BIRDS OF CAVE BUTTES: A MARICOPA COUNTY FLOOD CONTROL SITE IN NORTHEASTERN PHOENIX, ARIZONA

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ABSTRACT: We report year-round avian diversity and abundance at Cave Buttes, a site in the Sonoran Desert on the northern edge of the Phoenix metropolitan area. We conducted surveys on foot and by slowly driving a vehicle along little-used roads; we detected 109 species and a total of 10,078 individuals. Mourning Dove (*Zenaida macroura*), Gambel's Quail (*Callipepla gambelli*), House Finch (*Haemorphous mexicana*), White- crowned Sparrow (*Zonotrichia leucophrys*), and White-winged Dove (*Zenaida asiatic*) accounted for 55% of all individuals observed, and 10 species accounted for 67% of all individuals observed. Gambel's Quail were significantly more abundant following 2 successive wet winters. Of Passerines, the Emberizidae (sparrows and towhees) showed the highest species richness and abundance. Nonnative synanthropic birds – House Sparrow (*Passer domesticus*), Eurasian Collared-Dove (*Streptopelia decaocto*), Rock Pigeon (*Columba livia*), and European Starling (*Sturnus vulgari*) – were rare relative to surrounding urbanized habitats. Our results add to the documentation of the flora and fauna of Cave Buttes by providing a long-term inventory of birds over multiple years and seasons.

Cave Buttes is a rough square of approximately 2,330 ha that contains the confluence of Cave and Apache creeks in Maricopa County (33.734 N, 112.040 W, WGS, 1984; Figure 1; Sullivan et al. 2014a; 2014b). Administered by the Flood Control District of Maricopa County, it is a parcel of undeveloped land that was set aside for flood control along the Cave Creek floodplain during the 1920s. Over the past 4 decades we have used it as a long-term study site for amphibians and reptiles, including Sonoran Desert tortoises (*Gopherus morafkai*) and regal horned lizards (*Phyrnosoma solare*; Sullivan et al. 2014a, 2014b, 2016, 2017). Our objective was to complement these herpetological studies with a baseline inventory of the avian fauna that utilize Cave Buttes. We began our study in 2018 and conducted annual, year-round foot and road transect surveys through 2023.

STUDY SITE

On its western margins, Cave Buttes comprises the relatively low-elevation flank of the Union Hills in a region of transition from creosote (*Larrea tridentata*)-triangle leaf bursage (*Ambrosia deltoidea*) flats to saguaro (*Carnegiea gigantea*)-palo verde (*Parkinsonia microphylla*) dominated uplands (Figure 1). Slopes and incised arroyos that drain the Union Hills are dominated by plants associated with the Arizona Upland Subdivision of the Sonoran Desert (Brown 1994). Geologically, Union Hills comprise metavolcanic rocks with basaltic protoliths and various granitic rocks in lesser quantity. The Union Hills rise to approximately 650 m elevation from a surrounding area of flats of about 350 m in elevation to the east associated with the Cave Creek floodplain.

Cave Creek Dam was completed in the 1920s, significantly altering the floodplain over the past 100 years (Figure 2). Upstream siltation has resulted in expansive basins dominated by mesquite (*Neltuma* spp.) and invasive grasses on the north side of the dam. Construction of Cave Buttes Dam—a downstream replacement for Cave Creek Dam—was completed in 1980 (Figure 2). This dam has created a second large basin area dominated by invasive grasses. The Cave Creek floodplain generally lacks floral elements typical of Sonoran Desert riparian communities, e.g., cottonwood (*Populus fremontii*), willow (*Salix gooddingii*), seep willow (*Baccharis salicifolia*), in part due to the absence of perennial surface water. To the west and east of the floodplain extensive creosote-bursage flats (Figure 3) are interspersed with small xeric washes (Figure 4) lined by palo verde, catclaw acacia (*Senegalia greggii*), and ironwood (*Olneya tesota*).

Figure. 1. Cave Buttes: this view is to the north from the eastern edge of the southeastern Union Hills, 2 km southwest of Cave Creek Dam (visible in upper right). The distant (~ 3 km) caliche banks of Cave Creek can be seen in upper left of the image immediately below the hills dominating the horizon. Note the large basins dominated by invasive grass and mesquite on either side of the dam, and the off-road vehicle scars from decades past, 19 December 2014. Photo by B. K. Sullivan

Figure 2. Basins: catchments behind dams and dikes are important sources of water following rain and dominated by invasive grasses and mesquite. This view is from the western end of Cave Creek Dam looking to the southeast over a new, rolled earth dam, Cave Buttes Dam (right) and Dike # 1 (center), 27 October 2023. Photo by R. W. Bowker

Figure. 3. Creosote flats to the west of Apache Wash: this view is to the southwest from Dike # 3, a Flood Control District berm. The Union Hills dominate the horizon, 28 May 2017. Photo by B. K. Sullivan

Figure 4. Xeric washes that only flow during rainfall events, are dominated by native vegetation. This is Apache Wash, looking south, downstream, from a point approximately 4 km northwest of Cave Buttes Dam, 27 October 2023. Photo by R. W. Bowker

Like much of the Sonoran Desert, Cave Buttes receives roughly half its annual rainfall total (~ 180 mm) each year during a summer monsoon (July–August) and the other half during winter rains from Pacific fronts crossing the state from west to east during November through March (Sullivan and Fernandez 1999, Sullivan et al. 2014a). Summer can be divided into hot-dry and hot-wet periods (van Devender 2002), a division that affects the activity of a number of organisms, including birds.

Cave Buttes has experienced a considerable amount of anthropogenic disturbance over the past century. Cattle grazing was practiced until 2010 (Sullivan pers. obs.). Mining operations were conducted along a number of slopes of the Union Hills, including a small number of residences and outbuildings built within the study area in the early

1900s. Off-road vehicle recreation was widespread throughout the study area from the 1970s through the early 2000s (Sullivan et al. 2017). Finally, 2 dams, 3 associated dikes (large berms), and associated bypass spillways that were constructed in the 1920s and 1970s, dramatically altered the Cave Creek floodplain. Two large basins behind the dams (40 ha and 140 ha, respectively) eventually partially filled with sediment and are now dominated by invasive grasses and mesquite.

METHODS

Our efforts were largely restricted to the Cave Buttes property as recognized by the Flood Control District of Maricopa County (see map, Figure 5), an area surrounded by State Trust and Phoenix Parks Department properties (i.e., the Phoenix Parks Sonoran Preserve on the west, State Trust lands to the north and south). For our purposes, the perimeter was roughly defined by Cave Creek Road on the east, East Sonoran Desert Drive on the north, the southeast Union Hills on the west, and by the east-west running Happy Valley Road powerline access road to the south. The western edge of Cave Buttes is bounded by the Sonoran Desert Preserve, administered by the Phoenix Parks Department, and the eastern portion of the site, closed to the public, is maintained by the Flood Control District of Maricopa County.

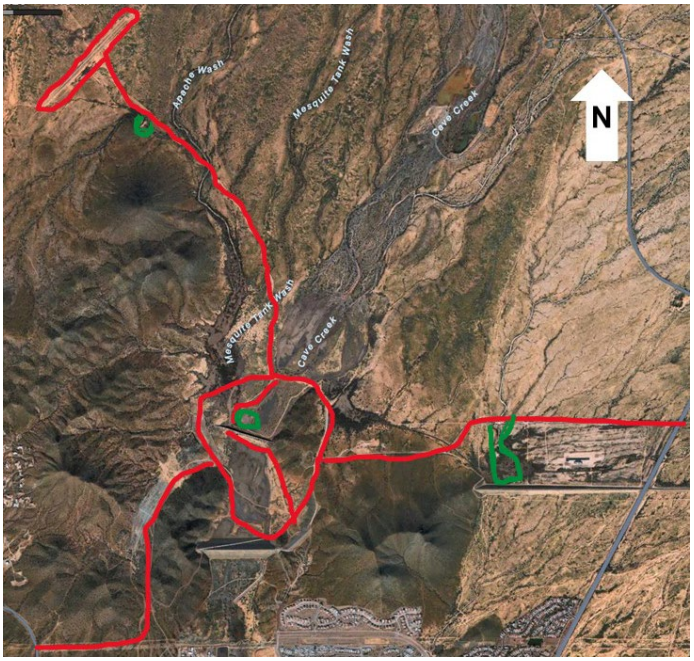

Figure. 5. Map showing the route while driving (red) and walking (green) at Cave Buttes.

To sample birds throughout the year across all seasons, we conducted one survey per month, staggering subsequent surveys from 2018 to 2023 until we had obtained a minimum of 4 surveys (one each week) for each month of the year. Scheduling of surveys each week was opportunistic, depending on availability of surveyors and access to the site, as it is otherwise closed to the public. We systematically added surveys over the 5-year period to ensure that each week of each month had been sampled at least once (i.e., 1 to 7 January was sampled once in the 5 years, as was 8 to 14 January, etc.). We undertook a total of 53 surveys over the 5-year period (1 in 2018, 11 in 2019, 13 in 2020, 13 in 2021, 12 in 2022, and 3 in 2023).

Bird species were censused by "road-riding" and walking transects in the morning between 0600 and 1100 hours. Road-riding (Sullivan 2012), in which a vehicle is driven at very low speeds (5-15 kmph) along little-used roads, has been used effectively to sample a variety of vertebrates in general (see review in Jones et al. 2022), and at Cave Buttes in particular (e.g., Sullivan et al. 2014b, 2017). There were always 2 (Robert Bowker and Brian Sullivan) and sometimes 3 (Elizabeth Sullivan) people counting, watching, and listening for birds as we drove. Images and audio recordings were made where possible to help confirm suspect species as well as document every species observed over the 5-year (8 March 2018 to 1 June 2023) census period. Photo records were obtained for 98 of the 109 species observed and recorded in eBird (eBird 2023). High density birds (e.g. Mourning and White-winged Doves) were estimated to the nearest 50 or 100 when we encountered very large flocks.

The main route through Cave Buttes is outlined in Figure 5. Surveys centered around Cave Buttes Dam and 3 roads (primarily dirt, one is partially paved but unmaintained) radiating outward: a) Jomax Road to the east; b) the Dike # 3 access road to the northwest adjacent to Apache Wash; and c) North Cave Creek Dam road that crosses between the 2 dams and continues southwestward, exiting the property at the Happy Valley Road and North 7th Street intersection. For each survey, we entered the site on East Jomax Road from North Cave Creek Road and exited on North 7th Street (Figure 5). During driving transects we incidentally stopped to pursue notable flocks of birds on foot to better estimate their numbers and species composition. We did not record the locations, times, or distances of these incidental foot surveys. Total distance covered was 10 – 13 miles (16 – 21 km) on each survey.

As we drove through the site from east to west, we stopped the vehicle at 3 sites for surveys on foot. The first and longest foot transect was along a wash that crossed Jomax Road 1.3 km east of North Cave Creek Road and just south of East Jomax Road. This 0.8 km loop followed the wash toward a basin just north of a flood control berm (Dike # 2), and then returned to East Jomax Road. The second foot transect was approximately 0.2 km and was located near Tin Can Tank at the northern end of the Dike # 3 access road. The third foot transect, also 0.2 km, was located on the northwest edge of Cave Creek Dam. We did not record the times and durations of these foot transects. These areas had many palo verde and mesquite trees used by birds.

Survey durations varied between 1.5 and 3.5 hours, but 65% were between 2.2 and 2.8 hours. We used a Kruskal-Wallis ANOVA to assess whether survey durations varied systematically on an annual basis: average survey duration varied from 2.37 to 2.69 hours per season (winter, spring, summer, fall), and did not vary significantly across seasons ($H = 2.90$, $P = 0.49$, $N = 53$).

RESULTS

We documented 10,078 individuals of 109 species during surveys at Cave Buttes. We averaged 48 species each month with a high of 64 species (September) and a low of 38 species (June). Passerines (49%) and nonpasserines (51%) were equally represented. Of those 109 species, 47 were observed on fewer than 10 occasions. Of those 47, 19 species were observed only once or twice. There were also 2 species, Rock Pigeon and American Pipit (*Anthus rubescens*), that were only observed once but, on each occasion, large numbers of individuals were observed, thus skewing their relative abundances. By contrast, the remaining 60 species were consistently observed. For the 4 years (2019-2022) surveyed on 11 occasions or more, an average of 69 species was recorded. The highest (77 species) year was 2022 and lowest (60 species) was 2019. Only 3 surveys were conducted in 2023, but 60 species were recorded.

Relative Abundance (RA) data are summarized in Table 1. Twenty-six species accounted for 90% of all observations. Mourning Dove (RA = 32.3) was the most abundant species at all times. Gambel's Quail (6.8%), House Finch (6.5%), White-crowned Sparrow (4.8%), White-winged Dove (3.95%), Western Meadowlark (*Sturnella neglecta*; 3.9%), Black-throated Sparrow (*Amphispiza bilineata*; 3.1%), Abert's Towhee (*Melozone aberti*; 2.9%), Cactus Wren (*Campylorhynchus brunneicapillus*; 2.9%), Northern Mockingbird (*Mimus polyglottus*; 2.8%), and Gila Woodpecker (*Melanerpes uropygialis*; 2.5%) were the next tier of common species. White-crowned Sparrow (October through April) and White-winged Dove (April through September) were not resident species. Red-tailed Hawk (*Buteo jamaicensis*; 1.7%), Curve-billed Thrasher (*Toxostoma curvirostris*; 1.61%), Verdin (*Auriparus flaviceps*; 1.6%), Vesper Sparrow (*Pooecetes gramineus*; 1.5%), Says Phoebe (*Sayornis saya*; 1.5%), Common Raven (*Corvus corax*; 1.4%), Lark Sparrow (*Chondestes grammacus*; 1.38%), and Horned Lark (*Eremophila alpestris*; 1.2%) composed the third tier of observed birds. The last tier was Ash-throated Flycatcher (*Myriarchus cinerascens*; 0.91%), Rock Wren (*Salpinctes obsoletus*; 0.83%), Phainopepla (*Phainopepla nitens*; 0.75%), Lesser Goldfinches (*Spinus psaltria*; 0.71%), Brewer's Sparrows (*Spizella breweri*; 0.67%), Barn Swallow (*Hirundo rustica*; 0.63%), and Green-winged Teal (*Anas crecca*; 0.63%). American Pipit was removed from the top 25 because 80 individuals were present on a single day. A complete listing of all 109 species is in the Appendix.

Table 1. Relative Abundance (RA) of the 25 most common species at Cave Buttes during 2018-2023 survey.

2018-2013 Totals	RA (%)
Mourning Dove (*Zenaida macroura*)	32.3
Gambel's Quail (*Callipepla gambelii*)	6.8
House Finch (*Haemorphous mexicana*)	6.5
White-crowned Sparrow (*Zonotrichia leucophrys*)	4.8
White-winged Dove (*Zenaida asiatica*)	3.95
Western Meadowlark (*Sturnella neglecta*)	3.9
Black-throated Sparrow (*Amphispiza bilineata*)	3.1
Abert's Towhee (*Melozone aberti*)	2.91
Cactus Wren (*Campylorhynchus brunneicapillus*)	2.9
Northern Mockingbird (*Mimus polyglottus*)	2.8
Gila Woodpecker (*Melanerpes uropygialis*)	2.5
Red-tailed Hawk (*Buteo jamaicensis*)	1.7
Curve-billed Thrasher (*Toxostoma curvirostris*)	1.61
Verdin (*Auriparus cinerascens*)	1.6
Vesper Sparrow (*Poocetes gramineus*)	1.5
Say's Phoebe (*Sayornis saya*)	1.5
Common Raven (*Corvus corax*)	1.4
Lark Sparrow (*Chondestes grammacus*)	1.38
Horned Lark (*Eremophila alpestris*)	1.2
Ash-throated Flycatcher (*Myiarchus cinerascens*)	0.91
Rock Wren (*Salpinctes obsoletus*)	0.83
American Pipit (*Anthus rubescens*)	0.79
Phainopepla (*Phainopepla nitens*)	0.75
Lesser Goldfinch (*Spinus psaltria*)	0.71
Brewer's Sparrow (*Spizella breweri*)	0.67
SUM of RA's	**89.01**

Nonpasserines were represented by 13 orders. Of those 13 orders, Galliformes (quail, 6.84%), Columbiformes (doves and pigeons, 36.4%), Falconiformes (hawks and falcons, 2.8%), and Piciformes (woodpeckers, 3.45%) accounted for most (97%) nonpasserines. Passerines, represented by 21 families, accounted for 49% of the avian fauna. Six families accounted for 79% of the passerines: Tyrannidae (flycatchers, 2.7%), Hirundinidae (swallows, 3.7%), Mimidae (thrashers and mockingbirds, 4.7%), Fringillidae (finches, 7.5%), Emberizidae (sparrows and towhees, 15%), and Icteridae (blackbirds and meadowlarks, 4.9%). Sparrows were the most diverse (8 species) and abundant despite most species

migrating. Towhees were diverse (4 species), but Abert's Towhee dominated numerically. The Parulidae were likely underrepresented as a result of survey methodology. While driving, one is much less likely to detect warblers than walking washes. Only one wash was walked extensively.

Four years (2019-2022) yielded adequate data for a year-to-year comparison (data from the FCD gauge at Cave Buttes Dam: https://alert.fcd.maricopa.gov/showrpts_mc.html). The first 2 of those years received considerable winter (October through March) rainfall: 203 mm in 2018-2019, and 213 mm in 2019-2020 whereas the subsequent years were drier (2020-2021 = 46 mm, 2021-2022 = 71 mm). For the 5 numerically dominant taxa during 2019-2022, Mourning Dove, Gambel's Quail, House Finch, Western Meadowlark, and White-crowned Sparrow, only Gambel's Quail was significantly more abundant (χ goodness of fit test = 22.24, $P < 0.001$, $N = 4$) in the 2 drier years following the 2 relatively wet years. Mourning Dove and House Finch did not exhibit significant variation in abundance across the 4 years, whereas variation in abundance of Western Meadowlark and White-crowned Sparrow was significantly different from year to year while not being consistently higher during wet or dry years. Some species, such as Mountain Bluebird (*Sialia currucoides*) in 2019 and Lawrence's Goldfinch (*Spinus lawrencei*) in 2022, were abundant only in those years.

DISCUSSION

Our observations reveal a species richness of 109 for Cave Buttes. Ten species accounted for the majority (67%) of individuals observed (Table 1). In general, nonnative taxa were rare, and some forms found widely in the Phoenix metropolitan region: Rock Pigeon, House Sparrow, Eurasian Collared-Dove, and European Starling were largely absent. Of those 4, only European Starling was found inside the preserve on a regular basis. A small number of species (10) generally associated with aquatic habitats (i.e., standing water) were noted, following both winter and summer rains that filled flood control basins: Mallard (*Anas platyrhynchos*); Green-winged and Cinnamon Teals (*Spatula cyanoptera*); Northern Shoveler (*S. clypeata*); White-faced Ibis (*Plegadis chihi*); Least (*Calidris minutilla*), Solitary (*Tringa solitaria*), and Western (*C. mauri*) Sandpipers; Greater Yellowlegs (*T. melanoleuca*); and Killdeer (*Charadrius vociferus*). Bufflehead (*Bucephala albeola*) and American Coot (*Fulica americana*) were only observed in the canal that skirts the southwestern border of Cave Buttes.

Green and Baker (2003) argued that riparian corridors composed of native floral elements may be instrumental in the maintenance of native bird communities in central Arizona. It is unclear whether the modified riparian corridor of Cave Creek, with abundant mesquite historically absent from the site, serves in a similar capacity for Cave Buttes. We did not detect a high proportion of riparian guild species (ducks, shorebirds, ibises, coots, herons, and egrets). McCreedy (2011) documented a relationship between winter rainfall and abundance of birds in xeric washes of the Sonoran and Mohave deserts of North America. Our rainfall data suggest that Gambel's Quail may have exhibited a population response to wet winters 1 to 2 years subsequent to the events.

van Ommeron and Helmstetter (2004) surveyed the vertebrates of Papago Park in the south-central Phoenix metropolitan area and documented 80 species of birds on the 476-ha plot. In a much larger survey, Litteral and Wu (2012) analyzed 15 Phoenix-area preserves, including some to the immediate south of Cave Buttes, and even larger in area (e.g., South Mountain Park), and they documented that larger preserves, and those that had only been completely surrounded by urbanization more recently, had fewer synanthropic bird forms. Our findings for Cave Buttes are consistent with this view, at least with respect to nonnative synanthropic birds as relatively few individuals were detected of those forms (Rock Pigeon, Eurasian Collared-Dove, House Sparrow, and European Starling). Our Cave Buttes avian survey, while lacking the comparative and environmental components of the studies by Litteral and Wu (2012) and Green and Baker (2003), can serve as a baseline for future surveys of this area that will likely experience increasing levels of isolation as residential development encroaches on all sides.

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APPENDIX. SPECIES OBSERVED

List of all avian species observed at Cave Buttes for the 5-year (2018-2023) survey. Abbreviations are: #CB is number of individuals, Gu = Guild, S/NS = Synanthropy/Nonsynanthropy, NT = Nesting behavior, FD = Main feeding mode, M/R = Migratory/Resident, N = Neotropical, NB = Neotropical breeding, RN = Resident native, RI = Resident introduced, W = Winter/Short distant migrant, G = Feeding generalist, I = Insectivore, F = Frugivore, SE = Seeds, C = Carnivorous, N = Nectivore, R = Resident, M = Migratory, S = Synanthropy, NS = Nonsynanthropy, GR = Ground nesting, STC = Shrubs, Tree, Cactus, CAV = Cavity nesting, CC = Crevice and cliff nesting, and P = Nest parasite. Designations are derived from 2 previous studies that included Cave Buttes (Green and Baker 2003, Literal and Wu 2012). Only species observed in our study are listed.

	Common Name	Species	#CB	Gu	S/NS	NT	FD	M/R
1	Mallard	*Anas platyrhynchos*	19	RN	NS	GR	G	R
2	Gambel's Quail	*Callipepla gambelii*	689	RN	S	GR	SE	R
3	Mourning Dove	*Zenaida macroura*	3252	RN	S	STC	F	R
4	Greater Roadrunner	*Geococcyx californianus*	30	RN	NS	GR	C	R
5	American Coot	*Fulica americana*	2	RN	NS	GR	G	R
6	Killdeer	*Charadrius vociferus*	30	RN	S	GR	I	R
7	Anna's Hummingbird	*Calypte anna*	29	RN	S	STC	N	R
8	Costa's Hummingbird	*Calypte costae*	5	RN	NS	STC	N	R
9	Great Blue Heron	*Ardea herodias*	2	RN	NS	STC	C	R
10	White Faced Ibis	*Plegadis chihi*	1	RN	NS	GR/STC	C	R
11	Turkey Vulture	*Cathartes aura*	16	RN	NS	STC	C	R
12	Cooper's Hawk	*Accipiter cooperii*	9	RN*	S	STC	C	R
13	Red-tailed Hawk	*Buteo jamaicensis*	170	RN	NS	STC	C	R
14	Great Horned Owl	*Bubo virginianus*	11	RN	S	STC	C	R
15	Gila Woodpecker	*Melanerpes uropygialis*	256	RN	S	CAV	I	R
16	Ladder-backed Woodpecker	*Dryobates scalaris*	40	RN	NS	CAV	I	R
17	Gilded Flicker	*Colaptes chrysoides*	32	RN	NS	CAV	I	R
18	American Kestrel	*Falco sparverius*	37	RN	NS	CAV	C	R
19	Peregrine Falcon	*Falco peregrinus*	3	RN*	S	CC	C	R
20	Prairie Falcon	*Falco mexicanus*	6	RN	NS	CC	C	R
21	Say's Phoebe	*Sayornis saya*	148	RN	NS	CC	I	R
22	Black Phoebe	*Sayornis nigricans*	9	RN	NS	CC	I	R
23	Ash-throated Flycatcher	*Myiarchus cinerascens*	92	RN	NS	CAV	I	R
24	Loggerhead Shrike	*Lanius ludovicianus*	77	RN	NS	STC	C	R
25	Common Raven	*Corvus corax*	143	RN	S	STC	C	R

	Common Name	Species	#CB	Gu	S/NS	NT	FD	M/R
26	Verdin	*Auriparus flaviceps*	159	RN	S	STC	G	R
27	Horned Lark	*Eremophila alpestris*	118	RN	NS	GR	SE/I	R
28	Black-tailed Gnatcatcher	*Polioptila melanura*	49	RN	NS	STC	I	R
29	Rock Wren	*Salpinctes obsoletus*	94	RN	NS	CC	I	R
30	Cactus Wren	*Campylorhynchus brunneicapillus*	288	RN	S	STC	G	R
31	Bewick's Wren	*Thryomanes bewickii*	1	RN	NS	CAV	I	R
32	Curve-billed Thrasher	*Toxostoma curvirostre*	163	RN	S	STC	I	R
33	Bendire's Thrasher	*Toxostoma bendirei*	12	RN*	NS	STC	I	R
34	Crissal Thrasher	*Toxostoma crissale*	4	RN	NS	STC	I	R
35	Northern Mockingbird	*Mimus polyglottos*	281	RN	S	STC	G	R
36	House Finch	*Haemorhous mexicanus*	655	RN	S	STC	G	R
37	Lesser Goldfinch	*Spinus psaltria*	72	RN	S	STC	G	R
38	Black-throated Sparrow	*Amphispiza bilineata*	308	RN	NS	STC	G	R
39	Canyon Towhee	*Melozone fusca*	6	RN	NS	STC	G	R
40	Abert's Towhee	*Melozone aberti*	293	RN	S	STC	G	R
41	Western Meadowlark	*Sturnella neglecta*	393	RN	NS	GR	G	R
42	Red-winged Blackbird	*Agelaius phoeniceus*	49	RN	NS	GR	G	R
43	Brown-headed Cowbird	*Molothrus ater*	39	RN	S	P	S	R
44	Great-tailed Grackle	*Quiscalus mexicanus*	3	RN	S	STC	G	R
45	Nothern Cardinal	*Cardinalis cardinalis*	6	RN	NS	STC	G	R
46	European Starling	*Sturnus vulgaris*	65	RI	S	CC**	G	R
47	House Sparrow	*Passer domesticus*	9	RI	S	CAV	G	R
48	Eurasian Collared Dove	*Streptopelia decaocto*	1	RI	S	STC	F	R
49	Rock Pigeon	*Columba livia*	15	RI	S	CC	SE/F	R
50	Vermilion Flycatcher	*Pyrocephalus rubinus*	4	NB	NS	STC	I	M/R
51	Western Kingbird	*Tyrannus verticalis*	14	NB	NS	STC	I	M
52	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	19	NB	S	CC	I	M
53	Cliff Swallow	*Petrochelidon pyrrhonota*	32	NB	S	CC	I	M
54	Bronzed Cowbird	*Molothrus aeneus*	1	NB	NS	P	G	M
55	Bullock's Oriole	*Icterus bullockii*	5	NB	NS	STC	G	M
56	Yellow Warbler	*Setophaga petechia*	3	NB	NS	STC	I	M
57	Lucy's Warbler	*Oreothlypis luciae*	7	NB	NS	STC	I	M

	Common Name	Species	#CB	Gu	S/NS	NT	FD	M/R
58	Lesser Nighthawk	*Chordeiles acutipennis*	5	NB	NS	GR	I	M
59	White-winged Dove	*Zenaida asiatica*	399	NB	S	STC	F	M
60	Barn Swallow	*Hirundo rustica*	59	N	NS	CC	I	M
61	Violet-Green Swallow	*Tachycineta thalassina*	19	N	NS	CC	I	M
62	Tree Swallow	*Tachycineta bicolor*	5	N	NS	CAV	I	M
63	Black-chinned Hummingbird	*Archilochus alexandri*	2	N	S	STC	N	M
64	Western Tanager	*Piranga ludoviciana*	7	N	NS	STC	G	M
65	Cinnamon Teal	*Spatula cyanoptera*	8	W	NS	GR	G	M
66	Green-winged Teal	*Anas crecca*	63	W	NS	GR	G	M
67	Northern Shoveler	*Spatula clypeata*	2	W	NS	GR	G	M
68	Bufflehead	*Bucephala albeola*	2	W	NS	GR	G	M
69	Least Sandpiper	*Calidris minutilla*	13	W	NS	GR	I	M
70	Western Sandpiper	*Calidris mauri*	1	W	NS	GR	I	M
71	Solitary Sandpiper	*Tringa solitaria*	3	W	NS	GR	I	M
72	Greater Yellowlegs	*Tringa melanoleuca*	7	W	NS	GR	I	M
73	Vaux Swift	*Chaetura vauxi*	1	W	NS	CC	I	M
74	Merlin	*Falco columbarius*	1	W	NS	CC/CAV	C	M
75	Olive-Sided Flycatcher	*Contopus cooperi*	1	W	NS	STC	I	M
76	Western Wood-Pewee	*Contopus sordidulus*	3	W	NS	STC	I	M
77	Gray Flycatcher	*Empidonax wrightii*	2	W	NS	STC	I	M
78	Pacific Slope Flycatcher	*Empidonax dificilis*	1	W	NS	STC	I	M
79	Ruby-crowned Kinglet	*Regulus calendula*	17	W	NS	STC	I	M
80	Blue-gray Gnatcatcher	*Polioptila caerulea*	1	W	NS	STC	I	M
81	House Wren	*Troglodytes aedon*	1	W	NS	CAV	I	M
82	Warbling Vireo	*Vireo gilvus*	4	W*	NS	STC	I	M
83	Northern Harrier	*Circus hudsonius*	16	W	NS	GR	C	M
84	Sharp-shinned Hawk	*Accipiter striatus*	7	W	NS	STC	C	M
85	Northern Flicker	*Colaptes auratus*	20	W	NS	CAV	I	M
86	Sage Thrasher	*Oreoscoptes montanus*	12	W	NS	STC	I	M
87	Mountain Bluebird	*Sialia currucoides*	37	W	NS	STC	G	M
88	Western Bluebird	*Sialia mexicana*	28	W	NS	STC	G	M
89	American Robin	*Turdus migratorius*	17	W	NS	STC	G	M
90	Townsend's Solitaire	*Turdus migratorius*	2	W	NS	STC	G	M

	Common Name	Species	#CB	Gu	S/NS	NT	FD	M/R
91	Phainopepla	*Phainopepla nitens*	76	W	NS	STC	F	M
92	Pine Siskin	*Spinus pinus*	5	W	NS	STC	SE	M
93	Lawrence's Goldfinch	*Spinus lawrencei*	26	W	NS	STC	SE	M
94	Chipping Sparrow	*Spizella passerina*	11	W	NS	STC	G	M
95	Brewer's Sparrow	*Spizella breweri*	68	W	NS	STC	G	M
96	Lincoln's Sparrow	*Melospiza lincolnii*	17	W	NS	GR	G	M
97	Lark Sparrow	*Chondestes grammacus*	140	W*	NS	STC	G	M
98	White-crowned Sparrow	*Zonotrichia leucophrys*	483	W	NS	STC	G	M
99	Vesper Sparrow	*Pooecetes gramineus*	149	W	NS	STC	G	M
100	Savannah Sparrow	*Passerculus sandwichensis*	26	W*	NS	STC	G	M
101	Sagebrush Sparrow	*Artemisiospiza nevadensis*	5	W	NS	STC/GR	G	M
102	Green-tailed Towhee	*Pipilo chlorurus*	4	W	NS	STC	SE	M
103	Spotted Towhee	*Pipilo maculatus*	3	W	NS	GR	G	M
104	Yellow-rumped Warbler	*Setophaga coronata*	18	W	S	STC	I	M
105	Black-throated Gray Warbler	*Setophaga nigrescens*	1	W	NS	STC	I	M
106	Wilson's Warbler	*Cardellina pusilla*	6	W	NS	STC	I	M
107	Orange crowned Warbler	*Oreothlypis celata*	1	W	NS	STC	I	M
108	Black-headed Grossbeak	*Pheucticus melanocephalus*	6	W	NS	STC	G	M
109	American Pipit	*Anthus rubescens*	80	W	NS	GR	I	M