Sixth & Seventh Year Project Report: The Effects of Prescribed Fire and Shrub-layer Mastication on Bird Communities in Ponderosa Pine Forests of the San Juan Mountains, Colorado, USA

A Citizen Science Project conducted by members of the
Weminuche Audubon Society
and
Audubon Rockies

In cooperation with
The San Juan Headwaters Forest Health Partnership
and
Mountain Studies Institute

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Introduction:
Beginning in the late spring of 2019, and each year since, volunteers from the Weminuche Audubon Society in Pagosa Springs, CO, have conducted a bird monitoring project (BMP) in dry, mixed-conifer forests in southwestern Colorado, USA. A project report and accompanying video has been produced for years one through five describing in detail the findings of our study.

Copies of these reports can be downloaded from the Weminuche Audubon Society's website at http://www.weminucheaudubon.org/bird-community-monitoring/.

Each year's report has also been accompanied by a video summarizing the findings for that year. These videos may be viewed through the following links:

2019 bird monitoring project video (26 minutes) – https://youtu.be/mfBiFN0gR6A
2020 bird monitoring project video (32 minutes) – https://youtu.be/zI1QNo7qZBU
2021 bird monitoring project video (28 minutes) – https://youtu.be/7DZ8xIk-Xhk
2021 bird monitoring project video (10 minutes) - https://youtu.be/xEFBj8EjotM
2022 bird monitoring project video (33 minutes) - https://youtu.be/mwUGLwi9ah0
2023 bird monitoring project video (20 minutes) - https://youtu.be/v3APnV0IPnM?si=nKCGo99pkNHepvR6

We did not produce an annual project report in 2024, so this year's project report includes the findings of both the sixth and seventh years of the project. This year's report follows a more readable and reader-friendly FAQ format. For brevity, literature citations are not inserted in the text of this report. Note that standardized data tables for each year of the study; bird species categorized by feeding habit; and the literature-cited sections of earlier project reports, are provided as Appendices A, B, and C, respectively.

1. What is the Weminuche Audubon Society (WAS) Bird Monitoring Project (BMP) all about?

The threat of wildland fires to residential communities in Colorado and the American southwest is well documented. Federal and state agencies charged with managing public lands have enacted several programs to reduce wildland fuel loads, with the goal of moderating the severity of potential wildland fires, and to partially restore historic forest canopy structure and diversity. In our region, management options implemented by the United State Forest Service (USFS) and Colorado State Forest Service (CSFS) include prescribed fire, understory mastication, and forest thinning. These wildland fuel reduction treatments are strategically implemented most often in dry, mixed-conifer forests dominated by ponderosa pine, white fir, and Douglas fir in the vicinity of residential communities established in the Wildland Urban Interface (WUI).

Members of WAS posed the question – **"What impact might wildland fuel reduction treatments have on bird communities in the dry, mixed-conifer forests surrounding Pagosa Springs, CO?"**

In addition to addressing this scientific question, our objectives were to provide our volunteers an opportunity to:

- improve their birding skills;
- gain a better understanding of forest ecology and fire ecology;
- experience the personal benefits from contributing to a field science project; and
- build a stronger sense of commitment to conserving the environment, especially with regard to forest bird communities.

2. How were sites selected for the BMP?

WAS BMP Co-coordinators – Keith Bruno, Herb Grover, and Jean Zirnhelt – consulted with USFS and Mountain Studies Institute (MSI) personnel in selecting study sites for this project. Five different sites have been monitored by volunteers over the seven years of this study, with three sites surveyed in each year. All sites are dominated by ponderosa pine, with gamble oak the most common understory shrub species. The sites differ in management history (years since fire; prescribed fire; mastication; and/or logging/thinning); presence or absence of white fir, Douglas fir, and aspen as co-dominant tree species; age and density of canopy tree species; and density and maturation of the understory shrub layer (see Grover et al. 2023 for detailed descriptions).

The Fawn Gulch (FG) site, which has been monitored in all years of the BMP, was subject to mastication in 2017 and prescribed fire in 2024, and has a relatively open canopy structure compared to the other sites.

The Jackson Mountain (JM) site was selected for comparison purposes because it has not been burned or logged in many decades, resulting in a denser and more diverse canopy layer with more mature and denser shrub-layer of Gambel's oak as well. We have collected five years of data for the JM site, but because of heavy truck traffic on the access road to this site, we did not sample JM in 2024.

The Turkey Springs (TS) site was monitored the first three years of our study. TS was subject to prescribed fire in 2019 as we were setting up the project, and slash piles and some thinning took place at the site in 2024. The canopy at TS is relatively open, with shrub-layer growth reduced by prescribed fires and thinning activities.

In 2022, The TS site was dropped from the study so that we could add the Jackson Mountain North (JMN) site. The JMN site is NE facing with the greatest canopy tree diversity and tree density of the five sites used in the BMP. We shifted to this site to collect baseline information in support of the Adaptive Silviculture for Climate Change study (ASCC; https://www.adaptivesilviculture.org), which includes the JMN site as part of their treatment area. We now have three years of data for the JMN site, with thinning treatments scheduled to take place in 2025-2026.

Finally, in 2024 we added the Jackson Mountain Thinned (JMT) site that had been thinned by selective logging in the 2021-2022 timeframe. With a widely disbursed tree canopy of ponderosa pine; a shrub layer of Gambel's oak; and some areas with abundant aspen root sprouts; the JMT site is recovering from logging operations. This site provides a more open physical environment for bird species compared to the other sites in this study.

3. What methodology was followed to monitor bird community composition?

Established bird monitoring protocols reported in the scientific literature were adopted in modified form for this study. A total of fifteen monitoring points were established at each site. Monitoring points were located approximately 75m apart along loops that observers walk during their site visits. Teams of observers recorded all birds identifiable by sight or by song at each point over a six-minute sampling period. Starting in 2022, the Merlin bird identification smartphone App (https://merlin.allaboutbirds.org) has been used to assist in bird identification by song. Each point was visited a total of 10 times between the third week of May and second week of July (the primary nesting season in our area), in each year that a site was included in the BMP. Sample visits took place on clear-weather days between sunrise and 11:00 am. In addition to recording birds observed at monitoring points, observers recorded incidental birds encountered while hiking between points. The combined monitoring point data and incidental sightings reveal that our sampling methodology provides a reasonably complete and accurate survey of the species composition of bird communities at our study sites.

4. How were teams of volunteer observers assembled?

Over the course of the BMP, more that 70 volunteers have participated in the study, with more than 20 volunteers engaged in the study each year. Teams of two to four volunteers were assigned two loops at a particular site as their primary monitoring location, with visitations conducted under the supervision of assigned site coordinators.

Each team was composed of at least one volunteer with intermediate to advanced bird identification skills, who also served as the team leader. Volunteers were encouraged to join other groups and visit non-assigned sites as time slots were available. The end result was a very dynamic system in which volunteers were learning from one another while experiencing the full range of forest habitats encompassed in the BMP. Participants reported that, in addition to improving their birding skills, returning to the same monitoring points multiple times during the sample season, and spending quiet moments recording observations made at those sites, provided them the opportunity to experience nature in a much more meaningful way than afforded by casual hikes in the forest.

5. How were the data compiled and analyzed?

Standardized data sheets were provided to each team of observers on which they recorded birds identified at each corresponding monitoring point by date and time of day, noting also whether identification was by sight or song. Completed data sheets were passed to site coordinators, who passed the data on to Herb Grover for compilation and analysis. We took a very straight-forward approach in data analysis – summing bird abundance and frequency of observations by site; date; and monitoring point. Other than summation by abundance and frequency, very little formal statistical analysis has been applied to the data.

Bird species were categorized by migratory status (resident vs. non-resident); feeding behavior (e.g., ground-brush foraging; timber-foliage searching; timber drilling/gleaning; etc.); nesting behavior (e.g., ground; shrub; cavity; etc.); and population status (e.g., stable vs declining). In addition, a simple "commonness score" was calculated for each species reflecting their presence or absence at the sites monitored in each year of the study.

6. How many bird species have been identified in the study?

Table 1 and Figure 1 provide a summary of data provided in Appendix A regarding the number of bird species identified by site and by year.

A total of 98 different bird species have been identified across all sites, with over 16,000 birds counted over the course of the seven years of the BMP. The implementation of the Merlin smartphone App to assist in identifying birds by song beginning in 2021 is reflected by the increased number of birds species recorded in 2021 and subsequent years of the study. With incorporation of Merlin into the study, identification by song has increased from 40% to 50% in early years of the BMP, to about 75% in 2024 and 2025. Improved birding skills gained by

Table 1. Summary of total number of bird species and birds counted across years at all five sites. The heading "All Years" represents summations across individual years of the study. Unique bird species refers to species observed only at a respective site in a given year or across multiple years. (see also Grover et al. 2019; 2020; 2021; 2022; 2023)

Year	2019	2020	2021	2022	2023	2024	2025	All Years
Total # Different Species	54	58	60	56	64	71	76	98
Total # Birds Counted	949	2227	1855	2086	2903	2958	3465	16443
Species Common to All Sites	15	26	22	23	27	30	34	9
# Unique Bird Species by Site:								
Turkey Springs	4	4	6	NA	NA	NA	NA	2
Fawn Gulch	11	7	7	5	8	9	11	2
Jackson Mountain (JM)	8	11	11	6	5	NA	5	4
Jackson Mountain North (JMN)	NA	NA	NA	8	6	5	NA	1
Jackson Mountain Thinned (JMT)	NA	NA	NA	NA	NA	4	8	3

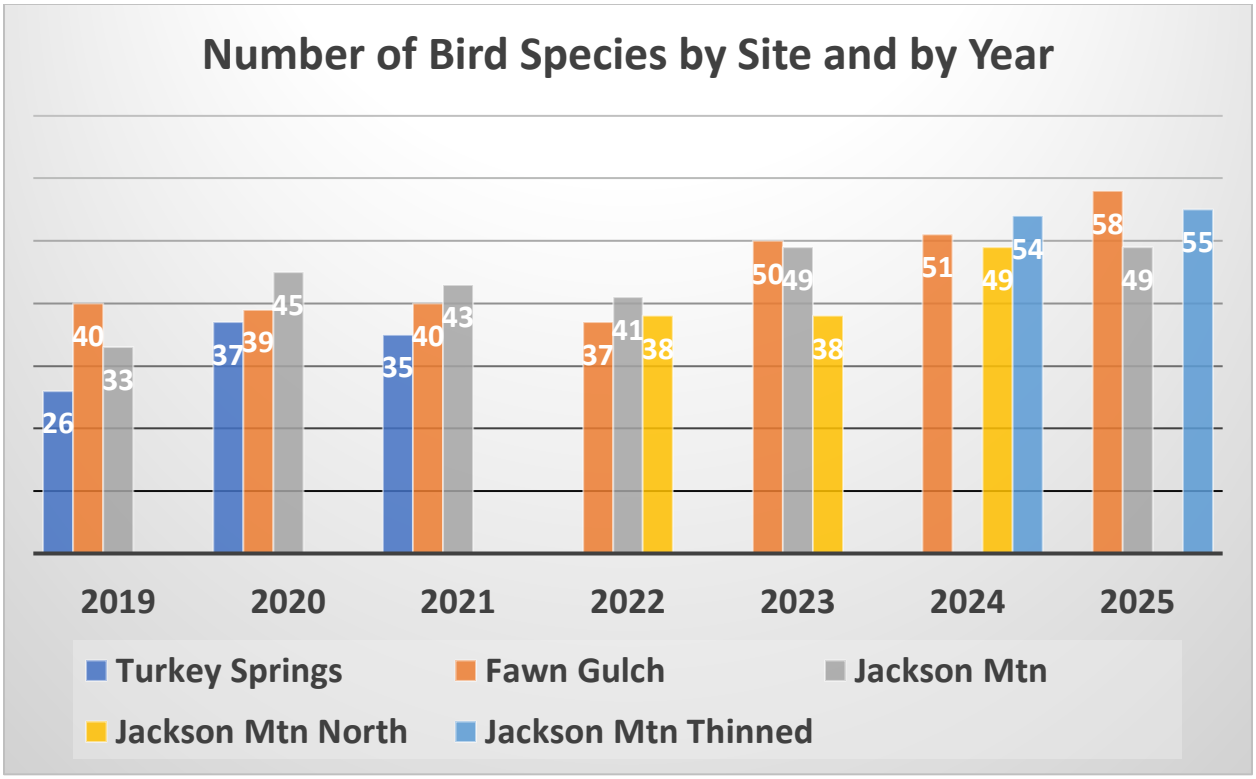


Figure 1. Summary of bird species recorded by site and by year.

volunteers participating over several years of the study may also account for increased numbers of bird species recorded in 2021 to 2025. The proportions of identifications by song vs. sight are consistent with similar studies reported in the literature.

7. Were there differences between sites in the number bird species observed?

In general, there were modest differences in number of bird species observed across sites within years (Table 1 and Fig. 1). However, the number of bird species at JMN tends to be fewer than for the other two sites studied in any given year. One obvious contributing factor to this pattern is the greater density and diversity of canopy tree species and understory shrubs at JMN, which, based on reports by volunteers in the field, seems to hinder the ability of observers to hear or see the birds that are present. With the increased use of the Merlin App, a greater number of birds were identified at this site in 2024 and 2025 than had been recorded in previous years.

8. What are the most common bird species observed in the study?

Tables 2A and 2B contain a summary of "Commonness Scores" (CS) for all bird species recorded in this study by site and by year. The CS equals "1" for a bird species observed at only one site in a given year. Birds present at all three sites sampled in a given year and across the seven years of the BMP would therefore be assigned a CS of 21. Nine bird species obtained the maximum CS of 21, meaning these species were encountered at least once at each site surveyed in each year of the study (see also Table 1). The most common bird species included the American Robin; Hairy Woodpecker; Northern Flicker; Pygmy Nuthatch; Steller's Jay; Violet-green Swallow; Western Tanager; White-breasted Nuthatch; and Yellow-rumped Warbler.

By comparison, there were 12 bird species encountered at only one site across all years of the study (Table 2B). Examples of these infrequent sightings include a few bird species that may have wandered out of their expected habitat, such as the European Starling; Gray Catbird; Lesser Goldfinch, and Western Meadowlark. Other infrequent sightings include bird species that are uncommon to rare in our area, such as the Black Swift; Northern Goshawk; Northern Pygmy Owl; Peregrine Falcon; and Western Screech Owl.

8. What bird species were most abundant in the study?

The CS discussed in the previous section does not tell the complete story. For that we have to take a closer look at the number of times a bird species was recorded (i.e., frequency), and the number of birds of each species counted (i.e., abundance), as shown in Table 3 below. Not all 98 bird species recorded in this study are included in this table. Follow the subheader groupings to view the list of bird species 1) recorded at all sites in all years (9); 2) those additional species recorded in at least 2 sites (but not all 3) in each year (10); 3) those recorded at one site in each year (15); and 4) those bird species recorded at only one site in any year (12).

Table 3 is jam-packed with information. First, the total number of bird species recorded in each year of the study is shown in the first row, followed by summed frequencies and abundances in the second row. In the sixth row in Table 3, totals for the groupings of birds shown in the table are shown, and to the far-right summations across all years of the study are calculated. As a quick summary, the number of points at which birds were counted (frequency), and number of birds counted (abundance) increases across years (see also Fig 1), likely reflecting improvement in the birding skills of observers, but also the use of the Merlin smartphone App to identify birds by song, which became a standard part of our sampling protocol beginning in 2023 and going forward.

The subset of bird species shown in Table 3 are grouped into the nine species observed at all study sites in each year of the study. The American Robin, Hairy Woodpecker and Northern Flicker are included in this group. The second group consists of 10 bird species observed at two or more sites (but not all three) in each year of the study, which includes the Chipping Sparrow, Common Raven, and Green-tailed Towhee. The third grouping includes 15 bird species, including the American Crow, Black-headed Grosbeak, and Broad-tailed Hummingbird, that were recorded in at least one site in each year of the study. The last group shown lists 12 bird species that were observed most infrequently - one-time at only one site in any year of the study. The Black Swift, Blue-throated Gray Warbler, and Blue-gray Gnatcatcher are included in this group.

Table 2A. Summary of "Commonness Scores" (CS) for bird species encountered in the BMP. The CS is a summation of the presence of respective bird species at the study sites included in each year of the project. Species recorded at each site in all years of the study yields a maximum CS of 21. Species coded in yellow are reportedly in population decline over the last 60 years or so, with conservation scores of 10 or greater (see Tables 5 and 6), as per Partners in Flight assessments reported by Cornell Lab of Ornithology (see www.allaboutbirds.org, and Grover et. al. 2023). Species in RED were first recorded in 2024 or 2025. TS = Turkey Springs site; FG = Fawn Gulch site; JM = Jackson Mountain site; JMN = Jackson Mountain North site; and JMT = Jackson Mountain Thinned site.

Commoness Score	2019			2020			2021			2022				2023				2024					2025				
# of Species	27	41	30	38	38	45	36	39	42		37	41	38		50	48	38		51		49	55		56	49		55	Commonness
Site	TS	FG	JM	TS	FG	JM	TS	FG	JM	TS	FG	JM	JMN	TS	FG	JM	JMN	TS	FG	JM	JMN	JMT	TS	FG	JM	JMN	JMT	SCORE
American Robin	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Hairy Woodpecker	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Northern Flicker	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Pygmy Nuthatch	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Steller's Jay	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Violet-green Swallow	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Western Tanager	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
White-breasted Nuthatch	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Yellow-rumped Warbler	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	21
Chipping Sparrow	x	x		x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	20
Mountain Chickadee		x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	20
Turkey Vulture	x	x	x	x	x	x	x	x	x		x	x			x	x	x		x		x	x		x	x		x	20
Warbling Vireo		x	x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	20
Broad-tailed Hummingbird	x	x	x	x	x	x	x				x	x	x		x	x	x		x		x	x		x	x		x	19
Common Raven		x	x	x		x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	19
Dark-eyed Junco		x		x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	19
Green-tailed Towhee		x	x	x	x	x	x	x	x		x	x	x		x	x			x		x	x		x	x		x	19
House Wren			x	x	x	x	x	x	x		x	x	x		x	x	x		x		x	x		x	x		x	19
Western Wood-Pewee	x	x	x	x	x	x	x	x	x		x	x			x	x			x		x	x		x	x		x	19
American Crow	x	x	x	x	x	x	x	x	x			x			x	x	x		x		x	x		x	x			18
Mourning Dove	x		x	x	x	x	x	x	x		x	x	x		x	x			x			x		x	x		x	18
Plumbeous Vireo	x	x		x	x	x	x	x	x		x	x	x		x	x			x			x		x	x		x	18
Orange-crowned Warbler			x		x	x		x	x		x	x	x		x	x	x		x		x	x		x	x		x	17
Red-tailed Hawk	x	x	x	x		x		x			x	x	x		x	x	x		x			x		x	x		x	17
Black-headed Grosbeak		x			x	x		x	x		x	x	x		x	x	x				x	x		x	x		x	16
Townsend's Solitaire			x	x	x	x	x	x	x				x			x	x		x			x		x	x		x	15
Western Bluebird	x	x		x	x	x	x	x			x	x			x	x			x			x		x			x	15
Cordilleran/Western Flycatcher		x		x	x	x		x	x		x	x	x		x	x			x					x			x	14
Spotted Towhee				x	x		x	x			x	x			x	x			x		x	x		x	x		x	14
Virginia's Warbler			x			x		x	x		x	x			x	x	x		x			x		x	x		x	14
Pine Siskin		x		x							x		x		x	x	x		x		x	x		x	x		x	13
Red Crossbill		x		x	x	x									x	x	x		x		x	x		x	x		x	13
Brown-headed Cowbird	x	x	x	x		x			x		x				x	x			x		x			x				12
Grace's Warbler					x	x	x		x		x		x		x	x			x			x		x	x			12
Hermit Thrush			x			x			x			x	x		x	x	x				x	x			x		x	12
Williamson's Sapsucker	x		x		x				x		x	x					x		x		x	x			x		x	12
Black-capped Chickadee			x	x	x	x	x		x			x	x				x							x	x			11
Cassin's Finch		x		x	x		x	x			x				x	x			x					x			x	11
Common Nighthawk	x		x	x		x	x	x			x				x				x					x			x	11
Hammond's Flycatcher												x	x		x	x	x		x		x	x		x	x		x	11
Red-breasted Nuthatch				x		x						x	x			x	x				x	x		x	x		x	11
Brown Creeper						x	x					x	x			x	x				x	x			x		x	10
Downy Woodpecker	x	x							x			x			x		x		x		x	x					x	10
Dusky Flycatcher						x					x	x			x	x	x		x					x	x		x	10

Table 2B. Continuation of Table 2 A.

Commoness Score (cont'd)	2019			2020			2021			2022				2023				2024					2025				
# of Species	5	12	2	4	6	7	6	8	10	2	4	7		11	8	5		12		17	17		16	11		15	Commonness
Site	TS	FG	JM	TS	FG	JM	TS	FG	JM	TS	FG	JM	JMN	TS	FG	JM	JMN	TS	FG	JM	JMN	JMT	TS	FG	JM	JMN	JMT	SCORE
Evening Grosbeak					x										x				x		x	x		x	x		x	8
Olive-sided Flycatcher								x				x				x					x	x			x		x	7
Wild Turkey								x	x				x			x			x			x					x	7
Dusky Grouse					x							x							x		x	x		x				6
House Finch													x		x	x			x		x						x	6
Lewis's Woodpecker	x								x										x		x	x					x	6
MacGillivray's Warbler	x												x				x				x	x					x	6
Osprey	x			x								x									x	x			x			6
Red-winged Blackbird								x							x	x			x					x	x			6
Ruby-crowned Kinglet													x				x				x	x		x			x	6
Canada Goose		x	x																			x		x			x	5
Cooper's Hawk						x							x								x				x		x	5
Great Blue Heron						x	x		x						x												x	5
Mountain Bluebird		x					x				x								x					x				5
Red-naped Sapsucker		x											x			x					x	x						5
White Throated Swift			x													x					x				x		x	5
Ash-throated Flycatcher								x							x		x		x									4
Band-tailed Pigeon					x				x															x	x			4
Bullock's Oriole	x	x							x																x			4
Eurasian Collared Dove				x		x			x													x						4
Say's Phoebe		x				x		x	x																			4
Song Sparrow					x										x				x					x				4
Tree Swallow	x	x				x		x																				4
White-crowned Sparrow				x			x														x			x				4
American Goldfinch		x																						x	x			3
American Kestrel		x										x							x									3
Bald Eagle		x							x		x																	3
Brewer's Blackbird																			x			x			x			3
Cassin's Vireo								x							x									x				3
Cedar Waxwing															x						x	x						3
Clark's Nutcracker																					x	x					x	3
Great-Horned Owl					x		x									x												3
Lesser Goldfinch																						x		x			x	3
Sharp-shinned Hawk							x						x		x													3
Yellow Warbler		x													x	x												3
Black-billed Magpie		x																							x			2
Black-chinned Hummingbird					x																			x				2
Mallard							x								x													2
Northern Pygmy Owl																x								x				2
Peregrine Falcon									x															x				2
Rose-breasted Grosbeak																					x	x						2
Three-toed Woodpecker								x													x							2
Black Swift																x												1
Black-throated Gray Warbler																								x				1
Blue-gray Gnatcatcher																											x	1
European Starling				x																								1
Golden-crowned Kinglet																					x							1
Gray Catbird						x																						1
Lark Sparrow																											x	1
Northern Goshawk						x																						1
Northern Rough Winged Swallow		x																										1
Vesper Sparrow																						x						1
Western Meadowlark									x																			1
Western Screech Owl																		x										1

Table 3. Summary of frequency and abundance of commonly observed bird species recorded by year.

TOTALS BY YEAR	2019				2020				2021				2022				2023				2024				2025				ALL YEARS			
NUMBER OF SPECIES			54				58				62				56				64				71				76				98		
BIRDS COUNTED (All Species)	557		1303		1578		2227		927		1855		1666		2086		2039		2397		2486		2903		2939		3465		12192		16236	
	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund	Freq	Rel Freq	Abund	Rel Abund
TOTALS ACROSS GROUPINGS	**532**		**770**		**1492**		**2071**		**1262**		**1778**		**1472**		**1867**		**2039**		**2397**		**2101**		**2422**		**2431**		**2826**		**11329**		**14131**	
Bird Species Recorded At All Sites In All Years = 9																																
American Robin	131	23.5	199	15.3	215	13.6	290	13.0	191	20.6	284	15.3	142	8.5	177	8.5	237	11.6	305	12.7	152	6.1	179	6.2	143	4.9	170	4.9	1211	9.9	1604	9.9
Hairy Woodpecker	3	0.5	4	0.3	20	1.3	22	1.0	23	2.5	28	1.5	9	0.5	9	0.4	12	0.6	14	0.6	21	0.8	21	0.7	46	1.6	50	1.4	134	1.1	148	0.9
Northern Flicker	57	10.2	80	6.1	64	4.1	76	3.4	79	8.5	95	5.1	95	5.7	113	5.4	100	4.9	115	4.8	128	5.1	135	4.7	165	5.6	193	5.6	688	5.6	807	5.0
Pygmy Nuthatch	22	3.9	33	2.5	114	7.2	193	8.7	117	12.6	209	11.3	110	6.6	199	9.5	64	3.1	94	3.9	55	2.2	73	2.5	155	5.3	228	6.6	637	5.2	1029	6.3
Steller's Jay	15	2.7	17	1.3	56	3.5	75	3.4	45	4.9	64	3.5	59	3.5	70	3.4	50	2.5	63	2.6	87	3.5	107	3.7	115	3.9	137	4.0	427	3.5	533	3.3
Violet-green Swallow	19	3.4	39	3.0	89	5.6	188	8.4	74	8.0	136	7.3	57	3.4	97	4.7	44	2.2	92	3.8	67	2.7	138	4.8	77	2.6	147	4.2	427	3.5	837	5.2
Western Tanager	32	5.7	44	3.4	71	4.5	95	4.3	72	7.8	101	5.4	156	9.4	194	9.3	251	12.3	286	11.9	223	9.0	258	8.9	194	6.6	223	6.4	999	8.2	1201	7.4
White-breasted Nuthatch	24	4.3	32	2.5	55	3.5	69	3.1	61	6.6	68	3.7	55	3.3	64	3.1	40	2.0	46	1.9	59	2.4	64	2.2	92	3.1	97	2.8	386	3.2	440	2.7
Yellow-rumped Warbler	18	3.2	24	1.8	78	4.9	105	4.7	67	7.2	82	4.4	55	3.3	63	3.0	169	8.3	180	7.5	161	6.5	170	5.9	145	4.9	150	4.3	693	5.7	774	4.8
SUB-TOTALS	**321**	**57.6**	**472**	**36.2**	**762**	**48.3**	**1113**	**50.0**	**729**	**78.6**	**1067**	**57.5**	**738**	**44.3**	**986**	**47.3**	**967**	**47.4**	**1195**	**49.9**	**953**	**38.3**	**1145**	**39.4**	**1132**	**38.5**	**1395**	**40.3**	**5602**	**45.9**	**7373**	**45.4**
Bird Species Recorded In At Least Two Sites In Each Year = 10																																
Chipping Sparrow	8	1.4	14	1.1	56	3.5	72	3.2	42	4.5	56	3.0	69	4.1	77	3.7	85	4.2	95	4.0	106	4.3	112	3.9	69	2.3	74	2.1	435	3.6	500	3.1
Common Raven	10	1.8	12	0.9	14	0.9	26	1.2	12	1.3	13	0.7	15	0.9	16	0.8	13	0.6	17	0.7	14	0.6	17	0.6	29	1.0	32	0.9	107	0.9	133	0.8
Green-tailed Towhee	8	1.4	23	1.8	56	3.5	69	3.1	56	6.0	68	3.7	79	4.7	85	4.1	51	2.5	56	2.3	96	3.9	106	3.7	131	4.5	139	4.0	477	3.9	546	3.4
Mountain Chickadee	2	0.4	4	0.3	12	0.8	18	0.8	4	0.4	6	0.3	34	2.0	39	1.9	55	2.7	62	2.6	91	3.7	104	3.6	68	2.3	78	2.3	266	2.2	311	1.9
Mourning Dove	2	0.4	2	0.2	69	4.4	108	4.8	40	4.3	53	2.9	12	0.7	14	0.7	19	0.9	23	1.0	8	0.3	10	0.3	73	2.5	93	2.7	223	1.8	303	1.9
Plumbeous Vireo	11	2.0	14	1.1	42	2.7	46	2.1	27	2.9	30	1.6	40	2.4	48	2.3	53	2.6	57	2.4	17	0.7	19	0.7	89	3.0	100	2.9	279	2.3	314	1.9
Turkey Vulture	9	1.6	12	0.9	13	0.8	14	0.6	8	0.9	9	0.5	8	0.5	10	0.5	6	0.3	6	0.3	16	0.6	29	1.0	14	0.5	17	0.5	74	0.6	97	0.6
Warbling Vireo	7	1.3	7	0.5	39	2.5	48	2.2	29	3.1	49	2.6	80	4.8	93	4.5	200	9.8	227	9.5	170	6.8	188	6.5	151	5.1	167	4.8	676	5.5	779	4.8
Western Bluebird	8	1.4	9	0.7	34	2.2	47	2.1	40	4.3	61	3.3	14	0.8	31	1.5	13	0.6	17	0.7	33	1.3	41	1.4	9	0.3	14	0.4	151	1.2	220	1.4
Western Wood-Pewee	71	12.7	98	7.5	171	10.8	245	11.0	154	16.6	208	11.2	154	9.2	210	10.1	141	6.9	162	6.8	128	5.1	139	4.8	237	8.1	259	7.5	1056	8.7	1321	8.1
SUB-TOTALS	**136**	**24**	**195**	**15.0**	**506**	**32**	**693**	**31.1**	**412**	**44**	**553**	**29.8**	**505**	**30**	**623**	**29.9**	**636**	**31**	**722**	**30.1**	**679**	**27**	**765**	**26**	**870**	**30**	**973**	**28**	**3744**	**31**	**4524**	**28**
Bird Species Recorded In At Least One Site In Each Year = 15																																
American Crow	13	2.3	16	1.2	15	1.0	16	0.7	10	1.1	11	0.6	7	0.4	7	0.3	7	0.3	7	0.3	5	0.2	6	0.2	8	0.3	9	0.3	65	0.5	72	0.4
Black-headed Grosbeak	10	1.8	10	0.8	15	1.0	16	0.7	14	1.5	17	0.9	23	1.4	24	1.2	58	2.8	61	2.5	42	1.7	46	1.6	83	2.8	88	2.5	245	2.0	262	1.6
Broad-tailed Hummingbird	5	0.9	5	0.4	19	1.2	20	0.9	5	0.5	5	0.3	14	0.8	14	0.7	22	1.1	22	0.9	14	0.6	14	0.5	19	0.6	19	0.5	98	0.8	99	0.6
Brown-headed Cowbird	5	0.9	6	0.5	3	0.2	3	0.1	2	0.2	4	0.2	1	0.1	1	0.0	2	0.1	3	0.1	3	0.1	5	0.2	1	0.0	1	0.0	17	0.1	23	0.1
Cassin's Finch	1	0.2	1	0.1	5	0.3	8	0.4	4	0.4	5	0.3	4	0.2	5	0.2	17	0.8	19	0.8	2	0.1	3	0.1	8	0.3	8	0.2	41	0.3	49	0.3
Common Nighthawk	8	1.4	8	0.6	4	0.3	4	0.2	13	1.4	23	1.2	12	0.7	12	0.6	19	0.9	20	0.8	17	0.7	17	0.6	10	0.3	12	0.3	83	0.7	96	0.6
Cordilleran/Western Flycatcher	2	0.4	3	0.2	23	1.5	28	1.3	14	1.5	20	1.1	7	0.4	8	0.4	3	0.1	3	0.1	1	0.0	1	0.0	3	0.1	3	0.1	53	0.4	66	0.4
Dark-eyed Junco	0	0.0	0	0.0	46	2.9	62	2.8	17	1.8	25	1.3	29	1.7	33	1.6	53	2.6	54	2.3	92	3.7	99	3.4	95	3.2	96	2.8	332	2.7	369	2.3
Hermit Thrush	1	0.2	1	0.1	2	0.1	3	0.1	1	0.1	1	0.1	30	1.8	39	1.9	54	2.6	62	2.6	70	2.8	79	2.7	7	0.2	7	0.2	165	1.4	192	1.2
House Wren	2	0.4	4	0.3	45	2.9	55	2.5	13	1.4	16	0.9	59	3.5	69	3.3	91	4.5	107	4.5	102	4.1	110	3.8	94	3.2	109	3.1	406	3.3	470	2.9
Orange-crowned Warbler	1	0.2	2	0.2	7	0.4	9	0.4	10	1.1	11	0.6	15	0.9	15	0.7	39	1.9	43	1.8	59	2.4	63	2.2	46	1.6	48	1.4	177	1.5	191	1.2
Red-tailed Hawk	7	1.3	8	0.6	8	0.5	8	0.4	1	0.1	1	0.1	8	0.5	9	0.4	10	0.5	10	0.4	3	0.1	3	0.1	12	0.4	13	0.4	49	0.4	52	0.3
Townsend's Solitaire	3	0.5	3	0.2	7	0.4	8	0.4	10	1.1	11	0.6	2	0.1	3	0.1	3	0.1	3	0.1	3	0.1	3	0.1	4	0.1	4	0.1	32	0.3	35	0.2
Virginia's Warbler	2	0.4	3	0.2	21	1.3	21	0.9	5	0.5	6	0.3	16	1.0	17	0.8	49	2.4	52	2.2	34	1.4	36	1.2	30	1.0	30	0.9	157	1.3	165	1.0
Williamson's Sapsucker	5	0.9	8	0.6	1	0.1	1	0.0	1	0.1	1	0.1	2	0.1	2	0.1	7	0.3	9	0.4	17	0.7	22	0.8	6	0.2	8	0.2	39	0.3	51	0.3
SUB-TOTALS	**65**	**11.7**	**78**	**6.0**	**221**	**14.0**	**262**	**11.8**	**120**	**12.9**	**157**	**8.5**	**229**	**13.7**	**258**	**12.4**	**434**	**21.3**	**475**	**19.8**	**464**	**18.7**	**507**	**17.5**	**426**	**14.5**	**455**	**13.1**	**1959**	**16.1**	**2192**	**13.5**
Bird Species Recorded At Only One Site In Any Year = 12																																
Black Swift																	2	0.1	5	0.2									2	0.1	5	0.2
Black-throated Gray Warbler																									1	0.1	1	0.1	1	0.1	1	0.1
Blue-gray Gnatcatcher																									1	0.1	1	0.1	1	0.1	1	0.1
European Starling					1	0.1	1	0.0																					1	0.1	1	0.0
Golden-crowned Kinglet																					3	0.1	3	0.1					3	0.1	3	0.1
Gray Catbird					1	0.1	1	0.0																					1	0.1	1	0.0
Lark Sparrow																									1	0.1	1	0.1	1	0.1	1	0.1
Northern Goshawk					1	0.1	1	0.0																					1	0.1	1	0.0
Northern Rough-winged Swallow	10	1.8	25	3.1																									10	1.8	25	3.1
Vsper Sparrow																					1	0.1	1	0.1					1	0.1	1	0.1
Western Meadowlark									1	0.1	1	0.1																	1	0.1	1	0.1
Western Screech Owl																					1	0.0	1	0.0					1	0.0	1	0.0
SUB-TOTALS	**10**	**1.8**	**25**	**3.1**	**3**	**0.2**	**3**	**0.1**	**1**	**0.1**	**1**	**0.1**	**0**	**0.0**	**0**	**0.0**	**2**	**0.1**	**5**	**0.2**	**5**	**0.3**	**5**	**0.2**	**3**	**0.3**	**3**	**0.3**	**24**	**2.7**	**42**	**3.9**

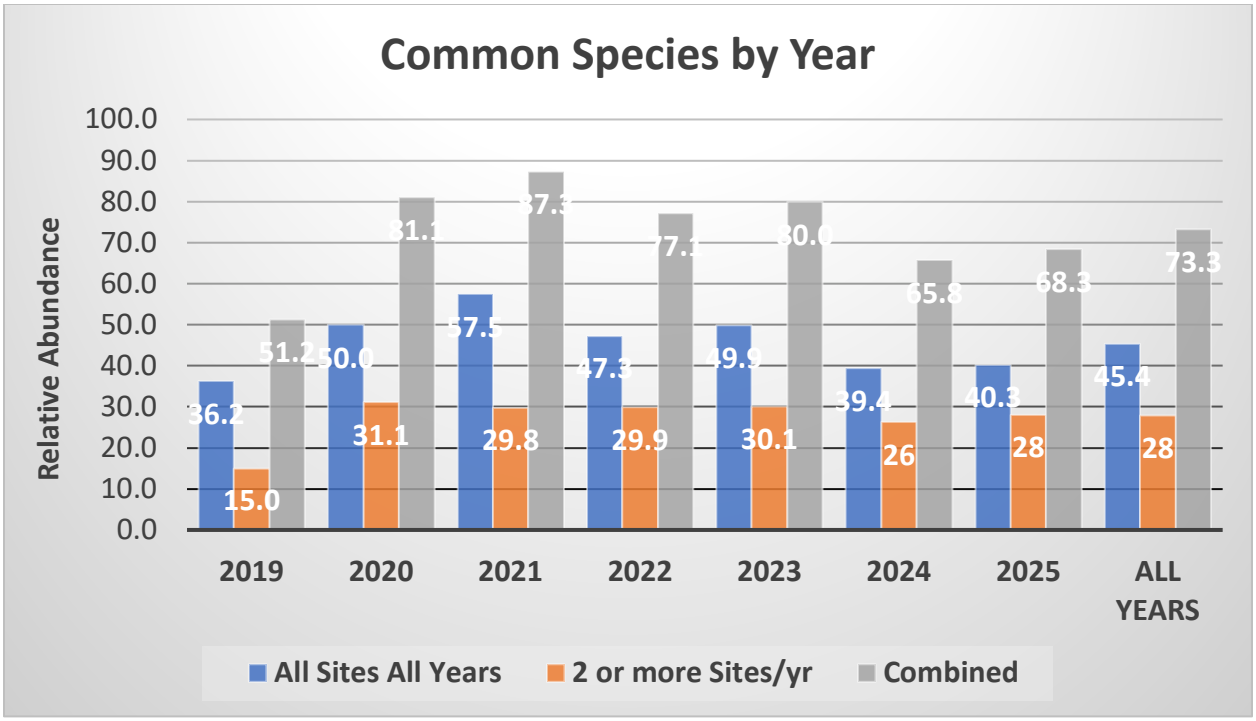


Figure 2. Summary of cumulative relative abundance of common bird species grouped as shown in Table 3.

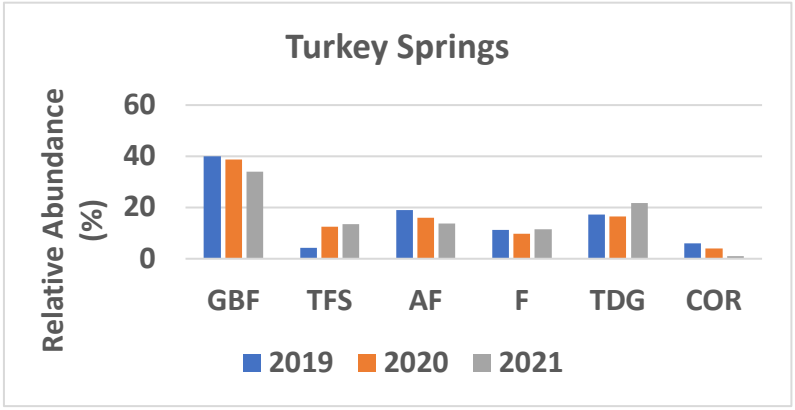
Figure 2 illustrates the subtotals in cumulative relative abundance for each bird species grouping shown in Table 3, including the summation across all years (columns to the far right in Table 3). Note that relative abundance indicates how abundant a species is within the context of all birds counted in a given year. For example, in 2020 the cumulative relative abundance of the nine bird species observed at all three sites (blue bar) constituted about 50% of all birds counted that year. The summed cumulative abundance for species observed at all three sites plus those observed at two or more sites in 2020 was about 81% of all birds counted in 2020 (gray bar).

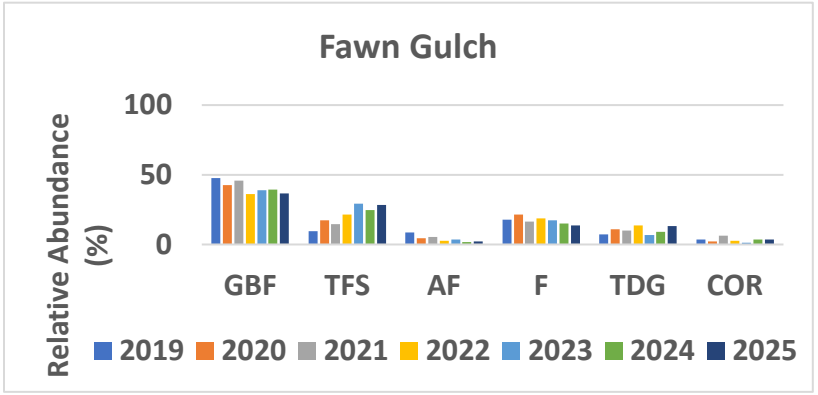
In the data shown on the far right of Fig 2, labeled "All Years," we see that the nine most common bird species fluctuate in the proportion of all birds counted across years, accounting for 45.4% all birds counted (blue bar) over the course of the study. If we add to that the cumulative relative abundances for the 10 bird species observed at any two sites in each year, the cumulative relative abundance across all years exceeds 70% (Fig 3). This means that, looking across all years of the BMP, 19 of the 98 bird species observed account for about 70% of the birds counted. Conversely, about 30% of the 16236 birds counted, or about 4870 birds, are spread across the remaining 79 bird species observed in the study. This pattern in commonness vs. rarity holds within each year of the study as well, and findings like these are commonly reported in ecological studies reported in the literature.

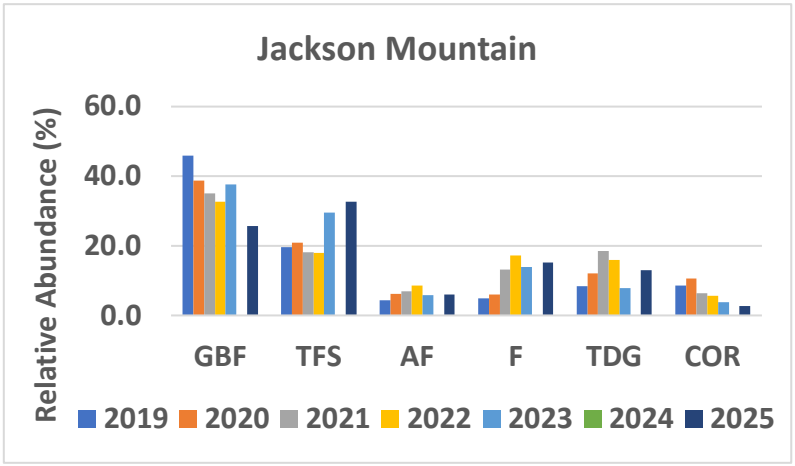
9. How are feeding strategies represented by the bird species observed in this study?

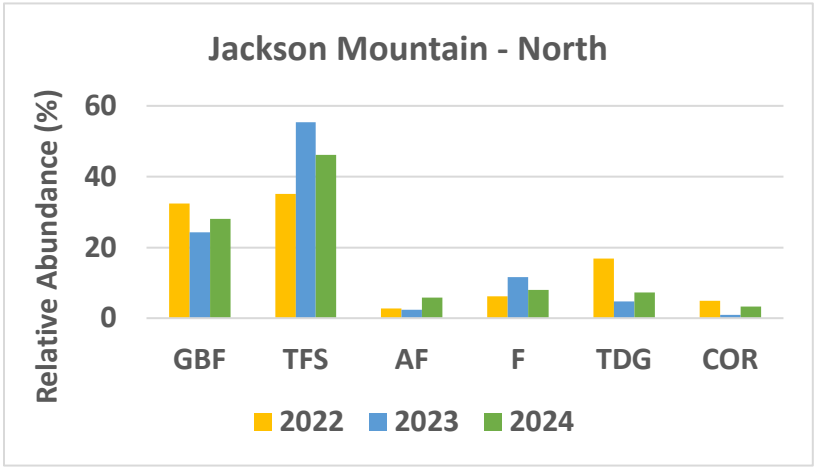
The bird species encountered in this study were categorized by their feeding habits in accordance with life history information published in the literature (see Appendix B for species listing). These categories are illustrated by site and by year in Fig. 3.

As shown in Fig 3, ground-brush foraging species (GBF) are most common at all sites except JMN, with timber-foliage searching species (TFS) second most common at TS, FG, JM, and JMT. JMN stands out as having relatively fewer GBF species represented, with TFS most common. These patterns in feeding guilds seems to correlate with observed differences in habitat quality across sites. The greater density and maturity of the tree canopy and shrub understory layer at JMN appears to favor bird species that feed on insects in the more complex and diverse foliage layers present at that site. The other sites are more open, favoring bird species that feed on insects harbored in leaf litter and the more open shrub and herbaceous understory.









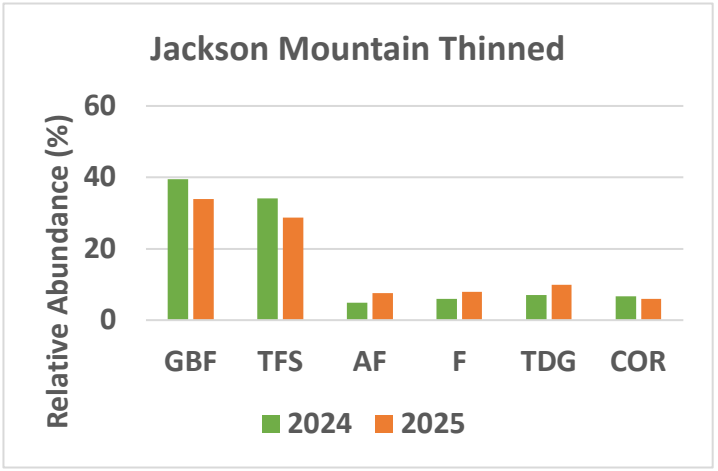


Figure 3. Summary of relative abundance of birds categorized by feeding guild. GBF = Ground Brush Foraging; TFS = Timber Foliage Searching; AF = Aerial Flycatcher; F = Flycatcher; TDG = Timber Drilling/Gleaning; COR = Corvid.

Table 4. Cavity nesting bird species by year observed at the respective BMP study sites. TS = Turkey Springs site; FG = Fawn Gulch site; JM = Jackson Mountain site; JMN = Jackson Mountain North site; and JMT = Jackson Mountain Thinned site.

Cavity Nesting Species																					
	Conservation	2019			2020			2021			2022			2023			2024			2025		
Species	Score	Sites	Freq	Rel Freq	Sites	Freq	Rel freq	Sites	Freq	Rel freq	Sites	Freq	Rel freq	Sites	Freq	Rel freq	Sites	Freq	Rel freq	Sites	Freq	Rel freq
Primary Cavity Nesters																						
Downy Woodpecker	7	TS, FG	2	0.3	none	none	none	JM	1	0.1	JM	1	0.1	FG, JMN	2	0.1	FG, JMN, JMT	4	0.4	JMT	2	0.2
Hairy Woodpecker	6	TS, FG, JM	9	1.4	TS, FG, JM	20	1.3	TS, FG, JM	23	1.7	FG, JM, JMN	9	0.7	FG, JM, JMN	12	0.9	FG, JMN, JMT	21	2.4	FG, JM, JMT	46	4.7
Three-toed Woodpecker	10	none	none	none	none	none	none	FG	2	0.2	none	none	none	none	none	none	JMN	1	0.1	none	none	none
Northern Flicker	10	TS, FG, JM	33	5.1	TS, FG, JM	64	4.1	TS, FG, JM	79	6.0	FG, JM, JMN	95	7.5	FG, JM, JMN	100	7.4	FG, JMN, JMT	128	14.9	FG, JM, JMT	165	16.8
Williamson's Sapsucker	12	TS, JM	5	0.8	FG	1	0.1	JM	1	0.1	FG, JM	2	0.2	JMN	7	0.5	FG, JMN, JMT	17	2.0	JM, JMT	6	0.6
Primary or Secondary Cavity Nesters																						
Black-capped Chickadee	7	JM	1	0.2	TS, FG, JM	25	1.6	TS, JM	6	0.5	JM, JMN	6	0.5	JMN	2	0.1	none	none	none	FG	1	0.1
Lewis's Woodpecker	15	TS	1	0.2	none	none	none	JM	3	0.2	none	none	none	none	none	none	FG, JMN, JMT	5	0.6	JMT	2	0.2
Red-breasted Nuthatch	6	none	none	none	TS, JM	2	0.1	none	none	none	JM, JMN	33	2.6	JM, JMN	34	2.5	JMN, JMT	23	2.5	FG, JM, JMT	22	2.3
Red-naped Sapsucker	9	FG	2	0.3	none	none	none	none	none	none	JMN	2	0.2	JM	1	0.1	JMN, JMT	3	0.3	none	none	none
Pygmy Nuthatch	11	TS, FG, JM	48	7.4	TS, FG, JM	114	7.2	TS, FG, JM	117	8.8	FG, JM, JMN	110	8.7	FG, JM, JMN	64	4.7	FG, JMN, JMT	55	6.5	FG, JMN, JMT	155	15.9
Secondary Cavity Nesters																						
American Kestrel	11	FG	1	0.2	none	none	none	none	none	none	JM	1	0.1	none	none	none	FG	1	0.1	none	none	none
Ash-throated Flycatcher	8	none	none	none	none	none	none	FG	1	0.8	none	none	none	FG, JMN	2	0.1	none	none	none	none	none	none
European Starling	5	none	none	none	TS	1	0.1	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
House Wren	5	JM	2	0.3	TS, FG, JM	45	2.9	TS, FG, JM	13	1.0	FG, JM, JMN	59	4.7	FG, JM, JMN	91	6.7	FG, JMN, JMT	102	12.3	FG, JM, JMT	94	9.6
Mountain Bluebird	12	FG	1	0.2	none	none	none	TS	1	0.1	FG	1	0.1	none	none	none	FG	1	0.1	FG	1	0.1
Mountain Chickadee	10	FG, JM	3	0.5	TS, FG, JM	12	0.8	none	none	none	FG, JM, JMN	34	2.7	FG, JM, JMN	55	4.1	FG, JMN, JMT	91	10.6	FG, JM, JMT	68	6.9
Tree Swallow	8	FG, JM	4	0.6	JM	1	0.1	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
Violet-green Swallow	9	TS, FG, JM	97	14.9	TS, FG, JM	89	5.6	TS, FG, JM	74	5.6	FG, JM, JMN	57	4.5	FG, JM, JMN	44	3.3	FG, JMN, JMT	67	7.7	FG, JM, JMT	77	7.8
Western Bluebird	9	TS, FG	9	1.4	TS, FG, JM	34	2.2	TS, FG	40	3.0	FG, JM	14	1.1	FG, JM	13	1.0	FG, JMT	33	7.3	FG, JMT	9	0.9
White-breasted Nuthatch	6	TS, FG, JM	31	4.7	TS, FG, JM	55	3.5	TS, FG, JM	61	4.6	FG, JM, JMN	55	4.4	FG, JM, JMN	40	3.0	FG, JMN, JMT	59	7.0	FG, JMN, JMT	92	9.3

The predominance of flycatchers (F) and timber drilling/gleaning (TDG) species at TS, FG and JM is also very telling. These sites offer a more open canopy layer favoring the "sallying" feeding behavior of flycatcher species, and also have numerous standing dead trees that are preferred feeding habitat for TDG species.

Among the 33 most common GBF species are the American Robin, Northern Flicker, and Green-tailed Towhee, each of which are among the most common bird species encountered (see Table 2). Common TFS bird species, of which 13 species were observed, include the Plumbeous Vireo, Steller's Jay, Warbling Vireo, Western Tanager, and Yellow-rumped Warbler, each species also yielding a CS above 10 (see Table 2). The 15 combined aerial and flycatcher species responsible for the predominance of these feeding guilds at TS, FG, and JM include Dusky Flycatchers, Violet-green Swallows, Hammond's Flycatchers, and Western Wood-Peewees. Hairy Woodpeckers, Pygmy Nuthatches, and White-breasted Nuthatches were the most common of the eight TDG bird species contributing to the number of bird species in this feeding guild at TS, FG, JM, and JMN.

There are a couple of interesting trends reflected in the feeding guild data shown in Fig. 3 that is most apparent for the JM and FG sites. Here we see a decreasing relative abundance of GBF species and a concomitant increase in TFS and F species. A similar pattern is hinted at for JMN, but with more variability between years. Superficially, it appears that decreasing numbers of American Robins in the GBF feeding guild, and an increase in Western Tanager numbers in the TFS guild at JMN contribute to these trends, but inter-annual variability in the abundance data for these and other bird species will require additional data collection to reveal whether these trends indicate substantive changes in the forest bird community.

10. What about nesting behaviors among bird species?

There is no question that many of the bird species we have documented in our study are using these sites for breeding. More than 25 of the 98 bird species we have recorded have been observed nesting in the course of our site visitations. These include several ground-nesting species, including the Common Nighthawk, Dusky Grouse, and Wild Turkeys; shrub/tree-nesting species, such as American Robins, Chipping sparrows, Dusky Flycatchers, Hammond's Flycatchers, Warbling Vireos, and Plumbeous Vireos; and several tree-nesting species, including Western Wood-peewees and Western Tanagers.

Perhaps most important from a forest management perspective are cavity nesters – those species that either excavate cavities in dead snags or living trees, or use existing cavities excavated by other species in previous years. We have identified 20 cavity nesting species in our study (Table 4), including Pygmy Nuthatches, White-breasted Nuthatches, and Red-breasted Nuthatches; Northern Flickers; House Wrens; Violet-green Swallows; Hairy and Downy Woodpeckers; Western Bluebirds and Mountain Bluebirds; and Williamson's Sapsuckers.

Cavity nesting bird species are grouped into Primary cavity nesters, which are the first to excavate nesting cavities in weak portions of living trees or in dead snags; secondary cavity nesters that depend solely on existing cavities to build their nests; and opportunistic species that may use existing cavities, or excavate new ones if existing cavities are unavailable. The data in Table 4 summarizes the cavity nesting species we have observed in our study, along with the sites where they are present, and the frequency with which they have been observed across the course of the BMP. What stands out from the data in Table 4 is that those cavity nesting species with higher conservation scores (e.g., Lewis's Woodpecker, Mountain Bluebirds, and Williamson's Sapsucker) exhibit greatest variability in how frequently they were observed; the sites where they have been observed; and how often they appear to observers (i.e., which years).

House Wrens, White-breasted Nuthatches, Pygmy Nuthatches and Northern Flickers have most often been observed occupying cavities in dead snags, with some observations revealing nest cavities in weakened portions of living trees. Northern Flickers are industrious excavators, with opportunistic and secondary cavity nesters often occupying cavities abandoned by Flickers. The concept of "nest webs" and primary cavity nesters serving as "keystone" species with regard to preparing nest sites for secondary cavity nesters appears in the literature and seems to apply to the community of cavity nesting species observed in the BMP.

Finally, it is clear that ensuring the availability of standing dead snags is critical to the survival of many cavity nesting bird species. Indeed, on several occasions our observers report individual dead snags housing two, three, or even four different cavity-nesting species over the course of a single season.

11. Which bird species are found in the Pagosa Springs area year-round (resident species), and which are non-resident, or migratory species?

Weather conditions, food availability, and nest-site preferences are among the many factors that determine a bird species' migratory strategies. Resident species are those bird species that remain in the general area, or migrate relatively short distances (e.g., to lower elevations) throughout the seasons of a year. Non-resident species may migrate moderately short distances from our region to northern Mexico, or much greater distances – even to the tip of South America (see Tables 5 and 6).

Of the 98 species observed in the BMP, 56 are considered resident species, with 46 of those documented in the annual Christmas Bird Count conducted in our area each year as part of an international citizen science project coordinated through the National Audubon Society. As shown in Table 5, several resident species migrate regionally, with some traveling as far as Central and South America. Table 6 lists those bird species that typically migrate greater distances, some as far as the sub-tropical and tropical forests of South America. Three of those species have also been recorded in our local CBC.

Interestingly, 24 (~ 43%) of the 56 resident species, have a Commonness Score (CS) or 10 or higher. For non-resident species, 20 out of 42 (~ 48%) have a CS of 10 or higher. These patterns in the data raise the question as to whether the migratory species return to the same area for breeding each year, which if true, underscores the importance of our regional forests for breeding success in these species.

It is important to note patterns in the number of species demonstrating population declines (shaded in yellow) among resident vs. non-resident species in Tables 5 and 6. Among resident bird species, 19 are reported to be in decline, constituting about ~ 34% of those species. Strikingly, 23 of the 42 non-resident species, or about ~ 54%, are reported in decline (shaded in yellow). Clearly, migration must have afforded these species an evolutionary advantage in the past that no longer is having as positive an impact on their reproduction and survival. For most species, habitat destruction across their migratory range, coupled with various forms of environmental pollution exacerbated by the complicated effects of climate change are considered the primary factors contributing to population declines in bird species.

12. How are bird migratory strategies, nesting behaviors, and conservation status reflected in our data?

The conservation status of bird species is indicated by color-coding in Tables 2A and 2B, with conservation scores developed by Partners in Flight and reported by Cornell Lab of Ornitohology (www.allaboutbirds.org) shown in Tables 5, 6, and 7. Yellow colors represent those bird species having conservation scores of 10 or greater on a scale of 1 (populations stable or increasing in numbers) to 20 (greatest concern), and that are reported to have undergone substantial population declines over the past 60 years or so. Setting a conservation score of 10 or greater to represent birds in population decline captures species that are often considered stable, even though population numbers may have declined more than 20% over the past 40 years. Conservation scores of 13 or higher are more reflective of bird species of particular concern to conservation biologists. Conservation scores and designation of bird species of concern in our study have been updated since our last project report in 2023, with some changes in bird species listed as being in decline.

In our overall dataset (Tables 2A and 2B), 43 species (43%) are in decline, and of those species with a CS of 10 or greater, 20 species (20%) are in decline. Of those bird species with a CS less than 10, 23 have conservation scores of 10 or more. These patterns in our findings draws attention to the importance of the dry-mixed conifer forests in our area to bird species with populations numbers that are in decline.

Bird species in population decline are notably more numerous for non-resident versus resident species, with 19 of 56 species (34%), vs. 23 of 42 (55%) in decline, respectively. Comparing CS scores for resident vs. non-resident species reveals that eight of 19 resident bird species (~ 42%) are in population decline and have CS scores greater than 10. Eleven of the 23 non-resident bird species (~ 47%) in decline have CS > 10. From these patterns in the data we can infer that migration strategies result in declining population numbers more often, and that a substantial proportion of migratory bird species in decline are found in the dry-mixed conifer forests in our area.

Table 5. Bird species oberved in the BMP that are year-round residents, short-range migrants, or regional migrants. CBC = recorded in annual Pagosa Springs, CO, Christmas Bird Count. Species coded in yellow are in population decline over the last 60 years or so, as per Partners in Flight analyses (www.allaboutbirds.org; updated from Grover et. al. 2023). Species in RED were first observed in 2024 and 2025.

Resident Species								
	Conservation	Commonness	Nearctic			Neotropical		
	Score	SCORE	Resident	Short-Dist	Mexico	Cent Am	Carribean	Sth Am
American Crow	6	18	x (CBC)	x				
American Goldfinch	7	3	x (CBC)	x	x			
American Kestrel	11	3	x (CBC)	x	x	x	x	x
American Robin	5	21	x (CBC)	x				
Bald Eagle	9	3	x (CBC)	x	x			
Black-billed Magpie	9	2	x (CBC)	x				
Black-capped Chickadee	7	11	x (CBC)					
Brewer's Blackbird	10	3	x (CBC)	x	x			
Brown Creeper	8	10	x (CBC)	x	x	x		
Canada Goose	5	5	x (CBC)	x				
Cassin's Finch	13	11	x (CBC)	x	x			
Cedar Waxwing	6	3	x(CBC)	x				
Chipping Sparrow	9	20	x (CBC)	x				
Clark's Nutcracker	11	3	x(CBC)	x				
Common Raven	6	19	x (CBC)					
Cooper's Hawk	7	5	x (CBC)	x	x	x		
Dark-eyed Junco	8	19	x (CBC)	x	x			
Downy Woodpecker	7	10	x (CBC)					
Dusky Grouse	11	6	x					
Eurasian Collared Dove	4	4	x (CBC)	x	x			
European Starling	9	1	x (CBC)	x	x	x	x	
Evening Grosbeak	14	8	x (CBC)	x				
Golden-crowned Kinglet	8	1	x (CBC)	x	x			
Great Blue Heron	8	5	x (CBC)	x	x	x	x	x
Great-Horned Owl	8	3	x (CBC)					
Hairy Woodpecker	6	21	x (CBC)	x				
House Finch	6	6	x (CBC)	x	x			
Lesser Goldfinch	7	3	x (CBC)	x	x	x		
Lewis's Woodpecker	13	6	x (CBC)	x				
Mallard	7	2	x (CBC)	x	x			
Mountain Bluebird	11	5	x (CBC)	x	x			
Mountain Chickadee	11	20	x (CBC)					
Mourning Dove	6	18	x (CBC)	x	x	x	x	
Northern Flicker	10	21	x (CBC)	x				
Northern Goshawk	11	1	x (CBC)	x	x			
Northern Pygmy Owl	11	2	x(CBC)					
Pine Siskin	10	13	x (CBC)	x	x	x		
Pygmy Nuthatch	11	21	x (CBC)					
Red Crossbill	8	13	x (CBC)	x	x	x		
Red-breasted Nuthatch	6	11	x (CBC)	x				
Red-tailed Hawk	6	17	x (CBC)	x	x	x	x	
Red-winged Blackbird	8	6	x (CBC)	x	x	x		
Ruby-crowned Kinglet	6	6	x (CBC)	x	x	x		
Sharp-shinned Hawk	7	3	x (CBC)	x	x	x	x	x
Song Sparrow	8	4	x (CBC)	x	x			
Spotted Towhee	8	14	x (CBC)	x	x			
Steller's Jay	10	21	x (CBC)					
Three-toed Woodpecker	8	2	x	x				
Townsend's Solitaire	10	15	x (CBC)	x	x			
Western Bluebird	9	15	x (CBC)	x	x			
Western Meadowlark	10	1	x (CBC)	x	x			
Western Screech Owl	13	1	x	x				
White-breasted Nuthatch	6	21	x (CBC)					
White-crowned Sparrow	7	4	x (CBC)	x	x			
Wild Turkey	7	7	x (CBC)					
Williamson's Sapsucker	13	12	x (CBC)	x	x			

Table 6. Bird species observed in the BMP that are seasonal migrants to Mexico, Central America, and South America. Species coded in yellow are in population decline over the last 60 years or so, as per Partner in Flight analyses reported by Cornell Lab of Ornithology (www.allaboutbirds.org; updated from Grover et. al. 2023). Species in RED were first observed in 2024 and 2025.

Non-Resident Species								
	Conservation	Commonness	Nearctic			Neotropical		
	Score	SCORE	Resident	Short-Dist	Mexico	Cent Am	Carribean	Sth Am
Ash-throated Flycatcher	8	4		x	x	x		
Band-tailed Pigeon	12	4			x	x		x
Black Swift	15	1			x	x		x
Black-chinned Hummingbird	9	2		x	x			
Black-headed Grosbeak	9	16		x	x			
Black-throated Gray Warbler	13	1			x	x		
Blue-gray Gnatcatcher	7	1			x	x	x	
Broad-tailed Hummingbird	13	19			x	x		
Brown-headed Cowbird	7	12		x	x			
Bullock's Oriole	11	4		x	x	x		
Cassin's Vireo	9	3			x	x		
Common Nighthawk	11	11			x	x	x	x
Cordilleran/Western Flycatcher	11	14		x	x			
Dusky Flycatcher	11	10		x	x	x		
Grace's Warbler	14	12		x	x	x		
Gray Catbird	8	1			x	x	x	x
Green-tailed Towhee	10	19		x	x			
Hammond's Flycatcher	10	11			x	x		
Hermit Thrush	7	12		x	x	x		
House Wren	5	19		x	x	x		x
Lark Sparrow	10	1			x			
MacGillivray's Warbler	12	6			x	x		
Northern Rough Winged Swallow	11	1		x	x	x	x	
Olive-sided Flycatcher	13	7			x	x		x
Orange-crowned Warbler	9	17		x	x	x		
Osprey	7	6	(CBC)	x	x	x	x	x
Peregrine Falcon	9	2			x	x	x	x
Plumbeous Vireo	13	18			x	x		
Red-naped Sapsucker	9	5	(CBC)	x	x			
Rose-breasted Grosbeak	11	2			x	x		x
Say's Phoebe	9	4	(CBC)	x	x	x		
Tree Swallow	10	4			x	x	x	
Turkey Vulture	5	20			x	x		x
Vesper Sparrow	11	1			x	x		
Violet-green Swallow	9	21			x	x		
Virginia's Warbler	15	14		x	x			
Warbling Vireo	8	20			x	x		
Western Tanager	10	21			x	x		
Western Wood-Pewee	11	19			x	x	x	x
White Throated Swift	13	5		x	x	x		
Yellow Warbler	8	3			x	x	x	x
Yellow-rumped Warbler	6	21			x	x	x	

Table 7. Bird species observed nesting in the BMP study sites sorted by resident vs. non-resident migratory status and nesting behavior. Species coded in yellow are in population decline over the last 60 years or so, as per Partner in Flight analyses reported by Cornell Lab of Ornithology (www.allaboutbirds.org; updated from Grover et. al. 2023).

	Resident	Non-Resident
Ground, Tree, or Shrub Nesters		
American Robin	x	
Broad-tailed Hummingbird		x
Cassin's Finch	x	
Common Nighthawk		x
Chipping Sparrow	x	
Cordilleran/Western Flycatcher		x
Dusky Flycatcher		x
Great-Horned Owl	x	
Hammond's Flycatcher		x
Plumbeous Vireo		x
Red-tailed Hawk	x	
Ruby-crowned Kinglet	x	
Warbling Vireo		x
Western Tanager		x
Western Wood-Pewee		x
Wild Turkey	x	
Yellow-rumped Warbler		x
Cavity Nesters		
Hairy Woodpecker	x	
House Wren		x
Lewis's Woodpecker	x	
Mountain Bluebird	x	
Northern Flicker	x	
Pygmy Nuthatch	x	
Red-breasted Nuthatch	x	
Red-naped Sapsucker		x
Violet-green Swallow		x
Western Bluebird	x	
White-breasted Nuthatch	x	
Williamson's Sapsucker	x	

The data summarized in Table 7 reveals additional insights regarding nesting behavior, population status, and migratory strategies. Of the 29 bird species listed in Table 7 that have been oberved nesting in our study areas, 17 species are ground/shrub/tree nesters and 12 are cavity nesters. As the color coding in Table 7 reveals, nine of the 18 ground/shrub/tree nesting species, are in population decline, with five of the 11 cavity nesting species in decline

These are among the most important findings in this portion of the study –

- first, a greater proportion of migratory bird species are at risk of population declines compared to resident or short-distant migrants; and
- second, about half of the bird species nesting in our study areas are in population decline.

These patterns in our data strongly indicate that dry, mixed-conifier forest ecosystems like those in our area play a significant role as breeding habitat for numerous bird species, many of which are in population decline as a result of threats to their survival because of migratory status.

13. What insights do our data provide with regard to the primary scientific question we set out to address?

The BMP was initially designed to examine how wildland fuel reduction treatments might affect the composition and structure of bird communities in the dry-mixed conifer forests surrounding Pagosa Springs, CO. The Turkey Springs site (FG) was subject to presecribed fire in late spring, 2019, concurrent with the establishment of our monitoring points at that site. Data from 2019 for this site compared to Fawn Gulch (FG), which was masticated in 2017, and Jackson Mountain (JM), which was the most undisturbed and mature of our initial sites, indicate fewer bird species and fewer birds immediately following the burn (see Fig 1). By 2020, however, the number of bird species and birds counted was comparable to the other two sites.

The Fawn Gulch site (FG) was subject to understory thinning (i.e. mastication) in 2017, about two years before we initiated our study, and was subject to prescribed fire in the late summer – early fall of 2024. Our data indicate that, the bird community responded initially with some species moving to areas less impacted by fuel reduction treatments. The return of bird species to the entire FG site appeared to be underway, but it will take another year of data collection to confirm the return of the bird community to pre-fire composition and structure as recovery of the understory layer progresses and insect populations recover. Notably, the bird community at the FG site has been the most diverse in terms of numbers of bird species of all sites included in this study.

14. What effect does forest thinning (i.e., selective logging) have on the bird communities we studied?

In 2024 the Jackson Mountain Thinned (JMT) site was added to our study. This site is located about 1.5 km (~ 1 mile) from our original Jackson Mountaint (JM) site. Recall that our original Jackson Mountain site (JM) was chosen to document the composition and structure of bird communities in a mixed-conifer forest stand that had not been burned or subjected to logging for many decades – probably a century or more.

The JMT site was subject to extensive thinning and selective logging in 2020-2021. By 2024 the understory layer at that site had recovered from logging operations and we subsequently established a network of monitoring points throughout the site consistent with the research design used at our other sites.

With two years of data now collected, our preliminary findings indicate that, although there were some impacts of forest thinning on the overall composition and structure of the bird community at JMT, the number of species observed was consistent with other sites sampled during this time (Fig 2). Furthermore, although there were modest changes in species composition (see Tables 1, 2, and 4), feeding guild proportions appear consistent with our other findings (Fig. 3), and several nesting species were observed at the site, indicating favorable forest conditions for breeding. Indeed, a nesting pair of Common Nighthawks, a ground-nesting species that had previously only been observed at TS and FG, was observed for the first time at JMT in 2025.

Over the course of the BMP we have had the opportunity to expand the scope of the study to include what we have designated the Jackson Mountain North site (JMN). JMN is part of a multi-site, nationwide study entitled, "Adaptive Silviculture for Climate Change" (ASCC), which is designed to examine how various selective logging and thinning practices might impact forest composition and sustainability in the face of warming and drying climates. Thinning treatments were planned for JMN beginning in 2025, and were completed in early 2026. Our objective was to establish baseline information on bird community composition and structure prior to selective logging and thinning operations at JMN.

Because thinning treatments were applied after the 2025 sample season, we have not had the opportunity to conduc post-treatment sampling. However, because the JMN site is located on a northeast-facing aspect, the forest canopy structure is notably more diverse and the understory shrub layer is very dense in some areas. Consequently, as noted earlier in this report, a number of bird species were more common at JMN compared to other sites, or were not observed at the other sites at all. Examples include the Red-breasted Nuthatch, MacGillivray's Warbler, Ruby-crowned Kinglet, and Three-toed Woodpecker. We expect to return to JMN in 2026 to record the response of these and other bird species to changes in forest composition and structure.

15. What are the most striking findings revealed by the data collected in this study?

1. With 98 bird species recorded over the seven years of the BMP, the bird communities in the dry, mixed-conifer forests surrounding Pagosa Springs are more diverse than many would expect.

2. A relatively small number of bird species (i.e. 18) make up about 70% of birds counted.

3. The proportion of bird species declining in population numbers (~ 44%), and in particular the proportion of non-resident bird species in decline (~ 50%), is very disconcerting and deserves greater attention by forest managers.

4. The number of resident vs. non-resident bird species observed nesting in our study sites is about equal, 16 vs. 13, respectively. The proportion of resident bird species nesting in our study areas that are in decline (six of 16 or 37%), however, is substantially less than for non-resident species (eight of 13 or 61%).

5. The proportion of cavity nesting bird species encountered out of the total number of confirmed species nesting in our sites (41%), points to the importance of dead snags as important nesting habitat for many of those species. Moreover, 5 of those 12 species (42%) are in population decline, with 50% of ground/shrub/tree nesting species in decline.

16. How do the findings drawn from the BMP compare to other studies reported in the scientific literature?

Extensive literature reviews were included in earlier annual reports and are provided as Appendix C to this report. Those earlier project reports are available through links posted on the Weminuche Audubon Website: (https://www.weminucheaudubon.org/bird-community-monitoring/).

One recent and very instructive research report for our region examines the recovery of bird communities after five years following a mixed-severity wildfire in the San Juan Mountains near Durango, CO (Scott and Korb, 2024). The methodology applied in their study was similar to that followed in our project. Their report is much more detailed in its interpretation and statistical analysis of bird communities surveyed in unburned, versus low, moderate, and severely impacted sites cateogorized based on tree canopy survival. Of the 42 bird species encountered in their research, all but one species – Lincoln's Sparrow – was also observed in our study. Statistically significant differences in bird community composition and structure were found, with the primary conclusion that increased landscape heterogeneity (i.e. patchiness) resulting from mixed-severity wildfires promotes bird species diversity. We have drawn similar conclusions regarding landscape heterogeneity and bird species diversity in the BMP.

As discussed in earlier project reports, our findings are largely consistent with those reported by the limited number of studies conducted in the southwestern U.S. The BMP, however stands out for several reasons, among them:

- the long-term nature of the BMP – no other studes we have found extend across more than one or two years;
- inclusion of the same sites and monitoring points for multiple years; and
- the conduct of the BMP as a citizen science endeavor.

Engaging amateur birders as the primary field observers was intentional. We consider the opportunities the BMP afforded members of our local community to broaden their understanding of forest ecology, fire ecology, and bird ecology to be equal in importance to answering the original scientific question – i.e. to examine the response of bird communties to wildland fuel reduction treatments. Our conclusion is that, after engaging more than 70 volunteers in the BMP over the first seven years of the study, we have been overwhelmingly successful in achieving these objectives.

17. Will this study continue and will there be any changes to the approach or study sites selected?

The short answer as to whether the BMP will continue into the future is yes, depending, of course, on the response of our membership to solicitations for volunteers. To avoid inflicting undue burden on individual participants, about 20 field observers are needed to conduct the project in a sample season. As long as our membership responds to satisfy these minimum volunteer requirements, we plan on continuing the study.

In order to maintain consistency in the BMP dataset, we do not anticipate changing our basic methodology regarding the number of site locations or monitoring points; duration of monitoring visits; or number of point visitations. Site locations may change, however, in response to ongoing forest management practices (e.g., logging operations or wildland fuel reduction treatments) that may limit access to previously visited study sites. We anticipate that the

JMN site will be subject to selective thinning treatments in 2026, after which we may return to collect post-treatment data for comparison to the baseline data already collected.

In conclusion, we consider the BMP to be an overwhelming success, both in terms of the quality of the long-term dataset generated by the study, and the positive impacts that participation in this study has had on the volunteers from our community.

Supplemental Literature Cited in 2025 report.

See **Appendix C** for complete list of citations from earlier project reports that were not inserted in the body of the text of this report.

Scott, L.A. and J.E. Korb. 2024. Birds of the Burn: Avian Community and Functional Guild Variation Five Years Post-Fire in Warm-Dry Mixed Conifer, Southwest Colorado. *Fire* 2024, 7, 62. https://doi.org/103390/fire7030062

Appendix A

Compilation of Tables contained in Bird Monitoring Project reports from 2019 through 2023, and similarly formatted tables for 2024 and 2025 sample seasons (see Grover et.al. 2019 to 2023 in Appendix C).

<u>Season 2019</u> - Table 3. Summary of all bird species observed across the three study areas monitored, including the FG Re-balanced data. Data shown are the number of birds counted (abundance) and number of monitoring points where the species were reported (frequency). Species lists represent those found at all three sites sorted by abundance; those unique to the sites shown sorted by abundance; or those found at two respective sites (unsorted).

	Turkey Springs					Fawn Gulch (Full Data)					Fawn Gulch (Re-balanced)					Jackson Mountain			
# Species	26				# Species	40				34				# Species	33			
# points w record	185		144		# points w record	486		300		354		204		# points w record	278		209	
	Abun	Rel Abun	Freq	Rel Freq		Abun	Rel Abun	Freq	Rel Freq	Abun	Rel Abun	Freq	Rel Freq		Abun	Rel Abun	Freq	Rel Freq
Species Found At All Three Sites (Sorted by Abundance)																		
American Robin	43	18.53	31	16.15	American Robin	130	25.95	67	21.47	81	22.88	47	23.04	American Robin	75	26.22	53	22.75
Violet-green Swallow	29	12.50	13	6.77	Western Wood-Pewee	83	16.57	59	18.91	64	18.08	41	20.10	Northern Flicker	29	10.14	25	10.73
Western Wood-Pewee	20	8.62	17	8.85	Northern Flicker	44	8.78	23	7.37	35	9.89	19	9.31	Western Tanager	16	5.59	14	6.01
Pygmy Nuthatch	17	7.33	14	7.29	Western Tanager	32	6.39	21	6.73	27	7.63	17	8.33	Western Wood-Pewee	14	4.90	13	5.58
Northern Flicker	16	6.90	13	6.77	White-breasted Nuthatch	23	4.59	14	4.49	17	4.80	9	4.41	Pygmy Nuthatch	12	4.20	6	2.58
White-breasted Nuthatch	11	4.74	11	5.73	Yellow-rumped Warbler	13	2.59	11	3.53	8	2.26	6	2.94	Yellow-rumped Warbler	12	4.20	9	3.86
American Crow	10	4.31	8	4.17	Violet-green Swallow	11	2.20	7	2.24	7	1.98	5	2.45	Steller's Jay	11	3.85	9	3.86
Yellow-rumped Warbler	4	1.72	3	1.56	Steller's Jay	10	2.00	10	3.21	5	1.41	5	2.45	Turkey Vulture	8	2.80	6	2.58
Brown-headed Cowbird	2	0.86	2	1.04	Pygmy Nutatch	7	1.40	4	1.28	4	1.13	2	0.98	Red-tailed Hawk	6	2.10	5	2.15
Hairy Woodpecker	2	0.86	1	0.52	Turkey Vulture	6	1.20	4	1.28	3	0.85	2	0.98	White-breasted Nuthatch	4	1.40	4	1.72
Broad-tailed Hummingbird	1	0.43	1	0.52	American Crow	4	0.80	3	0.96	4	1.13	3	1.47	Violet-green Swallow	3	1.05	1	0.43
Red-tailed Hawk	1	0.43	1	0.52	Brown-headed Cowbird	3	0.60	2	0.64	3	0.85	2	0.98	American Crow	2	0.70	2	0.86
Steller's Jay	1	0.43	1	0.52	Broad-tailed Hummingbird	2	0.40	2	0.64	1	0.28	1	0.49	Broad-tailed Hummingbird	2	0.70	2	0.86
Turkey Vulture	1	0.43	1	0.52	Hairy Woodpecker	2	0.40	2	0.64	1	0.28	1	0.49	Brown-headed Cowbird	1	0.00	1	0.43
Western Tanager	1	0.43	1	0.52	Red-tailed Hawk	1	0.20	1	0.32	1	0.28	1	0.49	Hairy Woodpecker	1	0.35	1	0.43
Species Unique to Respective Sites (Sorted by Abundance)																		
Lewis's Woodpecker	1	0.43	1	0.52														
MacGillvary's Warbler	1	0.43	1	0.52														
Osprey	1	0.43	1	0.52														
					Northern Rough-winged Swallow	25	4.99	10	3.21	25	7.06	10	4.90					
					American Goldfinch	3	0.60	2	0.64	3	0.85	2	0.98					
					Cassins's Finch	3	0.60	3	0.96	1	0.28	1	0.49					
					Cordilleran Flycatcher	3	0.60	2	0.64	3	0.85	2	0.98					
					Bald Eagle	2	0.40	2	0.64	2	0.56	2	0.98					
					Black-billed Magpie	2	0.40	2	0.64	1	0.28	1	0.49					
					Pine Siskin	2	0.40	1	0.32	2	0.56	1	0.49					
					Red-naped Sapsucker	2	0.40	2	0.64	1	0.28	1	0.49					
					Say's Phoebe	2	0.40	2	0.64	2	0.56	2	0.98					
					Yellow Warbler	2	0.40	2	0.64	2	0.56	2	0.98					
					American Kestrel	1	0.20	1	0.32									
					Dark-eyed Junco	1	0.20	1	0.32									
					Mountain Bluebird	1	0.20	1	0.32									
					Red Crossbill	1	0.20	1	0.32	1	0.28	1	0.49					
														House Wren	4	1.40	2	0.86
														Townsend's Solitaire	3	1.05	3	1.29
														Virginia's Warbler	3	1.05	2	0.86
														White-throated Swift	3	1.05	1	0.43
														Orange-crowned Warbler	2	0.70	1	0.43
														Black-capped Chickadee	1	0.35	1	0.43
														Hermit Thrush	1	0.35	1	0.43
Species Found At Two Respective Sites (Unsorted)																		
					Black-headed Grosbeak	5	1.00	5	1.60	5	1.41	5	2.45	Black-headed Grosbeak	5	1.75	5	2.15
Bullock's Oriole	1	0.43	1	0.52	Bullock's Oriole	1	0.20	1	0.32									
					Canada Goose	12	2.40	2	0.64	6	1.69	1	0.49	Canada Goose	5	1.75	1	0.43
Chipping Sparrow	6	2.59	5	2.60	Chipping Sparrow	10	2.00	5	1.60	8	2.26	3	1.47					
Common Nighthawk	6	2.59	7	3.65										Common Nighthawk	2	0.70	1	0.43
					Common Raven	1	0.20	1	0.32	1	0.28	1	0.49	Common Raven	11	3.85	9	3.86
Downy Woodpecker	1	0.43	1	0.52	Downy Woodpecker	3	0.60	1	0.32	3	0.85	1	0.49					
					Green-tailed Towhee	19	3.79	14	4.49	16	4.52	1	0.49	Green-tailed Towhee	7	2.45	7	3.00
					Mountain Chickadee	1	0.20	1	0.32					Mountain Chickadee	4	1.40	2	0.86
Mourning Dove	1	0.43	1	0.52										Mourning Dove	1	0.35	1	0.43
Plumbeous Vireo	2	0.86	2	1.04										Plumbeous Vireo	12	4.20	9	3.86
					Tree Swallow	7	1.40	3	0.96	7	1.98	3	1.47	Tree Swallow	4	1.40	1	0.43
					Warbling Vireo	1	0.20	1	0.32					Warbling Vireo	7	2.45	7	3.00
Western Bluebird	5	2.16	5	2.60	Western Bluebird	5	1.00	4	1.28	4	1.13	3	1.47					
Williamson's Sapsucker	1	0.43	1	0.52										Williamson's Sapsucker	7	2.45	4	1.72

<u>Season 2020</u> - Table 2. Summary of all bird species observed across the three study areas in 2020. Data shown are the number of sample points at which respective bird species were recorded (i.e., frequency); and the number of birds of the respective species observed (i.e., abundance). Species lists represent those found at all three sites, sorted by abundance within the respective sites; those unique at one of the three sites, sorted by abundance within the respective sites; and those found at two of the three sites, unsorted

	Turkey Springs					Fawn Gulch					Jackson Mountain				
# Species	37				# Species	39				# Species	45				
# point records	471	# birds	688		# point records	571	# birds	856		# point records	536	# birds	683		
	Freq	Rel Freq	Abund	Rel Abund		Freq	Rel Freq	Abund	Rel Abund		Freq	Rel Freq	Abund	Rel Abund	
Species Found At All Three Sites (Sorted by Abundance)															
Violet-green Swallow	50	10.2	109	15.7	Western Wood-Pewee	93	16.3	153	17.9	American Robin	76	14.2	103	15.1	
Pygmy Nuthatch	44	9.0	81	11.6	American Robin	78	13.7	110	12.9	Pygmy Nuthatch	41	7.6	57	8.3	
American Robin	61	12.5	77	11.1	Mourning Dove	32	5.6	63	7.4	Northern Flicker	44	8.2	52	7.6	
Western Wood-Pewee	51	10.4	63	9.1	Pygmy Nuthatch	29	5.1	55	6.4	Steller's Jay	36	6.7	52	7.6	
Yellow-rumped Warbler	35	7.2	53	7.6	Yellow-rumped Warbler	33	5.8	41	4.8	Western Tanager	34	6.3	49	7.2	
Dark-eyed Junco	32	6.5	46	6.6	Violet-green Swallow	14	2.5	38	4.4	Violet-green Swallow	25	4.7	41	6.0	
Mourning Dove	30	6.1	36	5.2	Western Tanager	28	4.9	36	4.2	Chipping Sparrow	25	4.7	37	5.4	
Western Bluebird	19	3.9	30	4.3	Green-tailed Towhee	28	4.9	35	4.1	Green-tailed Towhee	24	4.5	29	4.2	
Chipping Sparrow	20	4.1	23	3.3	House Wren	26	4.6	32	3.7	Western Wood-Pewee	27	5.0	29	4.2	
White-breasted Nuthatch	21	4.3	23	3.3	Warbling Vireo	22	3.9	30	3.5	Plumbeous Vireo	23	4.3	25	3.7	
Red Crossbill	4	0.8	17	2.4	White-breasted Nuthatch	18	3.2	29	3.4	Warbling Vireo	16	3.0	17	2.5	
House Wren	12	2.5	15	2.2	Black-capped Chickadee	13	2.3	21	2.5	White-breasted Nuthatch	16	3.0	17	2.5	
Northern Flicker	12	2.5	14	2.0	Cordilleran Flycatcher	15	2.6	19	2.2	Black-capped Chickadee	8	1.5	11	1.6	
Hairy Woodpecker	9	1.8	10	1.4	Plumbeous Vireo	17	3.0	19	2.2	Broad-tailed Hummingbird	10	1.9	11	1.6	
Western Tanager	9	1.8	10	1.4	Steller's Jay	13	2.3	16	1.9	Yellow-rumped Warbler	10	1.9	11	1.6	
Steller's Jay	7	1.4	7	1.0	Western Bluebird	14	2.5	16	1.9	Turkey Vulture	9	1.7	10	1.5	
American Crow	5	1.0	6	0.9	Chipping Sparrow	11	1.9	12	1.4	Mourning Dove	7	1.3	9	1.3	
Broad-tailed Hummingbird	6	1.2	6	0.9	Northern Flicker	8	1.4	10	1.2	American Crow	8	1.5	8	1.2	
Townsend's Solitaire	5	1.0	6	0.9	Red Crossbill	7	1.2	9	1.1	Dark-eyed Junco	8	1.5	8	1.2	
Cordilleran Flycatcher	4	0.8	5	0.7	Dark-eyed Junco	6	1.1	8	0.9	House Wren	7	1.3	8	1.2	
Green-tailed Towhee	4	0.8	5	0.7	Hairy Woodpecker	6	1.1	7	0.8	Mountain Chickadee	5	0.9	8	1.2	
Black-capped Chickadee	4	0.8	4	0.6	Mountain Chickadee	5	0.9	6	0.7	Red Crossbill	1	0.2	8	1.2	
Mountain Chickadee	2	0.4	4	0.6	Broad-tailed Hummingbird	3	0.5	3	0.4	Hairy Woodpiecker	5	0.9	5	0.7	
Plumbeous Vireo	2	0.4	2	0.3	Turkey Vulture	3	0.5	3	0.4	Cordilleran Flycatcher	4	0.7	4	0.6	
Turkey Vulture	1	0.2	1	0.1	American Crow	2	0.4	2	0.2	Townsend's Solitaire	1	0.2	1	0.1	
Warbling Vireo	1	0.2	1	0.1	Townsend's Solitaire	1	0.2	1	0.1	Western Bluebird	1	0.2	1	0.1	
Species Unique to Respective Sites (Sorted by Abundance)															
Pine Siskin	2	0.4	3	0.4											
European Starling	1	0.2	1	0.1											
Osprey	1	0.2	1	0.1											
White-crowned sparrow	1	0.2	1	0.1											
					Band-tailed Pigeon	6	1.1	34	4.0						
					Black-headed Grosbeak	8	1.4	9	1.1						
					Great Horned Owl	1	0.2	3	0.4						
					Black-chinned Hummingbird	1	0.2	1	0.1						
					Dusky Grouse	1	0.2	1	0.1						
					Evening Grosbeak	1	0.2	1	0.1						
					Song Sparrow	1	0.2	1	0.1						
					Williamson's Sapsucker	1	0.2	1	0.1						
										Virginia's Warbler	21	3.9	21	3.1	
										Black-headed Grosbeak	7	1.3	7	1.0	
										Say's Phoebe	4	0.7	4	0.6	
										Hermit Thrush	2	0.4	3	0.4	
										Brown Creeper	1	0.2	1	0.1	
										Cooper's Hawk	1	0.2	1	0.1	
										Dusky Flycatcher	1	0.2	1	0.1	
										Northern Goshawk	1	0.2	1	0.1	
										Gray Catbird	1	0.2	1	0.1	
										Great Blue Heron	1	0.2	1	0.1	
										Tree Swallow	1	0.2	1	0.1	
Species Found At Two Respective Sites (Unsorted)															
Cassin's Finch	1	0.2	2	0.3	Cassin's Finch	4	0.7	6	0.7						
Spotted Towhee	3	0.6	3	0.4	Spotted Towhee	3	0.5	4	0.5						
					Grace's Warbler	11	1.9	11	1.3	Grace's Warbler	3	0.6	4	0.6	
					Red-tailed Hawk	4	0.7	4	0.5	Red-tailed Hawk	4	0.7	4	0.6	
					Orange-crowned Warbler	4	0.7	6	0.7	Orange-crowned Warbler	3	0.6	3	0.4	
Brown-headed Cowbird	1	0.2	1	0.1						Brown-headed Cowbird	2	0.4	2	0.3	
Collared Dove	2	0.4	3	0.4						Eurasian Collared Dove	1	0.2	1	0.1	
Common Nighthawk	3	0.6	3	0.4						Common Nighthawk	1	0.2	1	0.1	
Common Raven	5	1.0	14	2.0						Common Raven	9	1.7	12	1.8	
Red-breasted Nuthatch	1	0.2	2	0.3						Red-breasted Nuthatch	1	0.2	3	0.4	

<u>Season 2021</u> - Table 3. Summary of the 60 different bird species observed across the three study areas in 2021. Data shown are the number of sample points at which respective bird species were recorded (i.e., frequency); and the number of birds of the respective species observed (i.e., abundance). Species lists represent those found at all three sites, sorted by abundance within the respective sites; those unique at any one of the three sites, sorted by abundance within the respective sites; and those found at two of the three sites, unsorted

2021	Turkey Springs					Fawn Gulch					Jackson Mountain				
Number of Species	35				Number of Species	40				Number of Species	43				
# Point Records	438	# Birds	609		# Point Records	422	# Birds	594		# Point Records	467	# Birds	652		
	Freq	Rel Freq	Abund	Rel Abund		Freq	Rel Freq	Abund	Rel Abund		Freq	Rel Freq	Abund	Rel Abund
Species Found At All Three Sites (Sorted by Abundance)															
Pygmy Nuthatch	48	11.0%	92	15.1%	American Robin	81	19.2%	140	23.6%	Pygmy Nuthatch	50	10.7%	90	13.8%
Violet-green Swallow	42	9.6%	77	12.6%	Western Wood-Pewee	67	15.9%	94	15.8%	American Robin	61	13.1%	85	13.0%
American Robin	49	11.2%	59	9.7%	Green-tailed Towhee	42	10.0%	53	8.9%	Western Wood-Pewee	44	9.4%	59	9.0%
Western Wood-Pewee	43	9.8%	55	9.0%	Western Tanager	24	5.7%	37	6.2%	Northern Flicker	40	8.6%	49	7.5%
Yellow-rumped Warbler	37	8.4%	45	7.4%	Stellar's Jay	24	5.7%	33	5.6%	Western Tanager	35	7.5%	47	7.2%
Chipping Sparrow	24	5.5%	35	5.7%	Pygmy Nuthatch	19	4.5%	27	4.5%	Violet-green Swallow	24	5.1%	45	6.9%
White-breasted Nuthatch	30	6.8%	34	5.6%	White-breasted Nuthatch	19	4.5%	20	3.4%	Mourning Dove	27	5.8%	39	6.0%
Northern Flicker	20	4.6%	27	4.4%	Northern Flicker	19	4.5%	19	3.2%	Stellar's Jay	20	4.3%	30	4.6%
Dark-eyed Junco	13	3.0%	17	2.8%	Warbling Vireo	11	2.6%	19	3.2%	Warbling Vireo	15	3.2%	27	4.1%
Western Tanager	13	3.0%	17	2.8%	Yellow-rumped Warbler	14	3.3%	19	3.2%	Yellow-rumped Warbler	16	3.4%	18	2.8%
Plumbeous Vireo	15	3.4%	15	2.5%	Chipping Sparrow	13	3.1%	15	2.5%	Hairy Woodpecker	13	2.8%	15	2.3%
House Wren	5	1.1%	7	1.1%	Violet-green Swallow	8	1.9%	14	2.4%	White-breasted Nuthatch	12	2.6%	14	2.1%
Townsend's Solitaire	6	1.4%	7	1.1%	Mourning Dove	10	2.4%	11	1.9%	Green-tailed Towhee	10	2.1%	11	1.7%
Hairy Woodpecker	5	1.1%	6	1.0%	Hairy Woodpecker	5	1.2%	7	1.2%	Plumbeous Vireo	8	1.7%	10	1.5%
American Crow	4	0.9%	5	0.8%	Plumbeous Vireo	4	0.9%	5	0.8%	Common Raven	7	1.5%	8	1.2%
Common Raven	4	0.9%	4	0.7%	American Crow	3	0.7%	3	0.5%	House Wren	6	1.3%	7	1.1%
Green-tailed Towhee	4	0.9%	4	0.7%	Dark-eyed Junco	2	0.5%	3	0.5%	Chipping Sparrow	5	1.1%	6	0.9%
Mourning Dove	3	0.7%	3	0.5%	Mountain Chickadee	2	0.5%	3	0.5%	Turkey Vulture	5	1.1%	6	0.9%
Warbling Vireo	3	0.7%	3	0.5%	House Wren	2	0.5%	2	0.3%	Dark-eyed Junco	2	0.4%	5	0.8%
Mountain Chickadee	1	0.2%	1	0.2%	Townsend's Solitaire	2	0.5%	2	0.3%	American Crow	3	0.6%	3	0.5%
Stellar's Jay	1	0.2%	1	0.2%	Turkey Vulture	2	0.5%	2	0.3%	Mountain Chickadee	1	0.2%	2	0.3%
Turkey Vulture	1	0.2%	1	0.2%	Common Raven	1	0.2%	1	0.2%	Townsend's Solitaire	2	0.4%	2	0.3%
Species Unique to Respective Sites (Sorted by Abundance)															
Brown Creeper	1	0.2%	1	0.2%										
Great-Horned Owl	1	0.2%	1	0.2%										
Mallard	1	0.2%	1	0.2%										
Mountain Bluebird	1	0.2%	1	0.2%										
Sharp-shinned Hawk	1	0.2%	1	0.2%										
White-crowned Sparrow	1	0.2%	1	0.2%										
					Three-toed Woodpecker	2	0.5%	3	0.5%					
					Ash-throated Flycatcher	1	0.2%	1	0.2%					
					Cassin's Vireo	1	0.2%	1	0.2%					
					Olive-sided Flycatcher	1	0.2%	1	0.2%					
					Red-tailed Hawk	1	0.2%	1	0.2%					
					Red-winged Blackbird	1	0.2%	1	0.2%					
					Tree Swallow	1	0.2%	1	0.2%					
										Brown-headed Cowbird	2	0.4%	4	0.6%
										Lewis's Woodpecker	3	0.6%	3	0.5%
										Bullock's Oriole	2	0.4%	2	0.3%
										Bald Eagle	1	0.2%	1	0.2%
										Band-tailed Pigeon	1	0.2%	1	0.2%
										Collared Dove	1	0.2%	1	0.2%
										Downy Woodpecker	1	0.2%	1	0.2%
										Hermit Thrush	1	0.2%	1	0.2%
										Peregrine Falcon	1	0.2%	1	0.2%
										Western Meadowlark	1	0.2%	1	0.2%
										Williamson's Sapsucker	1	0.2%	1	0.2%
Species Found At Two Respective Sites (Unsorted)															
Cassin's Finch	2	0.5%	3	0.5%	Cassin's Finch	2	0.5%	2	0.3%					
Common Nighthawk	5	1.1%	7	1.1%	Common Nighthawk	8	1.9%	16	2.7%					
Spotted Towhee	5	1.1%	5	0.8%	Spotted Towhee	11	2.6%	13	2.2%					
Western Bluebird	34	7.8%	53	8.7%	Western Bluebird	6	1.4%	8	1.3%					
					Black-headed Grosbeak	4	0.9%	7	1.2%	Black-headed Grosbeak	10	2.1%	10	1.5%
					Cordilleran Flycatcher	2	0.5%	2	0.3%	Cordilleran Flycatcher	12	2.6%	18	2.8%
					Great Blue Heron	1	0.2%	1	0.2%	Great Blue Heron	1	0.2%	1	0.2%
					Orange-crowned Warbler	2	0.5%	2	0.3%	Orange-crowned Warbler	8	1.7%	9	1.4%
					Say's Phoebe	2	0.5%	2	0.3%	Say's Phoebe	2	0.4%	2	0.3%
					Turkey	1	0.2%	2	0.3%	Turkey	1	0.2%	1	0.2%
					Virginia's Warbler	1	0.2%	1	0.2%	Virginia's Warbler	4	0.9%	5	0.8%
Black-capped Chickadee	3	0.7%	3	0.5%						Black-capped Chickadee	3	0.6%	5	0.8%
Broad-tailed Hummingbird	2	0.5%	2	0.3%						Broad-tailed Hummingbird	3	0.6%	3	0.5%
Grace's Warbler	10	2.3%	15	2.5%						Grace's Warbler	2	0.4%	3	0.5%

<u>Season 2022</u> - Table 2. Summary of the 56 different bird species observed across the three study areas in 2022. Data shown are the number of sample points at which respective bird species were recorded (i.e., frequency); and the number of birds of the respective species observed (i.e., abundance). Species lists represent those found at all three sites, sorted by abundance within the respective sites; those unique at any one of the three sites, sorted by abundance within the respective sites; and those found at two of the three sites, unsorted

2022	Fawn Gulch (FG)				Jackson Mountain (original site - JM)					Jackson Mountain (New Site - JMN)				
Number of Species	37				Number of Species	41		41		Number of Species	38		38	
# Point Records	554	# Birds	678		# Point Records	719	# Birds	933		# Point Records	393	# Birds	475	
	Freq	Rel Freq	Abund	Rel Abund		Freq	Rel Freq	Abund	Rel Abund		Freq	Rel Freq	Abund	Rel Abund
Species Found At All Three Sites (Sorted by Abundance)														
Pygmy Nuthatch	37	26.4	68	10.0	Pygmy Nuthatch	57	38.0	107	11.5	Warbling Vireo	37	28.5	44	9.3
Western Tanager	50	35.7	61	9.0	American Robin	71	47.3	92	9.9	Western Tanager	34	26.2	43	9.1
American Robin	48	34.3	60	8.8	Western Tanager	72	48.0	90	9.6	Mountain Chickadee	23	17.7	27	5.7
Green-tailed Towhee	45	32.1	49	7.2	Violet-green Swallow	46	30.7	78	8.4	American Robin	23	17.7	25	5.3
Northern Flicker	39	27.9	46	6.8	Northern Flicker	47	31.3	58	6.2	Pygmy Nuthatch	16	12.3	24	5.1
Yellow-rumped Warbler	31	22.1	34	5.0	House Wren	32	21.3	39	4.2	Steller's Jay	19	14.6	22	4.6
Plumbeous Vireo	28	20.0	32	4.7	Steller's Jay	27	18.0	33	3.5	Dark-eyed Junco	18	13.8	22	4.6
Chipping Sparrow	27	19.3	29	4.3	Green-tailed Towhee	30	20.0	31	3.3	Chipping Sparrow	16	12.3	21	4.4
White-breasted Nuthatch	21	15.0	23	3.4	Warbling Vireo	28	18.7	31	3.3	House Wren	17	13.1	20	4.2
Warbling Vireo	15	10.7	18	2.7	White-breasted Nuthatch	26	17.3	31	3.3	Yellow-rumped Warbler	16	12.3	19	4.0
Steller's Jay	13	9.3	15	2.2	Chipping Sparrow	26	17.3	27	2.9	Violet-green Swallow	7	5.4	13	2.7
House Wren	10	7.1	10	1.5	Black-headed Grosbeak	15	10.0	16	1.7	White-breasted Nuthatch	8	6.2	10	2.1
Violet-green Swallow	4	2.9	6	0.9	Common Raven	11	7.3	12	1.3	Northern Flicker	9	6.9	9	1.9
Broad-tailed Hummingbird	5	3.6	5	0.7	Mourning Dove	10	6.7	12	1.3	Orange-crowned Warbler	7	5.4	7	1.5
Orange-crowned Warbler	5	3.6	5	0.7	Plumbeous Vireo	9	6.0	10	1.1	Plumbeous Vireo	3	2.3	6	1.3
Black-headed Grosbeak	4	2.9	4	0.6	Yellow-rumped Warbler	8	5.3	10	1.1	Green-tailed Towhee	4	3.1	5	1.1
Mountain Chickadee	3	2.1	4	0.6	Dark-eyed Junco	9	6.0	9	1.0	Black-headed Grosbeak	4	3.1	4	0.8
Cordilleran Flycatcher	3	2.1	3	0.4	Mountain Chickadee	8	5.3	8	0.9	Broad-tailed hummingbird	4	3.1	4	0.8
Common Raven	2	1.4	2	0.3	Red-tailed Hawk	5	3.3	6	0.6	Common Raven	2	1.5	2	0.4
Dark-eyed Junco	2	1.4	2	0.3	Broad-tailed Hummingbird	5	3.3	5	0.5	Hairy Woodpecker	2	1.5	2	0.4
Hairy Woodpecker	2	1.4	2	0.3	Hairy Woodpecker	5	3.3	5	0.5	Cordilleran Flycatcher	1	0.8	1	0.2
Red-tailed Hawk	2	1.4	2	0.3	Cordilleran Flycatcher	3	2.0	4	0.4	Mourning Dove	1	0.8	1	0.2
Mourning Dove	1	0.7	1	0.1	Orange-crowned Warbler	3	2.0	3	0.3	Red-tailed Hawk	1	0.8	1	0.2
Species Unique to Respective Sites (Sorted by Abundance)														
Common Nighthawk	12	8.6	12	1.8										
Cassin's Finch	4	2.9	5	0.7										
Bald Eagle	1	0.7	1	0.1										
Brown-headed Cowbird	1	0.7	1	0.1										
Mountain Bluebird	1	0.7	1	0.1										
					American Crow	7	4.7	7	0.8					
					Dusky Grouse	1	0.7	2	0.2					
					Olive-sided Flycatcher	2	1.3	2	0.2					
					American Kestrel	1	0.7	1	0.1					
					Downey Woodpecker	1	0.7	1	0.1					
					Osprey	1	0.7	1	0.1					
										Ruby-crowned Kinglet	17	13.1	19	4.0
										Townsend's Solitaire	2	1.5	3	0.6
										Cooper's Hawk	1	0.8	2	0.4
										Red-naped Sapsucker	2	1.5	2	0.4
										Sharp-shinned Hawk	2	1.5	2	0.4
										Wild Turkey	1	0.8	2	0.4
										House Finch	1	0.8	1	0.2
										MacGillivray's Warbler	1	0.8	1	0.2
Species Found at Two Respective Sites (Unsorted)														
Dusky Flycatcher	20	14.3	20	2.9	Dusky Flycatcher	2	1.3	3	0.3					
Spotted Towhee	11	7.9	11	1.6	Spotted Towhee	10	6.7	10	1.1					
Turkey Vulture	4	2.9	5	0.7	Turkey Vulture	4	2.7	5	0.5					
Virginia's Warbler	1	0.7	1	0.1	Virginia's Warbler	15	10.0	16	1.7					
Western Bluebird	13	9.3	28	4.1	Western Bluebird	1	0.7	3	0.3					
Western Wood-Pewee	69	49.3	90	13.3	Western Wood-Pewee	85	56.7	120	12.9					
Williamson's Sapsucker	1	0.7	1	0.1	Williamson's Sapsucker	1	0.7	1	0.1					
					Black-capped Chickadee	1	0.7	2	0.2	Black-capped Chickadee	5	3.8	5	1.1
					Brown Creeper	1	0.7	1	0.1	Brown Creeper	7	5.4	7	1.5
					Hammond's Flycatcher	26	17.3	34	3.6	Hammond's Flycatcher	23	17.7	26	5.5
					Hermit Thrush	4	2.7	4	0.4	Hermit Thrush	26	20.0	35	7.4
					Red-breasted Nuthatch	3	2.0	3	0.3	Red-breasted Nuthatch	30	23.1	35	7.4
Grace's Warbler	18	12.9	18	2.7						Grace's Warbler	2	1.5	2	0.4
Pine Siskin	1	0.7	3	0.4						Pine Siskin	1	0.8	1	0.2

<u>Season 2023</u> - Table 2. Summary of the 64 different bird species observed across the three study areas in 2023. Data shown are the number of sample points at which respective bird species were recorded (i.e., frequency); and the number of birds of the respective species observed (i.e., abundance). Species lists represent those found at all three sites, sorted by abundance within the respective sites; those unique at any one of the three sites, sorted by abundance within the respective sites; and those found at two of the three sites, unsorted

2023	Fawn Gulch (FG)				Jackson Mountain (JM)					Jackson Mountain North (JMN)				
Number of Species	50				Number of Species	48				Number of Species	38			
# Point Records	814	# Birds	952		# Point Records	901	# Birds	1075		# Point Records	771	# Birds	876	
	Frequency	Rel Freq	Abundance	Rel Abund		Frequency	Rel Freq	Abundance	Rel Abund		Frequency	Rel Freq	Abundance	Rel Abund
Species Found At All Three Sites (sorted by Abundance)														
American Robin	104	12.78	136	14.29	American Robin	113	12.54	149	13.86	Hammond's Flycatcher	84	10.89	101	11.53
Western Tanager	85	10.44	99	10.40	Western Tanager	89	9.88	102	9.49	Warbling Vireo	81	10.51	93	10.62
Yellow-rumped Warbler	51	6.27	55	5.78	Warbling Vireo	75	8.32	85	7.91	Western Tanager	77	9.99	85	9.70
Warbling Vireo	44	5.41	49	5.15	Yellow-rumped Warbler	68	7.55	73	6.79	Mountain Chickadee	45	5.84	52	5.94
Northern Flicker	34	4.18	45	4.73	House Wren	49	5.44	63	5.86	Yellow-rumped Warbler	50	6.49	52	5.94
Chipping Sparrow	31	3.81	34	3.57	Pygmy Nuthatch	39	4.33	60	5.58	Hermit Thrush	42	5.45	50	5.71
Pygmy Nuthatch	23	2.83	32	3.36	Violet-green Swallow	30	3.33	59	5.49	Dark-eyed Junco	33	4.28	33	3.77
White-breasted Nuthatch	27	3.32	32	3.36	Hammond's Flycatcher	42	4.66	48	4.47	Orange-crowned Warbler	29	3.76	31	3.54
Dusky Flycatcher	26	3.19	28	2.94	Northern Flicker	41	4.55	45	4.19	Chipping Sparrow	23	2.98	28	3.20
House Wren	24	2.95	25	2.63	Black-headed Grosbeak	33	3.66	35	3.26	Northern Flicker	25	3.24	25	2.85
Black-Headed Grosbeak	20	2.46	21	2.21	Chipping Sparrow	31	3.44	33	3.07	Steller's Jay	20	2.59	25	2.85
Virginia's Warbler	17	2.09	18	1.89	Virginia's Warbler	29	3.22	31	2.88	American Robin	20	2.59	20	2.28
Dark-eyed Junco	14	1.72	15	1.58	Steller's Jay	22	2.44	29	2.70	Violet-green Swallow	11	1.43	20	2.28
Violet-green Swallow	3	0.37	13	1.37	Broad-tailed Hummingbird	11	1.22	11	1.02	House Wren	18	2.33	19	2.17
Steller's Jay	8	0.98	9	0.95	White-breasted Nuthatch	10	1.11	10	0.93	Pine Siskin	10	1.30	13	1.48
Broad-tailed Hummingbird	8	0.98	8	0.84	Hermit Thrush	9	1.00	9	0.84	Red Crossbill	10	1.30	12	1.37
Mountain Chickadee	7	0.86	7	0.74	Common Raven	7	0.78	8	0.74	Common Raven	4	0.52	7	0.80
Orange-crowned Warbler	5	0.61	6	0.63	Hairy Woodpecker	5	0.55	7	0.65	Hairy Woodpecker	6	0.78	6	0.68
Hammond's Flycatcher	3	0.37	4	0.42	Dark-eyed Junco	6	0.67	6	0.56	Black-headed Grosbeak	5	0.65	5	0.57
Red-tailed Hawk	4	0.49	4	0.42	Orange-crowned Warbler	5	0.55	6	0.56	White-breasted Nuthatch	3	0.39	4	0.46
Hermit Thrush	3	0.37	3	0.32	Pine Siskin	6	0.67	6	0.56	Broad-tailed Hummingbird	3	0.39	3	0.34
American Crow	2	0.25	2	0.21	Dusky Flycatcher	5	0.55	5	0.47	Virginia's Warbler	3	0.39	3	0.34
Common Raven	2	0.25	2	0.21	Red-tailed Hawk	5	0.55	5	0.47	Pygmy Nuthatch	2	0.26	2	0.23
Pine Siskin	2	0.25	2	0.21	American Crow	4	0.44	4	0.37	American Crow	1	0.13	1	0.11
Red Crossbill	2	0.25	2	0.21	Turkey Vulture	4	0.44	4	0.37	Dusky Flycatcher	1	0.13	1	0.11
Hairy Woodpecker	1	0.12	1	0.11	Mountain Chickadee	3	0.33	3	0.28	Red-tailed Hawk	1	0.13	1	0.11
Turkey Vulture	1	0.12	1	0.11	Red Crossbill	1	0.11	1	0.09	Turkey Vulture	1	0.13	1	0.11
Species Unique to Respective Sites (Sorted by Abundance)														
Common Nighthawk	19	2.33	20	2.10										
Cassin's Vireo	2	0.25	2	0.21										
Cedar Waxwing	1	0.12	2	0.21										
Evening Grosbeak	1	0.12	2	0.21										
Mallard	1	0.12	2	0.21										
Great Blue Heron	1	0.12	1	0.11										
Sharp-shinned Hawk	1	0.12	1	0.11										
Song Sparrow	1	0.12	1	0.11										
					Black Swift	2	0.22	5	0.47					
					White-throated Swift	1	0.11	2	0.19					
					Olive-sided Flycatcher	1	0.11	1	0.09					
					Red-naped Sapsucker	1	0.11	1	0.09					
					Wild Turkey	1	0.11	1	0.09					
										Ruby-crowned Kinglet	91	11.80	105	11.99
										Williamson's Sapsucker	7	0.91	9	1.03
										MacGillivray's Warbler	5	0.65	5	0.57
										Black-capped Chickadee	2	0.26	2	0.23
										Great Horned Owl	2	0.26	2	0.23
										Northern Pygmy Owl	1	0.13	1	0.11
Species Found at Two Respective Sites (Alphabetical)														
Brown-headed Cowbird	1	0.12	1	0.11	Brown-headed Cowbird	1	0.11	2	0.19					
Cassin's Finch	13	1.60	15	1.58	Cassin's Finch	4	0.44	4	0.37					
Cordilleran Flycatcher	2	0.25	2	0.21	Cordilleran Flycatcher	1	0.11	1	0.09					
Grace's Warbler	30	3.69	36	3.78	Grace's Warbler	19	2.11	22	2.05					
Green-tailed Towhee	42	5.16	47	4.94	Green-tailed Towhee	9	1.00	9	0.84					
House Finch	2	0.25	2	0.21	House Finch	1	0.11	1	0.09					
Mourning Dove	1	0.12	1	0.11	Mourning Dove	18	2.00	22	2.05					
Plumbeous Vireo	40	4.91	42	4.41	Plumbeous Vireo	13	1.44	15	1.40					
Red-winged Blackbird	2	0.25	2	0.21	Red-winged Blackbird	5	0.55	5	0.47					
Spotted Towhee	7	0.86	7	0.74	Spotted Towhee	4	0.44	4	0.37					
Western Bluebird	10	1.23	13	1.37	Western Bluebird	3	0.33	4	0.37					
Western Wood-Pewee	78	9.58	94	9.87	Western Wood-Pewee	63	6.99	68	6.33					
Yellow Warbler	1	0.12	1	0.11	Yellow Warbler	4	0.44	4	0.37					
					Brown Creeper	4	0.44	4	0.37	Brown Creeper	18	2.33	19	2.17
					Red-breasted Nuthatch	1	0.11	1	0.09	Red-breasted Nuthatch	33	4.28	37	4.22
					Townsend's Solitaire	2	0.22	2	0.19	Townsend's Solitaire	1	0.13	1	0.11
Ash-throated Flycatcher	1	0.12	2	0.21						Ash-throated Flycatcher	1	0.13	1	0.11
Downy Woodpecker	1	0.12	1	0.11						Downy Woodpecker	1	0.13	1	0.11

<u>Season 2024</u> - Summary of the 71 different bird species observed across the three study areas in 2024. Data shown are the number of sample points at which respective bird species were recorded (i.e., frequency); and the number of birds of the respective species observed (i.e., abundance). Species lists represent those found at all three sites, sorted by abundance within the respective sites; those unique at any one of the three sites, sorted alphabetically within the respective sites; and those found at two of the three sites, sorted alphabetically. Bird species shown in RED were observed for the first time in 2024.

Fawn Gulch							Jackson Mountain North							Jackson Mountain Thinned						
# of Species (of 71 total)	51			Percent	66%	34%	# of Species (of 71 total)	49			Percent	80%	20%	# of Species (of 71 total)	54			Percent	77%	23%
TOTALS	867		1038		645	339	TOTALS	946		1053		815	205	TOTALS	748		867		640	194
Species	Freq	Rel Freq	Abund	Rel Abund	Song	Sight	Species	Freq	Rel Freq	Abund	Rel Abund	Song	Sight	Species	Freq	Rel Freq	Abund	Rel Abund	Song	Sight
30 Species Common Across All Sites Sorted by Relative Abundance																				
Western Wood Pewee	82	9.5	89	8.6	70	23	Warbling Vireo	99	10.5	110	10.4	95	8	**Western Tanager**	70	9.4	80	9.2	63	21
American Robin	68	7.8	87	8.4	42	45	**Western Tanager**	83	8.8	93	8.8	72	22	**American Robin**	49	6.6	56	6.5	45	13
Western Tanager	70	8.1	85	8.2	47	35	Hammond's Flycatcher	67	7.1	73	6.9	57	18	Warbling Vireo	48	6.4	53	6.1	47	2
Green-tailed Towhee	59	6.8	68	6.6	53	17	**Yellow-rumped Warbler**	65	6.9	68	6.5	58	10	House Wren	45	6.0	49	5.7	40	6
Northern Flicker	61	7.0	64	6.2	50	22	**Violet-green Swallow**	35	3.7	59	5.6	16	24	Steller's Jay	35	4.7	48	5.5	21	21
Yellow-rumped Warbler	58	6.7	62	6.0	49	16	Mountain Chickadee	48	5.1	56	5.3	40	10	Western Wood-Pewee	37	4.9	40	4.6	35	8
White-breasted Nuthatch	39	4.5	44	4.2	30	15	Orange-crowned Warbler	43	4.5	43	4.1	42	3	**Yellow-rumped Warbler**	38	5.1	40	4.6	34	7
Violet-green Swallow	13	1.5	43	4.1	3	12	Northern Flicker	38	4.0	40	3.8	33	11	Dark-eyed Junco	36	4.8	36	4.2	35	1
Chipping Sparrow	39	4.5	40	3.9	37	5	Chipping Sparrow	34	3.6	37	3.5	30	4	**Violet-green Swallow**	19	2.5	36	4.2	9	15
Pygmy Nuthatch	31	3.6	39	3.8	21	13	**American Robin**	35	3.7	36	3.4	28	15	Black-headed Grosbeak	31	4.1	35	4.0	30	8
Subtotal	**520**	**60.0**	**621**	**59.8**	**402**	**209**	**Subtotal**	**547**	**57.8**	**615**	**58.4**	**471**	**125**	**Subtotal**	**408**	**54.5**	**473**	**54.6**	**359**	**102**
Dark-eyed Junco	31	3.6	36	3.5	24	10	House Wren	32	3.4	33	3.1	31	1	Chipping Sparrow	33	4.4	35	4.0	32	4
Red Crossbill	17	2.0	35	3.4	13	6	Dark-eyed Junco	25	2.6	27	2.6	21	7	Green-tailed Towhee	33	4.4	34	3.9	29	8
Steller's Jay	29	3.3	35	3.4	17	19	Steller's Jay	23	2.4	24	2.3	16	7	Mountain Chickadee	30	4.0	34	3.9	28	8
House Wren	25	2.9	28	2.7	21	4	Pine Siskin	16	1.7	17	1.6	16		Northern Flicker	29	3.9	31	3.6	17	18
Warbling Vireo	23	2.7	25	2.4	22	2	Williamson's Sapsucker	11	1.2	15	1.4	6	9	Pygmy Nuthatch	16	2.1	24	2.8	10	8
Spotted Towhee	21	2.4	21	2.0	21		Black-headed Grosbeak	11	1.2	11	1.0	10	2	Red Crossbill	10	1.3	22	2.5	7	6
Turkey Vulture	7	0.8	19	1.8		7	Pygmy Nuthatch	8	0.8	10	0.9	6	2	Pine Siskin	17	2.3	20	2.3	16	1
Mountain Chickadee	13	1.5	14	1.3	12	2	Western Wood-Pewee	9	1.0	10	0.9	7	2	Orange-crowned Warbler	13	1.7	16	1.8	13	
Blackheaded Grosbeak	7	0.8	10	1.0	3	4	Broad-tailed Hummingbird	7	0.7	7	0.7	6	3	White-breasted Nuthatch	15	2.0	15	1.7	13	3
Pine Siskin	6	0.7	10	1.0	6	2	Common Raven	6	0.6	7	0.7	5	2	Spotted Towhee	12	1.6	12	1.4	12	
Hairy Woodpecker	8	0.9	8	0.8	5	4	Hairy Woodpecker	6	0.6	6	0.6	6	3	Common Raven	6	0.8	8	0.9	4	2
Broad-tailed Hummingbird	4	0.5	4	0.4	2	2	Red Crossbill	6	0.6	6	0.6	6	1	Hammond's Flycatcher	8	1.1	8	0.9	8	
Hammond's Flycatcher	4	0.5	4	0.4	4	1	White-breasted Nuthatch	5	0.5	5	0.5	2	3	Hairy Woodpecker	7	0.9	7	0.8	4	4
Orange-crowned Warbler	3	0.3	4	0.4	3		Green-tailed Towhee	4	0.4	4	0.4	3	1	Turkey Vulture	5	0.7	6	0.7		5
Common Raven	2	0.2	2	0.2	1	2	Spotted Towhee	4	0.4	4	0.4	4		Williamson's Sapsucker	5	0.7	6	0.7		5
American Crow	1	0.1	1	0.1		1	Turkey Vulture	4	0.4	4	0.4		4	Evening Grosbeak	4	0.5	4	0.5	4	1
Downy Woodpecker	1	0.1	1	0.1	1	1	American Crow	2	0.2	3	0.3	1	1	Broad-tailed Hummingbird	3	0.4	3	0.3	3	
Dusky Grouse	1	0.1	1	0.1	1		Dusky Grouse	3	0.3	3	0.3		3	Dusky Grouse	1	0.1	3	0.3	1	1
Evening Grosbeak	1	0.1	1	0.1	1		Downy Woodpecker	2	0.2	2	0.2	2		Lewis's Woodpecker	3	0.4	3	0.3	2	2
Lewis's Woodpecker	1	0.1	1	0.1		1	Evening Grosbeak	2	0.2	2	0.2	1	1	American Crow	2	0.3	2	0.2	2	
Williamson's Sapsucker	1	0.1	1	0.1		1	Lewis's Woodpecker	1	0.1	1	0.1		1	Downy Woodpecker	1	0.1	1	0.1	1	
Total	**726**	**83.7**	**882**	**85.0**	**559**	**272**	**Total**	**734**	**77.6**	**816**	**77.5**	**620**	**178**	**Total**	**661**	**88.4**	**767**	**88.5**	**565**	**178**
Species Observed At One Site																				
American Kestrel	1	0.1	1	0.1		1														
Cassin's Finch	2	0.2	3	0.3	1	2														
Common Nighthawk	17	2.0	17	1.6	16	2														
Dusky Flycatcher	41	4.7	44	4.2	32	15														
Mountain Bluebird	1	0.1	2	0.2		1														
Red-winged Blackbird	1	0.1	1	0.1	1															
Song Sparrow	1	0.1	1	0.1	1															
Western Flycatcher	1	0.1	1	0.1		1														
Western Screech-owl	1	0.1	1	0.1	1															
							Cooper's Hawk	1	0.1	1	0.1		1							
							Golden-crowned Kinglet	3	0.3	3	0.3	3	1							
							Three-toed Woodpecker	1	0.1	1	0.1	1	1							
							White-crowned Sparrow	2	0.2	2	0.2	2								
							White-throated Swift	1	0.1	1	0.1		1							
														Canada Goose	1	0.1	5	0.6	1	1
														Eurasian Collared Dove	1	0.1	2	0.2		1
														Lesser Goldfinch	1	0.1	1	0.1	1	
Species Obwerved at Two Sites																				
Brewer's Blackbird	1	0.1	1	0.1	1									Brewer's Blackbird	1	0.1	3	0.3	1	1
Grace's Warbler	6	0.7	6	0.6	5	2								Grace's Warbler	1	0.1	1	0.1	1	
Mourning Dove	3	0.3	4	0.4		3								Mourning Dove	5	0.7	6	0.7	4	1
Plumbeous Vireo	10	1.2	11	1.1	6	4								Plumbeous Vireo	7	0.9	8	0.9	7	
Red-tailed Hawk	2	0.2	2	0.2	1	2								Red-tailed Hawk	1	0.1	1	0.1		1
Townsend's Solitaire	1	0.1	1	0.1		1								Townsend's Solitaire	2	0.3	2	0.2	2	
Virginia's Warbler	19	2.2	19	1.8	17	3								Virginia's Warbler	15	2.0	17	2.0	15	
Western Bluebird	29	3.3	36	3.5		29								Western Bluebird	4	0.5	5	0.6		4
Wild Turkey	1	0.1	1	0.1	1									Wild Turkey	1	0.1	2	0.2		1
							Brown Creeper	11	1.2	13	1.2	10	2	Brown Creeper	3	0.4	3	0.3	3	
							Cedar Waxwing	2	0.2	2	0.2	2		Cedar Waxwing	1	0.1	1	0.1	1	
							Clark's Nutcracker	3	0.3	3	0.3	3		Clark's Nutcracker	2	0.3	2	0.2	2	1
							Hermit Thrush	65	6.9	74	7.0	59	8	Hermit Thrush	5	0.7	5	0.6	5	
							MacGillivray's Warbler	5	0.5	5	0.5	5		MacGillivay's Warbler	10	1.3	10	1.2	10	
							Olive-sided Flycatcher	2	0.2	2	0.2	2		Olive-sided Flycatcher	6	0.8	6	0.7	5	1
							Osprey	1	0.1	1	0.1		1	Osprey	1	0.1	1	0.1		1
							Red-breasted nuthatch	19	2.0	23	2.2	18	4	Red-breasted Nuthatch	4	0.5	4	0.5	4	
							Red-naped Sapsucker	2	0.2	2	0.2		2	Red-naped Sapsucker	1	0.1	1	0.1	1	1
							Rose-breasted Grosbeak	2	0.2	2	0.2	2		**Rose-breasted Grosbeak**	1	0.1	1	0.1	1	
							Ruby-crowned Kinglet	90	9.5	99	9.4	87	5	Ruby-crowned Kinglet	13	1.7	13	1.5	11	2
Brown-headed Cowbird	2	0.2	3	0.3	2	1	Brown-headed Cowbird	1	0.1	2	0.2		1							
House Finch	1	0.1	1	0.1	1		**House Finch**	1	0.1	1	0.1	1								

<u>Season 2025</u> - Summary of the 76 different bird species observed across the three study areas in 2025. Data shown are the number of sample points at which respective bird species were recorded (i.e., frequency); and the number of birds of the respective species observed (i.e., abundance). Species lists represent those found at all three sites, sorted by abundance within the respective sites; those unique at any one of the three sites, sorted alphabetically within the respective sites; and those found at two of the three sites, sorted alphabetically.

Fawn Gulch							Jackson Mountain (Original Site)							Jackson Mountain Thinned						
# of Species (of 76 total)	58				76%	24%	# of Species (of 76 total)	49				74%	26%	# of Species (of 76 total)	55				75%	25%
	1000		1176		868	270		947		1142		810	289		992		1147		857	279
Species	Freq	Rel Freq	Abund	Rel Abund	Song	Sight	Species	Freq	Rel Freq	Abund	Rel Abund	Song	Sight	Species	Freq	Rel Freq	Abund	Rel Abund	Song	Sight
34 Species Common Across All Sites Sorted by Relative Frequency																				
Western Wood Pewee	87	8.7	98	8.3	78	25	**Western Wood Pewee**	84	8.9	94	8.2	72	27	Northern Flicker	75	7.6	90	7.8	56	37
Red Crossbill	48	4.8	96	8.2	45	13	**Pygmy Nuthatch**	65	6.9	92	8.1	53	22	**Western Tanager**	73	7.4	87	7.6	64	18
Pygmy Nuthatch	59	5.9	84	7.1	50	22	Warbling Vireo	81	8.6	90	7.9	81	9	Violet-green Swallow	41	4.1	77	6.7	23	34
Green-tailed Towhee	76	7.6	80	6.8	70	16	**Western Tanager**	67	7.1	78	6.8	51	28	Warbling Vireo	66	6.7	73	6.4	60	8
Yellow-rumped Warbler	72	7.2	73	6.2	70	5	Red Crossbill	38	4.0	71	6.2	33	13	**Western Wood Pewee**	66	6.7	67	5.8	59	15
American Robin	59	5.9	67	5.7	37	36	American Robin	49	5.2	59	5.2	36	21	House Wren	55	5.5	62	5.4	51	13
Northern Flicker	55	5.5	65	5.5	42	22	Hammond's Flycatcher	51	5.4	55	4.8	48	13	**Pygmy Nuthatch**	31	3.1	52	4.5	23	14
Western Tanager	54	5.4	58	4.9	49	15	Plumbeous Vireo	49	5.2	55	4.8	48	5	Stellar's Jay	45	4.5	50	4.4	32	25
Dusky Flycatcher	52	5.2	52	4.4	46	11	Violet-green Swallow	26	2.7	54	4.7	15	18	Dark-eyed Junco	45	4.5	46	4.0	44	6
White-breasted Nuthatch	44	4.4	47	4.0	36	16	Stellar's Jay	43	4.5	53	4.6	32	23	Green-tailed Towhee	42	4.2	44	3.8	40	5
Subtotal	**606**	**60.6**	**720**	**61.2**	**523**	**181**	**Subtotal**	**553**	**58.4**	**701**	**61.4**	**469**	**179**	**Subtotal**	**539**	**54.3**	**648**	**56.5**	**452**	**175**
Plumbeous Vireo	36	3.6	41	3.5	35	3	House Wren	36	3.8	44	3.9	32	11	American Robin	35	3.5	44	3.8	23	18
Dark-eyed Junco	39	3.9	39	3.3	39		Yellow-rumped Warbler	37	3.9	38	3.3	33	8	Yellow-rumped Warbler	36	3.6	39	3.4	35	6
Stellar's Jay	27	2.7	34	2.9	15	17	Northern Flicker	35	3.7	38	3.3	31	8	Red Crossbill	22	2.2	36	3.1	21	3
Spotted Towhee	32	3.2	32	2.7	32	3	Mourning Dove	26	2.7	35	3.1	22	9	Orange-crowned Warbler	31	3.1	32	2.8	31	4
Mourning Dove	22	2.2	29	2.5	18	5	Black-headed Grosbeak	31	3.3	34	3.0	28	5	Mountain Chickadee	29	2.9	31	2.7	27	5
Black-headed Grosbeak	27	2.7	28	2.4	26	5	Chipping Sparrow	24	2.5	28	2.5	24	3	Chipping Sparrow	28	2.8	29	2.5	27	6
Evening Grosbeak	13	1.3	21	1.8	11	5	Mountain Chickadee	21	2.2	27	2.4	18	7	Mourning Dove	25	2.5	29	2.5	20	9
Mountain Chickadee	18	1.8	20	1.7	16	4	White-breasted Nuthatch	25	2.6	26	2.3	22	6	Black-headed Grosbeak	25	2.5	26	2.3	25	2
Chipping Sparrow	17	1.7	17	1.4	16	2	Green-tailed Towhee	13	1.4	15	1.3	12	3	Hairy Woodpecker	23	2.3	25	2.2	17	12
Violet-green Swallow	10	1.0	16	1.4	7	5	Dark-eyed Junco	11	1.2	11	1.0	11		White-breasted Nuthatch	23	2.3	24	2.1	19	10
Hairy Woodpecker	13	1.3	15	1.3	12	5	Broad-tailed Hummingbird	10	1.1	10	0.9	8	6	Spotted Towhee	21	2.1	21	1.8	21	
Virginia's Warbler	12	1.2	12	1.0	11	2	Hairy Woodpecker	10	1.1	10	0.9	8	7	Common Raven	16	1.6	18	1.6	15	3
Orange-crowned Warbler	10	1.0	10	0.9	9	1	Red-breasted Nuthatch	10	1.1	10	0.9	9	2	Dusky Flycatcher	13	1.3	13	1.1	13	1
Common Raven	9	0.9	10	0.9	9	1	Spotted Towhee	10	1.1	10	0.9	10	1	Virginia's Warbler	10	1.0	10	0.9	10	
Hammond's Flycatcher	7	0.7	7	0.6	7		Red-tailed Hawk	8	0.8	9	0.8	4	5	Hammond's Flycatcher	8	0.8	8	0.7	8	
Broad-tailed Hummingbird	6	0.6	6	0.5	5	1	Virginia's Warbler	8	0.8	8	0.7	8	1	Pine Siskin	8	0.8	8	0.7	8	1
Red-breasted Nuthatch	5	0.5	5	0.4	5		Turkey Vulture	6	0.6	7	0.6		6	Red-breasted Nuthatch	7	0.7	7	0.6	7	
Turkey Vulture	4	0.4	5	0.4		4	Orange-crowned Warbler	5	0.5	6	0.5	5	1	Evening Grosbeak	6	0.6	6	0.5	6	1
Warbling Vireo	4	0.4	4	0.3	4		Brown Creeper	5	0.5	5	0.4	5	1	Turkey Vulture	4	0.4	5	0.4	1	3
House Wren	3	0.3	3	0.3	3		Common Raven	4	0.4	4	0.4	3	2	Brown Creeper	4	0.4	4	0.3	4	1
Pine Siskin	2	0.2	2	0.2	2		Dusky Flycatcher	2	0.2	2	0.2	2		Plumbeous Vireo	4	0.4	4	0.3	4	
Townsend's Solitaire	2	0.2	2	0.2	2		Evening Grosbeak	2	0.2	2	0.2	2		Broad-tailed Hummingbird	3	0.3	3	0.3	3	1
Brown Creeper	1	0.1	1	0.1	1		Pine Siskin	1	0.1	1	0.1	1	1	Red-tailed Hawk	3	0.3	3	0.3		3
Red-tailed Hawk	1	0.1	1	0.1		1	Townsend's Solitaire	1	0.1	1	0.1	1		Towsend's Solitaire	1	0.1	1	0.1	1	
Total	**926**	**92.6**	**1080**	**91.8**	**808**	**245**	**Total**	**894**	**94.4**	**1082**	**94.7**	**768**	**272**	**Total**	**924**	**93.1**	**1074**	**93.6**	**798**	**264**
Species Observed at One Site																				
Black-capped Chickadee	1	0.1	1	0.1	1															
Black-chinned Hummingbird	1	0.1	1	0.1	1															
Black-throated Gray Warbler	1	0.1	1	0.1	1															
Brown-headed Cowbird	1	0.1	1	0.1	1															
Cassin's Vireo	2	0.2	2	0.2	2															
Dusky Grouse	1	0.1	1	0.1	1	1														
Mountain Bluebird	1	0.1	2	0.2	1	1														
Northern Pygmy Owl	1	0.1	1	0.1	1															
Peregrine Falcon	1	0.1	1	0.1		1														
Song Sparrow	2	0.2	2	0.2	2															
White-crowned Sparrow	1	0.1	1	0.1	1															
							Black-billed Magpie	1	0.1	1	0.1	1	1							
							Black-capped Chickadee	1	0.1	1	0.1		1							
							Brewer's Blackbird	1	0.1	1	0.1	1	1							
							Bullock's Oriole	1	0.1	1	0.1	1								
							Osprey	1	0.1	1	0.1		1							
														Blue-gray Gnatcatcher	1	0.1	1	0.1	1	
														Downy Woodpecker	2	0.2	2	0.2	2	
														Great Blue Heron	3	0.3	4	0.3		3
														House Finch	1	0.1	1	0.1	1	
														Lark Sparrow	3	0.3	3	0.3	3	1
														Lewis's Woodpecker	2	0.2	2	0.2	2	1
														MacGillvray's Warbler	15	1.5	15	1.3	15	
														Wild Turkey	1	0.1	1	0.1	1	
Species Observed at Two Sites																				
American Crow	6	0.6	6	0.5	2	4	American Crow	2	0.2	3	0.3	2	1							
American Goldfinch	2	0.2	2	0.2	2		American Goldfinch	1	0.1	1	0.1	1								
Band-tailed Pigeon	2	0.2	3	0.3	1	2	Band-tailed Pigeon	1	0.1	1	0.1	1								
Grace's Warbler	1	0.1	1	0.1	1		Grace's Warbler	23	2.4	23	2.0	23	3							
Red-winged Blackbird	3	0.3	3	0.3	3		Red-winged Blackbird	4	0.4	4	0.4	4								
Canada Goose	1	0.1	1	0.1	1									Canada Goose	1	0.1	1	0.1	1	
Cassin's Finch	6	0.6	6	0.5	6									Cassin's Finch	2	0.2	2	0.2	2	
Clark's Nutcracker	20	2.0	34	2.9	17	7								Clark's Nutcracker	2	0.2	2	0.2	2	1
Common Nighthawk	8	0.8	9	0.8	8	2								Common Nighthawk	2	0.2	3	0.3		2
Lesser Goldfinch	1	0.1	1	0.1	1									Lesser Goldfinch	1	0.1	1	0.1	1	
Ruby-crowned Kinglet	1	0.1	1	0.1	1									Ruby-crowned Kinglet	17	1.7	18	1.6	17	
Western Bluebird	8	0.8	13	1.1	3	7								Western Bluebird	1	0.1	1	0.1	1	
Western Flycatcher	2	0.2	2	0.2	2									Western Flycatcher	1	0.1	1	0.1	1	
							Cooper's Hawk	1	0.1	1	0.1		1	Cooper's Hawk	1	0.1	1	0.1		1
							Hermit Thrush	3	0.3	3	0.3	3		Hermit Thrush	4	0.4	4	0.3	4	
							Olive-sided Flycatcher	2	0.2	2	0.2	1	1	Olive-sided Flycatcher	1	0.1	2	0.2		1
							White-throated Swift	8	0.8	13	1.1	1	7	White-throated Swift	4	0.4	4	0.3	3	3
							Williamson's Sapsucker	3	0.3	4	0.4	3		Williamson's Sapsucker	3	0.3	4	0.3	2	2

Appendix B

Categorization of bird species observed through 2024 by feeding strategy.

Summary of bird species by Ground-Brush Foraging (GBF), and Timber-Foliage Searching (TFS) feeding habit (i.e., feeding guilds) across sites. Categorization of bird species based on Lowe et al., 1978; Bock and Lynch, 1970; and Cornell Lab of Ornithology (www.allaboutbirds.org). (See Grover et.al. 2019 to 2023 in Appendix C for citations)

	Fawn Gulch										Jackson Mountain										Jackson Mountain North			
	2019		2020		2021		2022		2023		2019		2020		2021		2022		2023		2022		2023	
	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND
Ground-Brush Foraging																								
American Goldfinch	3	0.6																						
American Robin	130	25.9	110	12.9	140	23.6	60	8.7	136	14.3	75	26.2	103	15.1	85	13	92	9.9	149	13.9	25	5.3	20	2.8
Band-tailed Pigeon			34	4																				
Black-capped Chickadee			21	2.5							1	0.3	11	1.6	5	0.8	2	0.2			5	1.1	2	0.23
Black-headed Grosbeak	5	1	9	1.1	1	0.2	4	0.6	21	2.2	5	1.8			10	1.5	16	1.7	35	3.3	4	0.8	5	0.57
Brown-headed Cowbird	3	0.6					1	0.1	1	0.1	1	0.001	2	0.3	4	0.6			2	0.2				
Bullock's Oriole	1	0.2													2	0.3								
Canada Goose	12	2.4									5	1.75												
Cassin's Finch	3	0.6	6	0.7	2	0.3	5	0.7	15	1.6									4	0.4				
Chipping Sparrow	10	2	12	1.4	15	2.5	29	4.2	34	3.6			37	5.4	6	0.9	27	2.9	33	3.1	21	4.4	28	3.2
Dark-eyed Junco	1	0.2	8	0.9	3	0.5	2	0.3	15	1.6			8	1.2	5	0.8	9	1	6	0.6	22	4.6	33	3.8
Dusky Grouse			1	0.1													2	0.2						
Eurasian Collared Dove													1	0.1	1	0.2								
European Starling																								
Evening Grosbeak			1	0.1					2	0.2														
Gray Catbird													1	0.1										
Green-tailed Towhee	19	3.8	35	4.1	53	8.9	49	7.1	47	4.9	7	2.5	29	4.2	11	1.7	31	3.3	9	0.9	5	1.1		
Hermit Thrush									3	0.3	1	0.4	3	0.4	1	0.2	4	0.4	9	0.8	35	7.4	50	5.71
House Finch									2	0.2									1	0.1	1	0.2		
House Wren			32	3.7	2	0.3	10	1.4	25	2.6	1	1.4	8	1.2	7	1.1	39	4.2	63	5.9	20	4.2	19	2.2
Mountain Bluebird	1	0.2					2	0.3																
Mourning Dove			63	7.4	11	1.9	1	0.1	1	0.1	1	0.4	9	1.3	39	6	12	1.3	22	2.1	1	0.2		
Northern Flicker	44	8.8	10	1.2	19	3.2	46	6.8	45	4.7	29	10.1	52	7.6	49	7.5	58	6.2	45	4.2	9	1.9	25	2.85
Pine Siskin	2	0.4					2	0.3	2	0.2									6	0.6	1	0.2	13	1.48
Red Crossbill	1	0.2	9	1.1					2	0.2			8	1.2					1	0.1			12	1.4
Red-winged Blackbird					1	0.2			2	0.2									5	0.5				
Song Sparrow			1	0.1					1	0.1														
Spotted Towhee			4	0.4	13	2.2	11	1.6	7	0.7							10	1.1	4	0.4				
Townsend's Solitaire			1	0.1	2	0.3					3	1.1	1	0.1	2	0.3			2	0.2	3	0.6	1	0.11
Western Bluebird	5	1	16	1.9	8	1.3	28	4.1	13	1.4			1	0.1			3	0.3	4	0.4				
Western Meadowlark															1	0.2								
White-crowned sparrow																								
Wild Turkey					2	0.34													1	0.1	2	0.4		
Sub-TOTALS	**240**	**47.9**	**373**	**43.7**	**270**	**45.4**	**250**	**36.3**	**374**	**39.2**	**129**	**45.951**	**274**	**39.9**	**228**	**35.1**	**305**	**32.7**	**400**	**37.7**	**152**	**32**	**208**	**24.35**
Timber-Foliage Searching																								
Caissin's Vireo					1	0.2			2	0.2														
Cedar Waxwing									2	0.2														
MacGillvery's Warbler																					1	0.2	5	0.6
Mountain Chickadee	1	0.2	6	0.7	3	0.5	1	0.1	7	0.7	4	1.4	8	1.2	2	0.3	8	0.9	3	0.3	27	5.7	52	5.94
Orange-crowned Warbler			5	0.7	2	0.3	2	0.3	6	0.6	2	0.7	3	0.4	9	1.4	3	0.3	6	0.6	7	1.5	28	3.2
Plumbeous Vireo			19	2.2	5	0.8	32	4.7	42	4.4	12	4.2	25	3.7	10	1.5	10	1.1	15	1.4	6	1.3		
Red-breasted Nuthatch													3	0.4			3	0.3	1	0.1	35	7.4	37	4.22
Ruby-crowned Kinglet																					19	4	105	12
Steller's Jay	10	2	16	1.9	33	5.6	15	2.2	9	1	11	3.9	52	7.6	30	4.6	33	3.5	29	2.7	22	4.6	25	2.9
Virginia's Warbler					1	0.2	1	0.1	178	1.9	3	1	21	3.1	5	0.8	16	1.7	31	2.9			3	0.34
Warbling Vireo	1	0.2	30	3.5	19	3.2	18	2.6	49	5.1	7	2.5	17	2.5	27	4.1	31	3.3	85	8	44	9.3	93	10.6
Western Tanager	32	6.4	36	4.2	37	6.2	61	8.8	99	10.4	16	5.6	49	7.2	47	7.2	90	9.6	102	9.5	43	9.1	85	9.7
Yellow-rumped Warbler	13	2.6	41	4.8	19	3.2	34	4.9	55	5.8	12	4.2	11	1.6	18	2.8	10	1.1	73	6.8	19	4	52	5.9
Sub-TOTALS	**57**	**11.4**	**153**	**18**	**119**	**20**	**164**	**23.7**	**445**	**29.9**	**67**	**23.5**	**189**	**27.7**	**148**	**22.7**	**204**	**21.8**	**345**	**32.3**	**223**	**47.1**	**485**	**55.4**

Summary of bird species by Aerial Flycatcher (AF), Flycatcher (F), Timber-Drilling/Gleaning (TDG), Corvid (COR), Raptor (RAP), Nectar Feeding (NEC), and Other feeding habits (i.e., feeding guilds) across sites. Categorization of bird species based on Lowe et al., 1978; Bock and Lynch, 1970; and Cornell Lab of Ornithology (www.allaboutbirds.org). (See Grover et.al. 2019 to 2023 in Appendix C for citations)

	Fawn Gulch										Jackson Mountain										Jackson Mountain North			
	2019		2020		2021		2022		2023		2019		2020		2021		2022		2023		2022		2023	
	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND	ABUND	REL ABUND
Aerial Flycatcher																								
Common Nighthawk					16	2.7	12	1.7	20	2.1	2	0.7	1	0.1										
Northern Rough-winged Swallow	25	5																						
Olive-sided Flycatcher					1	0.2											2	0.2	1	0.1				
Tree Swallow	7	1.4			1	0.2					4	1.4	1	0.1										
Violet-green Swallow	11	2.2	38	4.4	14	2.4	6	0.9	13	1.4	3	1.1	41	6	45	6.9	78	8.4	59	5.5	13	2.7	20	2.3
White-throated Swift											3	1.1							2	0.2				
Sub-TOTALS	**43**	**8.6**	**38**	**4.4**	**32**	**5.5**	**18**	**2.6**	**33**	**3.5**	**12**	**4.3**	**43**	**6.2**	**45**	**6.9**	**80**	**8.6**	**62**	**5.8**	**13**	**2.7**	**20**	**2.3**
Flycatcher																								
Ash-throated Flycatcher									2	0.21													1	0.1
Cordilleran Flycatcher	3	0.6	19	2.2	2	0.3	3	0.4	2	0.2			4	0.6	18	2.8	4	0.4	1	0.1	1	0.2		
Dusky Flycatcher							20	2.9	28	2.9			1	0.1			3	0.3	5	0.5			1	0.11
Grace's Warbler			11	1.3			18	2.6	36	3.8			4	0.6	3	0.5			22	2.1	2	0.4		
Hammond's Flycatcher									4	0.4							34	3.6	48	4.5	26	5.5	101	11.5
Lewis's Woodpecker															3	0.5								
Say's Phoebe	2	0.4			2	0.3							4	0.6	2	0.3								
Western Wood-Pewee	83	16.6	153	17.9	94	15.8	90	13	94	9.9	14	4.9	29	4.2	59	9	120	12.9	68	6.3				
Yellow Warbler	2	0.4							1	0.1									4	0.4				
Sub-TOTALS	**90**	**18**	**183**	**21.4**	**98**	**16.4**	**131**	**18.9**	**165**	**17.3**	**14**	**4.9**	**42**	**6.1**	**85**	**13.1**	**161**	**17.2**	**148**	**13.9**	**29**	**6.1**	**102**	**11.61**
Timber Drilling/Gleaning																								
Brown Creeper					1	0.2							1	0.1			1	0.1	4	0.4	7	1.5	19	2.2
Downy Woodpecker	3	0.6							1	0.1							1	0.1					1	0.11
Hairy Woodpecker	2	0.4	7	0.8	7	1.2	2	0.3	1	0.1	1	0.4	5	0.7	15	2.5	5	0.5	7	0.7	2	0.4	6	0.7
Pygmy Nuthatch	7	1.4	55	6.4	17	4.5	68	10	32	3.4	12	4.2	57	8.3	90	13.8	107	11.5	60	5.6	24	5.1	2	0.23
Red-naped Sapsucker	2	0.4																	1	0.1	2	0.4		
Three-toed Woodpecker					3	0.5																		
White-breasted Nuthatch	23	4.6	29	3.4	20	3.4	23	3.3	32	3.4	4	1.4	17	2.5	14	2.1	31	3.3	10	0.9	10	2.1	4	0.46
Williamson's Sapsucker			1	0.1	1	0.1	1	0.1			7	2.45			1	0.2	1	0.1					9	1
Sub-TOTALS	**37**	**7.4**	**92**	**10.7**	**49**	**9.9**	**94**	**13.7**	**66**	**7**	**24**	**8.45**	**80**	**11.6**	**120**	**18.6**	**146**	**15.6**	**82**	**7.7**	**45**	**9.5**	**41**	**4.7**
Corvid																								
American Crow	4	0.8	2	0.2	3	0.5			2	0.2	2	0.7	8	1.2	3	0.5	7	0.8	4	0.4			1	0.11
Common Raven	1	0.2			1	0.2	2	0.3	2	0.2	11	3.9	12	1.8	8	1.2	12	1.3	8	0.7	2	0.4	7	0.8
Black-billed Magpie	2	0.4																						
Sub-TOTALS	**7**	**1.4**	**2**	**0.2**	**4**	**0.7**	**2**	**0.3**			**13**	**4.6**	**20**	**3**	**11**	**1.7**	**19**	**2.1**	**12**	**1.1**	**2**	**0.4**	**8**	**0.91**
Raptor																								
American Kestrel	1	0.2															1	0.1						
Bald Eagle	2	0.4					1	0.1							1	0.2								
Cooper's Hawk													1	0.1							2	0.4		
Goshawk													1	0.1										
Great Horned Owl			3	0.4																			2	0.23
Northern Pygmy Owl																							1	0.1
Osprey																	1	0.1						
Red-tailed Hawk	1	0.2	4	0.5	1	0.2	1	0.1	4	0.4	6	2.1	4	0.6			6	0.6	5	0.5	1	0.2	1	0.11
Sharp-shinned Hawk									1	0.1					1	0.2					2	0.4		
Turkey Vulture	6	1.2	3	0.4	2	0.3	5	0.7	1	0.1	8	2.8	10	1.5	6	0.5	5	0.5	4	0.4			1	0.11
Sub-TOTALS	**10**	**2**	**10**	**1.3**	**3**	**0.5**	**7**	**0.9**	**6**	**0.6**	**14**	**4.9**	**16**	**2.3**	**8**	**0.9**	**13**	**1.3**	**9**	**0.9**	**5**	**1**	**5**	**0.55**
Nectar Feeding																								
Black-chinned Hummingbird			1	0.1																				
Broad-tailed Hummingbird	2	0.4	3	0.4			5	0.7	8	0.8	2	0.7	11	1.6	3	0.5	5	0.5	11	1	4	0.8		
Sub-TOTALS	**2**	**0.4**	**4**	**0.5**	**0**	**0**	**5**	**0.7**	**8**	**0.8**	**2**	**0.7**	**11**	**1.6**	**3**	**0.5**	**5**	**0.5**	**11**	**1**	**4**	**0.8**	**0**	**0**
Other																								
Great Blue Heron									1	0.1			1	0.2										

Appendix C

Literature citations as contained in Bird Monitoring Project reports 2019 through 2023 (see Grover et.al. 2019 to 2023 below).

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