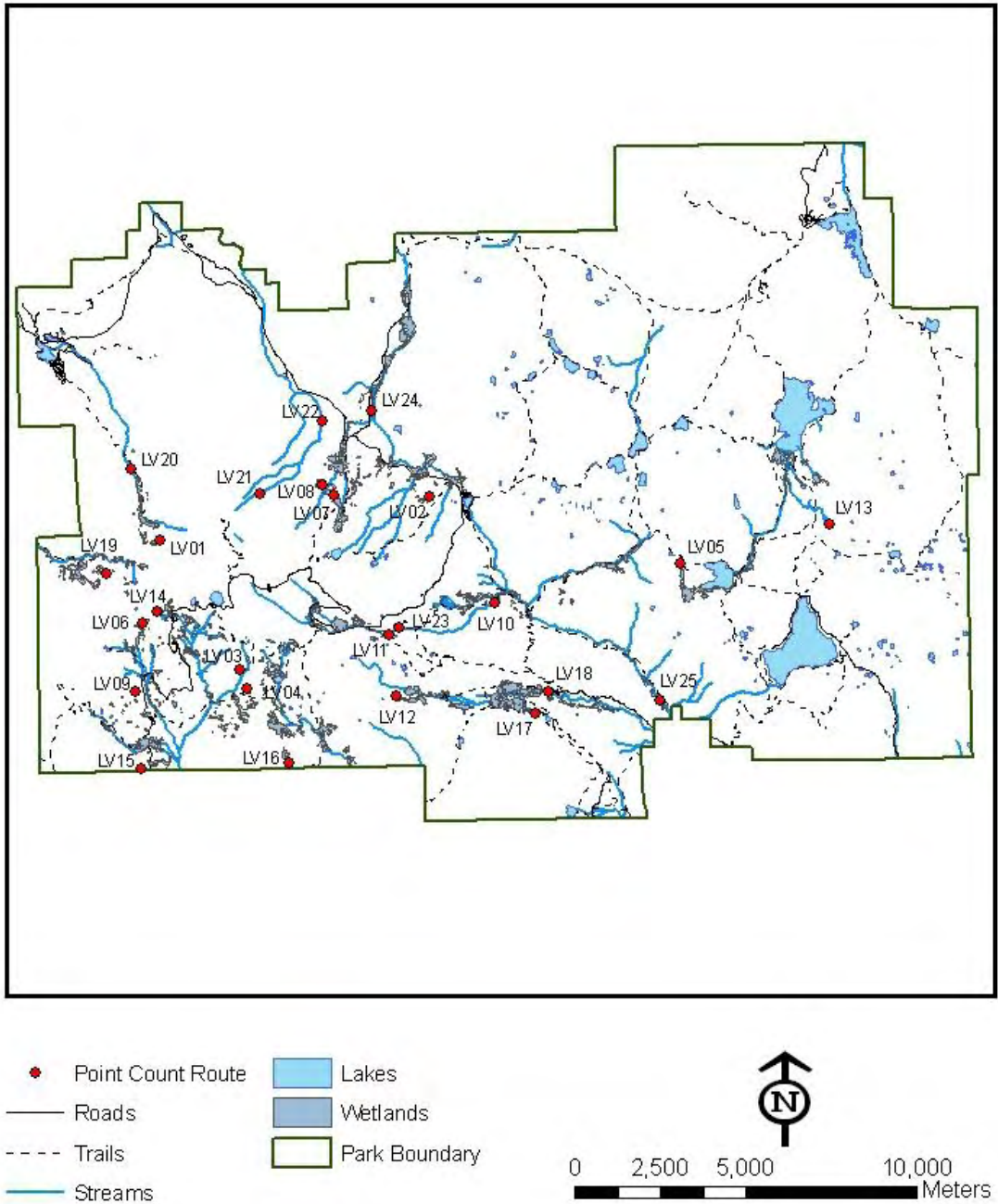
Relative abundance (birds/station), as measured by point counts and area search surveys, was calculated for all survey points combined within each park. Only species detected within 50 m of point count survey stations and within the established area search plot were included in abundance calculations. 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 1999, 2000; CalPIF 2002; RHJV 2004; Rich et al. 2004), and conservation status from the Oregon and California State Wildlife Conservation Strategies (CDFG 2005, ODFW 2005) are highlighted in the results where applicable.



## Results

### Lassen Volcanic National Park

In 2012 we surveyed 25 permanent point count survey routes at Lassen Volcanic National Park, each consisting of 10 to 12 survey stations (Figure 1, Table 1). 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 (Table 1). The sampling frame at Lassen Volcanic National Park is riparian, including both streams and wetlands. The 2012 point count surveys recorded 59 species within 50 m of the stations (Table 2). An additional 29 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 3). Two are new species not currently listed on the parks certified species list in NPSpecies, the Black-and-white Warbler (*Mniotilta varia*) and Cordilleran Flycatcher (*Empidonax occidentalis*).



**Figure 1.** Location of point count routes at Lassen Volcanic National Park.

**Table 1.** Long-term landbird monitoring sites established at Lassen Volcanic National Park, and the number of stations at each point count route. All sites were surveyed in 2012.

Point Count Route	Route Name	Number of Stations
LV01	Lassen Volcanic 01	11
LV02	Lassen Volcanic 02	12
LV03	Lassen Volcanic 03	12
LV04	Lassen Volcanic 04	12
LV05	Lassen Volcanic 05	12
LV06	Lassen Volcanic 06	12
LV07	Lassen Volcanic 07	12
LV08	Lassen Volcanic 08	12
LV09	Lassen Volcanic 09	12
LV10	Lassen Volcanic 10	12
LV11	Lassen Volcanic 11	12
LV12	Lassen Volcanic 12	12
LV13	Lassen Volcanic 13	12
LV14	Lassen Volcanic 14	12
LV15	Lassen Volcanic 15	12
LV16	Lassen Volcanic 16	12
LV17	Lassen Volcanic 17	12
LV18	Lassen Volcanic 18	12
LV19	Lassen Volcanic 19	10
LV20	Lassen Volcanic 20	12
LV21	Lassen Volcanic 21	12
LV22	Lassen Volcanic 22	12
LV23	Lassen Volcanic 23	12
LV24	Lassen Volcanic 24	12
LV25	Lassen Volcanic 25	12
Total		297

**Table 2.** Mean relative abundance (birds within 50 m/point) for species detected during 2010 and 2012 point count surveys at Lassen Volcanic National Park. Species ordered in decreasing order of abundance for 2012 with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF		Cont PIF <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012	Riparian <sup>1</sup>	Conifer <sup>2</sup>	Pacific	CA Wildlife: Cons. Strategy
Pine Siskin	<i>Spinus pinus</i>	0.266	0.677				
Oregon Junco	<i>Junco h. oregonus</i>	0.640	0.529		X		X
Audubon's Warbler <sup>5</sup>	<i>Setophaga coronata auduboni</i>	0.158	0.414		X		
American Robin	<i>Turdus migratorius</i>	0.242	0.263				
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.216	0.253		X		
Mountain Chickadee	<i>Poecile gambeli</i>	0.212	0.212				
Wilson's Warbler <sup>5</sup>	<i>Cardellina pusilla</i>	0.293	0.205	X			
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	0.229	0.168				
Cassin's Finch	<i>Carpodacus cassinii</i>	0.094	0.145		X		
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.074	0.125				
Nashville Warbler <sup>5</sup>	<i>Oreothlypis ruficapilla</i>	0.017	0.114				
Western Tanager	<i>Piranga ludoviciana</i>	0.024	0.101		X		
Brown Creeper	<i>Certhia americana</i>	0.125	0.098		X		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.017	0.098				
Warbling Vireo	<i>Vireo gilvus</i>	0.125	0.088	X			
Steller's Jay	<i>Cyanocitta stelleri</i>	0.104	0.074		X	X	
Orange-crowned Warbler <sup>5</sup>	<i>Oreothlypis celata</i>	0.040	0.061				
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.047	0.061		X		
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.014	0.061			X	
Pacific Wren <sup>6</sup>	<i>Troglodytes pacificus</i>	0.061	0.057			X	
American Dipper	<i>Cinclus mexicanus</i>	0.014	0.040				
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.003	0.034				
Song Sparrow	<i>Melospiza melodia</i>	0.044	0.027	X			
Fox Sparrow	<i>Passerella iliaca</i>	0.014	0.024		X	X	
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.000	0.024		X	X	X
Red Crossbill	<i>Loxia curvirostra</i>	0.000	0.024				
Calliope Hummingbird	<i>Stellula calliope</i>	0.003	0.017				
Gray Jay	<i>Perisoreus canadensis</i>	0.000	0.017		X		
MacGillivray's Warbler <sup>5</sup>	<i>Geothlypis tolmiei</i>	0.047	0.017		X		
Mountain Bluebird	<i>Sialia currucoides</i>	0.007	0.017				
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.051	0.017			X	
Barn Swallow	<i>Hirundo rustica</i>	0.003	0.013				
Hairy Woodpecker	<i>Picoides villosus</i>	0.020	0.013				
Lazuli Bunting	<i>Passerina amoena</i>	0.000	0.013				
Tree Swallow	<i>Tachycineta bicolor</i>	0.017	0.013	X			
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.010	0.013				
White-headed Woodpecker	<i>Picoides albolarvatus</i>	0.017	0.013			X	
Chipping Sparrow	<i>Spizella passerina</i>	0.020	0.010				
Hermit Warbler <sup>5</sup>	<i>Setophaga occidentalis</i>	0.007	0.010			X	
House Wren	<i>Troglodytes aedon</i>	0.003	0.010				

**Table 2 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2010 and 2012 point count surveys at Lassen Volcanic National Park. Species ordered in decreasing order of abundance for 2012 with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		Riparian <sup>1</sup>	Conifer <sup>2</sup>	Cont PIF <sup>3</sup>	CDFG <sup>4</sup>
		2010	2012				
Red-shafted Flicker	<i>Colaptes a. cafer</i>	0.003	0.010				
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.003	0.010				
Swainson's Thrush	<i>Catharus ustulatus</i>	0.000	0.010	X			
Western Flycatcher	<i>Empidonax difficilis/occidentalis</i>	0.044	0.010			X	
Anna's Hummingbird	<i>Calypte anna</i>	0.000	0.007				
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	0.000	0.007				
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.003	0.007				
Mountain Quail	<i>Oreortyx pictus</i>	0.024	0.007			X	
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.000	0.007			X	
Sooty Grouse	<i>Dendragapus fuliginosus</i>	0.007	0.007			X	
Black-backed Woodpecker	<i>Picoides arcticus</i>	0.003	0.003		X		
Cassin's Vireo	<i>Vireo cassinii</i>	0.000	0.003				
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.014	0.003				
Hammond's Flycatcher	<i>Empidonax hammondii</i>	0.003	0.003				
Killdeer	<i>Charadrius vociferus</i>	0.000	0.003				
Lesser Goldfinch	<i>Spinus psaltria</i>	0.000	0.003				
Vaux's Swift	<i>Chaetura vauxi</i>	0.000	0.003		X		X
Western Bluebird	<i>Sialia mexicana</i>	0.000	0.003				
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	0.000	0.003				
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.003	0.000			X	
Canada Goose	<i>Branta canadensis</i>	0.007	0.000				
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0.007	0.000		X		
Rock Wren	<i>Salpinctes obsoletus</i>	0.003	0.000				
Spotted Sandpiper	<i>Actitis macularius</i>	0.027	0.000	X			
Varied Thrush	<i>Ixoreus naevius</i>	0.003	0.000			X	
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.007	0.000				
Wilson's Snipe	<i>Gallinago delicata</i>	0.003	0.000				
Yellow Warbler	<i>Setophaga petechia</i>	0.007	0.000	X			X

<sup>1</sup>RHJV 2004, <sup>2</sup>CaPIF 2002, <sup>3</sup>Rich 2004, <sup>4</sup>CDFG 2005

<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)

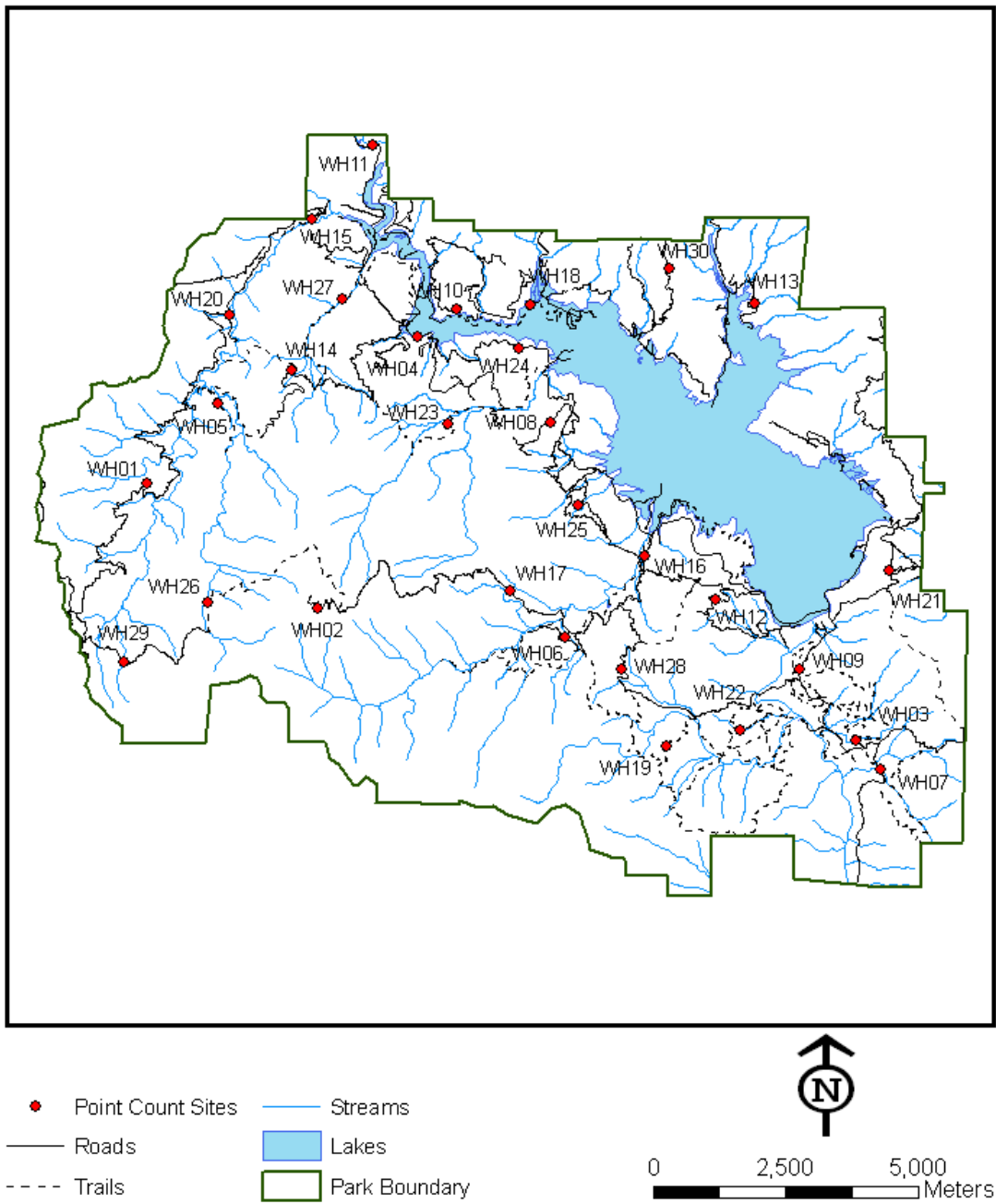
**Table 3.** List of additional species detected at Lassen Volcanic National Park in 2012 (not counted within 50 m during VCP point count surveys) and conservation status.

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
Bald Eagle	<i>Haliaeetus leucocephalus</i>			X	X
Brown-headed Cowbird	<i>Molothrus ater</i>				
Black-and-white Warbler	<i>Mniotilta varia</i>				
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	X			
Brewer's Sparrow	<i>Spizella breweri</i>				X
Band-tailed Pigeon	<i>Patagioenas fasciata</i>			X	
Canada Goose	<i>Branta canadensis</i>				X
Clark's Nutcracker	<i>Nucifraga columbiana</i>		X		
Common Merganser	<i>Mergus merganser</i>				
Common Nighthawk	<i>Chordeiles minor</i>				
Common Raven	<i>Corvus corax</i>				
Downy Woodpecker	<i>Picoides pubescens</i>				
Great Horned Owl	<i>Bubo virginianus</i>				
Hermit Thrush	<i>Catharus guttatus</i>				
Hutton's Vireo	<i>Vireo huttoni</i>				
Mallard	<i>Anas platyrhynchos</i>				
Mourning Dove	<i>Zenaida macroura</i>				
Northern Goshawk	<i>Accipiter gentilis</i>				X
Northern Harrier	<i>Circus cyaneus</i>				X
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>				
Pileated Woodpecker	<i>Dryocopus pileatus</i>		X		
Purple Finch	<i>Carpodacus purpureus</i>		X		
Rock Wren	<i>Salpinctes obsoletus</i>				
Red-tailed Hawk	<i>Buteo jamaicensis</i>				
Sandhill Crane	<i>Grus canadensis</i>				
Spotted Sandpiper	<i>Actitis macularius</i>	X			
Spotted Towhee	<i>Pipilo maculatus</i>				X
Turkey Vulture	<i>Cathartes aura</i>				
Wilson's Snipe	<i>Gallinago delicata</i>				
Yellow Warbler	<i>Setophaga petechia</i>				

<sup>1</sup>RHJV 2004, <sup>2</sup>CalPIF 2002, <sup>3</sup>Rich 2004, <sup>4</sup>CDFG 2005

## **Whiskeytown National Recreation Area**

In 2012 we surveyed 29 of the 30 permanent point count survey routes at Whiskeytown National Recreation Area, each consisting of 12 survey points (Figure 2). One route (WH27) could not be surveyed due to safety concerns that have already been addressed by Law Enforcement. The sampling frame at Whiskeytown National Recreation Area included all roads, trails, and power lines. The 2012 point count surveys recorded 74 species within 50 m of the stations (Table 4). An additional 24 species were detected, recorded outside of 50 m during point count surveys and accounted for on species checklists (Table 5).



**Figure 2.** Location of point count routes at Whiskeytown National Recreation Area.



**Table 4.** Mean relative abundance (birds within 50 m/point) for species detected during 2009 and 2012 point count surveys at Whiskeytown National Recreation Area. Species ordered in decreasing order of abundance for 2012 with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF				Cont PIF <sup>4</sup>	CDFG <sup>5</sup>
		2009	2012	Riparian <sup>1</sup>	Oak <sup>2</sup>	Conifer <sup>3</sup>	Pacific	CA Wildlife: Cons. Strategy	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	0.389	0.445						
Spotted Towhee	<i>Pipilo maculatus</i>	0.225	0.422						
Lesser Goldfinch	<i>Spinus psaltria</i>	0.183	0.307						
Black-throated Gray Warbler <sup>6</sup>	<i>Setophaga nigrescens</i>	0.439	0.284			X	X		
Orange-crowned Warbler <sup>6</sup>	<i>Oreothlypis celata</i>	0.267	0.213						
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.164	0.184	X					
Oregon Junco	<i>Junco h. oregonus</i>	0.150	0.141			X		X	
Bushtit	<i>Psaltiriparus minimus</i>	0.172	0.138						
Brown-headed Cowbird	<i>Molothrus ater</i>	0.106	0.132						
Wrentit	<i>Chamaea fasciata</i>	0.058	0.132				X		
Hutton's Vireo	<i>Vireo huttoni</i>	0.058	0.112		X				
Western Tanager	<i>Piranga ludoviciana</i>	0.086	0.112			X			
Fox Sparrow	<i>Passerella iliaca</i>	0.036	0.109			X	X		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.003	0.103						
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	0.103	0.098		X				
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.056	0.095				X		
Steller's Jay	<i>Cyanocitta stelleri</i>	0.072	0.089			X	X		
Bewick's Wren	<i>Thryomanes bewickii</i>	0.025	0.083		X				
Audubon's Warbler <sup>6</sup>	<i>Setophaga coronata auduboni</i>	0.042	0.075			X			
Cassin's Vireo	<i>Vireo cassinii</i>	0.150	0.069						
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.039	0.066		X				
Yellow Warbler	<i>Setophaga petechia</i>	0.072	0.063	X				X	
Anna's Hummingbird	<i>Calypte anna</i>	0.086	0.060						
Warbling Vireo	<i>Vireo gilvus</i>	0.067	0.060	X					
Wilson's Warbler <sup>6</sup>	<i>Cardellina pusilla</i>	0.186	0.060	X					
Mountain Quail	<i>Oreortyx pictus</i>	0.003	0.057			X	X		
American Robin	<i>Turdus migratorius</i>	0.042	0.055						
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	0.039	0.052		X				
Hairy Woodpecker	<i>Picoides villosus</i>	0.031	0.049						
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.042	0.046		X		X		
Mourning Dove	<i>Zenaida macroura</i>	0.036	0.043						
Nashville Warbler <sup>6</sup>	<i>Oreothlypis ruficapilla</i>	0.047	0.040						
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.028	0.037						
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.053	0.032			X			
Common Merganser	<i>Mergus merganser</i>	0.000	0.029						
Oak Titmouse	<i>Baeolophus inornatus</i>	0.044	0.029		X		X	X	
Lazuli Bunting	<i>Passerina amoena</i>	0.042	0.026						
MacGillivray's Warbler <sup>6</sup>	<i>Geothlypis tolmiei</i>	0.017	0.026			X			
Song Sparrow	<i>Melospiza melodia</i>	0.014	0.026	X					

**Table 4 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2009 and 2012 point count surveys at Whiskeytown National Recreation Area. Species ordered in decreasing order of abundance for 2012 with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF				Cont PIF <sup>4</sup>	CDFG <sup>5</sup>
		2009	2012	Riparian <sup>1</sup>	Oak <sup>2</sup>	Conifer <sup>3</sup>	Pacific	CA Wildlife: Cons. Strategy	
Downy Woodpecker	<i>Picoides pubescens</i>	0.000	0.023						
Red-shafted Flicker	<i>Colaptes a. cafer</i>	0.017	0.023						
California Quail	<i>Callipepla californica</i>	0.014	0.020		X				
Common Raven	<i>Corvus corax</i>	0.019	0.020						
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	0.011	0.017						
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.011	0.017						
Mountain Chickadee	<i>Poecile gambeli</i>	0.025	0.014						
Pacific Wren <sup>7</sup>	<i>Troglodytes pacificus</i>	0.003	0.014				X		
Purple Finch	<i>Carpodacus purpureus</i>	0.003	0.014			X			
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.006	0.011		X		X		
Brown Creeper	<i>Certhia americana</i>	0.008	0.011			X			
Yellow-breasted Chat	<i>Icteria virens</i>	0.014	0.011	X					X
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.003	0.009				X		X
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.006	0.009				X		X
Tree Swallow	<i>Tachycineta bicolor</i>	0.019	0.009	X					
Barn Swallow	<i>Hirundo rustica</i>	0.025	0.006						
Bullock's Oriole	<i>Icterus bullockii</i>	0.019	0.006						
European Starling	<i>Sturnus vulgaris</i>	0.006	0.006						
House Wren	<i>Troglodytes aedon</i>	0.003	0.006						
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.006	0.006						
Townsend's Warbler <sup>6</sup>	<i>Setophaga townsendi</i>	0.078	0.006						
Turkey Vulture	<i>Cathartes aura</i>	0.019	0.006						
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	0.000	0.003						
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.006	0.003						
California Thrasher	<i>Toxostoma redivivum</i>	0.000	0.003		X		X		X
California Towhee	<i>Melospiza crissalis</i>	0.014	0.003		X		X		
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	0.003	0.003				X		
Great Blue Heron	<i>Ardea herodias</i>	0.003	0.003						
Hammond's Flycatcher	<i>Empidonax hammondii</i>	0.003	0.003						
Hermit Thrush	<i>Catharus guttatus</i>	0.000	0.003						
Hermit Warbler <sup>6</sup>	<i>Setophaga occidentalis</i>	0.028	0.003				X		X
Lark Sparrow	<i>Chondestes grammacus</i>	0.000	0.003		X				X
Red-tailed Hawk	<i>Buteo jamaicensis</i>	0.000	0.003						
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.011	0.003						
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.000	0.003						
American Goldfinch	<i>Spinus tristis</i>	0.008	0.000						
Black Phoebe	<i>Sayornis nigricans</i>	0.006	0.000						
Black-capped Chickadee	<i>Poecile atricapillus</i>	0.008	0.000						X
Canada Goose	<i>Branta canadensis</i>	0.008	0.000						

**Table 4 (continued).** Mean relative abundance (birds within 50 m/point) for species detected during 2009 and 2012 point count surveys at Whiskeytown National Recreation Area. Species ordered in decreasing order of abundance for 2012 with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF		Cont PIF <sup>4</sup>	CDFG <sup>5</sup>	
		2009	2012	Riparian <sup>1</sup>	Oak <sup>2</sup>	Comifer <sup>3</sup>	Pacific	CA Wildlife: Cons. Strategy
Chipping Sparrow	<i>Spizella passerina</i>	0.006	0.000			X		X
Cooper's Hawk	<i>Accipiter cooperii</i>	0.006	0.000					X
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.003	0.000					
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	0.003	0.000				X	
Mallard	<i>Anas platyrhynchos</i>	0.006	0.000					
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	0.011	0.000					
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	0.003	0.000		X		X	X
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.008	0.000			X	X	X
Osprey	<i>Pandion haliaetus</i>	0.003	0.000					
Pine Siskin	<i>Spinus pinus</i>	0.008	0.000					
Pygmy Nuthatch	<i>Sitta pygmaea</i>	0.003	0.000					
Rufous-crowned Sparrow	<i>Aimophila ruficeps</i>	0.003	0.000					X
Western Kingbird	<i>Tyrannus verticalis</i>	0.006	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 2005

<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 5.** List of additional species detected at Whiskeytown National Recreation Area 2012 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name	ScientificName	CalPIF			Cont PIF <sup>4</sup>	CDFG <sup>5</sup>
		Riparian <sup>1</sup>	Oak <sup>2</sup>	Conifer <sup>3</sup>	Pacific	CA Wildlife: Cons. Strategy
American Dipper	<i>Cinclus mexicanus</i>					
Bald Eagle	<i>Haliaeetus leucocephalus</i>				X	X
Black-capped Chickadee	<i>Poecile atricapillus</i>					X
Belted Kingfisher	<i>Megaceryle alcyon</i>					
Black Phoebe	<i>Sayornis nigricans</i>					
Canada Goose	<i>Branta canadensis</i>					X
Cooper's Hawk	<i>Accipiter cooperii</i>					X
Evening Grosbeak	<i>Coccothraustes vespertinus</i>					
Great Horned Owl	<i>Bubo virginianus</i>					
Golden Eagle	<i>Aquila chrysaetos</i>					X
Green Heron	<i>Butorides virescens</i>					
House Finch	<i>Carpodacus mexicanus</i>					
Killdeer	<i>Charadrius vociferus</i>					
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>					
Northern Saw-whet Owl	<i>Aegolius acadicus</i>					
Olive-sided Flycatcher	<i>Contopus cooperi</i>			X	X	X
Osprey	<i>Pandion haliaetus</i>					X
Pileated Woodpecker	<i>Dryocopus pileatus</i>			X		
Purple Martin	<i>Progne subis</i>					X
Red-shouldered Hawk	<i>Buteo lineatus</i>		X			
Sharp-shinned Hawk	<i>Accipiter striatus</i>					X
Western Bluebird	<i>Sialia mexicana</i>		X			
Western Kingbird	<i>Tyrannus verticalis</i>					
Willow Flycatcher	<i>Empidonax traillii</i>	X			X	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 2005

## Oregon Caves National Monument

### **Ecological Monitoring Station**

The ecological monitoring station at Oregon Caves National Monument was run 15 times during 2012. Nine visits occurred during the breeding season (6 June to 22 August) and 6 visits during the fall dispersal and migration season (4 September to 10 October). On all visits, two area searches were completed.

In 2012, 50 species were detected at Oregon Caves National Monument at the ecological monitoring station (Table 6). Thirty-three species were captured during mist-netting, 25 during the breeding season and 21 during the migration season. During area searches 28 species were

detected, 22 during the breeding season and 13 during the migration season. Overall, the number of species surveyed aligns with past efforts. During 2008 - 2011, 38, 59, 49, and 41 species were detected, 27, 32, 30, and 34 species were captured during mist-netting, and 19, 22, 31, and 17 species were detected on area search surveys respectively (Stephens et al. 2009, Stephens et al. 2010b, Stephens et al. 2011, Stephens and Mohren 2012).

**Table 6.** Results from the ecological monitoring station at Oregon Caves National Monument; total mist net captures and relative abundance (birds/area search plot) during breeding (6 June to 22 August) and migration (4 September to 10 October), and conservation status. Species included in this table with no capture or abundance values were detected at the site, but not within a search area or captured in a mist-net.

Common Name	Scientific Name	Total captures breeding season	Total captures migration season	Relative abundance breeding season	Relative abundance migration season	ORWA PIF Conifer <sup>1</sup>	Continental PIF Pacific <sup>2</sup>	ODFW Oregon Conservation Strategy <sup>3</sup>
American Robin	<i>Turdus migratorius</i>	1			0.917			
Audubon's Warbler <sup>4</sup>	<i>Setophaga coronata auduboni</i>	1		0.176				
Bald Eagle	<i>Haliaeetus leucocephalus</i>						X	X
Black-capped Chickadee	<i>Poecile atricapillus</i>			0.059				
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	5						
Brown Creeper	<i>Certhia americana</i>	1		0.118	0.250	X		
Black-throated Gray Warbler <sup>4</sup>	<i>Setophaga nigrescens</i>		1			X	X	
California Quail	<i>Callipepla californica</i>							
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	2	13	0.588			X	
Common Raven	<i>Corvus corax</i>							
Downy Woodpecker	<i>Picoides pubescens</i>			0.235				
Dusky Flycatcher	<i>Empidonax oberholseri</i>	2	1					
Fox Sparrow	<i>Passerella iliaca</i>		21	0.118			X	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	11	5	0.235				
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		8	0.353	0.083		X	
Gray Jay	<i>Perisoreus canadensis</i>	2		1.000				
Hammond's Flycatcher	<i>Empidonax hammondii</i>		1			X		
Hairy Woodpecker	<i>Picoides villosus</i>	1			0.167			
Hermit Thrush	<i>Catharus guttatus</i>		11	0.059				
Hermit Warbler <sup>4</sup>	<i>Setophaga occidentalis</i>	4	1		0.083	X	X	
Lazuli Bunting	<i>Passerina amoena</i>	2						
MacGillivray's Warbler <sup>4</sup>	<i>Geothlypis tolmiei</i>	11	2		0.083			
Mountain Chickadee	<i>Poecile gambeli</i>			0.176				
Mourning Dove	<i>Zenaida macroura</i>							
Mountain Quail	<i>Oreortyx pictus</i>						X	X
Nashville Warbler <sup>4</sup>	<i>Oreothlypis ruficapilla</i>	16						
Northern Flicker	<i>Colaptes auratus</i>			0.059				

**Table 6 (continued).** Results from the ecological monitoring station at Oregon Caves National Monument; total mist net captures and relative abundance (birds/area search plot) during breeding (6 June to 22 August) and migration (4 September to 10 October), and conservation status. Species included in this table with no capture or abundance values were detected at the site, but not within a search area or captured in a mist-net.

Common Name	Scientific Name	Total captures breeding season	Total captures migration season	Relative abundance breeding season	Relative abundance migration season	ORWA PIF Conifer <sup>1</sup>	Continental PIF Pacific <sup>2</sup>	ODFW Oregon Conservation Strategy <sup>3</sup>
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>		1					
Orange-crowned Warbler <sup>4</sup>	<i>Oreothlypis celata</i>	1	2			X		
Oregon Junco	<i>Junco hyemalis oregonus</i>	71	42	0.412	1.167			
Olive-sided Flycatcher	<i>Contopus cooperi</i>			0.294	0.333	X	X	X
Pacific Wren <sup>5</sup>	<i>Troglodytes pacificus</i>	2	1	0.059	0.083	X	X	
Pileated Woodpecker	<i>Dryocopus pileatus</i>			0.059		X		X
Purple Finch	<i>Carpodacus purpureus</i>	1						
Red-breasted Nuthatch	<i>Sitta canadensis</i>	10	1	2.941	3.667			
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	4		0.235			X	
Rufous Hummingbird	<i>Selasphorus rufus</i>	4		0.176		X	X	
Sooty Grouse	<i>Dendragapus fuliginosus</i>	4					X	
Steller's Jay	<i>Cyanocitta stelleri</i>	8	16		0.333		X	
Swainson's Thrush	<i>Catharus ustulatus</i>	2	3	0.059				
Varied Thrush	<i>Ixoreus naevius</i>		2	0.118		X	X	
Warbling Vireo	<i>Vireo gilvus</i>							
	<i>Empidonax</i>							
Western Flycatcher	<i>difficilis/occidentalis</i>	2	2					
Western Tanager	<i>Piranga ludoviciana</i>							
Western Wood-Pewee	<i>Contopus sordidulus</i>			1.176	0.667			
White-headed Woodpecker	<i>Picoides albolarvatus</i>						X	X
Willow Flycatcher	<i>Empidonax traillii</i>				0.167		X	X
Wilson's Warbler <sup>4</sup>	<i>Cardellina pusilla</i>	12	13			X		
Yellow Warbler	<i>Setophaga petechia</i>		1					

<sup>1</sup>Altman 1999, <sup>2</sup>Rich 2004, <sup>3</sup>ODFW 2005

<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)

## Discussion

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

At Lassen Volcanic National Monument, of the 10 most abundant species, five are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 2). Four of these species are coniferous forest focal species (Audubon's Warbler, Cassin's Finch, Golden-crowned Kinglet, Oregon Junco) (CalPIF 2002) and one is a riparian focal species (Wilson's Warbler) (RHJV 2004). The mix of focal species is reflective of the sampling frame at Lassen Volcanic National Monument which includes both wetlands and streams which are adjacent to coniferous forest. Two species not currently listed on the parks certified species list in NPSpecies, the Black-and-white Warbler (*Mniotilta varia*) and Cordilleran Flycatcher (*Empidonax occidentali*) were observed in 2012 and it is recommended that the park add these species to their list.

At Whiskeytown National Recreation Area, of the 10 most abundant species, three are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 4). These included species that are indicators of riparian (Black-headed Grosbeak) and coniferous forest (Black-throated Gray Warbler, Oregon Junco) ecosystems (RHJV 2004, CalPIF 2002a). Two species among the 10 most abundant are species of continental importance (Table 4). The Black-throated Gray Warbler is a Stewardship Species in the Pacific avifaunal biome, where 69% of the breeding population occurs (Rich et al. 2004). This species prefers open conifer or oak forests with a brushy understory or shrubby stands of trees. The Wrentit is a Watch List Species in the Pacific avifaunal biome, where 97% of the breeding and wintering population occurs. The Wrentit prefers shrublands; dry habitat characterized by a dense shrub layer, a habitat that is abundant across the landscape at Whiskeytown National Recreation Area (Rich et al. 2004).

Oregon Junco was the most frequently captured species at Oregon Caves National Monument ecological monitoring station during both breeding and migration seasons. Wilson's Warbler, a Partners in Flight focal species in coniferous forest, was the second most frequently captured species during the combined breeding and migration seasons in 2012 (CalPIF 2002). The breeding season captures of Wilson's Warbler were during the latter part of the breeding season likely during a period of post-breeding dispersal (Frey et al. 2007). Oregon Caves National Monument contains important forest ecosystems; in total, 21 conifer and mixed-forest Partners in Flight focal species and species of continental importance were detected at the ecological monitoring station. In 2012, six Oregon Conservation Strategy species were detected, although none were captured (ODFW 2005).





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