



Klamath Network Landbird Monitoring Annual Report

2008 results from Oregon Caves National Monument, Lava Beds National Monument, and Redwood National and State Parks

Natural Resource Technical Report NPS/KLMN/NRTR—2009/191



ON THE COVER

Permanent survey markers were installed at Redwood National and State Parks.

Photograph by: Frank Lospalluto

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*2008 results from Oregon Caves National Monument,
Lava Beds National Monument, and Redwood National and
State Parks*

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Abstract

In 2008, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service began implementation of a landbird monitoring protocol. Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and completed the initial year of monitoring. Multiple standard avian sampling methods were implemented, including variable circular plot point counts, area search surveys, mist netting, species checklists, and habitat surveys. In 2008, point counts were completed, along with corresponding species checklists and habitat surveys, at 25 locations within Lava Beds National Monument and at 30 locations within Redwood National and State Parks. The operation of an ongoing constant effort monitoring station, which included mist netting, area searches, species checklists, and habitat surveys, continued at Oregon Caves National Monument during the breeding and fall migration seasons. Relative abundance (birds/station), as measured by point counts and area searches, were calculated for all survey sites combined within each park. Total captures, by season, were calculated using constant effort mist netting data. Species of conservation importance were among the most abundant species at each park. Results are presented along with conservation status of individual species based on Partners in Flight state and continental plans and Oregon and California Wildlife Conservation Strategies. This initial year of implementation of the KLMN landbird monitoring program laid the groundwork for improved understanding of landbird status and long-term trends in each park. When analyzed in the framework of the Klamath Bird Monitoring Network, the contribution of KLMN parks to bird conservation in this region will inform landbird conservation in the west.

Acknowledgements

We thank Daniel Sarr at the Klamath Network for his contributions to the Landbird Monitoring Protocol. Implementation of the monitoring program would not have been possible without the help of the park staff. Special thanks to John Roth, Kristin Schmidt, Amber Transou, Steve Mark, Scott Powell, Terri Hines, Judy Wartella, Sue McLaughlin, John McClelland, Brett Silver, Gregory Holm, David Hays, and David Larson for their logistical support in 2008. We would also like to thank Elizabeth (Bess) Perry for her editorial and formatting contributions. Additional thanks to Cave Research Foundation at Lava Beds National Monument for use of the Cave Research Center and accommodations. The dedication of the field crews made this season successful. Point count surveys were completed by Lyndia Hammer, Jherime Kellerman, and Frank Lospalluto. The Constant Effort Monitoring Station was run by Bob Frey, KBO Biologist and Banding Project Lead; Miguel Moreno Palacios, Park Flight and KBO Intern; Lee Melchior, Oregon Caves National Monument Americorps Volunteer; and KBO Interns: Adam Elzinga, Isabel Varela Garrido, Priscilla Lai, Sarah Lemelin, Adrienne Levoy, Bruktawit Abdu Mahamued, Laura Cárdenas Ortiz, Belén García Pérez, Ayden Sherritt, Anne Seiler, and Melody Warner.

Introduction

In 2008, the Klamath Inventory and Monitoring Network (KLMN) of the National Park Service began implementation of their long-term Landbird Monitoring Protocol (Stephens et al. *In Review*). Klamath Bird Observatory, in partnership with the KLMN, developed the protocol and completed the first year of monitoring this year. This annual report provides a summary of 2008 efforts, including (1) a summary of the monitoring protocol, (2) a summary of point count and area search survey 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. This region includes a broad range of topography, elevation, and corresponding climate and vegetation. The region is recognized for its rich biodiversity, which is represented by diverse avifauna (DellaSala et al. 1999; Trail et al. 1997).

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. *In Review*). The avian sampling methods incorporated in this protocol include point count surveys, constant effort mist netting, area search surveys, and a compilation of species checklists at specific sites. The methodology selected for each park was based on park unit size, habitat composition, and historic bird monitoring efforts (Stephens et al. *In Review*).

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 et al. 2009; Stephens and Alexander 2009). 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 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. PIF conservation plans and state wildlife

conservation strategies provide a framework for understanding landbird status in the parks. We therefore use these resources to frame the results of the KLMN landbird monitoring efforts.

The objectives of the Klamath Network Landbird Monitoring Protocol are to:

- 1) Monitor breeding landbird richness and density every three years in relatively accessible areas of the parks
- 2) Co-sample habitat parameters at bird survey points to aid in the analysis and interpretation of landbird and habitat status, trends, and interrelationships
- 3) Determine status and trends in demographic parameters for select landbird species at 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 structure, and landbird status and trends.

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, will optimize 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 frame for each park included 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).

We used the Generalized Random Tessellation Stratified (GRTS) method (Stevens and Olsen 2004) to develop spatially balanced sampling locations of point count sites within each sampling frame. At each point count site, a series of stations are surveyed in a single morning, referred to as a point count route. The number of point count stations on a route is typically determined by time constraints; optimally, 12 stations would be 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

Training

Point count surveyors participated in a two day training session at the onset of the field season. During this training, field technicians 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 is being refined and various written and audio exercises were tested in 2008. 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 detected at the time of detection, detection type (e.g., visual, song, call) and breeding status are also recorded. Point count surveys are completed within 3 or 4 hours of sunrise.

Constant Effort Monitoring Station

The mist netting station at Oregon Caves National Monument has ten nets set in an array. This arrangement optimizes bird capture and meets logistical constraints. Mist nets are opened within 15 minutes of local 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 unbanded 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, while the mist nets are 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 accounting for all species encountered during an effort and 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 each mist net location 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 with a vegetation relevé 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.

Data

Data Delivery

Data were entered into relational databases to store the variety of field data collected. Five databases are associated with each survey methodology (Point Count, Mist Net, Vegetation, Area Search, and Checklist) and an additional database is used to store location information for each site. The verified, validated, and certified data were submitted to the KLMN, where they were uploaded into one relational database designed using the NPS natural resource database template.

Data Analysis

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

Results

Lava Beds National Monument

In 2008, we established and surveyed 25 permanent point count survey routes at Lava Beds National Monument, each consisting 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 included matrix lands, which encompass the entire park with the exception of lava flow areas. The 2008 point count surveys recorded 56 species in the monument (Table 1). Beyond the point count surveys, an additional 27 species were detected at Lava Beds National Monument, and accounted for on species checklists (Table 2).

Lava Beds National Monument Long-term Landbird Monitoring Sites

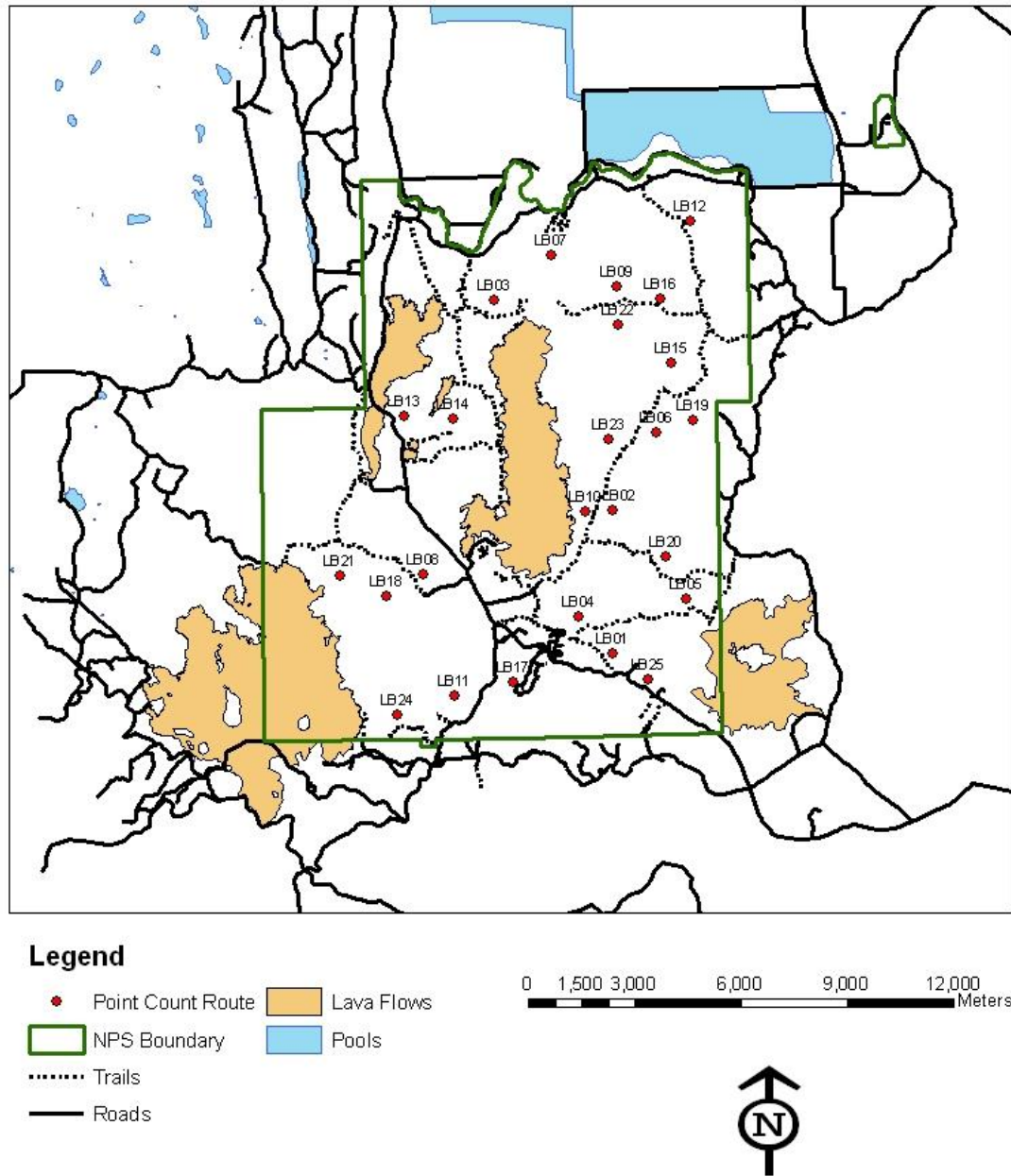


Figure 1. Location of point count routes at Lava Beds National Monument.

Table 1. Relative abundance (birds/point) in decreasing order of abundance detected during 2008 point count surveys at Lava Beds National Monument and conservation status.

Common Name	Relative Abundance	CalPIF		Continental PIF ³	CDFG ⁴
		Conifer ¹	Sagebrush ²	Intermountain West	
Spotted Towhee (<i>Pipilo maculatus</i>)	0.633				
Lazuli Bunting (<i>Passerina amoena</i>)	0.170				
Blue-gray Gnatcatcher (<i>Poliophtila melanocephalus</i>)	0.160				
Brown-headed Cowbird (<i>Molothrus ater</i>)	0.150				
Chipping Sparrow (<i>Spizella passerine</i>)	0.150	X			X
Western Meadowlark (<i>Sturnella neglecta</i>)	0.140		X		
Horned Lark (<i>Eremophila alpestris</i>)	0.080				
Lark Sparrow (<i>Chondestes grammacus</i>)	0.077		X		X
Mourning Dove (<i>Zenaida macroura</i>)	0.073				
Rock Wren (<i>Salpinctes obsoletus</i>)	0.073				
Gray Flycatcher (<i>Empidonax wrightii</i>)	0.067	X	X	X	
Bushtit (<i>Psaltiriparus minimus</i>)	0.060				
Western Scrub-Jay (<i>Aphelocoma californica</i>)	0.060				
Brewer's Sparrow (<i>Spizella breweri</i>)	0.040			X	X
Western Tanager (<i>Prianga ludoviciana</i>)	0.037	X			
Juniper Titmouse (<i>Baeolophus ridgwayi</i>)	0.033		X		
Mountain Chickadee (<i>Poecile gambeli</i>)	0.030				
Wilson's Warbler (<i>Wilsonia pusilla</i>)	0.030				
Oregon Junco (<i>Junco hyemalis</i>)	0.027	X			
Dusky Flycatcher (<i>Empidonax oberholseri</i>)	0.023			X	
Lesser Goldfinch (<i>Carduelis psaltria</i>)	0.023				
Vesper Sparrow (<i>Pooecetes gramineus</i>)	0.023		X		
American Robin (<i>Turdus migratorius</i>)	0.020				
Bewick's Wren (<i>Thryomanes bewickii</i>)	0.020				
Warbling Vireo (<i>Vireo gilvus</i>)	0.017				
Ash-throated Flycatcher (<i>Myiarchus cinerascens</i>)	0.013				
Black-headed Grosbeak (<i>Pheucticus melanocephalus</i>)	0.013				
California Quail (<i>Callipepla californica</i>)	0.013				
Mountain Bluebird (<i>Sialia currucoides</i>)	0.013			X	
Mountain Quail (<i>Oreortyx pictus</i>)	0.013	X			
Purple Martin (<i>Progne subis</i>)	0.013				X
Bullock's Oriole (<i>Icterus bullockii</i>)	0.010				
Red-shafted Flicker (<i>Colaptes Auratus</i>)	0.010				
Audubon's Warbler (<i>Dendroica coronata</i>)	0.007				
Black-throated Sparrow (<i>Amphispiza bilineata</i>)	0.007				
Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)	0.007				
Calliope Hummingbird (<i>Stellula calliope</i>)	0.007			X	

Table 1. Relative abundance (birds/point) in decreasing order of abundance detected during 2008 point count surveys at Lava Beds National Monument and conservation status (continued).

Common Name	Relative Abundance	CalPIF		Continental PIF ³	CDFG ⁴
		Conifer ¹	Sagebrush ²	Intermountain West	CA wildlife: Cons. strategy
Green-tailed Towhee (<i>Pipilo villosus</i>)	0.007		X	X	
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	0.007	X		X	X
Savannah Sparrow (<i>Passerculus sandwichensis</i>)	0.007				
Townsend's Warbler (<i>Dendroica townsendi</i>)	0.007				
Vaux's Swift (<i>Chaetura vauxi</i>)	0.007				X
Western Wood-Pewee (<i>Contopus sordidulus</i>)	0.007				
Barn Swallow (<i>Hirundo rustica</i>)	0.003				
Black-throated Gray Warbler (<i>Dendroica nigrescens</i>)	0.003	X			
California Towhee (<i>Pipilo crissalis</i>)	0.003				
Cassin's Vireo (<i>Vireo cassinii</i>)	0.003				
Hairy Woodpecker (<i>Picoides villosus</i>)	0.003				
House Wren (<i>Troglodytes aedon</i>)	0.003				
Pinyon Jay (<i>Gymnorhinus cyanocephalus</i>)	0.003			X	
Pygmy Nuthatch (<i>Sitta pygmaea</i>)	0.003				
Red-breasted Nuthatch (<i>Sitta canadensis</i>)	0.003	X			
Red-breasted Sapsucker (<i>Sphyrapicus ruber</i>)	0.003				X
Steller's Jay (<i>Cyanocitta stelleri</i>)	0.003	X			
Violet-green Swallow (<i>Tachycineta thalassina</i>)	0.003				

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

Table 2. List of additional species detected at Lava Beds National Monument in 2008 (not detected during point count surveys) and conservation status.

Common Name	CalPIF Sagebrush ¹	CDFG ² CA wildlife: Cons. strategy
American Kestrel (<i>Falco sparverius</i>)		
American White Pelican (<i>Pelecanus erythrorhynchos</i>)		
Anna's Hummingbird (<i>Calypte anna</i>)		
Barn Owl (<i>Tyto alba</i>)		
California Gull (<i>Larus californica</i>)		X
Canada Goose (<i>Branta canadensis</i>)		
Canyon Wren (<i>Catherpes mexicanus</i>)		
Common Nighthawk (<i>Chordeiles minor</i>)		
Common Raven (<i>Corvus corax</i>)		
Gadwall (<i>Anas strepera</i>)		
Great Horned Owl (<i>Bubo virginianus</i>)		
House Finch (<i>Carpodacus mexicanus</i>)		
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	X	
Mallard (<i>Anas platyrhynchos</i>)		
Northern Pygmy-Owl (<i>Glaucidium gnoma</i>)		
Peregrine Falcon (<i>Falco peregrines</i>)		
Prairie Falcon (<i>Falco mexicanus</i>)		
Ring-billed Gull (<i>Larus delawarensis</i>)		
Ring-necked Pheasant (<i>Phasianus colchicus</i>)		
Sage Thrasher (<i>Oreoscoptes montanus</i>)		
Sandhill Crane (<i>Grus canadensis</i>)		X
Say's Phoebe (<i>Sayornis saya</i>)		
Townsend's Solitaire (<i>Myadestes townsendi</i>)		
Turkey Vulture (<i>Cathartes aura</i>)		
Western Bluebird (<i>Sialia mexicana</i>)		
Western Kingbird (<i>Tyrannus verticalis</i>)		
White-breasted Nuthatch (<i>Sitta carolinensis</i>)		

¹ CalPIF 2005, ² CDFG 2005

Redwood National and State Parks

In 2008, 30 permanent point count survey stations were established and surveyed at Redwood National and State Parks (Figure 2 and Figure 3). The number of points varied for each route due to the rugged terrain at this park; most routes consisted of six survey points, but ranged from four to nine (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. Results from 2008 point count surveys included 41 species (Table 4). Beyond point count surveys, an additional 43 species were detected and recorded (Table 5).

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

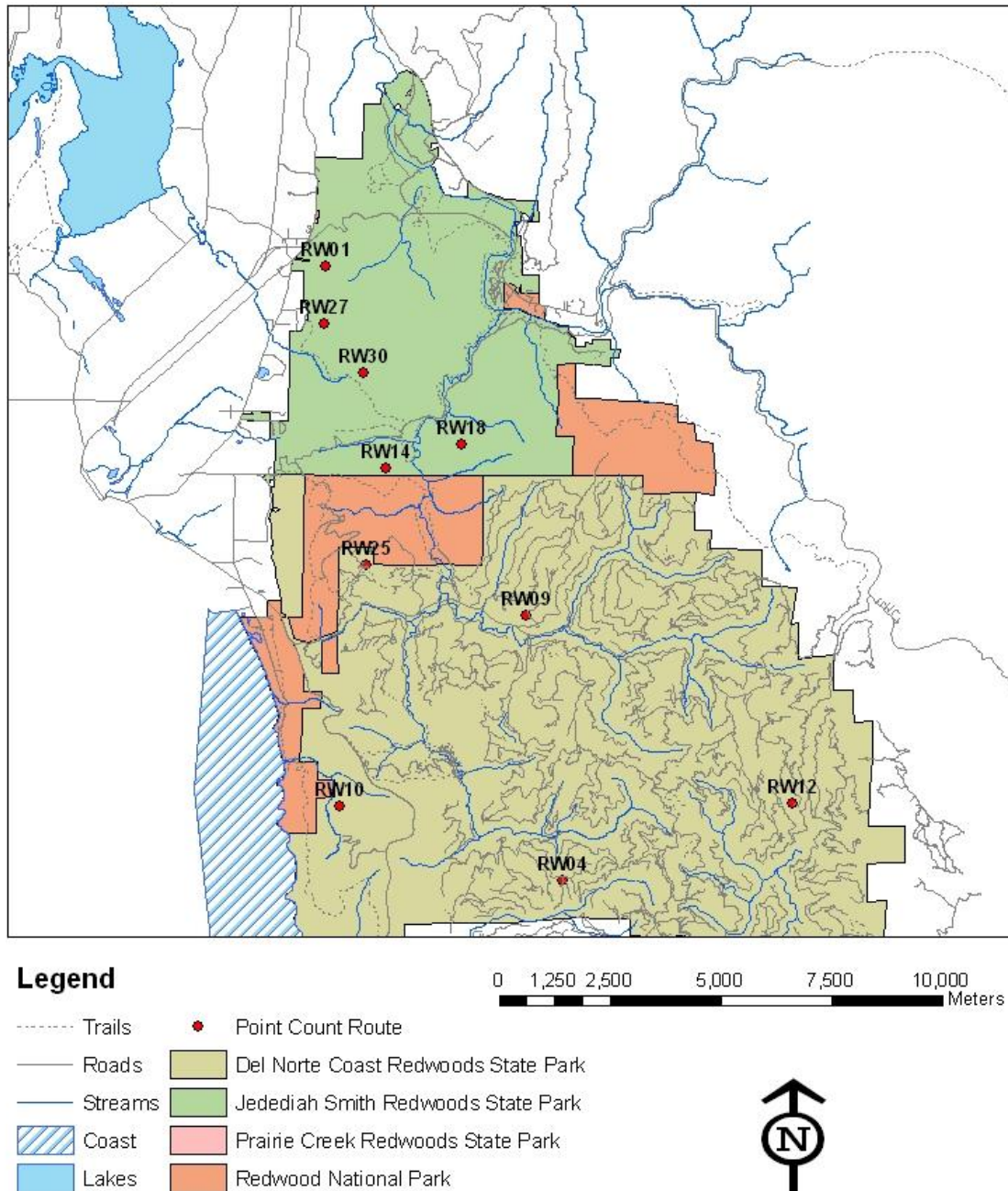


Figure 2. Location of point count routes in the northern area of Redwood National and State Parks.

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

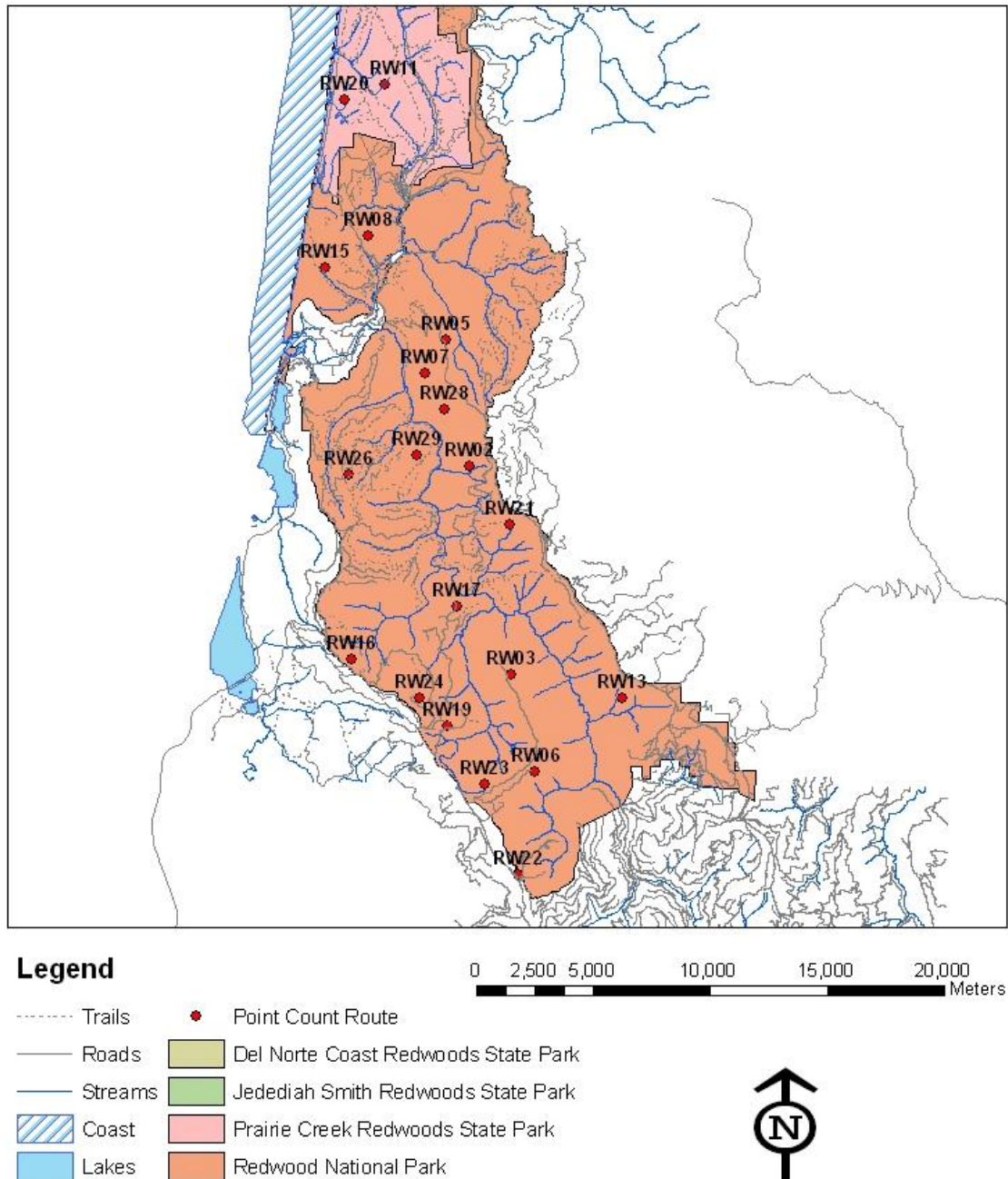


Figure 3. Location of point count routes in the southern area of Redwood National and State Parks.

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	Redwoods 02	4
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		192

Table 4. Relative abundance (birds/point) in decreasing order of abundance detected during 2008 point count surveys at Redwood National and State Parks and conservation status.

Common Name	Relative Abundance	CalPIF			Continental PIF ⁵	CDFG ⁶
		Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴	Pacific
Pacific-slope Flycatcher (<i>Empidonax difficilis</i>)	0.771					X
Chestnut-backed Chickadee (<i>Poecile rufescens</i>)	0.375					X
Winter Wren (<i>Troglodytes troglodytes</i>)	0.354					X
Wilson's Warbler	0.276	X				
Golden-crowned Kinglet (<i>Regulus satrapa</i>)	0.234			X		
Steller's Jay	0.162			X		X
Brown Creeper	0.135			X		
Hutton's Vireo (<i>Vireo huttoni</i>)	0.115		X			
Varied Thrush (<i>Ixoreus naevius</i>)	0.099			X		X
Swainson's Thrush (<i>Catharus ustulatus</i>)	0.094	X				
Vaux's Swift	0.094					
Hermit Warbler (<i>Dendroica occidentalis</i>)	0.057					X
Band-tailed Pigeon (<i>Columba fasciata</i>)	0.052		X			X
Wrentit (<i>Chamaea fasciata</i>)	0.052				X	X
Gray Jay (<i>Perisoreus canadensis</i>)	0.031			X		
Red Crossbill (<i>Loxia curvirostra</i>)	0.031					
Hermit Thrush (<i>Catharus guttatus</i>)	0.026					
Black-throated Gray Warbler	0.021			X		X
Hairy Woodpecker	0.021					
Oregon Junco	0.021			X		
Pine Siskin (<i>Carduelis pinus</i>)	0.016					
Audubon's Warbler	0.010					
Common Raven	0.010					
European Starling (<i>Sturnus vulgaris</i>)	0.010					
Lazuli Bunting	0.010					
Orange-crowned Warbler (<i>Vermivora celata</i>)	0.010					
Red-breasted Nuthatch	0.010			X		
Red-shafted Flicker	0.010					
Savannah Sparrow	0.010					
Song Sparrow (<i>Melospiza melodia</i>)	0.010	X			X	
Anna's Hummingbird	0.005					
Black-headed Grosbeak	0.005	X				
Bushtit	0.005					
Downy Woodpecker (<i>Picoides pubescens</i>)	0.005					
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	0.005					

Table 4. Relative abundance (birds/point) in decreasing order of abundance detected during 2008 point count surveys at Redwood National and State Parks and conservation status (continued).

Common Name	Relative Abundance	CalPIF				Continental PIF ⁵	CDFG ⁶
		Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴	Pacific	CA wildlife: Cons. strategy
Northern Saw-whet Owl (<i>Aegolius acadicus</i>)	0.005						
Dusky Grouse (<i>Dendragapus obscurus</i>)	0.005						
Rufous Hummingbird	0.005					X	X
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	0.005						
Tree Swallow (<i>Tachycineta bicolor</i>)	0.005	X					
Western Scrub-Jay	0.005		X		X	X	
Western Wood-Pewee	0.005						

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

Table 5. List of additional species detected at Redwood National and State Parks in 2008 (not detected during point count surveys) and conservation status.

Common Name	CalPIF				Continental PIF ⁵	CDFG ⁶
	Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴	Pacific	CA wildlife: Cons. strategy
American Crow (<i>Corvus brachyrhynchos</i>)						
American Dipper (<i>Cinclus mexicanus</i>)						
American Goldfinch (<i>Carduelis tristis</i>)						
American Robin						
Bald Eagle (<i>Haliaeetus leucocephalus</i>)						X
Barn Swallow						
Barred Owl (<i>Strix varia</i>)						
Belted Kingfisher (<i>Ceryle alcyon</i>)						
Black-chinned Hummingbird (<i>Archilochus alexandri</i>)						
Brown-headed Cowbird						
California Quail		X		X		
Cassin's Vireo						
Cedar Waxwing (<i>Bombycilla cedrorum</i>)						
Chipping Sparrow			X			X

Table 5. List of additional species detected at Redwood National and State Parks in 2008 (not detected during point count surveys) and conservation status (continued).

Common Name	CalPIF			Continental PIF ⁵	CDFG ⁶
	Riparian ¹	Oak ²	Conifer ³	Coastal Scrub ⁴	Pacific
Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)					
Common Merganser (<i>Mergus merganser</i>)					
Common Nighthawk					
Dusky Flycatcher					
Evening Grosbeak (<i>Coccothraustes vespertinus</i>)					
Great Horned Owl					
House Wren					
Lesser Goldfinch (<i>Carduelis psaltria</i>)					
MacGillivray's Warbler (<i>Oporornis tolmiei</i>)			X		
Mountain Chickadee					
Mountain Quail			X	X	X
Mourning Dove					
Northern Pygmy-Owl		X			
Northern Rough-winged Swallow (<i>Stelgidopteryx serripennis</i>)					
Olive-sided Flycatcher			X		X
Osprey (<i>Pandion haliaetus</i>)					X
Pileated Woodpecker (<i>Dryocopus pileatus</i>)			X		
Purple Finch (<i>Carpodacus purpureus</i>)			X		
Red-breasted Sapsucker					X
Red-tailed Hawk (<i>Buteo jamaicensis</i>)					
Sooty Grouse (<i>Dendragapus fuliginosus</i>)					X
Townsend's Solitaire					
Townsend's Warbler					
Turkey Vulture				X	
Violet-green Swallow					
Warbling Vireo	X				
Western Screech-Owl (<i>Otus kennicottii</i>)					
Western Tanager (<i>Piranga ludoviciana</i>)			X		
White-crowned Sparrow (<i>Zonotrichia leucophrys</i>)					

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

Oregon Caves National Monument

The ecological monitoring station at Oregon Caves National Monument was run 15 times during 2008. Nine visits occurred during the breeding season (5 June to 25 August) and six visits during the fall dispersal and migration season (4 September to 15 October). During one visit, only one area search was completed due to snow and cold temperatures, which requires the mist nets to be checked more frequently. On all other visits, two area searches were completed.

In 2008, 38 species were detected at Oregon Caves National Monument (Table 6). Twenty-seven species were captured during mist netting: 18 during the breeding season and 19 during the migration season. During area searches, 16 species were detected during the breeding season and 14 during migration (Table 6).

Table 6. Results from the ecological monitoring station at Oregon Caves National Monument; complete list of species detected on checklists, total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 25 August) and migration (4 September to 15 October), and conservation status.

Common 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
Allen's Hummingbird (<i>Selasphorus sasin</i>)	4		0.059	0.083		X
American Robin	2		0.059			
Audubon's Warbler			0.118			
Band-tailed Pigeon					X	X
Black-capped Chickadee (<i>Poecile atricapillus</i>)						
Black-headed Grosbeak	1					
Brown Creeper		2	0.059	0.083	X	
Chestnut-backed Chickadee	11	20	0.177	0.333		X
Common Raven						
Downy Woodpecker						
Dusky Flycatcher	2	2				
Flammulated Owl (<i>Otus flammeolus</i>)						X
Fox Sparrow (<i>Passerella iliaca</i>)		7		0.250		X
Golden-crowned Kinglet	2	21		0.250		
Gray Jay		1				
Hermit Thrush	1	12				
Hermit Warbler	1				X	X
MacGillivray's Warbler	19	3	0.118	0.083		
Nashville Warbler (<i>Vermivora ruficapilla</i>)	14		0.177			

Table 6. Results from the ecological monitoring station at Oregon Caves National Monument; complete list of species detected on checklists, total mist net captures and relative abundance (birds/area search plot) during breeding (5 June to 25 August) and migration (4 September to 15 October), and conservation status (continued).

Common 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
Northern Pygmy-Owl						
Northern Waterthrush (<i>Seiurus noveboracensis</i>)		1				
Orange-crowned Warbler		8			X	
Oregon Junco	45	14	0.941	1.250		
Pacific-slope Flycatcher	5		0.059		X	X
Pileated Woodpecker					X	
Red-breasted Nuthatch	1	6	0.059	1.000		
Red-breasted Sapsucker		1	0.118	0.083		X
Red-shafted Flicker		1	0.059	0.083		
Red-tailed Hawk						
Rufous Hummingbird	1				X	X
Spotted Towhee				0.083		
Sooty Grouse						X
Steller's Jay	6		0.118	0.750		X
Swainson's Thrush (<i>Catharus ustulatus</i>)	2	3				
Varied Thrush			0.059	0.250	X	X
White-crowned Sparrow		1				
Wilson's Warbler	6	9	0.059	0.083	X	
Winter Wren	3	1	0.059		X	X
Yellow Warbler (<i>Dendroica petechia</i>)		1				

¹Altman 1999, ²Rich 2004

Discussion

This initial 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. 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, 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 indicator species for both coniferous forest (Chipping Sparrow) and sagebrush (Western Meadowlark, Lark Sparrow) ecosystems. The Gray Flycatcher is a Stewardship Species in the intermountain west, where 96% of the breeding population occurs (Rich et al. 2004). This species inhabits Pinyon-Juniper woodlands throughout the west, and should be considered in long-term land management planning.

All of the species detected at greater than 5% of the points at Redwood National and State Parks 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 Winter Wren, are Stewardship Species in the Pacific Avifaunal Biome, where 91%, 90%, and 26% of their breeding populations, respectively, occur (Rich et al. 2004). These three species inhabit the coniferous habitats at Redwood National and State Parks.

Many of the species monitored at Oregon Caves are Partners in Flight coniferous forest focal species and are of continental importance (Table 6). The Chestnut-backed Chickadee, a Stewardship Species, is abundant and frequently captured (Rich 2004). One rarity was captured in 2008 at Oregon Caves National Monument on 11 September - a Northern Waterthrush. This individual had hatched in 2008 and the sex could not be determined. This was the first record of this species at Oregon Caves National Monument. The Northern Waterthrush is a rare breeder in Oregon and is otherwise considered a vagrant species (Contreras 2003).

Implementation of the KLMN landbird monitoring protocol began in 2008. Landbird status and community composition results from this initial year of monitoring will provide information to park managers at Lava Beds National Monument and Redwoods National and State Parks, and provide the first of many years of data which will contribute to avian trend monitoring in the parks. In addition, continuation of monitoring 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.

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