

BIRD SURVEYS AT JORDAN RIVER MILL CREEK CONFLUENCE

2017-2018 Project Report
October 2018



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EXECUTIVE SUMMARY

The Mill Creek Confluence is an 8-acre property located where the 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 citizen science bird monitoring study at 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?

During 11 breeding season surveys in 2017-2018, we had 2,008 bird observations and detected 59 species. During 10 non-breeding season surveys in 2017-2019, we had 2,569 bird observations and detected 81 species. 17 species were detected exclusively during the breeding season, and 39 species were detected exclusively during the non-breeding season, resulting in a total species list of 98 species. We examined patterns of species occurrence at each of four sampling points within the site, and highlight notable patterns of distribution. We also list the species of conservation concern that we detected during both the breeding and non-breeding surveys. We conclude the report with recommendations to enhance the ecological value of the Mill Creek Confluence and promote a healthy bird community.

ACKNOWLEDGEMENTS

We'd like to thank the extremely dedicated team of volunteers from Tracy Aviary's Citizen Science Program who braved the early mornings and long hours to collect this data. Thanks also to our project partners: the Seven Canyons Trust, the Jordan River Commission, South Salt Lake, and Salt Lake County.

INTRODUCTION

The Jordan River is a waterway that flows over 50 miles through the Salt Lake valley between Utah Lake and the Great Salt Lake. As a riparian corridor in a highly urbanized matrix, the Jordan River provides recreation benefits to the 1.2 million residents of the area, and also contains vital remnant wildlife habitat for the region. This habitat is especially important for both resident and neotropical migratory birds; riparian areas are used by up to $\frac{3}{4}$ of all Utah bird species and can have up to fourteen times the density of birds as upland habitat (Knopf et al. 1988).

Due to decades of channelization, development, urban and agricultural runoff, and the spread of exotic plants, the Jordan River has drastically changed from its historic condition. However, it remains an important resource for city residents and wildlife, and many sections are undergoing restoration and land management activities to enhance the ecological health of the river and riparian area. Especially in a highly disturbed system, restoration and management activities can have varied impacts on birds, and it is important to assess the current ecological conditions and monitor impacts of habitat modification in order to successfully support healthy bird communities (Block et al. 2001).

The Mill Creek Confluence is an 8-acre property located where the 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 restoration work at the site. In 2017, the Seven Canyons Trust partnered with Mark Mill Subaru, TreeUtah, and HawkWatch International to plant 1,500 native trees and shrubs on the south side of the Mill Creek. The north side of the creek is designated as a levee and cannot have any woody vegetation. In this area, the Seven Canyons Trust is sowing pilot seed mixes of grasses that will enhance habitat value and compete with invasive weeds. Restoration throughout the Mill Creek Confluence is ongoing, and has the potential to improve water quality, create a community amenity, and enhance wildlife habitat.

In spring of 2017, Tracy Aviary began a citizen science bird monitoring study at the Mill Creek Confluence to 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?

As the study continues over the long-term, the data that we collect will help us understand any changes in diversity, species richness, community composition, and how birds use these sites over time, especially as ongoing restoration takes place.

METHODS

Study Design

We conducted year-round bird surveys in the Mill Creek Confluence during 2017 and 2018. We used a systematic random sampling frame to generate four sampling points within the site area (Figure 1), separating each point by a distance of at least 125m.

Citizen Scientist Participation and Training

We recruited a total of 9 citizen scientists and two Tracy Aviary staff members to complete breeding season bird surveys at the Mill Creek Confluence in April – July of 2017 and 2018. Participants were trained as part of Tracy Aviary’s Citizen Science Program, which is made up of 30-40 participants that conduct yearly breeding bird surveys in 11 project locations throughout Salt Lake County, Utah. Training for the Citizen Science Program begins in late February and continues through the survey season. Each year, we provided 6 indoor trainings (2-3 hours), 35 field trainings (2-5 hours), and we required citizen scientists to attend at least one indoor training and 4-6 field trainings. Before citizen scientists conducted surveys, they were required to pass two tests: a bird identification by sound test, where they had to identify the calls and songs of 30 of the most common birds, and a field survey test, where they had to successfully complete a series of mock breeding bird surveys.

Bird Survey Methods

Using the IMBCR point-transect protocol developed by the Bird Conservancy of the Rockies (Hanni et al. 2015), we conducted 4 breeding bird surveys at Mill Creek Confluence during the 2017 breeding season (May 18th – July 5th), and 7 breeding bird surveys during the 2018 breeding season (April 19th – July 12th). Pairs of citizen scientists conducted unlimited radius point count surveys at sampling point locations between sunrise and approximately 10am. The ‘observer’ of the team identified all birds seen and heard at the point during a six minute point count, and noted the exact distance using a laser rangefinder, direction, detection type (visual, singing, calling, other), and any other information they could determine about the bird (age, sex, etc.). The ‘recorder’ of the team 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

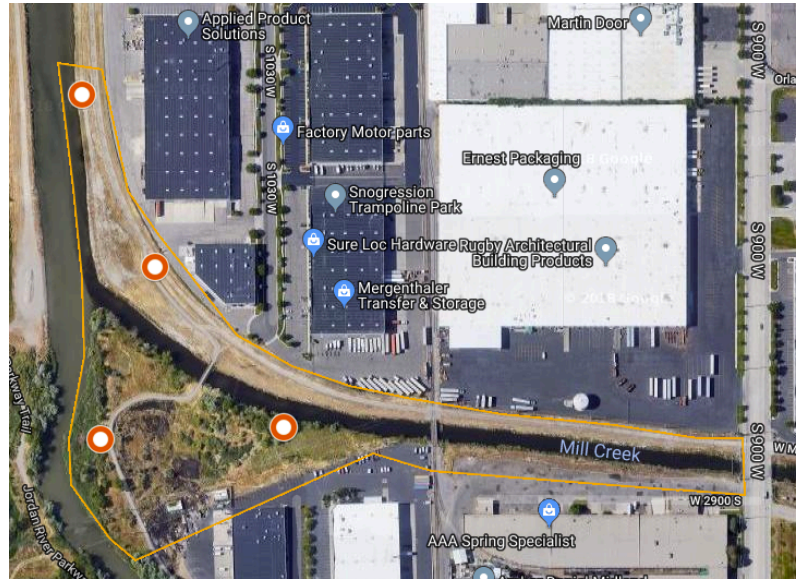


Figure 1. Map of four bird monitoring sampling points at Mill Creek Confluence.

site variables, such as wind speed, cloud cover, ambient noise levels, and presence of water/snow.

In addition to the breeding bird surveys conducted in the spring and summer, we also completed monthly non-breeding surveys to better understand the birds that use the area year-round. These surveys were conducted once a month in January, February, March, August, September, October, and November, and December. During the non-breeding surveys, at least one trained Tracy Aviary staff person lead groups of participants on a walk through the sampling area and noted any birds seen and heard during that time. Participants were allowed to point out and identify birds, but the survey leader made the final decision for identification of the bird species and the number of individuals present. The survey leader also noted weather variables, the total amount of time, and the total distance traveled during the survey. We conducted 5 non-breeding surveys in 2017 and 5 non-breeding surveys in 2018.



Figure 2. Tracy Aviary Citizen Scientists conduct a breeding season point count bird survey.

Data Analysis

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. We noted whether birds occupied the area during the breeding season, non-breeding season, or throughout the year, and compiled a total species list for the site. To investigate spatial patterns of bird occurrence across the area, we compared the number of observations of species within different bird families at each of the four sampling points distributed across the site. Finally, we used regional and state lists of priority conservation species to document all species of conservation concern that occur at Mill Creek Confluence.

RESULTS

Bird occurrence at the Mill Creek Confluence

During 11 breeding season surveys in 2017-2018, we had 2,008 bird observations and detected 59 species (Table 1). During 10 non-breeding season surveys in 2017-2019, we had 2,569 bird observations and detected 81 species. 17 species were detected exclusively during the breeding season, and 39 species were detected exclusively during the non-breeding season, resulting in a total species list of 98 species.

Table 1: Complete list of species and the number of observations per survey for each species during breeding season and non-breeding season at Mill Creek Confluence

Species	Number of Observations (detections/survey)			
	Breeding Season 2017 (4 surveys)	Non-breeding Season 2017 (5 surveys)	Breeding Season 2018 (7 surveys)	Non-breeding Season 2018 (5 surveys)
Canada Goose	58.5	33.8	65.71	48.2
Red-winged Blackbird	9.75	3	7.71	7
White-faced Ibis	7.5	0	0.29	0
Cliff Swallow	7	0	2.28	0
Black-billed Magpie	6.5	3.8	6.29	3.8
N. Rough-winged Swallow	7.5	0	14.57	0.6
House Finch	4.75	3.6	5.29	2.2
Mourning Dove	4.25	7	4.43	4
Yellow-headed Blackbird	3.75	0	2.14	0
American Robin	3.25	8.8	3.14	3.2
European Starling	3	27.2	13.71	31.4
Mallard	3	49.6	14.14	36.4
American Avocet	2	0.8	3.43	0.6
Eurasian Collared-dove	2	3.2	2	3.2
Killdeer	2.25	3.2	5	7.6
California Gull	1.75	10.4	3.43	7
House Sparrow	1.75	4	1	3.6
Song Sparrow	1.75	1.6	2.43	2.8
Barn Swallow	1.75	4.8	3.86	4.2
Black-crowned Night Heron	1.5	0	0.43	0.2
Bullock's Oriole	1.25	0	3	0
Franklin's Gull	1.25	0	1.71	0
Belted Kingfisher	1	2	0.71	1.4
Brown-headed Cowbird	1	0	1.43	0
Spotted Sandpiper	0.75	0.4	0.29	0.4
Western Kingbird	0.75	0.4	3	0.2
Yellow Warbler	0.75	0.4	0.86	0.8
Brewer's Blackbird	0.75	0.2	2	25.4
California Quail	0.5	0	0.14	0.4
Common Yellowthroat	0.5	0	0.43	0
Downy Woodpecker	0.5	0.8	0	0
Northern Flicker	0.5	0.8	0.14	1.4
Rock Pigeon	0.5	1.6	0.57	4.6
Western Tanager	0.5	0	0.29	0
American Coot	0.5	20.6	1.86	17.2
American Goldfinch	0.25	0.8	0.29	1.4

Table 1 cont.

Species	Number of Observations (detections/survey)			
	Breeding Season 2017 (4 surveys)	Non-breeding Season 2017 (5 surveys)	Breeding Season 2018 (7 surveys)	Non-breeding Season 2018 (5 surveys)
American Kestrel	0.25	0.6	0.14	1
American White Pelican	0.25	0	0.86	0
Bank Swallow	0.25	0.2	18.43	0.2
Black-capped Chickadee	0.25	0.6	0.29	1.2
Black-chinned Hummingbird	0.25	1	0.14	2.2
Common Raven	0.25	0	0	0
Great-tailed Grackle	0.25	0	0.29	0
Peregrine Falcon	0.25	0	0	0
Ring-necked Pheasant	0	0	1	0.2
Double-crested Cormorant	0	0.2	0.86	0.8
Gadwall	0	15.8	0.57	9.6
Black-headed Grosbeak	0	0	0.43	0
Cinnamon Teal	0	0	0.29	0.6
Eared Grebe	0	0	0.29	0
Sora	0	0	0.29	0
Forster's Tern	0	0	0.14	0
Great Blue Heron	0	0.2	0.14	0.2
Green-winged Teal	0	2.8	0.14	2.4
Lazuli Bunting	0	0.2	0.14	0.2
Mallard (domestic type)	0	0.6	0.14	0.2
Red-tailed Hawk	0	0	0.14	0.8
Snowy Egret	0	0	0.14	0
White-crowned Sparrow	0	3.2	0.14	4.4
Northern Shoveler	0	7.2	0	1.8
Ring-billed Gull	0	7	0	1
Common Goldeneye	0	5.8	0	1.8
American Pipit	0	3.2	0	1.2
American Crow	0	1.6	0	1
Northern Pintail	0	1.4	0	0.6
Bufflehead	0	1.4	0	1.6
Dark-eyed Junco	0	1.2	0	0
Lesser Goldfinch	0	1	0	0.6
Pied-billed Grebe	0	0.8	0	0.8
Lesser Scaup	0	0.6	0	0.4
Ruby-crowned Kinglet	0	0.6	0	0

Table 1 cont.

Species	Number of Observations (detections/survey)			
	Breeding Season 2017 (4 surveys)	Non-breeding Season 2017 (5 surveys)	Breeding Season 2018 (7 surveys)	Non-breeding Season 2018 (5 surveys)
Cedar Waxwing	0	0.6	0	0.2
Sharp-shinned Hawk	0	0.4	0	0.2
Marsh Wren	0	0.4	0	0.2
Blue-gray Gnatcatcher	0	0.4	0	0.2
Hermit Thrush	0	0.4	0	0
Wilson's Warbler	0	0.4	0	0
American Wigeon	0	0.2	0	0.8
Black-necked Stilt	0	0.2	0	0
Osprey	0	0.2	0	0
Swainson's Hawk	0	0.2	0	0
Cordilleran Flycatcher	0	0.2	0	0
Evening Grosbeak	0	0.2	0	0
Chipping Sparrow	0	0.2	0	0
Lark Sparrow	0	0.2	0	0
Swamp Sparrow	0	0.2	0	0
Spotted Towhee	0	0.2	0	0.2
Orange-crowned Warbler	0	0.2	0	0.4
Yellow-rumped Warbler	0	0	0	0.6
Bald Eagle	0	0	0	0.4
Western Meadowlark	0	0	0	0.4
Solitary Sandpiper	0	0	0	0.2
Golden Eagle	0	0	0	0.2
Cooper's Hawk	0	0	0	0.2
Horned Lark	0	0	0	0.2
Brewer's Sparrow	0	0	0	0.2
White-throated Sparrow	0	0	0	0.2
Nashville Warbler	0	0	0	0.2

Species occurrence across the Mill Creek Confluence

Because the Mill Creek Confluence is made up of heterogeneous habitat, we found different types of birds that tended to use certain areas more than others. To explore patterns of species occurrence across the landscape, we separated species into family groups, and noted how many observations of each we had within 125m of each sampling point (Figure 3). We had high numbers of observations of ducks and geese at Points 4 and 3, which is unsurprising as both

points had good view of the Jordan River. We also observed relatively high numbers of shorebirds at points 3 and 4, including members of the stilt, avocet, plover, and sandpiper families. The northern section of the site is free of woody vegetation and fairly open, and makes good shorebird habitat; we observed nesting American Avocets and Killdeer near points 3 and 4, as well as many spotted sandpipers foraging along the edge of the water. Swallows were observed throughout the site, and there was a very active Bank Swallow colony observed in the bank adjacent to point number 4. Point number 2 had the largest number of birds in the Icterid family. At this point, we observed many Bullock’s Orioles, Red-winged Blackbirds, and Yellow-headed Blackbirds on territory. The Bullock’s Orioles appeared to be nesting in the thick riparian shrubs and trees between the path and the river, while the Red-winged Blackbirds were closer to the water, and were especially abundant across the river in the adjacent wetlands. Point number 1 had a relatively large number of House Sparrows, European Starling, and Corvids such as Black-billed Magpies. These species are highly urban-adapted, and indicate the impact of neighboring developed areas on the composition of the bird community in this section of the site.

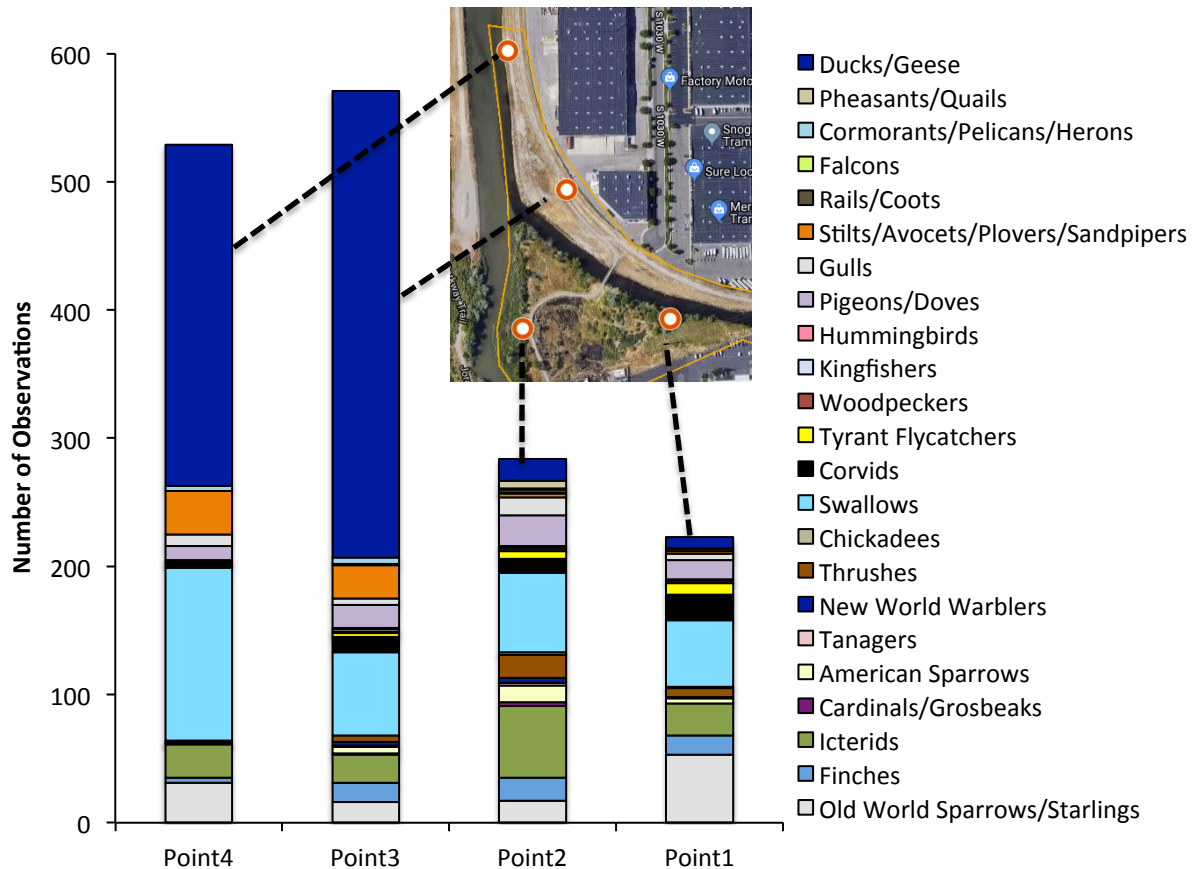


Figure 3. Number of observations of bird species from different families at 4 sampling points in the Mill Creek Confluence.

Bird species of conservation concern at the Mill Creek Confluence

The Mill Creek Confluence supports a diverse bird community, and provides important habitat for migratory and resident bird species. The species richness of the area is comparable to - and even higher than - yearly counts of species in other riparian areas in Northern Utah. For example, in a study by Parrish et al. (2007) of Utah's riparian birds surveyed during May to August in 1992-2005, the sites near Ogden, Provo, Logan, and Salt Lake City had an average of 29 to 56 species detected per year. We detected 59 species during the 2017 and 2018 breeding seasons.

We also detected several species of conservation concern during both the breeding and non-breeding surveys. We detected 4 of the 24 Partners in Flight Utah Avian Conservation Strategy priority species: the American Avocet, American White Pelican, Brewer's Sparrow, and Black-necked Stilt (Parrish et al. 2002). We also detected 9 of the 20 North American Waterfowl Management Plan (NAWMP) priority species: the American Wigeon, Canada Goose, Cinnamon Teal, Gadwall, Green-winged Teal, Lesser Scaup, Mallard, Northern Pintail, and Northern Shoveler (Utah Steering Committee 2005). We detected 6 of the 11 North American Waterbird Conservation Plan priority species: the American White Pelican, Black-crowned Night Heron, California Gull, Franklin's Gull, Snowy Egret, and White-faced Ibis (Utah Steering Committee 2005). We detected 2 birds listed as State of Utah Sensitive Species: the American White Pelican and Bald Eagle (State of Utah 2017).

Recommendations for management actions that could improve habitat for bird species

To enhance the ecological value of Mill Creek Confluence and promote a healthy bird community, we suggest the following:

1. Promote vertical structure and canopy cover throughout the site. Protect the existing trees and shrubs and/or replace trees that are removed. 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. No tree removal or thinning activities should take place during the breeding and nesting season (April – July).
2. Discourage spraying and mowing of the northern levee section, especially during the nesting season (April – July); several shorebird species were observed nesting in this area.
3. 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.
4. Maintain standing dead trees to provide habitat for cavity-nesting species. Avoid complete removal if possible; cutting them to a height of 10ft can mitigate safety concerns while still providing cavity habitat.

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