

Avian Point Count Report for Indreland Audubon Wetland Preserve 2024

3rd Annual Progress Report

Victoria Ann Saab¹

¹Sacajawea Audubon Society Board Member & Scientist Emeritus USDA Rocky Mountain Research Station

December 2024

Introduction

Avian point count surveys were established in spring 2022 to provide baseline information on avian species richness, species abundance, and species diversity at the Indreland Audubon Wetland Preserve (IAWP) managed/owned by Sacajawea Audubon Society (SAS) in Bozeman, Montana. Point count data are being collected to provide a standardized and repeatable method for evaluating changes in avian metrics related to proposed wetland restoration activities and the potential designation of a wetland mitigation bank. The IAWP is being considered by the U.S. Army Corps of Engineers (COE) for the establishment of the Sacajawea Wetland Bank (Bank). Bird point count monitoring for at least a 5-year period is one requirement by the COE for designation of the wetland mitigation bank. The Bank will be used to mitigate for unavoidable wetland impacts approved through the COE (administered by Section 404 of the Clean Water Act). The Bank will provide a local wetland mitigation option to help offset wetland impacts occurring specifically in Bozeman and the surrounding watershed. Monitoring may be extended if success of performance standards (increases in species richness, abundance, and diversity) is not achieved within the five-year period. The performance standards for birds as defined by Confluence Consulting (2022) include the following:

- a. Avian species richness (i.e., number of species identified) within vegetated wetland and open water areas will exhibit a 10% increase over baseline conditions (63 species) by the final monitoring year.
- b. Avian species abundance will increase by 10% over baseline conditions by the final monitoring year.
- c. Avian species diversity, using the Shannon-Wiener Diversity Index will increase by the final monitoring year.

Study Area

The IAWP is located on the east side of Bozeman, Montana in Gallatin County (Latitude 45.681688°, Longitude -111.013765°) north of the I-90/Main St. interchange (Figure 1). The site consists of two parcels, located north and south of the railroad tracks, comprising 6.8 acres and 31.2 acres, respectively. Montana Rail Link (MRL) operates the railroad tracks, which bisect the project area northwest to southeast and separates the two parcels. A 30-ft tall historic railroad berm divides the 31.2-acre south parcel into two areas, located northwest and southeast of the berm, respectively. The Montana Department of Transportation's (MDT) I-90 East Bozeman Wetland Mitigation Reserve is located immediately southeast of the project's southern parcel.

Methods

During the 2024 field season, we conducted point count surveys at 9 established point count locations within the IAWP (Figure 2). We were able to collect data at all point count stations even with open and high-water levels.

Point counts are located a minimum of 150 meters apart to maintain independence of counts between locations. All birds seen or heard were recorded during a 5-min point count survey within a 75-m radius of each point count location. Data were recorded in eBird (primarily using smart phones) (<https://science.ebird.org/en/use-ebird-data/citation>; Sullivan et al. 2009).

A total of 14 surveys were conducted approximately every two weeks from mid-April through mid-October to collect data during spring migration, the breeding season and fall migration. All surveys were recorded by one person, not by pairs or groups, to maintain consistency and comparability of the data among years. Data were not collected during inclement weather, including strong winds and rain.

Seven observers (5 of 7 were the same observers as 2023) conducted point count surveys during 2024 (Table 1). Each person conducted 1-4 surveys. We did not correct for imperfect species detectability among observers (MacKenzie et al. 2009).

We recorded avian species richness (total number of species), species abundance (total number of individuals counted per species) and species diversity. We derived the Shannon-Weiner Species Diversity Index (H'), which is calculated by taking the number of each species, the proportion each species is of the total number of individuals, and then sum the proportion times the natural log of the proportion for each species (Nolan and Callahan 2006).

Results/Discussion

Sixty-five bird species (species richness) and 2,072 individuals (species abundance) were recorded during 14 point-count surveys in 2024 at 9 stations from mid-April through mid-October (Table 2 and Appendix 1). During years 2022 and 2023, we conducted 15 point-count surveys that included late October, whereas we completed 14 surveys in 2024, missing the late October survey. Species richness and abundance in 2024 was reduced compared to 2023 (75 species, 2,343 individuals) but closer to numbers in 2022 (67 species, 1,908 individuals).

The Shannon-Weiner Species Diversity Index (H') was 3.3 (Appendix 1; $H' = 3.258$). This diversity index is minimally higher than in 2022 ($H' = 3.176$) and 2023 ($H' = 3.158$) (Saab 2023a, 2023b).

The most notable changes in 2024 compared to 2022-2023 were the additions of three duck species (Blue-winged teal, Canvasback and Lesser Scaup) (Appendix 2). The continuation of open water created by beavers (*Castor canadensis*) in 2023 likely provided stop-over habitat that attracted both dabbling (teal) and diving ducks (Canvasback and scaup).

Consistent with the last 2 years, the most abundant species was Red-winged Blackbird (total of 328 individuals). We recorded several species on only 1 occasion, which increased the overall species richness during 2024 compared with 2022 - 2023. Those species observed on only one occasion, included Canvasback, Northern Flicker, Veery, Warbling Vireo, Nashville Warbler, Lincoln's Sparrow, and White-throated Sparrow.

We have recorded 95 species total during point count surveys since the project began in April of 2022, with 27 species recorded in only 1 of 3 years (Appendix 2). Overall species richness continues to increase from the baseline number of 67 species. Although abundance of Red-winged Blackbirds dropped this year, this species and Mallards continue to be the most abundant. Eastern Kingbird has had the greatest increase in abundance overall years, with Canada Goose and Cedar Waxwing having notable increases as well.

Future

We (SAS) will continue point count surveys next year (4 of 5 years) to meet the monitoring obligations needed for the IAWP to be considered for designation as a wetland mitigation bank.

Acknowledgments

We are grateful to all observers (see Table 1) that conducted point count surveys and entered data into eBird, which allowed for more efficient data entry and data management to complete this report.

Literature Cited

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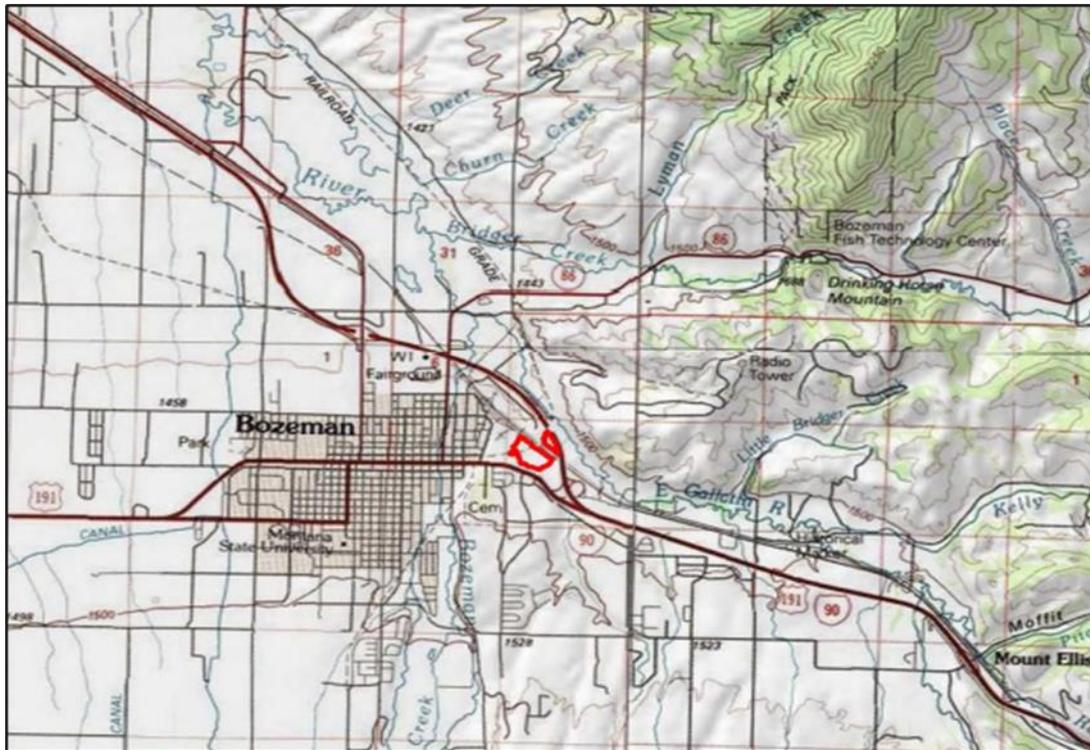


Figure 1. Location of Indreland Audubon Wetland Preserve outlined in red - - - -.

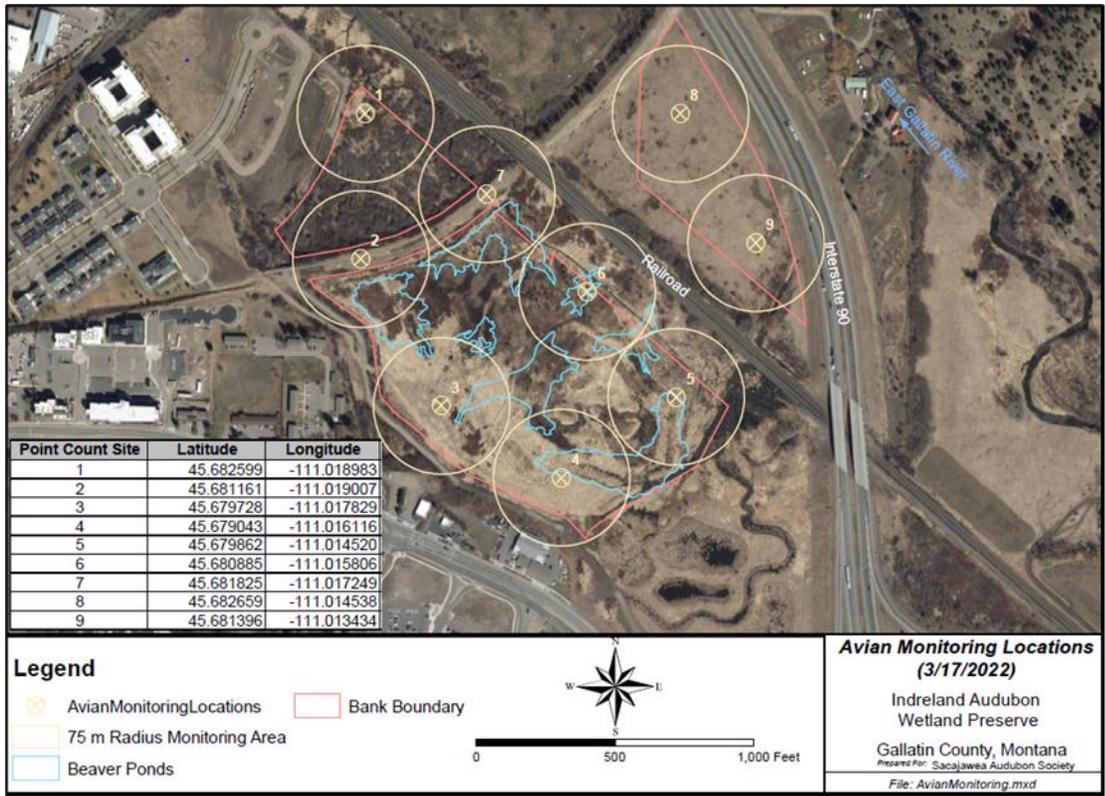


Figure 2. Point Count (Avian Monitoring) locations (X) at IAWP.

Table 1. Avian point count surveyors by date during 2024.

Surveyor	18 April	1 May	15 May	29 May	12 June	26 June	10 July	24 July	7 Aug	21 Aug	4 Sept	24 Sept	2 Oct	16 Oct
Bontadelli, Kristen				KB			KB	KB			KB			
Cox, Kevin						KC								
Goodheart, Ben	BG													
Kociolek, Angie		AK												
Koenen, Sam												SK		SK
McSpadden, Doug			DM							DM			DM	
Saab, Victoria					VS				VS					

Table 2. Species richness (total number of species = 65) and species abundance (total count of individuals = 2,072 recorded during 5-minute point count surveys conducted twice per month from mid-April through mid-October 2024 on the Indreland Audubon Wetland Preserve.

Common_Name	18 Apr	1, 15, 29 May	12,26 Jun	10,24 Jul	7,21 Aug	4,24 Sep	2,16 Oct	Total
1 Canada Goose	12	32				51	2	97
2 Blue-winged Teal	2	2	2					6
3 Green-winged Teal	2							2
4 Cinnamon Teal		4	3					7
5 Gadwall	7	4	2					13
6 Mallard	15	46	56	43	22	20	47	249
7 Canvasback		1						1
8 Lesser Scaup		3						3
9 Ring-necked Pheasant	3	6	3		1			13
10 Pied-billed Grebe		2						2
11 Black-necked Stilt		2						2
12 Rock Pigeon (Feral Pigeon)	2						5	7
13 Virginia Rail	1	1						2
14 Sora		6						6
15 American Coot	4	26	11	12	1	2		56
16 Sandhill Crane		3		3				6
17 Killdeer	2	2	4	16	3			27
18 Wilson's Snipe	3	4	4		1	1	1	14
19 Great Blue Heron		2	3					5
20 Belted Kingfisher		1		3	3	8	1	16
21 Downy Woodpecker	2			1		2	1	6
22 Northern Flicker							1	1
23 Willow Flycatcher			8	3	3			14
24 Least Flycatcher		1		1		1		3
25 Eastern Kingbird		8	8	18	47	2		83
26 Black-billed Magpie	3	9	2	11	11	7	20	63
27 American Crow		2		2		1	4	9
28 Common Raven	1	2		2		2		7
29 Black-capped Chickadee	13	20		5	11	25	18	92
30 Mountain Chickadee	1							1
31 Northern Rough-winged Swallow		1	14		3			18
32 Tree Swallow		14	13	5	2			34
33 Barn Swallow		11						11
34 Cliff Swallow				4				4

Common_Name (cont.)	18 Apr	1, 15, 29 May	12,26 Jun	10,24 Jul	7,21 Aug	4,24 Sep	2,16 Oct	Total
35 Northern House Wren		8	5	1	2			16
36 Marsh Wren		2	2	4			1	9
37 European Starling			5		51	2	9	67
38 Gray Catbird		3	3	4	5	4		19
39 Swainson's Thrush						6		6
40 Veery			1					1
41 American Robin	10	25	7	8	9	21	20	100
42 Cedar Waxwing				35	17	53	23	128
43 House Sparrow							3	3
44 Pine Siskin		2	1	5	8	10		26
45 American Goldfinch		9	5	10	25	31	3	83
46 Warbling Vireo			1					1
47 Northern Waterthrush			1	1				2
48 Common Yellowthroat		17	5	26	1	13		62
49 Yellow Warbler		21	18	32	2	3		76
50 Yellow-rumped Warbler		2		1		1		4
51 Nashville Warbler					1			1
52 White-crowned Sparrow						1	2	3
53 Savannah Sparrow		5	2	3		3		13
54 Chipping Sparrow						2		2
55 Song Sparrow	5	11	8	19	5	5	6	59
56 Lincoln's Sparrow			1					1
57 White-throated Sparrow						1		1
58 Yellow-headed Blackbird	3	38	24	6				71
59 Red-winged Blackbird	36	111	58	50	15	15	43	328
60 Brown-headed Cowbird		12	5	2			4	23
61 Common Grackle		1	1	4	3		3	12
62 Great-tailed Grackle		2						2
63 Black-headed Grosbeak			3					3
64 House Finch	2			8	11	8	20	49
65 Evening Grosbeak						19	2	21
Total Individuals								2072

Appendix 2. Species and their abundance by year recorded during point count surveys at IAWP 2022 – 2024, yellow unique to that year.

Count	Common Name	YR2022	YR2023	YR2024
1	Canada Goose	22	42	97
2	Trumpeter Swan	1		
3	Wood Duck	2	2	
4	Blue-winged Teal			6
5	Green-winged Teal	9		2
6	Cinnamon Teal	4		7
7	Gadwall	5	2	13
8	American Wigeon	2		
9	Mallard	217	225	249
10	Northern Shoveler		2	
11	Canvasback			1
12	Lesser Scaup			3
13	Ruddy Duck	3	3	
14	Hooded Merganser		1	
15	Ring-necked Pheasant	4	7	13
16	Pied-billed Grebe		6	2
17	Eared Grebe		2	
18	Black-necked Stilt	9		2
19	Eurasian Collared-Dove	3	1	
20	Rock Pigeon (Feral Pigeon)		33	7
21	Mourning Dove	1		
22	Calliope Hummingbird	1		
23	Sora	3	4	6
24	Virginia Rail		1	2
25	American Coot	63	63	56
26	Sandhill Crane	6	10	6
27	Killdeer	7	5	27
28	Wilson's Snipe	21	23	14
29	Solitary Sandpiper		1	
30	Great Blue Heron	1	1	5
31	Osprey		1	
32	Northern Harrier	2	8	
33	Sharp-shinned Hawk		1	
34	Red-tailed Hawk	6	1	
35	Belted Kingfisher	3	17	16
36	Downy Woodpecker	4	1	6
37	Northern Flicker	7	5	1
38	Western Wood-Pewee		1	
39	Willow Flycatcher	7	8	14
40	Least Flycatcher	3		3
41	Olive-sided Flycatcher	2		
42	Eastern Kingbird	11	31	83
43	Warbling Vireo	3		1
44	Black-billed Magpie	64	55	63
45	American Crow	13	5	9
46	Common Raven	3	5	7
47	Black-capped Chickadee	101	94	92
48	Mountain Chickadee		2	1
49	Northern Rough-winged Swallow	4	19	18
50	Bank Swallow		58	
51	Tree Swallow	31	93	34
52	Barn Swallow		18	11
53	Cliff Swallow		6	4
54	Northern House Wren	8	13	16
55	Marsh Wren	31	33	9
56	Gray Catbird	28	26	19
57	Swainson's Thrush			6
58	American Robin	138	79	100
59	Veery		1	1
60	Sage Thrasher		1	
61	Cedar Waxwing	82	85	128
62	European Starling	151	94	67
63	House Sparrow	10	5	3
64	Pine Siskin	41	30	26
65	American Goldfinch	65	81	83
66	Clay-colored Sparrow	2		
67	White-crowned Sparrow	16	17	3
68	Savannah Sparrow	13	25	13
69	Chipping Sparrow		10	2
70	Song Sparrow	51	71	59
71	Lincoln's Sparrow	8	4	1
72	Dark-eyed Junco	3		
73	White-throated Sparrow		1	1
74	American Tree Sparrow	10		
75	House Finch	50	28	49
76	Yellow-headed Blackbird	52	108	71
77	Western Meadowlark	5		
78	Red-winged Blackbird	357	573	328
79	Brown-headed Cowbird	12	15	23
80	Brewer's Blackbird	12	3	
81	Bullock's Oriole		2	
82	Common Grackle	2	14	12
83	Great-tailed Grackle		2	2
84	Western Tanager		2	
85	Northern Waterthrush	3	5	2
86	Common Yellowthroat	31	63	62
87	American Redstart	2	1	
88	Yellow Warbler	75	89	76
89	Wilson's Warbler	2		
90	Yellow-rumped Warbler	5	7	4
91	Orange-crowned Warbler		1	
92	Nashville Warbler			1
93	Evening Grosbeak		8	21
94	Black-headed Grosbeak	7	2	3
95	Lazuli Bunting	2	1	
	Total # Species by Year	67	75	65