



# **Sampson Creek Preserve bird monitoring: Summary from a year-long citizen science inventory**

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Rep. No. KBO-2018-0005  
August 2018



### **Recommended Citation:**

Armstrong, E. A., J. L. Stephens. 2018. Sampson Creek Preserve bird monitoring: Summary from a year-long citizen science inventory. Rep. No. KBO-2018-0005. Klamath Bird Observatory, Ashland, OR.

### **On the cover:**

Sampson Creek in the spring  
Photograph by Ellie Armstrong

## **Acknowledgments**

We would like to thank Maia Black of the Selberg Institute for assisting in study design and field logistics for this project. We also appreciate the work of Kate Halstead who oversaw the field logistics during the 2015 KBO baseline monitoring. This project would not have been possible without the dedicated citizen scientists who spent many early mornings monitoring the preserve, they include: Stephen Anderson, Cindy Beck, Dorsey Burger, Nala Cardillo, Allen Drescher, Dave Garcia, Julie Graef, Ashley Hebert, Margaret Humphrey, Cathy Jessome, Janet Kelly, Linda Kreisman, Peter Kreisman, Frank Lospalluto, Sandra Mayne, Kathrin McCoy, Christine McCullough, Tom Pratum, Peggy Pratum, Dan Reinkensmeyer, Sherrill Rinehar, Shannon Rio, Susan Schlosser, Karl Schneck, Cecile Schohet, Nick Viani, and Sooney Viani. Funding for this project was provided by Anna Mae Ross, LLC.

## Introduction

In April of 2017 Klamath Bird Observatory (KBO) partnered with the manager of AMR LLC properties, the Selberg Institute, to implement a new citizen science project on the Sampson Creek Preserve. This work complemented KBO's 2015 baseline breeding season surveys on the preserve by building the breeding species list and expanding inventory to the migration and winter seasons.

The Sampson Creek Preserve is situated in the foothills of the Cascade Mountains and covers 4,800 acres throughout the Sampson, Cattle, and Soda Creek watersheds within Jackson County, Oregon. The property is contiguous with a portion of the Emigrant Lake Recreation Area, and is within newly expanded Cascade-Siskiyou National Monument boundary. Elevation on the property ranges from around 700 m to 1600 m. The climate in the region is highly seasonal, with cold, rainy/snowy winters and hot, dry summers. According to the US Geological Survey's GAP land cover database (USGS 2011), the primary vegetation types on the property include prairie and savannah, various oak types (including Oregon white oak woodland and California black oak/conifer), oak chaparral, conifer forest, and riparian woodland (Halstead and Stephens 2016).

The goal of this project was to generate a robust species list for the Sampson Creek Preserve. We implemented a citizen science project as a cost-effective way to regularly survey the property for an entire year. The trained citizen scientists entered their data into eBird Northwest, a regional node of the international eBird site. eBird is the world's largest biodiversity-related citizen science project, where birders around the world can enter their bird sightings. These data have provided a valuable resource to scientists who have been able to document bird distribution, abundance, habitat use, and many more trends leading to hundreds of conservation decisions around the world (Sullivan et al 2009).

## Methods

### *Study Design and Field Surveys*

Three locations, Sampson A, Sampson B, and Sampson C (Figure 1) were chosen as the primary survey sites. These three sites were selected based on accessibility and distance from one another to maximize the portion of the preserve that was regularly surveyed. Due to accessibility issues these three survey locations are all within the lower elevation of the preserve and cover riparian, oak savannah, and oak woodland habitats but exclude the higher elevation coniferous forest portions of the preserve. To make sure all elevation gradients and habitats were surveyed, an additional transect from the highest to lowest elevations of the property was occasionally surveyed throughout the year. Additional surveys took place at the site of a historic mine on the preserve as well as a location where pollinator restoration work was underway. These two sites were more difficult to access and therefore were only surveyed twice during the breeding season and twice during fall migration.

Recruitment for Citizen Scientist volunteers was done through public outreach to many local birding organizations, including a presentation at the Rogue Valley Audubon Society chapter meeting. Training in field methodology and eBird best practices was provided to every volunteer. Surveys took place regularly every other Saturday between April 2017 and April 2018, with occasional additional surveys on other days of the week.

Citizen Scientists rotated survey locations each week to minimize observer bias. Surveys were completed both by individuals and in small groups. Surveys began within an hour of sunrise and were completed within four hours of sunrise. Citizen Scientists completed transect surveys by walking through the assigned areas and recording all birds detected by sight or sound. In an effort to not double count birds, surveyors either walked the plot in a circle or did not record any birds while walking back to their starting location, unless a new species was detected. After the survey was complete, the checklists were entered and submitted into eBird Northwest and shared with a single account, *SelbergCitizenScience*.

To maximize detection probability for most songbird species it is best to begin surveying at sunrise (Ralph et al 1993). This, however, is not an ideal time to survey for nocturnal species such as owls. According to the Guidelines for Nocturnal Owl Monitoring in North America, surveys for owls should be conducted between a half hour after sunset and midnight, therefore owls were surveyed separately in two additional surveys (Takats et al. 2001). These surveys were completed during the breeding season by using playback for owl species likely to be detected in the survey location's habitat. Playback surveys were conducted at four separate points, two within or adjacent to coniferous forest at the highest elevation of the preserve and two in oak woodlands at low elevation.

## Analysis

eBird has many built in tools to quickly summarize and analyze data. Though these tools provide a powerful user friendly platform the analyses have some temporal limitations which did not meet the objectives of this report, therefore program R was used to analyze data downloaded from eBird to complete similar analyses with some customization. The total number of species and total number of checklists submitted per month were summed and it was identified which survey location each species was detected. Species richness was summed for each season, passerine breeding season (May-August), migration (April, September and October) and, winter (November-March). In addition, a complete species list was compiled for the preserve from the citizen science data as well as the KBO baseline surveys.

## Results

During the year-long citizen science monitoring, 26 trained volunteers completed surveys on the preserve, submitting 114 eBird checklists and completing surveys on 52 days. During these surveys 120 bird species were detected on the preserve, substantially adding to the 54 species previously documented during the baseline breeding surveys and totaling species richness to 121. Swainson's Thrush was the only species previously detected during baseline monitoring that was not detected during citizen science surveys. Eight species, seven which were newly detected, are listed on the Partners in Flight (PIF) Watch List for the Pacific Birds Habitat Joint Venture region which covers Alaska, western portions of British Columbia, Washington, Oregon, northern California, and the Hawaiian and other Pacific Islands. These are species of the highest conservation concern and, four additional species are 'common birds in steep decline' (Table 1) (Rosenberg et al. 2016). There were also a large number of species detected that are Partners in Flight focal species in Oregon and Washington, that is, species indicative of important habitat components. These included twenty-six species for valleys and lowlands in Oregon (Altman 2000), 25 species for oak habitat in the Rogue Basin (Altman and Stephens 2012), and 21 species for coniferous forests (Altman and Alexander 2012) (Table 1).

Of the survey locations, Sampson B contained the highest species richness with 93 species detected, Sampson A and C were surveyed approximately the same number of times as B and showed lower species richness with 67 species at A and 74 at C (Table 3). The second highest species richness was detected on the hike transect, which contained checklists submitted while hiking from the top of the property down to Sampson B, with 79 species (Table 3). The Mine and Pollinator locations show lower diversity but, these sites were only surveyed occasionally throughout the year and therefore have a much smaller sample size than the three main survey locations. While it is hard to compare species richness per month for the entire preserve because some months contained additional surveys and survey locations, September had the most species detected at 88 while July had the lowest at 29 (Table 2). The migration season had the highest species richness of 103, while the passerine breeding season and winter had species richness of 79 and 65 respectively.

## Discussion

This year-long monitoring project which utilized citizen science volunteers to complete regular surveys on the preserve showed to be largely successful. By having consistent surveys throughout the year we were able to compile a robust inventory for the preserve, adding 67 species to the existing inventory and gaining a better understanding of species composition throughout the year.

Species richness showed to be highest during the spring and fall migration seasons with 103 species detected during migration followed by the passerine breeding season with 73 species and lowest during the winter with 65 species. Note that the breeding season is specific to passerine (songbirds) breeding season, which were the most common type of species detected on the property. Other non-passerines such as owls, hawks, ducks and more can breed at different times of the year. By monitoring throughout the year and not just during the passerine breeding season we were able to detect many species during the migration and/or winter that were not recorded during the breeding season.

Three of the survey locations, Sampson A, Sampson B and Sampson C, were regularly surveyed with similar effort. These three locations have similar oak habitats with slightly different amounts of tree and shrub cover. Sampson B parallels Sampson Creek and Sampson C hosts a small drainage, each providing some riparian features and vegetation. Of these three survey locations Sampson B had the highest species richness with 93 species followed by Sampson C at 74 and Sampson A at 67 (Table 3). Riparian habitats are particularly biodiverse areas, hosting the most diverse bird communities in the arid and semiarid western United States (RHJV 2004). Having adjacent riparian habitat could lead to higher diversity at Sampson B and C.

Overall, the bird community is comprised of many species highly associated with oak habitat including some oak obligate or near-obligate species such as Acorn Woodpecker, Ash-throated Flycatcher, Blue-gray Gnatcatcher, California Towhee, Oak Titmouse, and White-breasted Nuthatch (Altman and Stephens 2012). These six species require different vegetation structures for breeding including tree canopy, shrubs, ground, cavities, and edges. Having all of these obligate or near-obligate species present on the preserve, as well as all 25 oak focal species for the Rogue Basin (Table 1), indicates that oak habitat is meeting a variety of structural needs for bird, and likely many other taxa (Altman and Stephens 2012). Oak habitat loss has been extensive throughout the Pacific Northwest with a wide variety of threats such as habitat conversion through land development, timber production, fire suppression, and invasive species. The Klamath Mountain region provides a unique and diverse oak

landscape because it is a convergence zone of multiple oak communities. Within the Klamath Mountain region the majority of oak habitats exist on privately owned land, approximately 65%, making the region's oak habitats and their diverse wildlife largely dependent on private landowner management (Altman and Stephens 2012).

Twenty-one species detected on the preserve are focal species for coniferous forests for Oregon and Washington (Altman and Alexander 2012). Four of those are Partners in Flight Watchlist species for the Pacific Birds Habitat Joint Venture, these species include Band-tailed Pigeon, Olive-sided Flycatcher, Rufous Hummingbird, and Sooty Grouse (Rosenberg et al. 2016). 98% of the Sooty Grouse population is found within this region. This species, heavily dependent on western coniferous forests, has seen a 55% regional population decline since 1944 (Rosenberg et al. 2016). The Olive-sided Flycatcher is another species found on the property whose population is in steep decline, it is estimated that in 34 years half of the regional population will be lost and in only 24 years half of its global population will be lost (Rosenberg et al. 2016). Though these species are both found in western coniferous forests their habitat requirements differ from a mosaic landscape for Sooty Grouse to residual canopy trees for Olive-sided Flycatcher. Other species found on the property such as Brown Creeper, Pileated Woodpecker, Pacific-sloped Flycatcher, and Varied Thrush require old-growth and mature coniferous forests (Altman and Alexander 2012). Having this variety of species with different habitat requirements suggests the preserve is able to fill a suite of niches for coniferous species.

## Conclusion

Completing a year-long citizen science monitoring project greatly added to the understanding of the species richness on the preserve throughout the year. To further explore these data, eBird Northwest can be used to query these checklists in many different formats to answer a multitude of questions. Overall, the Sampson Creek Preserve is providing habitat to a large suite of avian species including many species of concern as well as focal species for oak and conifer habitats. This preserve is filling an important niche for land conservation in this region, where oak and savanna habitats are underrepresented on protected lands (Alexander et al. 2017, Stephens et al. 2016). In combination with the breeding season baseline data, this robust citizen science dataset can inform management on the Sampson Creek Preserve, and future bird and vegetation monitoring can measure changes and evaluate success of those management actions.

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**Table 1.** Species detected during year round citizen science surveys from April 2017-April 2018 and from KBO baseline breeding season (May-June) monitoring in 2015. Species are listed in alphabetical order. Conservation information available in rightmost columns.

Species	Surveys		OR/WA PIF		Pacific NW Oak Land Manager's Guide <sup>3</sup>	ODFW Strategy Species <sup>4</sup>	Cont. PIF <sup>5</sup>
	Citizen Science	KBO Baseline Surveys	Valley and Lowlands <sup>1</sup>	Conifer <sup>2</sup>	Rogue Basin	Klamath Mountains	Pacific Birds
Acorn Woodpecker	X	X	X		X	X	
American Crow	X	X					
American Goldfinch	X						
American Kestrel	X		X				
American Robin	X	X					
Anna's Hummingbird	X						
Ash-throated Flycatcher	X	X	X		X		
Band-tailed Pigeon	X			X			W <sup>6</sup>
Bewick's Wren	X		X		X		
Black Phoebe	X						
Black-billed Magpie	X						
Black-capped Chickadee	X	X	X		X		
Black-headed Grosbeak	X	X			X		
Black-throated Gray Warbler	X	X		X	X		
Blue-gray Gnatcatcher	X	X	X		X		
Brewer's Blackbird	X	X					
Brown Creeper	X	X		X			
Brown-headed Cowbird	X						
Bullock's Oriole	X	X	X				
Bushtit	X	X	X		X		
California Quail	X	X					
California Scrub-Jay	X	X			X		
California Towhee	X		X		X		
Canada Goose	X						
Caspian Tern	X						
Cassin's Vireo	X	X			X		
Cedar Waxwing	X						
Chestnut-backed Chickadee	X						W
Chipping Sparrow	X	X	X		X		
Common Raven	X	X					
Cooper's Hawk	X						

Citizen Science Monitoring

Species	Surveys		OR/WA PIF		Pacific NW Oak Land Manager's Guide <sup>3</sup>	ODFW Strategy Species <sup>4</sup>	Cont. PIF <sup>5</sup>
	Citizen Science	KBO Baseline Surveys	Valley and Lowlands <sup>1</sup>	Conifer <sup>2</sup>	Rogue Basin	Klamath Mountains	Pacific Birds
Dark-eyed Junco	X	X					
Downy Woodpecker	X		X		X		
Dusky Flycatcher	X	X					
Eurasian Collared-Dove	X						
European Starling	X						
Evening Grosbeak	X						W
Fox Sparrow	X			X			
Golden Eagle	X						
Golden-crowned Kinglet	X						
Golden-crowned Sparrow	X						
Gray Jay	X						
Great Blue Heron	X						
Great Egret	X						
Great Horned Owl	X						
Hairy Woodpecker	X						
Hermit Thrush	X	X		X			
Hermit Warbler	X	X					
House Finch	X	X					
House Wren	X		X		X		
Hutton's Vireo	X				X		
Killdeer	X						
Lark Sparrow	X	X	X				
Lazuli Bunting	X	X		X	X		
Lesser Goldfinch	X	X	X		X		
Lewis's Woodpecker	X		X			X	W
Lincoln's Sparrow	X			X			
MacGillivray's Warbler	X	X					
Merlin	X						
Mountain Chickadee	X	X					
Mountain Quail	X	X					W
Mourning Dove	X	X					
Nashville Warbler	X	X	X	X	X		
Northern Flicker	X	X		X			
Northern Harrier	X		X				

Citizen Science Monitoring

Species	Surveys		OR/WA PIF		Pacific NW Oak Land Manager's Guide <sup>3</sup>	ODFW Strategy Species <sup>4</sup>	Cont. PIF <sup>5</sup>
	Citizen Science	KBO Baseline Surveys	Valley and Lowlands <sup>1</sup>	Conifer <sup>2</sup>	Rogue Basin	Klamath Mountains	Pacific Birds
Northern Pygmy-Owl	X						
Northern Rough-winged Swallow	X						
Oak Titmouse	X	X	X		X		
Olive-sided Flycatcher	X			X			W
Orange-crowned Warbler	X			X			
Osprey	X						
Pacific Wren	X			X			
Pacific-slope Flycatcher	X	X		X			
Peregrine Falcon	X						
Pileated Woodpecker	X	X		X			
Pine Siskin	X	X					D <sup>7</sup>
Prairie Falcon	X						
Purple Finch	X	X		X	X		
Red Crossbill	X						
Red-breasted Nuthatch	X	X					
Red-breasted Sapsucker	X	X					
Red-shouldered Hawk	X		X				
Red-tailed Hawk	X	X					
Red-winged Blackbird	X						
Rock Pigeon (Feral Pigeon)	X						
Rock Wren	X						
Rough-legged Hawk	X						
Ruby-crowned Kinglet	X						
Ruffed Grouse	X	X					
Rufous Hummingbird	X			X			W
Sandhill Crane	X						
Savannah Sparrow	X						
Say's Phoebe	X						
Sharp-shinned Hawk	X						
Song Sparrow	X						
Sooty Grouse	X			X			W
Spotted Towhee	X	X			X		
Steller's Jay	X	X					
Swainson's Thrush		X	X				

Citizen Science Monitoring

Species	Surveys		OR/WA PIF		Pacific NW Oak Land Manager's Guide <sup>3</sup>	ODFW Strategy Species <sup>4</sup>	Cont. PIF <sup>5</sup>
	Citizen Science	KBO Baseline Surveys	Valley and Lowlands <sup>1</sup>	Conifer <sup>2</sup>	Rogue Basin	Klamath Mountains	Pacific Birds
Townsend's Solitaire	X						
Townsend's Warbler	X	X					
Tree Swallow	X	X	X				
Turkey Vulture	X						
Varied Thrush	X			X			D
Vaux's Swift	X			X			
Violet-green Swallow	X						
Warbling Vireo	X	X					
Western Bluebird	X	X			X		
Western Kingbird	X						
Western Meadowlark	X	X	X				
Western Screech-Owl	X		X				
Western Tanager	X	X		X	X		
Western Wood-Pewee	X	X	X		X		
White-breasted Nuthatch	X	X			X		
White-crowned Sparrow	X						
Wild Turkey	X	X					
Willow Flycatcher	X		X				
Wilson's Warbler	X	X		X			D
Wrentit	X	X	X				D
Yellow Warbler	X		X				
Yellow-rumped Warbler	X						

<sup>1</sup> Altman 2000, <sup>2</sup> Altman and Alexander 2012, <sup>3</sup> Altman and Stephens 2012, <sup>4</sup> CDFW 2015, <sup>5</sup> Rosenberg et al. 2016 <sup>6</sup>W are 'Watch List Species' for Pacific Birds Joint Venture region in Rosenberg et al. 2016, <sup>7</sup>D are 'Common Birds in Decline' for the Pacific Birds Joint Venture region in Rosenberg et al. 2016

**Table 2.** Number of species detected per month and number of checklists per month submitted to eBird Northwest.

Month	Number of Species Detected	Number of Checklists
1	30	6
2	35	5
3	60	15
4	47	9
5	58	7
6	45	23
7	29	3
8	38	3
9	88	19
10	58	10
11	43	8
12	34	6

**Table 3.** Location where each species was detected on the Sampson Creek Preserve. Species listed in alphabetical order.

Species	Location					
	Sampson A	Sampson B	Sampson C	Hike	Mine	Pollinator
Acorn Woodpecker	x	x	x	x	x	x
American Crow	x	x	x			x
American Goldfinch		x	x	x		
American Kestrel	x	x	x	x	x	x
American Robin	x	x	x	x	x	x
Anna's Hummingbird	x	x	x	x		
Ash-throated Flycatcher	x	x				x
Band-tailed Pigeon			x	x		
Bewick's Wren	x	x	x	x		
Black Phoebe			x			
Black-billed Magpie	x	x		x	x	
Black-capped Chickadee	x	x	x	x		x
Black-headed Grosbeak	x	x	x	x		
Black-throated Gray Warbler		x	x	x	x	
Blue-gray Gnatcatcher	x	x	x	x		
Brewer's Blackbird		x				
Brown Creeper	x	x	x	x		
Brown-headed Cowbird		x				

Species	Location					
	Sampson A	Sampson B	Sampson C	Hike	Mine	Pollinator
Bullock's Oriole	x	x	x	x	x	x
Bushtit		x	x	x		
California Quail	x	x	x		x	
California Scrub-Jay	x	x	x	x	x	x
California Towhee	x	x	x		x	
Canada Goose	x	x	x		x	
Caspian Tern		x				
Cassin's Vireo		x	x	x		
Cedar Waxwing	x	x		x		
Chestnut-backed Chickadee		x		x		
Chipping Sparrow	x	x	x	x		
Common Raven	x	x	x	x		
Cooper's Hawk	x	x	x	x	x	x
Dark-eyed Junco	x	x	x	x	x	x
Downy Woodpecker	x	x	x	x		
Dusky Flycatcher		x	x			
Eurasian Collared-Dove		x	x			
European Starling	x	x	x	x		x
Evening Grosbeak				x		
Fox Sparrow	x	x	x	x		
Golden Eagle	x	x	x	x		
Golden-crowned Kinglet	x	x		x		
Golden-crowned Sparrow	x	x	x	x	x	
Gray Jay				x		
Great Blue Heron	x					
Great Egret	x					
Great Horned Owl		x				
Hairy Woodpecker		x	x	x		
Hermit Thrush	x	x	x	x	x	
Hermit Warbler				x		
House Finch		x		x		
House Wren		x	x	x		
Hutton's Vireo		x	x	x		
Killdeer	x	x				
Lark Sparrow	x	x	x	x	x	
Lazuli Bunting	x	x	x	x		
Lesser Goldfinch	x	x	x	x	x	x
Lewis's Woodpecker	x	x	x	x	x	x
Lincoln's Sparrow		x	x			

Species	Location					
	Sampson A	Sampson B	Sampson C	Hike	Mine	Pollinator
MacGillivray's Warbler		x		x		
Merlin			x			
Mountain Chickadee				x		
Mountain Quail		x		x		
Mourning Dove	x	x	x	x	x	x
Nashville Warbler		x		x		
Northern Flicker	x	x	x	x	x	x
Northern Harrier	x	x	x		x	
Northern Pygmy-Owl				x		
Northern Rough-winged Swallow		x				
Oak Titmouse	x	x	x	x	x	x
Olive-sided Flycatcher		x				
Orange-crowned Warbler		x	x			
Osprey	x	x				
Pacific Wren			x	x		
Pacific-slope Flycatcher		x				
Peregrine Falcon				x		
Pileated Woodpecker				x		
Pine Siskin	x			x		
Prairie Falcon	x					
Purple Finch		x	x	x		
Red Crossbill				x		
Red-breasted Nuthatch				x		
Red-breasted Sapsucker				x		x
Red-shouldered Hawk			x			
Red-tailed Hawk	x	x	x	x		x
Red-winged Blackbird		x	x			
Rock Pigeon (Feral Pigeon)	x	x	x			
Rock Wren		x				
Rough-legged Hawk			x			
Ruby-crowned Kinglet	x	x	x			
Ruffed Grouse		x				
Rufous Hummingbird		x				
Sandhill Crane	x			x		
Savannah Sparrow	x	x	x			
Say's Phoebe	x	x		x		
Sharp-shinned Hawk	x	x		x		
Song Sparrow	x	x	x			
Sooty Grouse	x			x	x	

Species	Location					
	Sampson A	Sampson B	Sampson C	Hike	Mine	Pollinator
Spotted Towhee	x	x	x	x	x	
Steller's Jay	x	x	x	x	x	
Townsend's Solitaire				x		
Townsend's Warbler			x			
Tree Swallow		x				
Turkey Vulture	x	x	x			x
Varied Thrush				x		
Vaux's Swift		x		x		
Violet-green Swallow	x	x	x	x		
Warbling Vireo		x	x	x		
Western Bluebird	x	x	x	x	x	x
Western Kingbird	x	x				x
Western Meadowlark	x	x	x	x	x	x
Western Screech-Owl	x		x	x		
Western Tanager	x	x	x	x		
Western Wood-Pewee	x	x	x	x	x	x
White-breasted Nuthatch	x	x	x	x	x	x
White-crowned Sparrow	x	x		x		x
Wild Turkey			x			
Willow Flycatcher		x	x			
Wilson's Warbler	x	x	x	x		
Wrentit		x				
Yellow Warbler	x	x	x		x	
Yellow-rumped Warbler	x	x	x	x		x



**Figure 1.** Sampson Creek Preserve citizen science survey locations. A, B, and C were regular survey locations, the “Hike” transect started at the Cove Creek access and ended at B. The pollinator restoration site and the mine (located close by) were surveyed twice during the breeding season and fall migration.

