

Project Overview

The Mill Creek Confluence is an 8-acre property in South Salt Lake, UT, located where Mill Creek flows into the Jordan River. In partnership with the Jordan River Commission, South Salt Lake, and Salt Lake County, Seven Canyons Trust is conducting ongoing restoration work at the site. In the spring of 2017, Tracy Aviary began a community science bird monitoring study at the Mill Creek Confluence to investigate the bird community of the site and inform the following research questions:

1. What birds are using the Mill Creek Confluence, when do they occur in the area, and how do they use the site?
2. Are there any species of conservation concern using the site?
3. What management actions could improve habitat for bird species, and what actions or activities could potentially degrade bird habitat and should be avoided?

Here, we summarize results from our 2019 bird monitoring field season.

Breeding season point count surveys:

During April – July of 2019, 7 community scientists and Tracy Aviary staff conducted 5 breeding season point count surveys at 4 survey points in the Mill Creek Confluence (Figure 1, 2). Point count surveys were conducted by pairs of community scientists between dawn and 10am. The ‘observer’ identified all birds seen and heard during a 6-minute period, and noted the number of individuals, distance, and direction. The ‘recorder’ wrote all of the observations on the datasheet, noted the minute during the survey (1-6) when the observation was made, and also noted weather and site variables, such as wind speed and cloud cover.

Non-breeding season group surveys:

Data from point count surveys was supplemented by 8 non-breeding group surveys conducted in monthly in January, March, August, October, November, and December 2019. During non-breeding surveys, groups of community scientists led by a trained Tracy Aviary staff person walked a transect through the site and noted all birds seen and heard in the area.

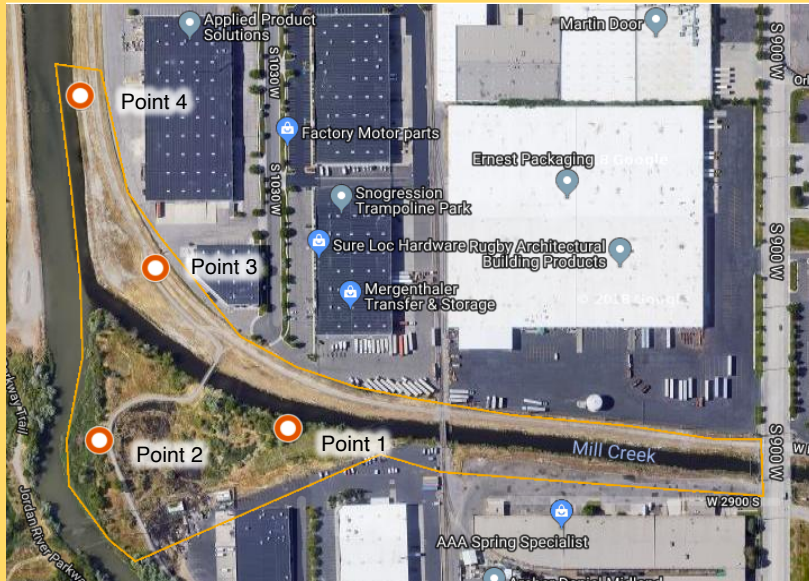


Figure 1. Map of bird sampling points at the Mill Creek Confluence.



Figure 2. Tracy Aviary community scientists conducting breeding season (top) and non-breeding season (bottom) bird surveys.

MILL CREEK CONFLUENCE 2019 RESULTS

2019 Bird Occurrence

During 5 breeding season surveys in 2019 we had 704 bird observations and detected 48 species (Figure 3, 4). During 8 non-breeding season surveys, we had 2,119 bird observations and detected 60 species. 15 species were detected exclusively during the breeding season, and 27 species were detected exclusively during the non-breeding season, resulting in a total species list of 75 species for the year. See the complete species list for the Mill Creek Confluence on pages 5-7.

Bird Detections of Different Families and Habitat Guilds at the Mill Creek Confluence

To determine which birds are using the Mill Creek Confluence site, we used point count data to calculate the relative abundance, or total number of observations per survey, of each species. To explore patterns of species occurrence across the landscape, we separated species into family groups and habitat guilds, and noted how many observations of each we had within 125m of each sampling point. Similar to previous years, we had high numbers of swallows, ducks, and geese at points 4 and 3. Both of these points have good views to the Jordan River, and there is a large swallow colony on the steep bank across from point 4. We also observed nesting Avocets and Killdeer in the northern section of the site. These species are able to nest in this area because it is open and free of woody vegetation, unlike many stretches of the Jordan River. Points 1 and 2 are surrounded by both trees and shrubs, and we had a higher proportion of species associated with forests and open woodlands, such as orioles, sparrows, and warblers, near these two points.

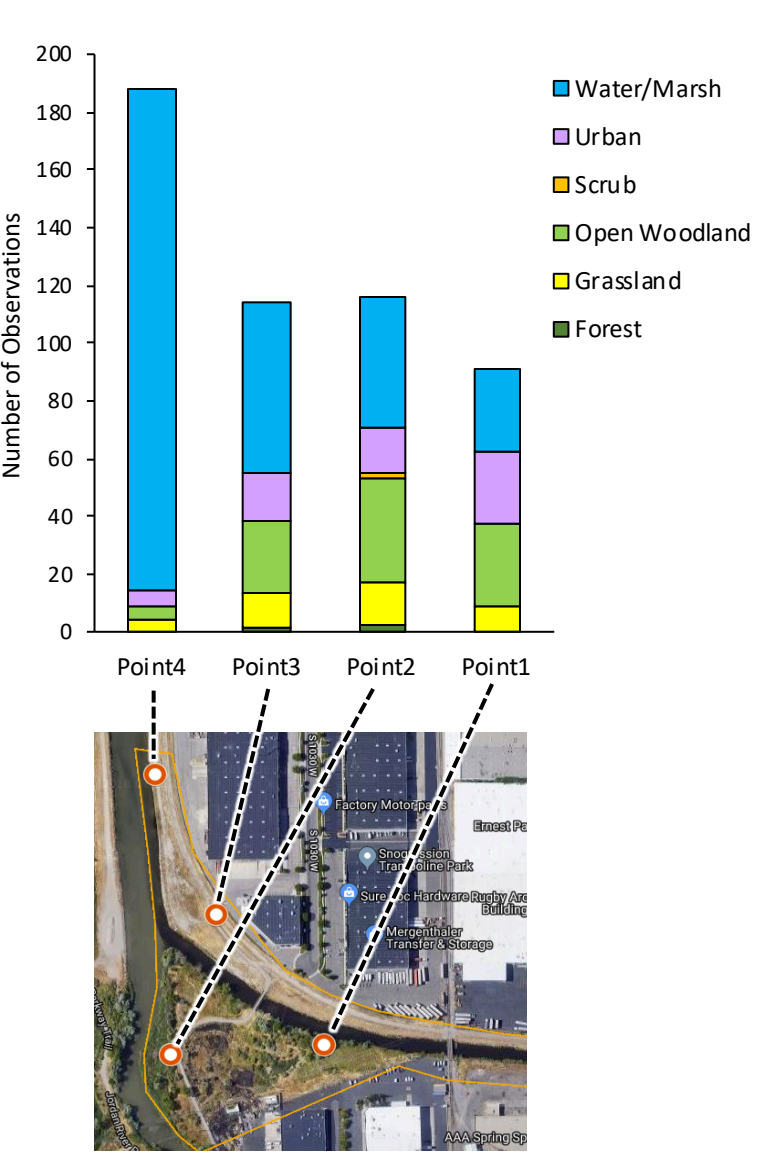


Figure 3. Number of birds from different habitat guilds detected during 2019 breeding season surveys at Mill Creek Confluence.

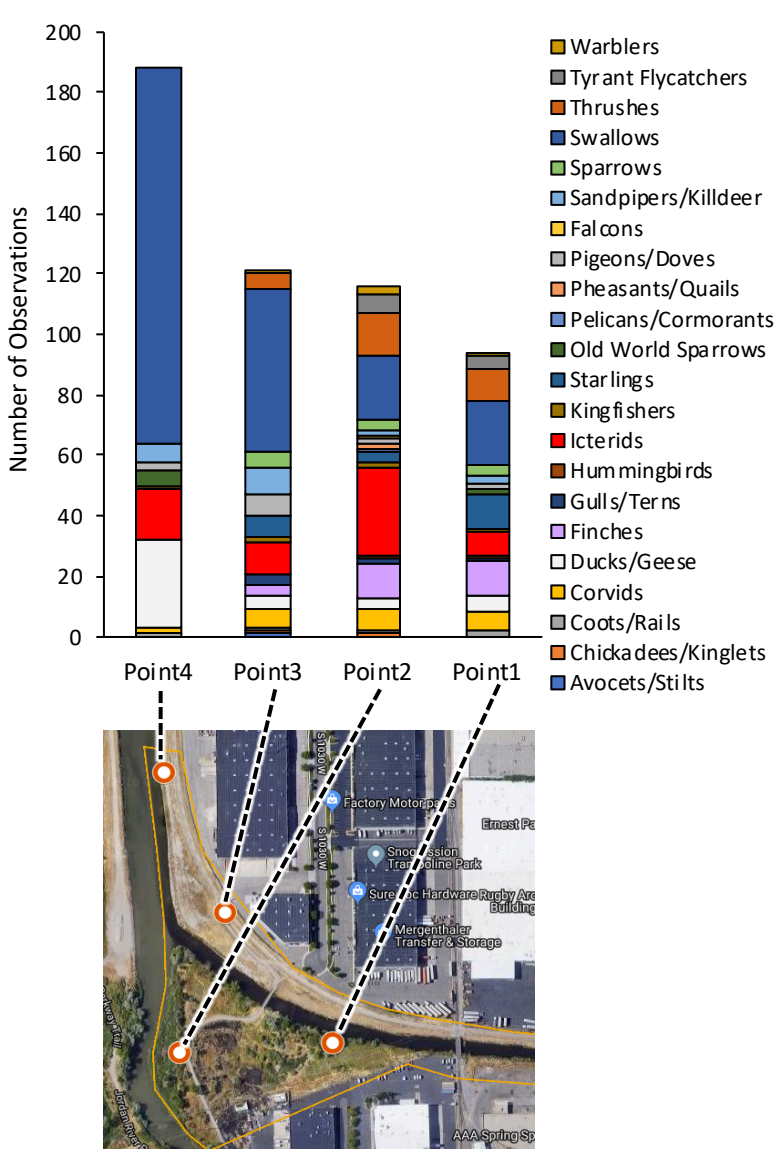


Figure 4. Number of birds from different families detected during 2019 breeding season surveys at Mill Creek Confluence.

MILL CREEK CONFLUENCE 2019 RESULTS

Species of Conservation Concern

Since we began monitoring the site in 2017, we have documented several bird species of local conservation interest at the Mill Creek Confluence:

Utah Wildlife Action Plan (2015 - 2025)

Species of Greatest Conservation Need:

- ✓ American White Pelican
- ✓ Bald Eagle
- ✓ Caspian Tern
- ✓ Golden Eagle
- ✓ White-faced Ibis

Utah Partners in Flight Avian Conservation Strategy Species:

- ✓ American Avocet
- ✓ American White Pelican
- ✓ Brewer's Sparrow
- ✓ Black-necked Stilt
- ✓ Broad-tailed Hummingbird

US Fish and Wildlife Service BCR16 Birds of Conservation Concern:

- ✓ Bald Eagle
- ✓ Golden Eagle
- ✓ Peregrine Falcon
- ✓ Brewer's Sparrow

US Fish and Wildlife Service BCR9 Birds of Conservation Concern:

- ✓ Eared Grebe
- ✓ Bald Eagle
- ✓ Golden Eagle
- ✓ Peregrine Falcon
- ✓ Sage Thrasher
- ✓ Brewer's Sparrow

Images from Audubon.org

Comparison to other Jordan River Sites

We compared the bird community at the Mill Creek Confluence with a sample of 6 other sites that we monitor along the Jordan River (Figure 5). These sites contain 33 sampling points located within lowland riparian habitat surrounding the river. We compiled data from 2019 breeding season surveys at all sites between April and July 2019. We classified observed bird species in three different ways. First we determined whether they were native or non-native to the area. Second, we classified them as urban-adapted or urban-neutral/urban-avoider based on classification developed by Wood et al. (2014). Finally, we classified them according to their association with riparian vegetation; species were classified as riparian-associated when >60% of nests/abundance are in riparian vegetation (Bureau of Land Management 1998, Young et al. 2013). For each survey, we calculated the number of species of each group that were detected within 125m of the sampling point. We used an independent samples t-test to test for significant differences between the proportion of non-native species, urban-adapted species, and riparian-associated species detected in the Mill Creek Confluence and other Jordan River comparison sites.

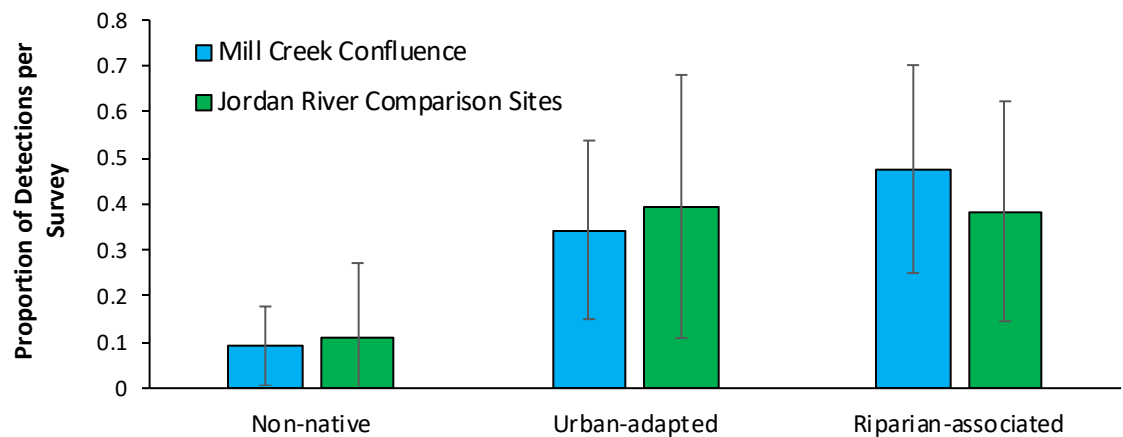
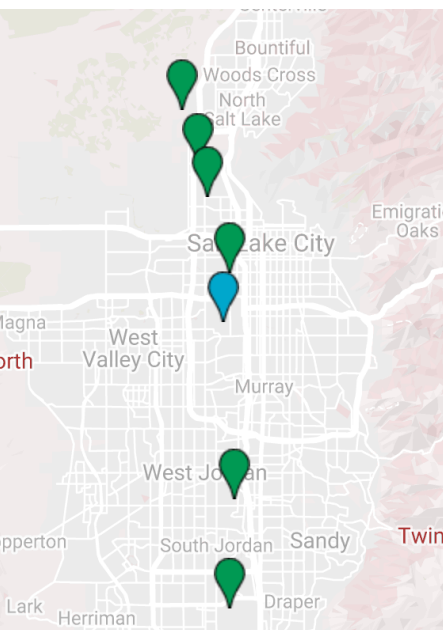


Figure 6. Average proportion and standard deviation of detections of non-native, urban-adapted, and riparian-associated birds at Mill Creek Confluence (blue) and Jordan River Comparison sites (green).

The Mill Creek Confluence had a slightly lower proportion of detections per survey of non-native and urban-adapted species than other Jordan River Comparison sites, and a slightly higher proportion of riparian-associated species. However, this trend was not statistically significant (independent samples t-tests, $p > 0.05$).

MILL CREEK CONFLUENCE MANAGEMENT RECOMMENDATIONS

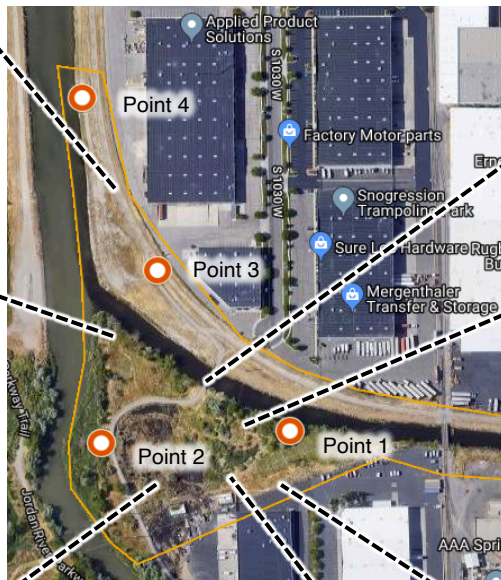
Management actions that could improve habitat for target bird species, and actions or activities that could potentially degrade bird habitat and should be avoided

Avoid spraying and mowing of the northern levee section, especially during the nesting season (April – July); several shorebird species were observed nesting in this area.

Plant and maintain trees, shrubs, and other native vegetation over a large footprint of the site. This vegetation will enhance the contiguous habitat along the Jordan River corridor and provide a buffer from the surrounding roads and residential development.

Promote vertical structure and canopy cover throughout the site by protecting existing trees and/or replacing trees that are removed. This will enhance habitat for riparian-associated birds such as warblers, flycatchers, and orioles.

No tree removal or thinning activities should take place during the breeding and nesting season (April – July).



If trees are to be removed, mature trees should be thinned out slowly while they are replaced so vertical structure and fruiting resources are maintained throughout the restoration process.

Add wetland elements. The southern section of the site has some ephemeral water, and enhancing these wetland components and adding wetland vegetation could enhance habitat for species such as Red-winged and Yellow-headed Blackbirds, Virginia rails and Sora, Marsh Wrens, and Common Yellowthroats.

Maintain standing dead trees to provide habitat for cavity-nesting species, such as chickadees, nuthatches, screech-owls, and woodpeckers. Avoid complete removal if possible; cutting them to a height of 10ft can mitigate safety concerns while still providing cavity habitat.

COMPLETE LIST OF BIRDS DETECTED AT THE MILL CREEK CONFLUENCE IN 2017-2019

Species	Number of Observations (detections/survey)					
	Breeding Season 2017	Non-breeding Season 2017	Breeding Season 2018	Non-breeding Season 2018	Breeding Season 2019	Nonbreeding Season 2019
Canada Goose	58.5	33.8	65.71	48.2	12	42.88
Red-winged Blackbird	9.75	3	7.71	7	9.4	9.13
White-faced Ibis	7.5	0	0.29	0	0	0
Cliff Swallow	7	0	2.28	0	0.6	0
Black-billed Magpie	6.5	3.8	6.29	3.8	4.8	2.13
N. Rough-winged Swallow	7.5	0	14.57	0.6	8	0
House Finch	4.75	3.6	5.29	2.2	4.6	3.5
Mourning Dove	4.25	7	4.43	4	2.2	5.5
Yellow-headed Blackbird	3.75	0	2.14	0	2.6	0.25
American Robin	3.25	8.8	3.14	3.2	6.6	7.13
European Starling	3	27.2	13.71	31.4	4.4	44.88
Mallard	3	49.6	14.14	36.4	6.8	16.38
American Avocet	2	0.8	3.43	0.6	0.4	1
Eurasian Collared-dove	2	3.2	2	3.2	1.4	2.88
Killdeer	2.25	3.2	5	7.6	2.8	3.5
California Gull	1.75	10.4	3.43	7	3.6	14.5
House Sparrow	1.75	4	1	3.6	1.4	1.63
Song Sparrow	1.75	1.6	2.43	2.8	2.6	1.63
Barn Swallow	1.75	4.8	3.86	4.2	1.2	2
Black-crowned Night Heron	1.5	0	0.43	0.2	0	0.38
Bullock's Oriole	1.25	0	3	0	3	0
Franklin's Gull	1.25	0	1.71	0	0.8	0
Belted Kingfisher	1	2	0.71	1.4	1.4	0.25
Brown-headed Cowbird	1	0	1.43	0	2	0
Spotted Sandpiper	0.75	0.4	0.29	0.4	1	0.13
Western Kingbird	0.75	0.4	3	0.2	2.2	0
Yellow Warbler	0.75	0.4	0.86	0.8	0.8	0.25
Brewer's Blackbird	0.75	0.2	2	25.4	0.8	9.38
California Quail	0.5	0	0.14	0.4	0.8	0.13
Common Yellowthroat	0.5	0	0.43	0	0	0
Downy Woodpecker	0.5	0.8	0	0	0	0.25
Northern Flicker	0.5	0.8	0.14	1.4	0	0.88
Rock Pigeon	0.5	1.6	0.57	4.6	4.2	4.75
Western Tanager	0.5	0	0.29	0	0	0
American Coot	0.5	20.6	1.86	17.2	1.4	20.25
American Goldfinch	0.25	0.8	0.29	1.4	0	1.63
American Kestrel	0.25	0.6	0.14	1	0.2	0.63
American White Pelican	0.25	0	0.86	0	0.4	0.25
Bank Swallow	0.25	0.2	18.43	0.2	37	0.13
Black-capped Chickadee	0.25	0.6	0.29	1.2	0	0.25
Black-chinned Hummingbird	0.25	1	0.14	2.2	0.4	0.25
Common Raven	0.25	0	0	0	0	0
Great-tailed Grackle	0.25	0	0.29	0	0.2	0

**COMPLETE LIST OF BIRDS DETECTED AT
THE MILL CREEK CONFLUENCE IN 2017-2019, cont.**

Species	Number of Observations (detections/survey)					
	Breeding Season 2017	Non-breeding Season 2017	Breeding Season 2018	Non-breeding Season 2018	Breeding Season 2019	Nonbreeding Season 2019
Peregrine Falcon	0.25	0	0	0	0	0
Ring-necked Pheasant	0	0	1	0.2	0.2	0
Double-crested Cormorant	0	0.2	0.86	0.8	0.8	0.25
Gadwall	0	15.8	0.57	9.6	0.2	17.25
Black-headed Grosbeak	0	0	0.43	0	0	0
Cinnamon Teal	0	0	0.29	0.6	0	1.25
Eared Grebe	0	0	0.29	0	0	0
Sora	0	0	0.29	0	0	0
Forster's Tern	0	0	0.14	0	0.2	0
Great Blue Heron	0	0.2	0.14	0.2	0.2	0
Green-winged Teal	0	2.8	0.14	2.4	0	4.88
Lazuli Bunting	0	0.2	0.14	0.2	0	0
Mallard (domestic type)	0	0.6	0.14	0.2	0	0.38
Red-tailed Hawk	0	0	0.14	0.8	0	0.63
Snowy Egret	0	0	0.14	0	0	0
White-crowned Sparrow	0	3.2	0.14	4.4	0	2.63
Northern Shoveler	0	7.2	0	1.8	0	16.88
Ring-billed Gull	0	7	0	1	0	5.25
Common Goldeneye	0	5.8	0	1.8	0	6.88
American Pipit	0	3.2	0	1.2	0	1.75
American Crow	0	1.6	0	1	0	0.13
Northern Pintail	0	1.4	0	0.6	0	0.63
Bufflehead	0	1.4	0	1.6	0	1.13
Dark-eyed Junco	0	1.2	0	0	0	0.38
Lesser Goldfinch	0	1	0	0.6	0.4	0.63
Pied-billed Grebe	0	0.8	0	0.8	0.2	0.13
Lesser Scaup	0	0.6	0	0.4	0	0.25
Ruby-crowned Kinglet	0	0.6	0	0	0.4	0.38
Cedar Waxwing	0	0.6	0	0.2	0	0
Sharp-shinned Hawk	0	0.4	0	0.2	0	0
Marsh Wren	0	0.4	0	0.2	0	0
Blue-gray Gnatcatcher	0	0.4	0	0.2	0	0
Hermit Thrush	0	0.4	0	0	0	0
Wilson's Warbler	0	0.4	0	0	0	0
American Wigeon	0	0.2	0	0.8	0	0.5
Black-necked Stilt	0	0.2	0	0	0	0
Osprey	0	0.2	0	0	0	0
Swainson's Hawk	0	0.2	0	0	0	0
Cordilleran Flycatcher	0	0.2	0	0	0	0
Evening Grosbeak	0	0.2	0	0	0	0
Chipping Sparrow	0	0.2	0	0	0	0.13

COMPLETE LIST OF BIRDS DETECTED AT THE MILL CREEK CONFLUENCE IN 2017-2019, cont.

Species	Number of Observations (detections/survey)					
	Breeding Season 2017	Non-breeding Season 2017	Breeding Season 2018	Non-breeding Season 2018	Breeding Season 2019	Nonbreeding Season 2019
Lark Sparrow	0	0.2	0	0	0.2	0
Swamp Sparrow	0	0.2	0	0	0	0
Spotted Towhee	0	0.2	0	0.2	0	0.75
Orange-crowned Warbler	0	0.2	0	0.4	0	0
Yellow-rumped Warbler	0	0	0	0.6	0.2	1.75
Bald Eagle	0	0	0	0.4	0	0
Western Meadowlark	0	0	0	0.4	0.4	0
Solitary Sandpiper	0	0	0	0.2	0	0.13
Golden Eagle	0	0	0	0.2	0	0
Cooper's Hawk	0	0	0	0.2	0	0
Horned Lark	0	0	0	0.2	0	0
Brewer's Sparrow	0	0	0	0.2	0	0
White-throated Sparrow	0	0	0	0.2	0	0
Nashville Warbler	0	0	0	0.2	0	0.13
Caspian Tern	0	0	0	0	0.6	0
Canvasback	0	0	0	0	0.4	0
Great Egret	0	0	0	0	0.2	0
Trumpeter/Tundra Swan	0	0	0	0	0	0.25
Ring-necked Duck	0	0	0	0	0	0.13
Broad-tailed Hummingbird	0	0	0	0	0	0.13
Turkey Vulture	0	0	0	0	0	0.13
Sage Thrasher	0	0	0.14	0	0	0

Acknowledgements

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