



Klamath Network Landbird Monitoring Annual Report 2011 Results from Oregon Caves National Monument, Lava Beds National Monument, and Redwood National and State Parks

Natural Resource Data Series NPS/KLMN/NRDS—2012/317



ON THE COVER

Rock Wren

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Abstract

In 2011, the Klamath Network Inventory and Monitoring Program, in partnership with the Klamath Bird Observatory, implemented the fourth year of its 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 2011, a second year of point counts were completed, along with corresponding species checklists and habitat surveys, at 25 locations within Lava Beds National Monument, and 30 locations within Redwood National and State Parks. The operation of an ongoing constant effort monitoring station, which included mist netting, point counts, area searches, species checklists, and habitat surveys, continued at Oregon Caves National Monument during the breeding and fall migration seasons. Relative abundance (birds/station), as measured by 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 fourth 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 the information from this project to bird conservation in this region will help to inform landbird conservation in the West.

Acknowledgments

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Introduction

In 2011, the National Park Service's Klamath Network Inventory and Monitoring Program (KLMN) implemented the fourth year of its long-term landbird monitoring protocol (Stephens et al. 2010b). 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 2011 efforts, including (1) a summary of the monitoring protocol, (2) a summary of point count and area search surveys and constant effort monitoring efforts, and (3) a summary of birds detected at each of the park units where monitoring occurred.

The KLMN, located in southern Oregon and northern California, includes Crater Lake National Park (CRLA), Lassen Volcanic National Park (LAVO), Lava Beds National Monument (LAVE), Oregon Caves National Monument (ORCA), Redwood National and State Parks (RNSP), and Whiskeytown National Recreation Area (WHIS). These park units fall within the Klamath Region, 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. 2010b). 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. 2010b).

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 data and information 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 et al. 2011, Stephens and Alexander 2011). 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 2011, to include results of species detectability and density, community and habitat structure, and landbird status and trends.

Methods

Sampling Design

The KLMN Landbird Monitoring Protocol (Stephens et al. 2010b) 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.

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 vegetation and elevation gradients that occur in the park. 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.

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.

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 addition, the constant effort monitoring station, which is operated annually at Oregon Caves National Monument, was operated in 2011.

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 2011. 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 within the logistical constraints of the site. 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. This year, 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.

We are currently in the process of updating the standard operating procedures (SOPs) in the landbird monitoring protocol to reflect these changes. A new version of *SOP 5: Conducting Variable Circular Plot Point Count Surveys*, *SOP 7: Conducting Area Search Surveys*, and *SOP 9: Completing Species Checklists* will be made available prior to the start of the 2012 field season.

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 (Stephens et al 2010b). 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 (Stephens et al 2010b). The data and reports for this project are made available to NPS staff 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

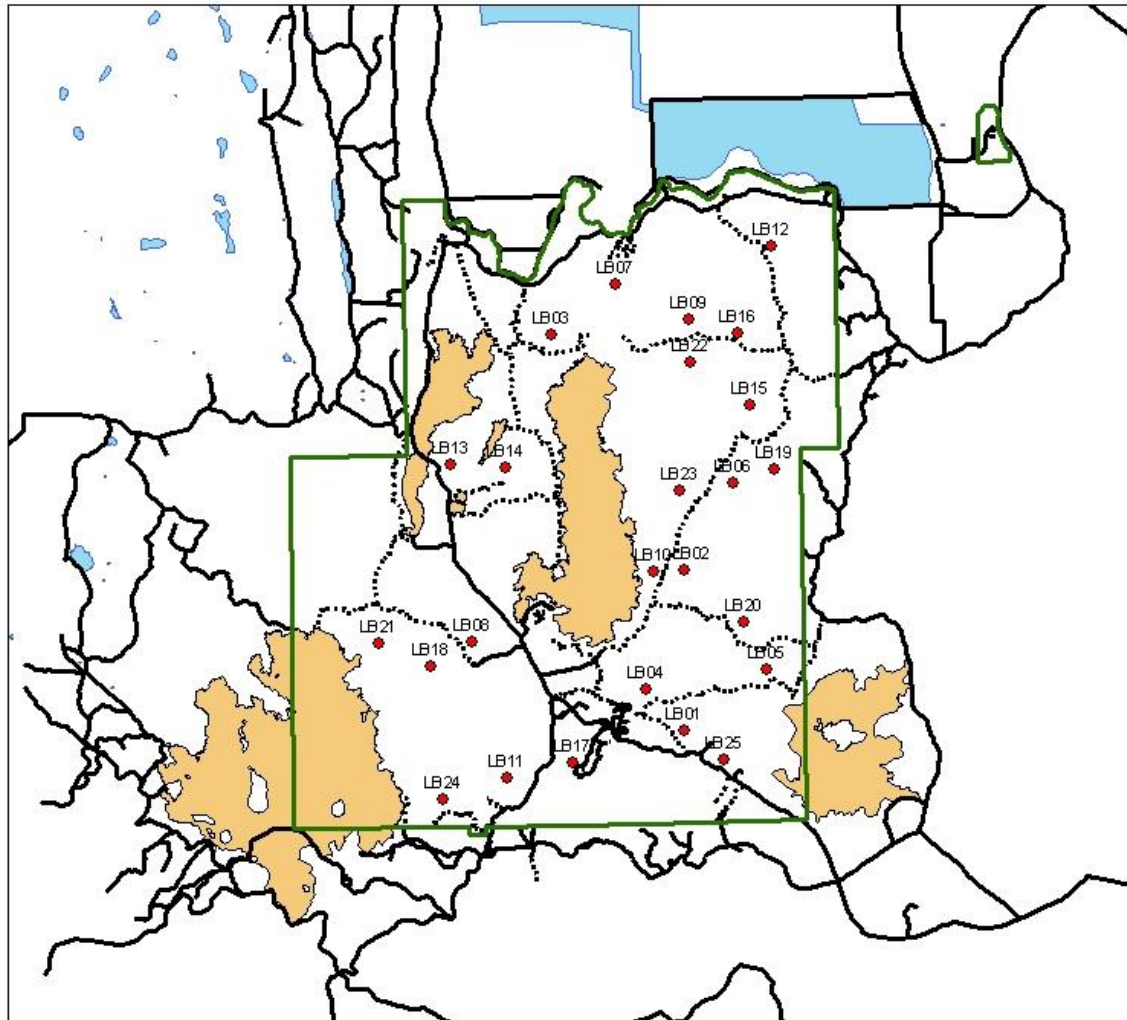
Relative abundance (birds/station), as measured by point counts and area search surveys, was calculated for all survey points combined within each park. Only species detected within 50 m of point count survey stations and within the established area search plot were included in abundance calculations. 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

Lava Beds National Monument

In 2011, we surveyed 25 permanent point count survey routes at Lava Beds National Monument between 19 May and 5 June. Each route consisted of 12 survey points (Figure 1). Lava Beds National Monument does not contain any high elevation or riparian areas, so the sampling frame for this park unit was entirely on matrix lands, which encompass the entire park with the exception of lava flow areas. The 2011 point count surveys recorded 63 species that were within 50 m of the point count station, 17 of which were not detected on point count surveys in 2008 (Table 1). Beyond the point count surveys, an additional 38 species were detected at Lava Beds National Monument in 2011, and accounted for on species checklists (Table 2). Two are new species not currently listed on the parks certified species list in NPSpecies, the Wild Turkey (*Meleagris gallopavo*) and Eurasian Collared Dove (*Streptopelia decaocto*), which are both expanding their range in California. Similar numbers of species were detected in 2008 with 56 species detected on point count surveys and 27 additional species recorded on species checklists.

Lava Beds National Monument Long-term Landbird Monitoring Sites



Legend

- Point Count Route
- Lava Flows
- Pools
- NPS Boundary
- ⋯ Trails
- Roads

0 1,500 3,000 6,000 9,000 12,000 Meters



Figure 1. Location of point count routes at Lava Beds National Monument.

Table 1. Mean relative abundance (birds within 50 m/point) for species detected during 2008 and 2011 point count surveys at Lava Beds National Monument. Species ordered in decreasing order of abundance for 2011 at the park with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF		Cont PIF ³	CDFG ⁴
		2008	2011	Conifer ¹	Sagebrush ²	Intermountain West	CA wildlife: Cons. strategy
Spotted Towhee	<i>Pipilo maculatus</i>	0.633	0.347				X
Rock Wren	<i>Salpinctes obsoletus</i>	0.073	0.150				
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	0.160	0.147				
Brown-headed Cowbird	<i>Molothrus ater</i>	0.150	0.130				
Audubon's Warbler ⁵	<i>Setophaga coronata auduboni</i>	0.007	0.127				
Lazuli Bunting	<i>Passerina amoena</i>	0.170	0.120				
Chipping Sparrow	<i>Spizella passerina</i>	0.150	0.093	X			X
Lark Sparrow	<i>Chondestes grammacus</i>	0.077	0.090		X		X
Western Meadowlark	<i>Sturnella neglecta</i>	0.140	0.087		X		
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.060	0.080				X
Brewer's Sparrow	<i>Spizella breweri</i>	0.040	0.080			X	X
Mountain Chickadee	<i>Poecile gambeli</i>	0.030	0.077				
Mourning Dove	<i>Zenaida macroura</i>	0.073	0.073				
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	0.007	0.070				
Oregon Junco	<i>Junco hyemalis oregonus</i>	0.027	0.060	X			X
Bushtit	<i>Psaltirparus minimus</i>	0.060	0.060				
Bewick's Wren	<i>Thryomanes bewickii</i>	0.020	0.053				
Cedar Waxwing	<i>Bombycilla cedrorum</i>	0.000	0.050				
Gray Flycatcher	<i>Empidonax wrightii</i>	0.067	0.043	X	X	X	
Horned Lark	<i>Eremophila alpestris</i>	0.080	0.040				X
American Robin	<i>Turdus migratorius</i>	0.020	0.037				
Orange-crowned Warbler ⁵	<i>Oreothlypis celata</i>	0.000	0.037				
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	0.013	0.027				
Pine Siskin	<i>Spinus pinus</i>	0.000	0.023				
Cassin's Finch	<i>Carpodacus cassinii</i>	0.007	0.023	X		X	
Red-shafted Flicker	<i>Colaptes auratus cafer</i>	0.010	0.020				
Violet-green Swallow	<i>Tachycineta thalassina</i>	0.003	0.020				
Oak/Juniper Titmouse ⁶	<i>Baeolophus inornatus/ridgwayi</i>	0.033	0.020		X		
Lesser Goldfinch	<i>Spinus psaltria</i>	0.023	0.017				
Sage Thrasher	<i>Oreoscoptes montanus</i>	0.000	0.017		X	X	
California Quail	<i>Callipepla californica</i>	0.013	0.017				
Townsend's Warbler ⁵	<i>Setophaga townsendi</i>	0.007	0.017				
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.013	0.013				
Mountain Bluebird	<i>Sialia currucoides</i>	0.013	0.013			X	
Wilson's Warbler ⁵	<i>Cardellina pusilla</i>	0.030	0.010				
Turkey Vulture	<i>Cathartes aura</i>	0.000	0.010				
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.007	0.010				X
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.003	0.010	X			
Mountain Quail	<i>Oreortyx pictus</i>	0.013	0.007	X			

Table 1 (continued). Mean relative abundance (birds within 50 m/point) for species detected during 2008 and 2011 point count surveys at Lava Beds National Monument. Species ordered in decreasing order of abundance for 2011 at the park with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF		Cont PIF ³	CDFG ⁴
		2008	2011	Conifer ¹	Sagebrush ²	Intermountain West	CA wildlife: Cons. strategy
House Wren	<i>Troglodytes aedon</i>	0.003	0.007				
Black-throated Sparrow	<i>Amphispiza bilineata</i>	0.007	0.007				
Western Tanager	<i>Piranga ludoviciana</i>	0.037	0.007	X			
Clark's Nutcracker	<i>Nucifraga columbiana</i>	0.000	0.007	X		X	
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	0.000	0.007				
Green-tailed Towhee	<i>Pipilo chlorurus</i>	0.007	0.007		X	X	
Dusky Flycatcher	<i>Empidonax oberholseri</i>	0.023	0.007			X	
Calliope Hummingbird	<i>Stellula calliope</i>	0.007	0.007			X	
Canyon Wren	<i>Catherpes mexicanus</i>	0.000	0.007				
Barn Swallow	<i>Hirundo rustica</i>	0.003	0.003				
Pygmy Nuthatch	<i>Sitta pygmaea</i>	0.003	0.003				
Black-throated Gray Warbler ⁵	<i>Setophaga nigrescens</i>	0.003	0.003	X			
White-breasted Nuthatch	<i>Sitta carolinensis</i>	0.000	0.003				
Purple Martin	<i>Progne subis</i>	0.013	0.003				X
Western Kingbird	<i>Tyrannus verticalis</i>	0.000	0.003				
Townsend's Solitaire	<i>Myadestes townsendi</i>	0.000	0.003				
Say's Phoebe	<i>Sayornis saya</i>	0.000	0.003				
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.000	0.003			X	X
Steller's Jay	<i>Cyanocitta stelleri</i>	0.003	0.003	X			
Prairie Falcon	<i>Falco mexicanus</i>	0.000	0.003				X
Loggerhead Shrike	<i>Lanius ludovicianus</i>	0.000	0.003		X		X
Hairy Woodpecker	<i>Picoides villosus</i>	0.003	0.003				
House Finch	<i>Carpodacus mexicanus</i>	0.000	0.003				
Common Raven	<i>Corvus corax</i>	0.000	0.003				
Bullock's Oriole	<i>Icterus bullockii</i>	0.010	0.000				
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	0.003	0.000			X	
Warbling Vireo	<i>Vireo gilvus</i>	0.017	0.000				
Vesper Sparrow	<i>Poocetes gramineus</i>	0.023	0.000		X		
Vaux's Swift	<i>Chaetura vauxi</i>	0.007	0.000	X			X
California Towhee	<i>Pipilo crissalis</i>	0.003	0.000				X
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	0.003	0.000				X
Cassin's Vireo	<i>Vireo cassinii</i>	0.003	0.000				
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.007	0.000	X		X	X
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.007	0.000				

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

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

⁶ size cannot be used to distinguish the Oak and Juniper Titmouse where ranges meet; literature suggests 79% of birds sampled at Lava Beds had mitochondrial DNA characteristic of the Oak Titmouse (Cicero 2004)

Table 2. List of additional species detected at Lava Beds National Monument in 2011 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name	Scientific Name	CalPIF		Cont PIF ³	CDFG ⁴
		Conifer ¹	Sagebrush ²	Intermountain West	CA wildlife: Cons. strategy
American Goldfinch	<i>Spinus tristis</i>				
American Kestrel	<i>Falco sparverius</i>				
Bald Eagle	<i>Haliaeetus leucocephalus</i>				X
Barn Owl	<i>Tyto alba</i>				
Black-billed Magpie	<i>Pica hudsonia</i>				
Bullock's Oriole	<i>Icterus bullockii</i>				
California Gull	<i>Larus californicus</i>				X
California Towhee	<i>Pipilo crissalis</i>				X
Canada Goose	<i>Branta canadensis</i>				
Cassin's Vireo	<i>Vireo cassinii</i>				
Common Nighthawk	<i>Chordeiles minor</i>				
Cooper's Hawk	<i>Accipiter cooperii</i>				X
Double-crested Cormorant	<i>Phalacrocorax auritus</i>				X
Eurasian Collared-Dove ³	<i>Streptopelia decaocto</i>				
Gadwall	<i>Anas strepera</i>				
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>				
Great Horned Owl	<i>Bubo virginianus</i>				
Hermit Thrush	<i>Catharus guttatus</i>				
Mallard	<i>Anas platyrhynchos</i>				
Northern Harrier	<i>Circus cyaneus</i>				X
Olive-sided Flycatcher	<i>Contopus cooperi</i>	X		X	X
Peregrine Falcon	<i>Falco peregrinus</i>				X
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>			X	
Purple Finch	<i>Carpodacus purpureus</i>	X			
Red Crossbill	<i>Loxia curvirostra</i>				
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>				X
Red-tailed Hawk	<i>Buteo jamaicensis</i>				
Red-winged Blackbird	<i>Agelaius phoeniceus</i>				
Ring-necked Pheasant	<i>Phasianus colchicus</i>				
Sandhill Crane	<i>Grus canadensis</i>				
Sooty Grouse	<i>Dendragapus fuliginosus</i>				X
Tricolored Blackbird	<i>Agelaius tricolor</i>				X
Vesper Sparrow	<i>Pooecetes gramineus</i>		X		
Warbling Vireo	<i>Vireo gilvus</i>				
Western Bluebird	<i>Sialia mexicana</i>				
Western Wood-Pewee	<i>Contopus sordidulus</i>				
Wild Turkey ³	<i>Meleagris gallopavo</i>				
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>			X	

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

³ new species for the park confirmed by two observers

Redwood National and State Parks

In 2011, we surveyed 30 permanent point count survey routes at Redwood National and State Parks between 11 June and 28 June (Figure 2 and Figure 3). The number of points varied for each route due to the rugged terrain and dense vegetation at this park. In 2011 two points were added to route RW02, so that all routes consist of 6 to 9 survey points (Table 3). At Redwood National and State Parks, the matrix areas were sampled. The park does not contain high elevation areas but does contain riparian areas that were excluded from sampling (Stephens et al. 2010b). Results from 2011 point count surveys included 42 species that were within 50 m of the point count station, 11 of which were not detected during point count surveys in 2008 (Table 4). Beyond point count surveys, an additional 32 species were detected and recorded on species checklists (Table 5). Similar numbers of species were detected in 2008 with 41 species detected on point count surveys and 43 additional species recorded on species checklists.

Redwood National and State Parks Long-term Landbird Monitoring Sites North Overview

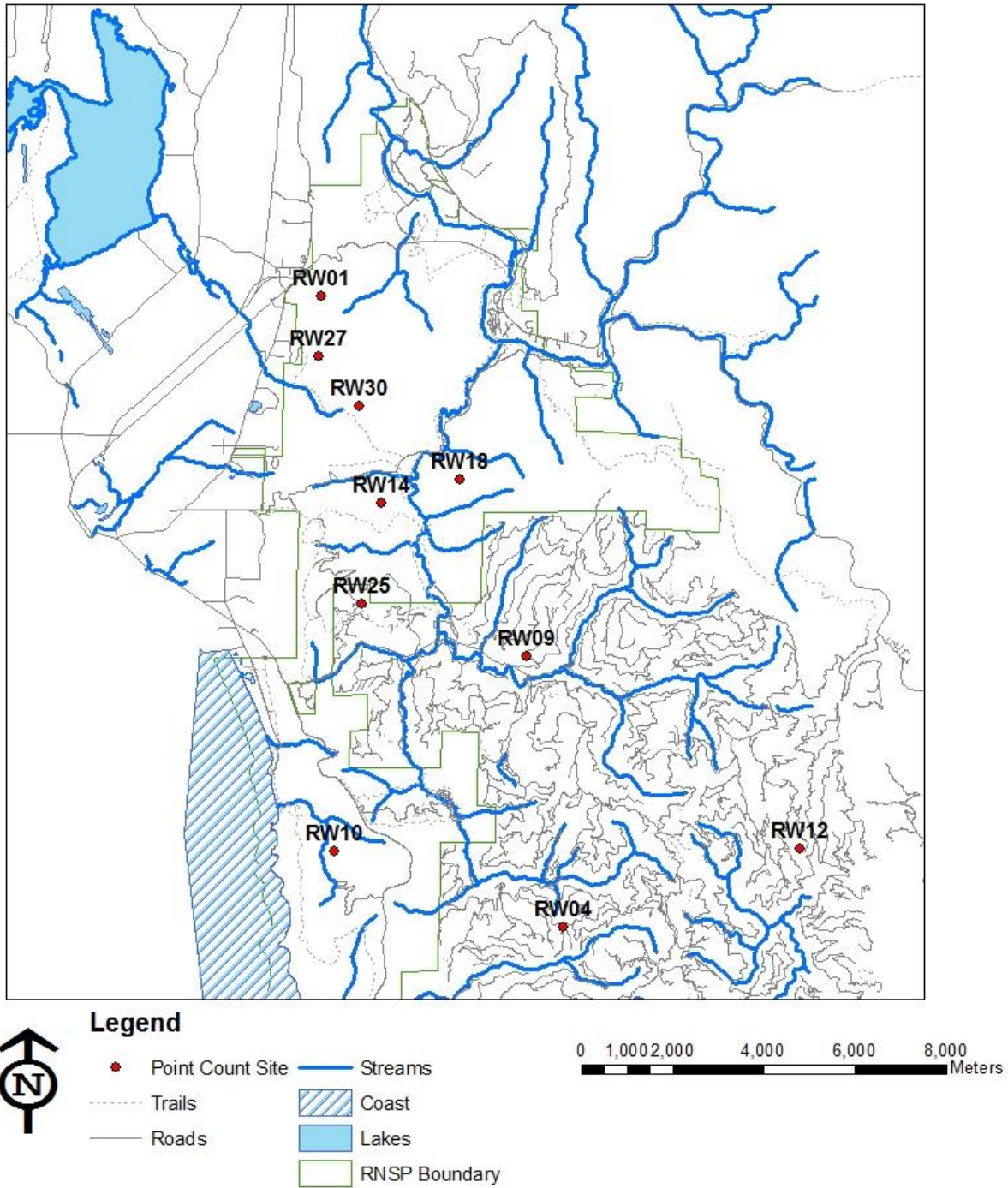


Figure 2. Location of point count routes in the northern area of Redwood National and State Parks.

Redwood National and State Parks Long-term Landbird Monitoring Sites South Overview

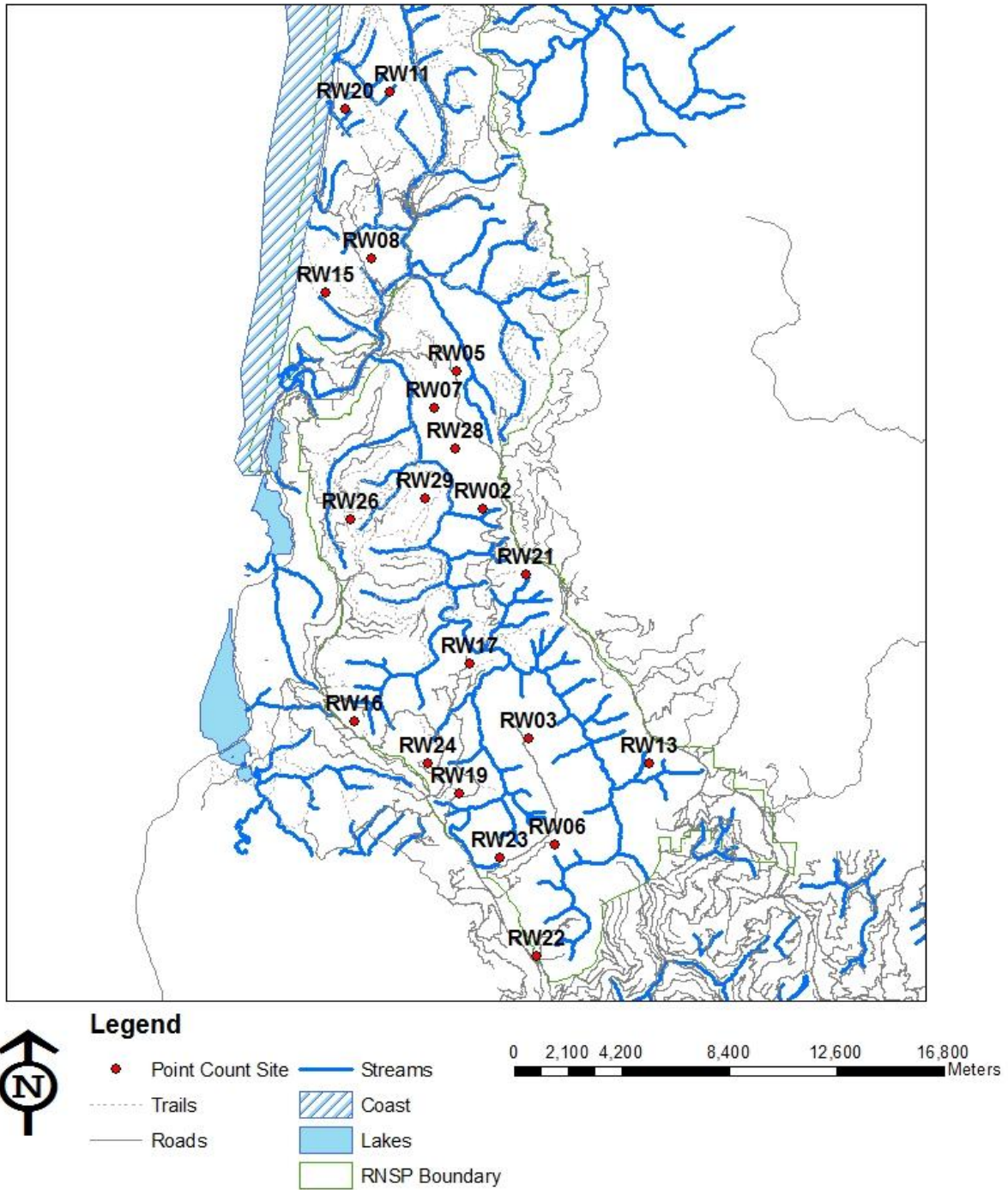


Figure 3. Location of point count routes in the southern area of Redwood National and State Parks.

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

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

¹ two points added in 2011

Table 4. Mean relative abundance (birds within 50 m/point) for species detected during 2008 and 2011 point count surveys at Redwood National and State Parks. Species ordered in decreasing order of abundance for 2011 at the park with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF				Cont PIF ⁵	CDFG ⁶
		2008	2011	Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴	Pacific	CA wildlife: Cons. strategy
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	0.771	0.492					X	
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	0.375	0.323					X	
Pacific Wren ⁷	<i>Troglodytes pacificus</i>	0.354	0.287					X	
Wilson's Warbler ⁸	<i>Cardellina pusilla</i>	0.276	0.174	X					
Steller's Jay	<i>Cyanocitta stelleri</i>	0.162	0.164			X		X	
Brown Creeper	<i>Certhia americana</i>	0.135	0.159			X			
Hutton's Vireo	<i>Vireo huttoni</i>	0.115	0.144		X				
Golden-crowned Kinglet	<i>Regulus satrapa</i>	0.234	0.128			X			
Swainson's Thrush	<i>Catharus ustulatus</i>	0.094	0.123	X					
Red-breasted Nuthatch	<i>Sitta canadensis</i>	0.010	0.087			X			
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	0.052	0.067		X			X	
Vaux's Swift	<i>Chaetura vauxi</i>	0.094	0.067			X			X
Red Crossbill	<i>Loxia curvirostra</i>	0.031	0.067						
Hermit Warbler ⁸	<i>Setophaga occidentalis</i>	0.057	0.056					X	X
Hermit Thrush	<i>Catharus guttatus</i>	0.026	0.046						
Song Sparrow	<i>Melospiza melodia</i>	0.010	0.041	X					X
Wrentit	<i>Chamaea fasciata</i>	0.052	0.036				X	X	
Rufous Hummingbird	<i>Selasphorus rufus</i>	0.005	0.031					X	X
Hairy Woodpecker	<i>Picoides villosus</i>	0.021	0.031						
Oregon Junco	<i>Junco hyemalis oreganus</i>	0.021	0.031			X			X
Allen's Hummingbird	<i>Selasphorus sasin</i>	0.000	0.021					X	X
Lazuli Bunting	<i>Passerina amoena</i>	0.010	0.021						
Black-throated Gray Warbler ⁸	<i>Setophaga nigrescens</i>	0.021	0.021			X		X	
Varied Thrush	<i>Ixoreus naevius</i>	0.099	0.015					X	
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	0.000	0.015						
Spotted Towhee	<i>Pipilo maculatus</i>	0.000	0.015						X
Gray Jay	<i>Perisoreus canadensis</i>	0.031	0.010						
Pine Siskin	<i>Spinus pinus</i>	0.016	0.010						
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	0.005	0.010	X					
American Robin	<i>Turdus migratorius</i>	0.000	0.010						
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0.010	0.010						X
Western Wood-Pewee	<i>Contopus sordidulus</i>	0.005	0.010						
Warbling Vireo	<i>Vireo gilvus</i>	0.000	0.005	X					
Olive-sided Flycatcher	<i>Contopus cooperi</i>	0.000	0.005			X		X	X
Mountain Quail	<i>Oreortyx pictus</i>	0.000	0.005			X	X	X	
MacGillivray's Warbler ⁸	<i>Geothlypis tolmiei</i>	0.000	0.005			X			
Chipping Sparrow	<i>Spizella passerina</i>	0.000	0.005			X			X

Table 4 (continued). Mean relative abundance (birds within 50 m/point) for species detected during 2008 and 2011 point count surveys at Redwood National and State Parks. Species ordered in decreasing order of abundance for 2011 at the park with conservation information available from selected plans.

Common Name	Scientific Name	Relative Abundance		CalPIF			Cont PIF ⁵	CDFG ⁴
		2008	2011	Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴	Pacific
Downy Woodpecker	<i>Picoides pubescens</i>	0.005	0.005					
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	0.000	0.005		X			
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	0.005	0.005					X
Red-shafted Flicker	<i>Colaptes auratus cafer</i>	0.010	0.005					
Cassin's Vireo	<i>Vireo cassinii</i>	0.000	0.005					
Western Scrub-Jay	<i>Aphelocoma californica</i>	0.005	0.000		X		X	X
Anna's Hummingbird	<i>Calypte anna</i>	0.005	0.000					
Audubon's Warbler ⁸	<i>Setophaga coronata auduboni</i>	0.010	0.000			X		
Ruffed Grouse	<i>Bonasa umbellus</i>	0.005	0.000					X
European Starling	<i>Sturnus vulgaris</i>	0.010	0.000		X			
Tree Swallow	<i>Tachycineta bicolor</i>	0.005	0.000	X				
Common Raven	<i>Corvus corax</i>	0.010	0.000					
Bushtit	<i>Psaltriparus minimus</i>	0.005	0.000					
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	0.005	0.000					
Orange-crowned Warbler ⁸	<i>Oreothlypis celata</i>	0.010	0.000					
Sharp-shinned Hawk	<i>Accipiter striatus</i>	0.005	0.000					X

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

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

⁸ classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

Table 5. List of additional species detected at Redwood National and State Parks 2011 (not counted within 50 m during VCP point count surveys) and conservation status.

Common Name		CalPIF		Cont PIF ⁴	CDFG ⁵
		Riparian ¹	Oak ²	Conifer ³	Pacific
American Dipper	<i>Cinclus mexicanus</i>				
Barn Owl	<i>Tyto alba</i>				
Black-capped Chickadee	<i>Poecile atricapillus</i>				X
Belted Kingfisher	<i>Megaceryle alcyon</i>				
Brown-headed Cowbird	<i>Molothrus ater</i>				
Bushtit	<i>Psaltriparus minimus</i>				
California Quail	<i>Callipepla californica</i>		X		
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>				
Common Nighthawk	<i>Chordeiles minor</i>				
Common Raven	<i>Corvus corax</i>				
European Starling	<i>Sturnus vulgaris</i>		X		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>				
Great Horned Owl	<i>Bubo virginianus</i>				
Lesser Goldfinch	<i>Spinus psaltria</i>				
Mourning Dove	<i>Zenaida macroura</i>				
Nashville Warbler ⁶	<i>Oreothlypis ruficapilla</i>				
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>		X		
Northern Saw-whet Owl	<i>Aegolius acadicus</i>				
Orange-crowned Warbler ⁶	<i>Oreothlypis celata</i>				
Osprey	<i>Pandion haliaetus</i>				X
Pileated Woodpecker	<i>Dryocopus pileatus</i>			X	
Purple Finch	<i>Carpodacus purpureus</i>			X	
Purple Martin	<i>Progne subis</i>				X
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>			X	X
Red-tailed Hawk	<i>Buteo jamaicensis</i>				
Ruffed Grouse	<i>Bonasa umbellus</i>				X
Sooty Grouse	<i>Dendragapus fuliginosus</i>				X
Spotted Owl	<i>Strix occidentalis</i>			X	
Turkey Vulture	<i>Cathartes aura</i>				
Western Scrub-Jay	<i>Aphelocoma californica</i>		X	X	X
Western Tanager	<i>Piranga ludoviciana</i>			X	
Willow Flycatcher	<i>Empidonax traillii</i>	X		X	X

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

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

Oregon Caves National Monument

Ecological Monitoring Station

The ecological monitoring station at Oregon Caves National Monument was run 14 times during 2011. Eight visits occurred during the breeding season (23 June to 18 August) and 6 visits during the fall dispersal and migration season (1 September to 12 October). On all visits, two area searches were completed.

In 2011, 41 species were detected at Oregon Caves National Monument at the ecological monitoring station (Table 6). Twenty-four species were captured during mist-netting, 17 during the breeding season and 17 during the migration season. During area searches 17 species were detected, 15 during the breeding season and 10 during the migration season. Overall, the number of species surveyed aligns with past efforts. During 2008, 2009 and 2010, 38, 59, and 49 species were detected, 27, 32, and 30 species were captured during mist-netting, and 19, 22, and 31 species were detected on area search surveys respectively (Stephens et al. 2009, Stephens et al. 2010a, Stephen et al. 2011).

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 (23 June to 18 August) and migration (1 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 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	OR/WA PIF Conifer ¹	Continental PIF ² Pacific
American Robin	<i>Turdus migratorius</i>	2		0.188			
Anna's Hummingbird	<i>Calypte anna</i>						
Audubon's Warbler ³	<i>Setophaga coronata auduboni</i>			0.125			
Band-tailed Pigeon	<i>Patagioenas fasciata</i>					X	X
Black-capped Chickadee	<i>Poecile atricapillus</i>						
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	1		0.125			
Brown Creeper	<i>Certhia americana</i>	2	1		0.167	X	
Chestnut-backed Chickadee	<i>Poecile rufescens</i>		3	0.063	0.083		X
Downy Woodpecker	<i>Picoides pubescens</i>						
Fox Sparrow	<i>Passerella iliaca</i>		4				X
Golden-crowned Kinglet	<i>Regulus satrapa</i>	4	1	0.750	0.500		
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		1				X
Gray Jay	<i>Perisoreus canadensis</i>						
Hairy Woodpecker	<i>Picoides villosus</i>				0.083		
Hammond's Flycatcher	<i>Empidonax hammondi</i>		1			X	
Hermit Thrush	<i>Catharus guttatus</i>	1	10				
Hermit Warbler ³	<i>Setophaga occidentalis</i>	8				X	X
Lazuli Bunting	<i>Passerina amoena</i>		1				
MacGillivray's Warbler ³	<i>Geothlypis tolmiei</i>	7	4	0.188			

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 (23 June to 18 August) and migration (1 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 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	OR/WA PIF Conifer ¹	Continental PIF ² Pacific
Mountain Chickadee	<i>Poecile gambeli</i>			0.063			
Nashville Warbler ³	<i>Oreothlypis ruficapilla</i>	3	3	0.125			
Red-shafted Flicker	<i>Colaptes auratus cafer</i>			0.188	0.167		
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>						
Orange-crowned Warbler ³	<i>Oreothlypis celata</i>	1				X	
Oregon Junco	<i>Junco hyemalis oregonus</i>	18	20	0.688	1.500		
Pacific Wren ⁴	<i>Troglodytes pacificus</i>	3	1	0.313	0.167		
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	1					
Pileated Woodpecker	<i>Dryocopus pileatus</i>					X	
Pine Siskin	<i>Spinus pinus</i>						
Red-breasted Nuthatch	<i>Sitta canadensis</i>		2	0.063	0.667		
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	2	2				X
Ruffed Grouse	<i>Bonasa umbellus</i>			0.125			
Rufous Hummingbird	<i>Selasphorus rufus</i>	3				X	X
Sooty Grouse	<i>Dendragapus fuliginosus</i>						
Steller's Jay	<i>Cyanocitta stelleri</i>	4	4	1.063	1.167		X
Swainson's Thrush	<i>Catharus ustulatus</i>		3				
Tree Swallow	<i>Tachycineta bicolor</i>						
Varied Thrush	<i>Ixoreus naevius</i>	2				X	X
Western Tanager	<i>Piranga ludoviciana</i>						
Western Wood-Pewee	<i>Contopus sordidulus</i>						
Wilson's Warbler ³	<i>Cardellina pusilla</i>	10	16	0.125	0.167	X	

¹Altman 1999, ²Rich 2004

³classification of *Parulidae* species has been revised based on recent genetic work (Chesser et al. 2011)

⁴previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes* (Chesser et al. 2011)

Discussion

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

At Lava Beds National Monument, the Spotted Towhee was the most abundant species at the park in both 2008 and 2011 (Table 1). Of the species detected on more than 5% of the points, six are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 1). These included species that are indicators for both coniferous forest (Oregon Junco, Chipping Sparrow) and sagebrush (Brewer's Sparrow, Lark Sparrow, Western Meadowlark) ecosystems. The Brewer's Sparrow is a Watch List Species in the Intermountain West Avifaunal Biome, where 94% of the breeding population occurs (Rich et al. 2004). Watch List Species have concerning population trends rangewide and are considered most in need of conservation action. This species inhabits shrub steppe throughout the west, and a 100% population increase is recommended in order to maintain a healthy population (Rich et al. 2004).

At Redwood National and State Parks, the Pacific Slope Flycatcher, Chestnut-backed Chickadee, Pacific Wren, and Wilson's Warbler were the most abundant species at the park in both 2008 and 2011 (Table 4). Of the 15 species detected at greater than 5% of the points 14 are Partners in Flight and/or California Wildlife Conservation Strategy focal species (Table 4). This park unit has a diverse range of habitats; the most abundant species included indicators of riparian, oak, conifer, and coastal scrub habitats. The three most abundant species, Pacific-slope Flycatcher, Chestnut-backed Chickadee, and Pacific Wren (this was previously grouped with eastern North American and Eurasian species as the Winter Wren, *Troglodytes troglodytes*), are Stewardship Species in the Pacific Avifaunal Biome, where 91%, 90%, and 26% of their breeding populations, respectively, occur (Rich et al. 2004). Stewardship Species have a high proportion of their range within a given region and are highlighted for conservation action. These three species inhabit the coniferous habitats at Redwood National and State Parks.

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 2011 (CalPIF 2002). The breeding season captures were during the later 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, 14 conifer and mixed-forest Partners in Flight focal species and species of continental importance were detected at the ecological monitoring station. In 2011, no Oregon Conservation Strategy species were detected (ODFW 2005).

Implementation of the KLMN Landbird Monitoring Protocol began in 2008. Landbird status and community composition results from this fourth year of monitoring will provide information to park managers at Lava Beds National Monument and Redwood National and State Parks, and will contribute to avian trend monitoring in the parks. In addition, continuation of the constant effort monitoring station at Oregon Caves National Monument contributes to long-term 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. The mist netting efforts at Oregon Caves are planned to continue each year, with the sampling at Redwood and Lava Beds to next occur in 2014.

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