

Klamath Bird Observatory's 2018 Long-term Constant Effort Monitoring Station and Bird Banding Efforts in the Klamath-Siskiyou Bioregion

Robert I. Frey, Lauren E. diBiccari, and Jaime L. Stephens
Klamath Bird Observatory
Rep. No. KBO-2018-0012
November 19, 2018

Background

Klamath Bird Observatory (KBO) continued its comprehensive, long-term bird monitoring program in the Klamath-Siskiyou Bioregion in 2018. The objectives of this program are to collect data that provide an index to Neotropical migratory and resident bird species diversity and abundance, to evaluate reproductive success, survivorship, and population health, and to track trends over time in abundance and demographics using a suite of avian monitoring methodologies (Alexander et al. 2004). KBO also continued its role as a support source for collaborative capture and banding-associated research and monitoring projects by providing technical assistance, community and professional training, and consultation to cooperating individuals, organizations, and agencies.

KBO works with the U.S. Forest Service Pacific Southwest Research Station Arcata and partners in the Klamath-Siskiyou Bioregion to fulfill monitoring goals defined by the National Partners in Flight (PIF) Inventory and Monitoring Working Group (Hussell and Ralph 1998, Rosenberg et al. 2016). The Klamath-Siskiyou Bioregion lies within the PIF Pacific and Intermountain West Avifaunal Biomes that include true fir, mixed conifer, mixed conifer hardwood, oak woodland, and riparian forest habitat types for which PIF conservation plans recommend monitoring efforts be targeted for habitat-associated focal bird species (Altman 2000, Altman and Alexander 2012, CalPIF 2002, RHJV 2004, Rosenberg et al. 2016). KBO has established a network of constant effort monitoring stations at which bird distribution, abundance, and demographic information are gathered for over 130 species annually, including 76 designated as PIF habitat focal species, Watch List species, and Common Species in Steep Decline (Altman 2000, Altman and Alexander 2012, CalPIF 2002, RHJV 2004, Rosenberg et al. 2016), California Department of Fish and Wildlife Species of Concern (Shuford and Gardali 2008), Oregon Department of Fish and Wildlife Sensitive Species (ODFW 2017), and/or U.S. Fish and Wildlife Service Species of Concern (USFWS 2008) (Table 1).

This report provides a summary of monitoring at constant effort mist netting stations (CES), public demonstration and target-species netting, sampling efforts completed, and associated professional training accomplished in 2018.

Monitoring at Constant Effort Stations

KBO's long-term constant effort monitoring station protocol is designed to provide bird distribution, abundance, and demographic information. Standardized methods are followed for mist netting and banding, area search survey, vegetation survey, plant phenological survey, and tissue sampling for DNA and stable isotope study (Ralph et al. 1993 and 2012, Stephens et al. 2010). In 2018, KBO conducted this integrated bird monitoring at seven CES—six operated 17-26 years and one established in 2017—during the period May-October (Table 2).

Monitoring began at the onset of the landbird breeding season in southern Oregon and northern California, varying by altitudinal location, and continued through the fall migration. CES efforts were scheduled for the five hours following sunrise except the Wildlife Images station scheduled for six. From May through August (breeding season), stations were scheduled once every 10-day period (period 1 beginning on 1 May). In September and October (fall migration season), CES station efforts were scheduled once per week, except the Rocky Point Cabin station scheduled thrice weekly.

Numerous wildfires in our region created widespread smoky air conditions, occasionally reaching hazardous health levels. These conditions caused some scheduled CES efforts to be shortened, postponed, or cancelled at each of the CES from mid-July through early-September.

Supplemental mist netting capture survey data, species checklist tallies were completed beginning May 2018. The species checklist tally documents all bird species encounters during a CES mist netting visit detected by sight or sound, including captured birds, and denoting presence, breeding status, and abundance. Species checklist tallies were completed for all CES visits except at Oregon Caves National Monument where KBO's pre-2017 area search surveys and species checklist (presence and breeding status only) continued. This programmatic transition provides similar information in a more practical procedure for field workers concurrently managing a mist netting operation. These data were contributed to Avian Knowledge Northwest. CES plant phenological surveys were continued at each CES. These data were contributed to National Phenology Network, the U.S.-wide monitoring network (<https://www.usanpn.org/>).

Combined CES mist netting capture totals from all stations include 5,122 birds of 78 species captured during 5,463 net hours (number of 12-meter mist nets operated multiplied by time operated in hours) during 108 efforts (Table 3). During CES efforts, 103 species were encountered (i.e., captured, observed during area search survey, or incidentally observed), including 25 detected and not captured.

Banding Demonstration, Target-Species Netting & Auxiliary Marking

In addition to constant effort monitoring station operations, mist netting and banding efforts were conducted for community education and public outreach demonstrations, and target-species netting and auxiliary marking for two species and pilot surveys related to planned Klamath River dam removal. Demonstrations were presented at the City of Ashland's Rogue Valley Bird Festival at North Mountain Park and at the Munson Valley CES and Sevenmile Guard

Station CES. Target-species mist netting and auxiliary-marking was completed for two partnership-driven projects. Genetics and stable isotope sampling continued for our altitudinal migration research and in collaboration with University of California Los Angeles' Center for Tropical Research and their migratory bird genetics studies. Genetic sampling of two target species was completed and contributed to the Bird Genoscape Project.

Banding Demonstrations

In partnership with the City of Ashland's North Mountain Park Nature Center and several other organizations, KBO presented a bird banding demonstration to several dozen visitors on May 12 as part of the Rogue Valley Bird Festival, a local celebration of World Migratory Bird Day (Table 4). In partnership with the Crater Lake National Park, Park Ranger-led groups visited the Munson Valley CES during operations regularly throughout the season totaling 126 visitors. Regional Audubon Society chapter groups and several local citizens totaling 34 individuals visited during operations at the Sevenmile Guard Station CES. During these visits, our banding team interpreted how results from banding help inform bird and habitat conservation efforts and provided close-up views of birds being banded (Frey and Stephens 2018).

Target-Species Auxiliary Marking

In tracking particular species populations, plastic color bands can be applied to birds in unique combinations to visually recognize individuals without needing to recapture them. A common practice to capture targeted-species is to broadcast a recording of the species—an audio lure—to draw them into a mist net. KBO used this technique in marking Yellow-breasted Chats and Oregon Vesper Sparrows in 2018.

In our continuing tri-national partnership with Environment and Climate Change Canada, University of Guadalajara, and San Pancho Bird Observatory, KBO Research Associate and University of British Columbia PhD Candidate Kristen Mancuso target-netted Yellow-breasted Chats using audio lure at numerous locations along the Trinity River. Chats were also color-banded during CES operations at our Wildlife Images station and during pilot target-species netting at several tributaries above and below the planned dam removal stretch of the Klamath River. A total of 45 chats were color-banded and a total of 21 birds of five species captured at the Klamath River sites.

In 2018 KBO built upon our earlier study of the Oregon Vesper Sparrow by contributing to a range-wide project to assess limiting factors for this declining species. This work included nest-searching and color-banding, as well as collection of morphological measurements and song recordings. Color bands were placed on 36 adults target-netted using an audio lure and 43 nestlings which were retrieved from, and immediately returned to, their nest. This study is a collaboration of KBO, American Bird Conservancy, Center for Natural Lands Management, and Southern Oregon University—collecting information to develop strategies for stabilizing and recovering populations in Oregon and Washington (Stephens 2018).

Genetic and Stable Isotope Sampling

Feather samples collected during CES operations were contributed to the University of California, Los Angeles (UCLA) Conservation Genetics Resource Center. UCLA's Center for Tropical Research (CTR) and Department of Ecology and Evolutionary Biology jointly manage the Conservation Genetics Resource Center to provide expertise, resources and sample repository facilities for the generation and analysis of molecular genetic data for wildlife conservation applications. CTR researchers have documented breeding and wintering population connections of several migrant songbird species (available at <http://www.ioe.ucla.edu/CTR/>). In 2018, KBO also collected blood samples from American Robins and Western Tanagers for CTR's Bird Genoscape Project. Genetic information derived from the samples is used to create genetic maps of migratory birds.

Training

KBO's long-term monitoring is integrated with our academic bird banding internship program, providing specialized training in the latest and most effective bird monitoring techniques for students and biologists. In addition to the intensive internship program, KBO provided bird banding techniques training with a 5-day workshop, and during CES operations for professionals with our partner federal land management agencies in 2018.

Seven student volunteer interns received experiential instruction in advanced bird banding and survey techniques. The instruction is supplemented with study materials, published by the North American Banding Council (NABC), pertinent scientific literature, and regular seminars presented by KBO staff. Continuing our commitment to international capacity building through technical training, two of these student volunteer interns were recruited from Mexico and Peru. These international internships were made possible through our partnerships with the U.S. Forest Service International Programs' Wings Across the Americas Program and Oregon State University's Division of International Studies. KBO hosted a NABC-sanctioned bander and bander trainer certification evaluation session in October where five KBO interns were certified at the Bander level and two at the Assistant Bander level.

In August, we hosted a fee-based *Fundamentals of Bird Banding Workshop* at our Upper Klamath Field Station. The 5-day workshop presented seminars and practical skills instruction to 12 participants—biologists from California, Idaho, Nevada, Oregon, the Marianas Islands, Nicaragua, and Spain.

Experiential training in banding techniques during CES operations was provided to partnering biologists from the Bureau of Land Management, National Park Service, and U.S. Forest Service. These professional-level training sessions totaled 34 person days.

Conclusion

Klamath Bird Observatory's long-term bird monitoring program utilizes multiple methods, at local and landscape scales, to monitor bird populations during the breeding and migration seasons. Integral components of this monitoring program are technical training and outreach efforts. Data resulting from these efforts are contributed to several databases including the U.S. Geological Survey North American Bird Banding Laboratory, Institute for Bird Populations' Monitoring Avian Productivity and Survivorship Program, eBird, National Phenology Network, University of California Los Angeles Center for Tropical Research's migratory bird genetics projects, and Avian Knowledge Northwest—regional node of the Avian Knowledge Network.

Acknowledgements

KBO research and long-term monitoring efforts are conducted in collaboration with the U.S. Forest Service Pacific Southwest Research Station Arcata. Cooperators who contribute to KBO's research, monitoring, and training efforts include: American Bird Conservancy, Bureau of Land Management Oregon State Office, Lakeview and Medford Districts; Center for Natural Lands Management, City of Ashland Parks & Recreation Department and North Mountain Park Nature Center; Costa Rica Bird Observatories; Environment and Climate Change Canada; Environment for the Americas; Gardens of Joy; Mantiqueira Bird Observatory; National Park Service Crater Lake National Park, Klamath Network, and Oregon Caves National Monument; Northwest Nature Shop; Oregon State University Division of International Programs; Rocky Point Fire and EMS; Rocky Point Resort; Rogue Valley Audubon Society; San Pancho Bird Observatory; Southern Oregon University, University of British Columbia, Universidad de Guadalajara, U.S. Forest Service Fremont-Winema, Klamath, and International Programs; U.S. Fish and Wildlife Service Region 1 Non-game Landbird Program, and Klamath Basin Refuge Complex; Wildlife Images Rehabilitation and Education Center; and KBO members and private sector contributors.

We especially thank Mike Johnson of the U.S. Fish and Wildlife Service; Alice Chung-MacCoubrey, Sean Mohren, Coby Bishop, and John Roth of the National Park Service; Heather Berg, Michael DeSmit, Debra Freeling, and Amy Markus of the U.S. Forest Service; and Steve Hayner and Marlin Pose of the Bureau of Land Management. Also, we thank Barb Bresson, the Regional Avian Coordinator for the U.S. Forest Service and Bureau of Land Management.

KBO accomplished the work described in this report with the considerable efforts made by our student volunteer interns and other cooperators. Many thanks to Jelicsa Peña Girón, Said Quintero Felix, Lorraine (Mamo) Waianuhe, Ricky Murphy, Tania Romero, Lauren Hill, and Edder Antunez. We appreciate the support of Kim Hollinger of Humboldt Bay Bird Observatory, Luiza Figueira Rodrigues and Pedro Martins of Mantiqueira Bird Observatory, and Pablo Elizondo of Costa Rica Bird Observatories. Target-netting efforts were led by KBO staff Jaime Stephens and Sarah Rockwell, working with KBO Research Associates Kristen Mancuso (University of British Columbia) and Emily Lind (Southern Oregon University). Our long-term constant effort monitoring would not be possible without the guidance and support of KBO Executive Director John Alexander and Research Advisor C. John Ralph of the Humboldt Bay Bird Observatory.

Literature Cited

- Alexander, J. D., C. J. Ralph, K. Hollinger, and B. Hogoboom. 2004. Using a wide-scale landbird monitoring network to determine landbird distribution and productivity in the Klamath Bioregion. Pp. 33-41 in K. L. Mergenthaler, J. E. Williams, and E. S. Jules (Eds.). Proceedings of the Second Conference on Klamath-Siskiyou Ecology. [Available online at https://www.klamathbird.org/images/stories/kbo/pdfs_peer_reviewed_publications/alexanderetal_2004_usingawidescale.pdf]
- Altman, B. 2000. Conservation strategy for landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Oregon-Washington Partners in Flight. [Available online at http://www.avianknowledge northwest.net/images/aknw/pdfs_cons_plans/OR%20WA%20PIF%20east_slope.pdf]
- Altman, B. and J. D. Alexander. 2012. Habitat conservation for landbirds in coniferous forests of western Oregon and Washington. Version 2.0. Oregon-Washington Partners in Flight (www.orwapif.org) and American Bird Conservancy and Klamath Bird Observatory. [Available online at http://www.avianknowledge northwest.net/images/aknw/pdfs_cons_plans/OR%20WA%20PIF%20Western_Conifer_Plan_new.pdf]
- CalPIF (California Partners in Flight). 2002. Version 1.1. The coniferous forest bird conservation plan: A strategy for protecting and managing coniferous forest habitats and associated birds in California (J. Robinson and J. Alexander, lead authors). PRBO Conservation Science, Petaluma, California. [Available online at <http://www.prbo.org/calpif/pdfs/conifer.v-1.pdf>]
- Frey, R. I. and J. L. Stephens. 2018. Engaging visitors in bird ecology at Crater Lake National Park: 2018 summary report. Report No. KBO-2018-0013. Klamath Bird Observatory. Ashland, Oregon.
- Hussell, D. J. T. and C. J. Ralph. 1998. Recommended methods for monitoring bird populations by counting and capture of migrants. Partners in Flight Inventory and Monitoring Working Group. [Available online at <http://treesearch.fs.fed.us/pubs/31585>]
- ODFW (Oregon Department of Fish and Wildlife). 2017. Sensitive species list. [Available online at https://www.dfw.state.or.us/wildlife/diversity/species/docs/2017_Sensitive_Species_List.pdf]

- Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of field methods for monitoring landbirds. USDA Forest Service. Pacific Southwest Research Station, General Technical Report PSW-GTR-144. [Available online at http://www.fs.fed.us/psw/publications/documents/psw_gtr144/psw_gtr144.pdf]
- Ralph, C. J., K. R. Hollinger, and R. I. Frey. 2012. Redwood Sciences Laboratory and the Klamath Demographic Monitoring Network mist-netting station management procedures. U.S. Department of Agriculture, Forest Service Pacific Southwest Research Station Redwood Sciences Laboratory, Arcata, California. [Available online at http://www.fs.fed.us/psw/publications/ralph/2012_ralph_redbook.pdf]
- RHJV (Riparian Habitat Joint Venture). 2004. Version 2.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. [Available online at http://www.prbo.org/calpif/pdfs/riparian_v-2.pdf]
- Rosenberg, K. V., J. A. Kennedy, R. Dettmers, R. P. Ford, D. Reynolds, J. D. Alexander, C. J. Beardmore, P. J. Blancher, R. E. Bogart, G. S. Butcher, A. F. Camfield, A. Couturier, D. W. Demarest, W. E. Easton, J. J. Giocomo, R. H. Keller, A. E. Mini, A. O. Panjabi, D. N. Pashley, T. D. Rich, J. M. Ruth, H. Stabins, J. Stanton, and T. Will. 2016. Partners in Flight Landbird Conservation Plan: 2016 Revision for Canada and Continental United States. Partners in Flight Science Committee. [Available online at <http://www.partnersinflight.org/wp-content/uploads/2016/08/pif-continental-plan-final-spread-single.pdf>]
- Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. [Available online at <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83841&inline>]
- Stephens, J. L., S. R. Mohren, J. D. Alexander, D. A. Sarr, and K. M. Irvine. 2010. Klamath Network landbird monitoring protocol. Natural Resource Report NPS/KLMN/NRR – 2010/187. National Park Service, Fort Collins, Colorado.
- Stephens, J. L. 2018. Limiting factors for the Oregon Vesper Sparrow population: An assessment of demographic parameters to direct conservation action in the Rogue Basin, Oregon. Report No. KBO-2018-0006. Klamath Bird Observatory. Ashland, Oregon.
- USFWS (U.S. Fish and Wildlife Service). 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Available online at <https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf>]

Table 1. Species of Concern (with elevated conservation status) and Habitat Focal Species for which Klamath Bird Observatory gathers distribution, abundance, and demographic information constant effort monitoring stations in southern Oregon and northern California by select Partners in Flight, and state and federal agency conservation plan (Altman 2000, Altman and Alexander 2012, CalPIF 2002, ODFW 2017, RHJV 2004, Rosenberg et al. 2016, Shuford and Gardali 2008, USFWS 2008).

Common Name	Species of Concern						Habitat Focal Species			
	California Department of Fish & Wildlife Species of Concern (Shuford and Gardali 2008)	Oregon Department of Fish & Wildlife Sensitive Species (ODFW 2016)	United States Fish & Wildlife Service Species of Concern (USFWS 2008)	Partners in Flight Continental Plan Prevent Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Reverse Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Common Species in Steep Decline (Rosenberg et al. 2016)	California Partners in Flight Coniferous Forests (CalPIF 2002)	California Partners in Flight Riparian Habitats (RHJV 2004)	Oregon-Washington Partners in Flight Coniferous Forests (Altman and Alexander 2012)	Oregon-Washington Partners in Flight East-slope Cascades Mtns (Altman 2000)
Mountain Quail		x			x		x			
Blue (Sooty) Grouse					x				x	
Pied-billed Grebe			x							
Western Grebe			x							
American White Pelican		x								
American Bittern			x							
Sandhill Crane										x
Bald Eagle			x							
American Kestrel			x							
Black Tern	x		x							
Band-tailed Pigeon					x				x	
Flammulated Owl		x	x	x			x			x
Common Nighthawk		x				x				
Vaux's Swift	x						x			x
Calliope Hummingbird			x							
Rufous Hummingbird			x		x				x	

Table 1 (continued). Species of Concern (with elevated conservation status) and Habitat Focal Species for which Klamath Bird Observatory gathers distribution, abundance, and demographic information constant effort monitoring stations in southern Oregon and northern California by select Partners in Flight, and state and federal agency conservation plan (Altman 2000, Altman and Alexander 2012, CalPIF 2002, ODFW 2017, RHJV 2004, Rosenberg et al. 2016, Shuford and Gardali 2008, USFWS 2008).

Common Name	Species of Concern						Habitat Focal Species			
	California Department of Fish & Wildlife Species of Concern (Shuford and Gardali 2008)	Oregon Department of Fish & Wildlife Sensitive Species (ODFW 2017)	United States Fish & Wildlife Service Species of Concern (USFWS 2008)	Partners in Flight Continental Plan Prevent Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Reverse Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Common Species in Steep Decline (Rosenberg et al. 2016)	California Partners in Flight Coniferous Forests (CalPIF 2002)	California Partners in Flight Riparian Habitats (RHJV 2004)	Oregon-Washington Partners in Flight Coniferous Forests (Altman and Alexander 2012)	Oregon-Washington Partners in Flight East-slope Cascades Mtns (Altman 2000)
Allen's Hummingbird			x		x					
Lewis's Woodpecker		x	x		x				x	x
Acorn Wookpecker		x								
Williamson's Sapsucker										x
White-headed Woodpecker		x	x							x
Northern Flicker			x						x	
Pileated Woodpecker		x					x		x	
Olive-sided Flycatcher	x	x	x		x		x		x	x
Willow Flycatcher		x	x					x		
Hammond's Flycatcher									x	
Pacific-slope Flycatcher									x	
Ash-throated Flycatcher										x
Warbling Vireo								x		
Gray (Canada) Jay							x			
Steller's Jay							x			
Clark's Nutcracker							x			x

Table 1 (continued). Species of Concern (with elevated conservation status) and Habitat Focal Species for which Klamath Bird Observatory gathers distribution, abundance, and demographic information constant effort monitoring stations in southern Oregon and northern California by select Partners in Flight, and state and federal agency conservation plan (Altman 2000, Altman and Alexander 2012, CalPIF 2002, ODFW 2017, RHJV 2004, Rosenberg et al. 2016, Shuford and Gardali 2008, USFWS 2008).

Common Name	Species of Concern						Habitat Focal Species			
	California Department of Fish & Wildlife Species of Concern (Shuford and Gardali 2008)	Oregon Department of Fish & Wildlife Sensitive Species (ODFW 2017)	United States Fish & Wildlife Service Species of Concern (USFWS 2008)	Partners in Flight Continental Plan Prevent Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Reverse Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Common Species in Steep Decline (Rosenberg et al. 2016)	California Partners in Flight Coniferous Forests (CalPIF 2002)	California Partners in Flight Riparian Habitats (RHJV 2004)	Oregon-Washington Partners in Flight Coniferous Forests (Altman and Alexander 2012)	Oregon-Washington Partners in Flight East-slope Cascades Mtns (Altman 2000)
Tree Swallow								x		
Bank Swallow						x		x		
Chestnut-backed Chickadee					x					
Black-capped Chickadee			x							
Oak Titmouse			x		x					
Red-breasted Nuthatch							x			
Pygmy Nuthatch										x
Brown Creeper							x		x	x
Bewick's Wren			x							
Winter (Pacific) Wren									x	
Marsh Wren			x							
Golden-crowned Kinglet							x			
Swainson's Thrush								x		
Hermit Thrush									x	x
Varied Thrush						x			x	
Wrentit					x					

Table 1 (continued). Species of Concern (with elevated conservation status) and Habitat Focal Species for which Klamath Bird Observatory gathers distribution, abundance, and demographic information constant effort monitoring stations in southern Oregon and northern California by select Partners in Flight, and state and federal agency conservation plan (Altman 2000, Altman and Alexander 2012, CalPIF 2002, ODFW 2017, RHJV 2004, Rosenberg et al. 2016, Shuford and Gardali 2008, USFWS 2008).

Common Name	Species of Concern						Habitat Focal Species			
	California Department of Fish & Wildlife Species of Concern (Shuford and Gardali 2008)	Oregon Department of Fish & Wildlife Sensitive Species (ODFW 2017)	United States Fish & Wildlife Service Species of Concern (USFWS 2008)	Partners in Flight Continental Plan Prevent Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Reverse Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Common Species in Steep Decline (Rosenberg et al. 2016)	California Partners in Flight Coniferous Forests (CalPIF 2002)	California Partners in Flight Riparian Habitats (RHJV 2004)	Oregon-Washington Partners in Flight Coniferous Forests (Altman and Alexander 2012)	Oregon-Washington Partners in Flight East-slope Cascades Mtns (Altman 2000)
Nashville Warbler									x	x
Orange-crowned Warbler									x	
Yellow Warbler	x		x					x		
Yellow-rumped Warbler							x			
Black-throated Gray Warbler			x				x		x	
Townsend's Warbler									x	
Hermit Warbler									x	
MacGillivray's Warbler							x			
Common Yellowthroat			x					x		
Wilson's Warbler						x		x	x	
Yellow-breasted Chat		x						x		
Western Tanager							x		x	
Green-tailed Towhee			x							
Spotted Towhee			x							
Chipping Sparrow		x					x			x
Brewer's Sparrow		x	x							

Table 1 (continued). Species of Concern (with elevated conservation status) and Habitat Focal Species for which Klamath Bird Observatory gathers distribution, abundance, and demographic information constant effort monitoring stations in southern Oregon and northern California by select Partners in Flight, and state and federal agency conservation plan (Altman 2000, Altman and Alexander 2012, CalPIF 2002, ODFW 2017, RHJV 2004, Rosenberg et al. 2016, Shuford and Gardali 2008, USFWS 2008).

Common Name	Species of Concern						Habitat Focal Species			
	California Department of Fish & Wildlife Species of Concern (Shuford and Gardali 2008)	Oregon Department of Fish & Wildlife Sensitive Species (ODFW 2017)	United States Fish & Wildlife Service Species of Concern (USFWS 2008)	Partners in Flight Continental Plan Prevent Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Reverse Decline Watch List - Western Forest (Rosenberg et al. 2016)	Partners in Flight Continental Plan Common Species in Steep Decline (Rosenberg et al. 2016)	California Partners in Flight Coniferous Forests (CalPIF 2002)	California Partners in Flight Riparian Habitats (RHJV 2004)	Oregon-Washington Partners in Flight Coniferous Forests (Altman and Alexander 2012)	Oregon-Washington Partners in Flight East-slope Cascades Mtns (Altman 2000)
Oregon Vesper Sparrow	x	x	x							
Fox Sparrow							x		x	
Song Sparrow			x				x			
Lincoln's Sparrow									x	
Dark-eyed Junco							x			
Black-headed Grosbeak								x		
Lazuli Bunting									x	
Brewer's Blackbird						x				
Purple Finch			x				x		x	
Cassin's Finch			x		x		x			
Red Crossbill			x							
Evening Grosbeak					x					
Pine Siskin						x				

Table 2. Location of Klamath Bird Observatory constant effort monitoring stations (CES), banding demonstration sites (DEMO), and targeted-species netting sites (TARG) operated in 2018 by station name, code, ownership, year CES established, and geospatial information. [USFS = U.S. Department of Agriculture U.S. Forest Service; BLM = U.S. Department of Interior Bureau of Land Management; USFWS = U.S. Department of Interior U.S. Fish and Wildlife Service; NPS = U.S. Department of Interior National Park Service.]

Station Name	Ownership	Year CES		Latitude	Longitude	Location
		Established				
Antelope Creek (CES)	USFS, Klamath NF	1993		41° 29' 32"	121° 56' 21"	Antelope Creek, 7 miles SSW of Tennant, Siskiyou Co., CA
Frain Ranch Campground (CES)	BLM, Lakeview District	1998		42° 01' 30"	122° 06' 05"	Frain Ranch Camp./Topsy Grade, 10 miles NW of Dorris, CA, Klamath Co., OR
Munson Valley (CES)	Crater Lake NP	2017		42° 53' 28"	122° 08' 17"	Crater Lake NP, Munson Valley, 14 miles NNW of Fort Klamath, Klamath Co., OR
Oregon Caves (CES)	NPS, Oregon Caves NM	2002		42° 05' 37"	123° 23' 47"	Oregon Caves NM, 14 miles SE of Cave Junction, Josephine Co., OR
Rocky Point Cabin (CES)	USFWS, Klamath Basin Refuge Network	1996		42° 29' 49"	122° 04' 47"	Rocky Point, 23 miles NW of Klamath Falls, Klamath Co., OR
Sevenmile Guard Station (CES)	USFS, Fremont-Winema NF	1996		42° 42' 18"	122° 04' 26"	Sevenmile Guard Station, 6 miles W of Ft. Klamath, Klamath Co., OR
Wildlife Images (CES)	BLM, Medford District	1994		42° 29' 25"	123° 28' 48"	Rogue River at Wildlife Images, 3.5 miles SW of Merlin, Josephine Co., OR
Lily Glen Park (TARG)	Jackson County Parks	N/A		42° 16' 15"	122° 25' 40"	Lily Glen Park, 15 miles ENE of Ashland, Jackson Co., OR
North Mountain Park (DEMO)	City of Ashland	N/A		42° 12' 08"	122° 41' 51"	North Mountain Park, City of Ashland, Jackson Co., OR
Trinity River (TARG)	USFS, Shasta-Trinity NF	N/A		40° 41' 00"	123° 01' 41"	TRRP Reference Plot 2, 10 miles SW of Weaverville, Trinity Co., CA
Trinity River (TARG)	BLM, Redding Field Office	N/A		40° 42' 54"	122° 50' 12"	TRRP Reference Plot 4, 5.5 miles E of Weaverville, Trinity Co., CA
Upper Klamath River (TARG)	multiple	N/A		N/A	N/A	Multiple sites 8-15 miles NE of Hornbrook, Siskiyou Co., CA
Mid Klamath River (TARG)	USFS, Klamath NF	N/A		N/A	N/A	Multiple sites 8-15 miles W of Hornbrook, Siskiyou Co., CA

Table 3. Summary of Klamath Bird Observatory's constant effort monitoring station (CES) efforts in 2018. [STATION (BLM = U.S. Department of Interior Bureau of Land Management, NPS = U.S. Department of Interior National Park Service, USFS = U.S. Department of Agriculture Forest Service, USFWS = U.S. Department of Interior Fish and Wildlife Service); EFFORTS = number of station visits; RECAP, NEW, UNBANDED and TOTAL = number of previously banded birds recaptured, newly banded birds, birds released without being banded, and total number of birds captured respectively; NET HOURS = number of 12-meter mist nets operated multiplied by the time operated in hours]

STATION CODE	STATION (Ownership)	EFFORTS	CAPTURES				NET HOURS
			RECAP	NEW	UNBANDED	TOTAL	
7MIL	Sevenmile Guard Station CES (USFS)	16	123	921	56	1,100	780
ANT1	Antelope Creek CES (USFS)	12	75	360	32	467	589
CABN	Rocky Point Field Station CES (USFWS)	25	160	1,230	34	1,424	1,326
MUVA	Munson Valley/Crater Lake National Park (NPS)	14	32	369	14	415	779
ORCA	Oregon Caves National Monument CES (NPS)	13	55	306	22	383	589
TOPS	Frain Ranch Campground/Topsy Grade CES (BLM)	12	54	455	24	533	571
WIIM	Wildlife Images CES (BLM)	16	155	618	27	800	829
CES Totals		108	654	4,259	209	5,122	5,463

Table 4. Summary of Klamath Bird Observatory's demonstration and target-species netting efforts in 2018, including Rogue Valley Bird Festival demonstration and Oregon Vesper Sparrow, Yellow-breasted Chat, and Klamath River Dam Removal studies targeted-species efforts. [RECAP, NEW, UNBANDED and TOTAL = number of previously banded birds recaptured, newly banded birds, birds released without being banded, and total number of birds captured respectively]

Project	STATION (Ownership)	CAPTURES			
		RECAP	NEW	UNBANDED	TOTAL
Rogue Valley Bird Festival	North Mountain Park (City of Ashland)	2	16	0	18
Vesper Sparrow Study	Lily Glen Park (Jackson County)	0	79	0	79
Yellow-breasted Chat Study	Multiple sites along Trinity and Klamath Rivers (multiple)	0	33	0	33
Klamath River Dams Study	Multiple sites along Klamath River tributaries (multiple)	0	15	6	21
Demonstration & Target-Species Netting Effort Totals		2	143	6	151