



# COMMUNITY SCIENCE BIRD MONITORING

## AT THE REGIONAL ATHLETIC COMPLEX AND THE JORDAN RIVER GOLF COURSE

### 2020 Project Report

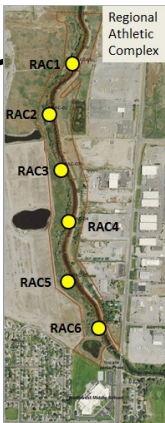
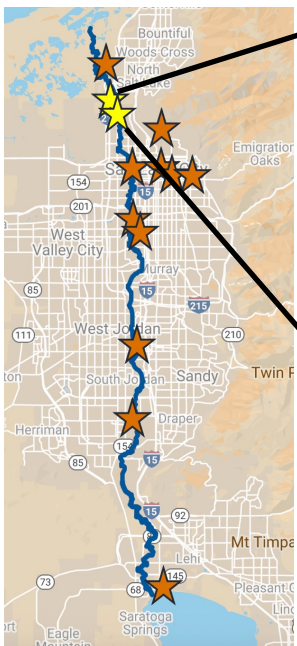
## PROJECT OVERVIEW

In partnership with Salt Lake City Trails & Natural Lands, Tracy Aviary is conducting community science bird monitoring projects at two sites along the Jordan River: 1) the Nature Preserve Area of the Regional Athletic Complex (RAC), and 2) the Jordan River Golf Course (JGC). Beginning in 2015, our goal for this study was to collect data on the avian community of these sites to better understand the birds that occur at the RAC and JGC, determine how the bird community differs between sites and over time, and identify the presence of species of conservation concern. Here, we summarize results from our 2020 field season.

## STUDY SITES

We generated six sampling points within the RAC and two sampling points in the JGC where we conducted bird and vegetation surveys. These surveys are part of a larger community science bird monitoring program that includes seven other study sites along the Jordan River. Using information from other study sites, we can gain inference about larger scale patterns and trends in birds communities along the river.

### Bird Monitoring Sites



**Regional Athletic Complex (RAC)**



**Jordan River Golf Course (JGC)**

## BIRD SURVEY METHODS

### Breeding season point count surveys



During May – July of 2020, 6 community scientists conducted 5 breeding season point count surveys at the RAC and the JGC. Point count surveys were conducted by pairs of community scientists between dawn and 10am. The ‘observer’ identified all birds seen and heard during six minutes, 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

Information from point count surveys was supplemented by non-breeding group surveys conducted at each site in January, February, March, August, September, October, November, and December 2020. During non-breeding surveys, groups of volunteers led by a trained Tracy Aviary staff person walked a transect through the site and noted all birds seen and heard in the area.



# BIRD MONITORING 2020 RESULTS

## 2020 SURVEY SUMMARY

During 6 breeding season surveys at the RAC, we had 1149 bird observations and detected 69 species. During 8 non-breeding season surveys, we had 3,058 bird observations and detected 83 species. We had a total species list of 101 species at the RAC in 2020.

During 6 breeding season surveys at the JGC, we had 385 bird observations and detected 32 species. During 5 non-breeding season surveys, we had 3769 bird observations and detected 57 species. We had a total species list of 66 species at the JGC in 2020.



**Song Sparrows** are common at the RAC, JGC, and elsewhere along the Jordan River.

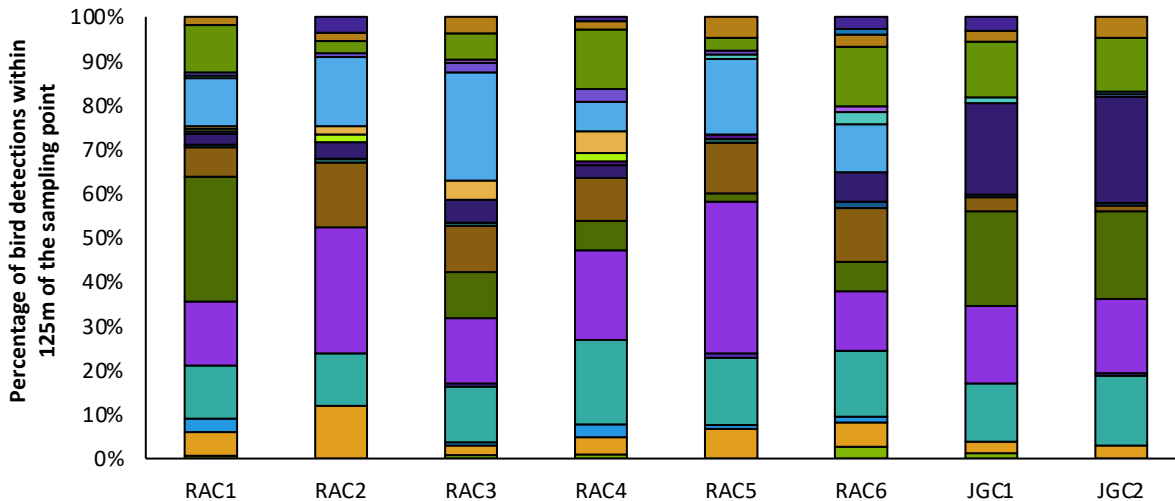
**We've detected a total of 150 bird species at the RAC and 123 bird species at the JGC from 2015 - 2020.**

## BREEDING SEASON COMMUNITY COMPOSITION ACROSS EACH SITE

We examined the composition of bird communities across sampling points at the RAC and JGC by comparing relative proportions of bird families and habitat guilds for species detected within 125m of each point during the breeding season.

### Families

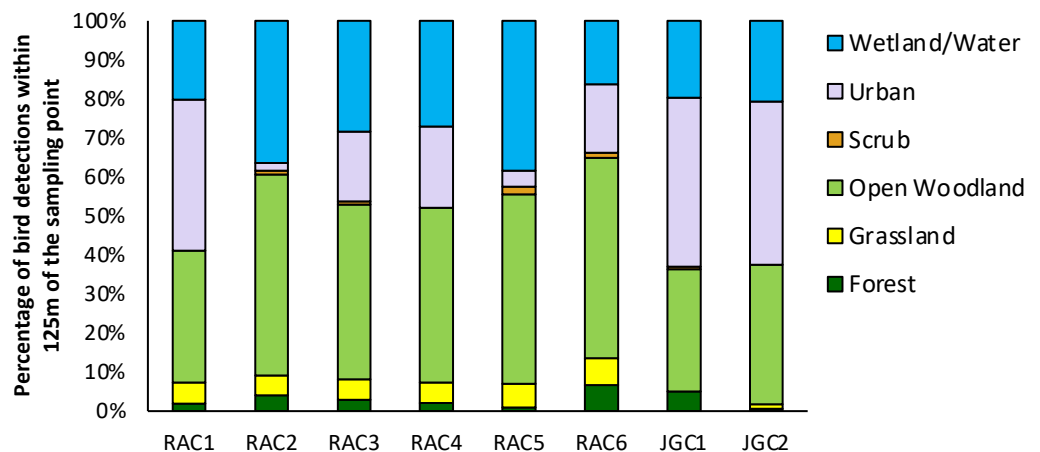
Overall, the bird community at the RAC had a higher proportion of Icterids, Sparrows, and Shorebirds/Waders, while the JGC had a higher proportion of Pigeons/Doves.



- Chickadees/Kinglets
- Coots/Rails
- Corvids
- Ducks/Geese
- Finches
- Gnat catchers
- Gulls/Terns
- Hummingbirds
- Icterids
- Shorebirds/Waders
- Kingfishers/Cormorants
- Mimid
- Pigeons/Doves
- Quails/Pheasants
- Raptors/Owls
- Sparrows
- Starlings/House Sparrows
- Swallows
- Tanagers
- Thrushes/Waxwings
- Tyrant Flycatchers
- Warblers/Vireos
- Woodpeckers

### Habitat Guilds

Bird communities at both sites had a high proportion of birds that use open woodland habitats and those that use wetland or water. The JGC and RAC1 had an especially high proportion of birds that are urban habitat specialists. Grassland species made up a small proportion of the community at the RAC, but were rarely detected at the JGC.



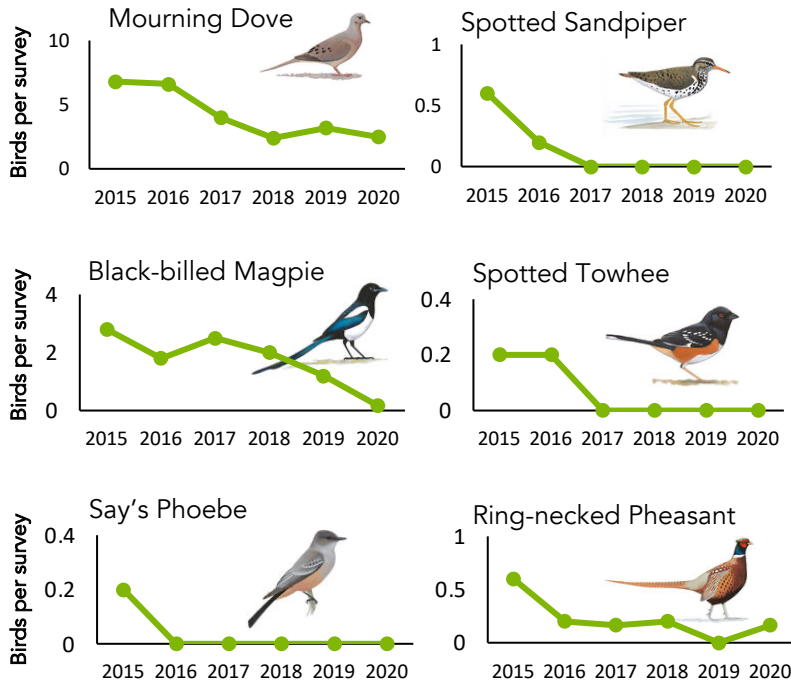
# BIRD MONITORING 2020 RESULTS

## TRENDS OVER TIME

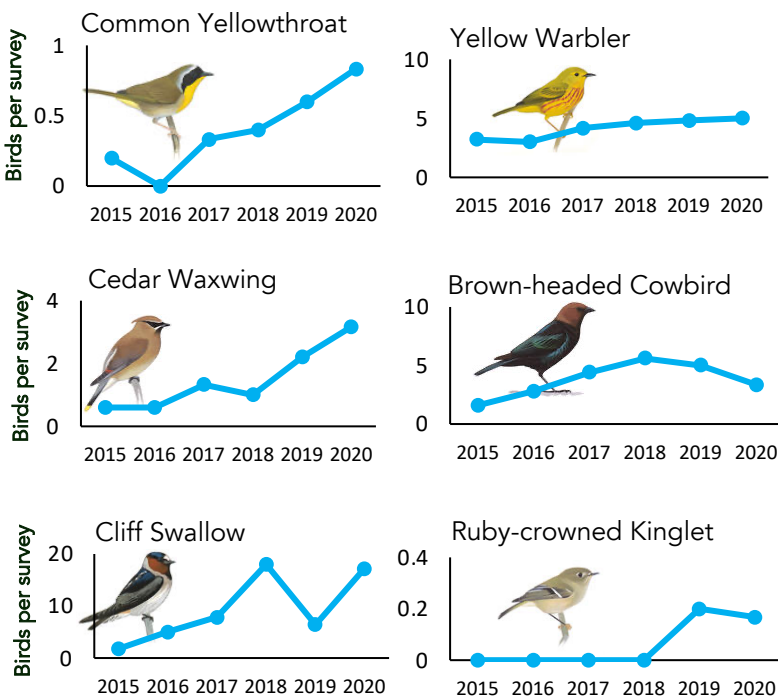
Over the past six years of monitoring, some bird species have declined and even gone locally extinct at the RAC and JGC, and some have increased in relative abundance. These trends are different in each site; the RAC has seen increasing trends for several riparian obligate species, while it is mostly urban-adapted species that are increasing at the JGC.

### Regional Athletic Complex (RAC)

#### Declining trends and local extinctions

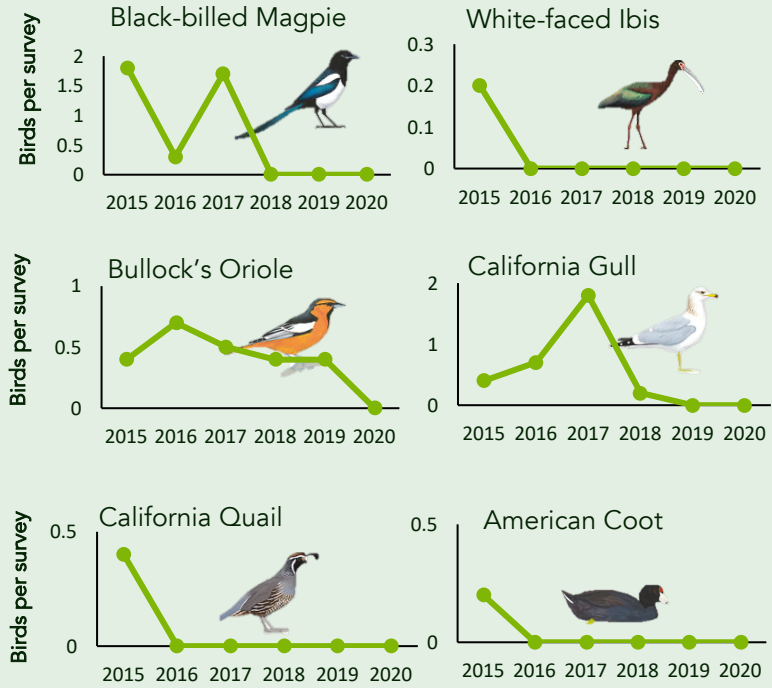


#### Increasing trends and local colonization

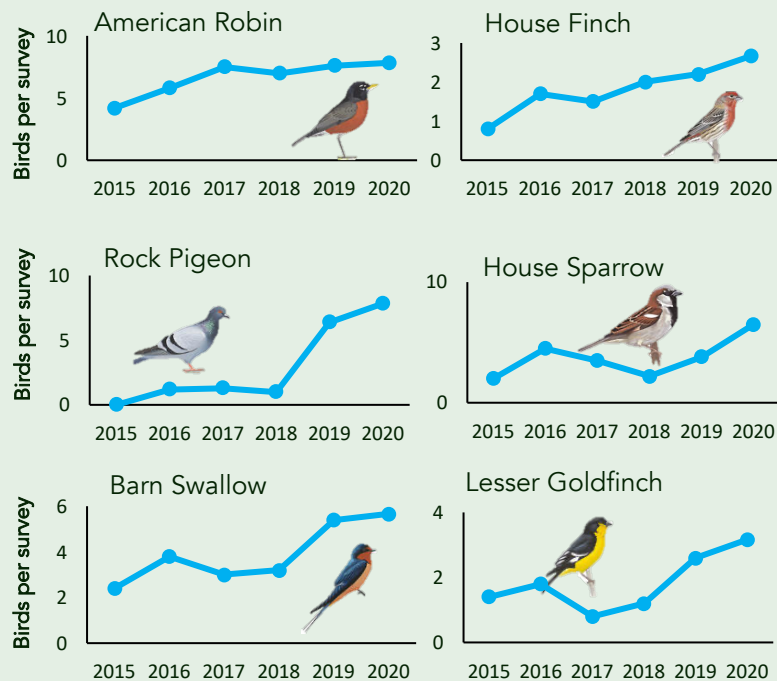


### Jordan River Golf Course (JGC)

#### Declining trends and local extinctions



#### Increasing trends and local colonization



# BIRD MONITORING 2020 RESULTS

## BIRD HABITAT USE PATTERNS THROUGHOUT THE JORDAN RIVER

We use breeding season data to help understand the how habitat features and landscape attributes impact where different bird species are found; information that could help with land management and restoration decisions that create, protect, or enhance healthy bird habitat for target species. A preliminary occupancy modeling analysis using bird survey data from 2020 identified the most important factors influencing habitat use by 12 species across the 12 bird monitoring sites. We selected 8 species that were considered target species (i.e., native, riparian-associated, and urban-sensitive), and 4 species that were considered non-target species (i.e., non-native and/or urban-associated). Our analysis examined which habitat or landscape attributes (Table 1) influenced the probability that these species would use an area within our sampling sites.

### Occupancy Analysis: Overall Habitat Use Patterns

**Canopy Cover** was found to be an important factor for habitat use by **50%** of the target species examined. All but Western Kingbird positively associated with canopy cover.

**Distance to River or Riparian/Wetland habitat within 125m** was found to be an important factor for habitat use by **37.5%** of the target species examined. All species had decreased habitat use as distance from river increased and riparian/wetland habitat decreased.

**Undeveloped Habitat** was found to be an important factor for habitat use by **75%** of the non-target species examined, with decreasing habitat use in areas with more undeveloped habitat.

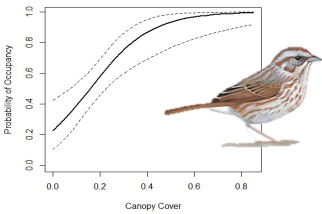
Table 1. Habitat and landscape attributes included in occupancy analysis.

Variable	Measurement (unit)
Canopy	Tree canopy cover within 50m (%)
Shrub	Shrub cover within 50m (%)
Herb	Herbaceous cover within 50m (%)
Water	Cover of water within 50m (%)
DistRiver	Distance to the river or stream (m)
Elevation	Elevation (m)
Riparian125	Riparian or wetland habitat within 125m (%)
Undeveloped125	Undeveloped habitat within 125m (%)
Undeveloped500	Undeveloped habitat within 500m (%)

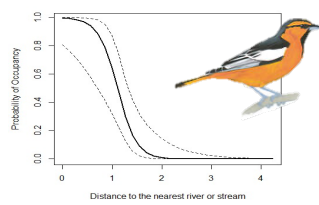
### Occupancy Analysis: Species Results

#### Target Species

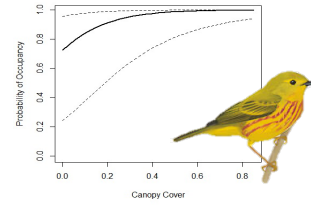
**Song Sparrow** habitat use increases with increasing **tree canopy cover**



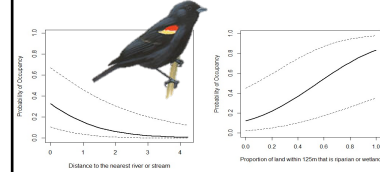
**Bullock's Oriole** habitat use decreases as you get further from a **river or stream**



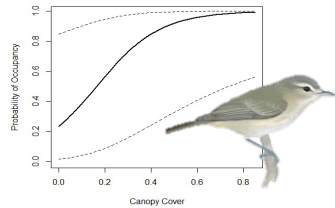
**Yellow Warbler** habitat use increases with increasing **tree canopy cover**



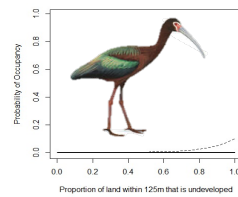
**Red-winged Blackbird** habitat use decreases with **distance from a river or stream**, and increases with the proportion of **riparian/wetland habitat** within 125m of the point



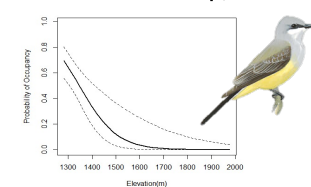
**Warbling Vireo** habitat use increases with increasing **tree canopy cover**



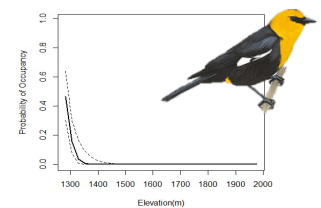
**White-faced Ibis** habitat use increases with the proportion of **undeveloped habitat** within 125m



**Western Kingbird** habitat use decreases with **distance from a river or stream**, and decreases with increasing **tree canopy cover**

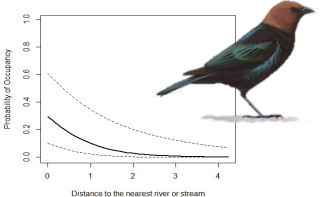


**Yellow-headed Blackbird** habitat use decreases with increasing **elevation**

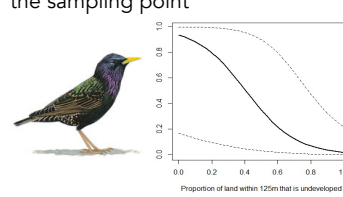


#### Non-target Species

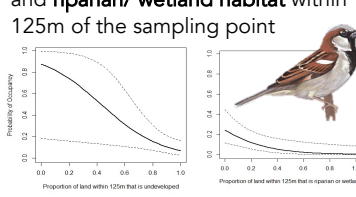
**Brown-headed Cowbird** habitat use decreases as you get further from a **river or stream**



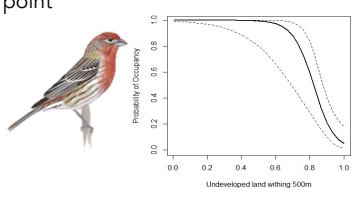
**European Starling** habitat use decreases with the proportion of **undeveloped habitat** within 125m of the sampling point



**House Sparrow** habitat use decreases with the proportion of **undeveloped habitat** within 500m and **riparian/wetland habitat** within 125m of the sampling point



**House Finch** habitat use decreases with the proportion of **undeveloped habitat** within 500m of the sampling point

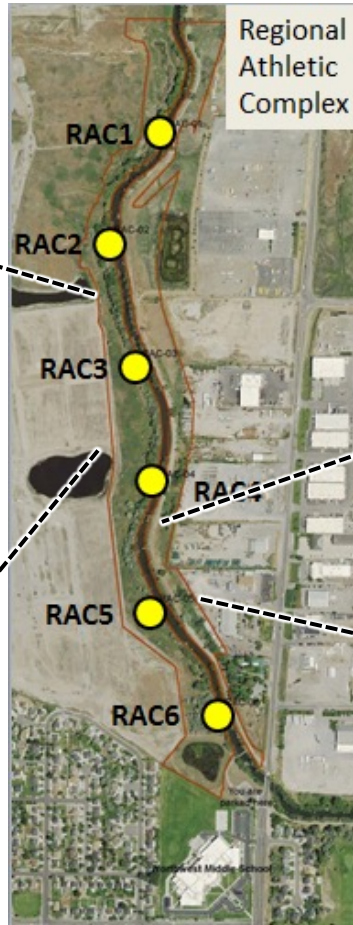


# BIRD MONITORING 2020 RESULTS

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

**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.

**Add wetland elements.** Several areas near the RAC have ephemeral water and wetland vegetation, 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.



**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 development.

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

**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.



**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.

**REGIONAL ATHLETIC COMPLEX (RAC)**  
**COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON**  
**SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)**

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
American Avocet	1	1.3	0.2	1.3	0	0	0	0.8	0	0	0.3	1.5
American Coot	0.8	8.5	0.3	15.1	0	9.1	0.2	7.4	0.4	13	0.2	3.5
American Crow	0	1.2	0.2	1.6	0	1.8	0	8.4	0	4.6	0.2	3.3
American Goldfinch	1	8.3	1.5	5.6	0.7	3.5	1.2	1.5	1.2	3	1.3	2.8
American Kestrel	0	0.5	0	1.1	0	0.6	0	0.5	0	0.6	0	0.4
American Pipit	0	1	0	0.4	0	0.1	0	1	0	0.2	0	0.3
American Robin	9.8	15.8	12.3	32.8	10.3	10.6	13.4	7.9	10.8	16.4	13.8	12.1
American Tree Sparrow	0	0.2	0	0	0	0	0	0	0	0.2	0	0
American White Pelican	1.8	0	0.3	0	0	0	0	9.1	0	0	1.7	0
American Wigeon	0	0.5	0	0	0	0.1	0	0	0	0	0	0
Bald Eagle	0	0	0	0.1	0	0	0	0.1	0	0.2	0	0.1
Bank Swallow	0	0	0.3	0.4	0	3.6	0.2	0.3	0	0	0.3	0
Barn Owl	0	0	0.7	0	0	0	0	0	0	0	0.3	0.1
Barn Swallow	1.4	1.7	1.2	4.4	1.2	0	0.6	2.1	2.6	5.2	1.3	1.9
Belted Kingfisher	0.2	0.7	0	0.4	0	0.3	0	1.1	0	0.4	0.2	0.6
Black Phoebe	0	0	0.2	0	0	0	0	0	0	0	0	0
Black-billed Magpie	3	8.2	3.2	11.1	3.3	9.5	1.8	6.3	1.2	8.6	1	7.9
Black-capped Chickadee	1	8.5	2.8	8.9	0	4.4	1.6	3.5	1.4	9.2	1.5	3
Black-chinned Hummingbird	0	0.5	0.7	1.4	1.8	0.3	0.6	0.1	0	0.4	0.7	0.8
Black-crowned Night-Heron	0.2	0.2	0.3	0.5	0.3	0.1	0.2	0.8	0.2	0.4	0.3	0
Black-headed Grosbeak	0	0	0.2	0.1	0.2	0.1	0	0	0.2	0.2	0	0.3
Black-necked Stilt	0.4	0	0.3	0	0	0	0	0.6	0	0	0	0
Blue-gray Gnatcatcher	0.6	0.3	0	0.6	0.3	0.5	0.2	0.1	0	1.2	0.3	0.4
Blue-winged Teal	0	0.2	0	0.1	0	0	0	0	0	0	0	0
Brewer's Blackbird	0	0.3	0.5	1	0	0	0	0.4	0	0.4	0	0
Brewer's Sparrow	0	0	0	0	0	0	0	0	0	0	0	0.1
Broad-tailed Hummingbird	0	0	0	0	0	0.1	0	0	0	0	0	0
Brown Creeper	0	0.8	0	0.9	0	0	0	0.3	0	0	0	0
Brown-headed Cowbird	2	0	2.7	0.1	3.8	0	5.4	0	5	0	3.5	0
Bullock's Oriole	5.4	0.2	8.8	0.1	8.3	0	12.6	0	9.8	0	10.8	0
Cackling Goose	0	0	0	0.1	0	0	0	0	0	0	0	0
California Gull	0.8	29	2.3	1.8	0.5	2.6	0.8	9.4	0.8	16.8	1.3	2.6
California Quail	0.4	1.5	0	4.4	0.2	4	0.8	0.9	0.2	12.4	0.8	8.3
Canada Goose	4.8	86	2.2	78.8	0	28.5	0.2	29.8	2	23	3.5	19.6
Canvasback	0	0	0	0	0	0	0	0.3	0	0	0	0
Caspian Tern	0	0.3	0.2	0	0	0	0	0	0	0	0.5	0
Cassin's Finch	0	0	0	0	0	0	0	0	0	0	0.2	0
Cedar Waxwing	3	12.8	0.7	6.1	0.8	0.8	0.6	1.6	2.2	5.6	3.3	2.8
Chipping Sparrow	0	0.8	0.8	0.5	0	0	0	0.1	0.2	0.2	0	0
Cinnamon Teal	0.2	0	0	0	0	0	0	0	0	1.2	0	0
Cliff Swallow	2	0	8	0	3	0.3	10.4	0	6.6	0.8	40.2	0
Common Goldeneye	0	0	0	0.1	0	0.3	0	0.5	0	1	0	0

**REGIONAL ATHLETIC COMPLEX (RAC)**  
**COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON**  
**SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)**

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
Common Merganser	0	0.2	0	0	0	0	0	0	0	0	0	0
Common Nighthawk	0	0	0	0.1	0	0	0	0.1	0	0.2	0	0
Common Raven	0	0.2	0.2	0	0.8	0.4	0	0	0	0.8	0	1.1
Common Yellowthroat	0.2	0	0	0.1	0.3	0	0.6	0.1	0.8	0.6	1.2	0.3
Cooper's Hawk	0	0.5	0	0.6	0.2	0.1	0	0.4	0.2	0.4	0.2	0.1
Cordilleran Flycatcher	0	0	0	0.1	0	0	0	0	0	0	0	0
Dark-eyed Junco	0	32.2	0	14.4	0	6.3	0	4.9	0	10.2	0	8.1
Double-crested Cormorant	0.2	0.3	0.5	0	0	0	0.2	0.1	0.6	0.4	1.2	0.1
Downy Woodpecker	1.8	2.7	0.7	2.8	0.5	1.3	1	1.4	1.4	1.4	1.5	1.9
Dusky Flycatcher	0	0	0	0	0	0	0	0.1	0	0	0	0
Eurasian Collared-Dove	1.6	22.2	1.8	38.4	0.7	13.8	0.4	6	1	13	1.2	17.8
European Starling	7.6	596.7	4.8	602.4	4.2	107.8	3.8	500.1	4.8	198	17.2	157.6
Evening Grosbeak	0.2	0.2	0	0	0	0.1	0	0	0	0	2	0.1
Ferruginous Hawk	0	0	0	0	0	0	0	0.1	0	0	0	0
Forster's Tern	1	0.2	1	0	0.3	0.1	0.6	0.6	0.6	0	3.3	0
Franklin's Gull	3.2	21.3	21.5	3.6	1	3.5	0.6	5.8	1.8	8.8	5.2	1.9
Gadwall	0.2	0.7	0.8	1.4	0	0.9	0	0.4	0	1.8	0.5	0.1
Golden Eagle	0	0	0	0	0	0	0	0.1	0	0	0	0
Gray Catbird	0.4	0.2	0.3	0	0.5	0.3	0.2	0.1	0.2	0.8	1.2	0.4
Great Blue Heron	0	0.2	0	0.1	0.2	0.5	0.4	0.3	0.2	0.4	0.8	0.1
Great-horned Owl	0	0	0	0.3	0	0	0	0.3	0	0	0	0
Great-tailed Grackle	0.8	0.2	2	0	1.7	0.3	0.8	0.6	0.4	0	0.5	0
Greater Yellowlegs	0	1.2	0	0.6	0	0.3	0	0.1	0	1.8	0	0
Green-winged Teal	0	0.2	0	0	0	0.3	0	0.5	0	2	0	0.1
Hammond's Flycatcher	0	0	0	0.1	0	0.1	0	0	0	0	0	0
Harris's Sparrow	0	0	0	0	0	0	0	0	0	0.2	0	0
Hermit Thrush	0	0	0	0.6	0	0.1	0	0.8	0	1.6	0.2	0.1
Herring Gull	0	0.5	0	0	0	0	0	0	0	0	0	0
Hooded Merganser	0	0	0	0	0	0.5	0	0	0	0	0	0
House Finch	4.4	25	4.2	24.9	2.2	12.5	2.2	11.8	5.8	25.2	7.5	9.8
House Sparrow	0.4	21.3	0.5	25.1	0.3	5	0.8	3.5	0.8	6.8	0.3	3.3
House Wren	0.2	0	0	0	0	0	0	0	0	0	0	0
Killdeer	3.6	2.2	2.2	1.3	1.5	0.4	0.6	0.8	0.4	1.6	2.2	1.6
Lazuli Bunting	0.4	0.5	0	0.4	0	0.8	0	0.3	0.4	0.4	0	0.3
Lesser Goldfinch	2.4	3.2	0.5	5.9	0.7	3	1.8	1.8	1.2	19.6	1.2	1.5
Lesser Scaup	0	0	0	0	0	1	0	0	0	0	0	0
Lesser Yellowlegs	0	0	0	0	0	0	0	0	0	0.2	0	0.1
Lincoln's Sparrow	0.2	0.3	0	0.1	0	0	0	0	0	0.8	0	0.1
Loggerhead Shrike	0	0	0	0	0	0.1	0	0	0	0	0	0
MacGillivray's Warbler	0.2	0.2	0.2	0.3	0	0.1	0	0.1	0	0.6	0	0.3
Mallard	4.4	30.2	5	77.5	3.8	42	1.8	30.5	5	66.4	3.3	28.4
Marsh Wren	0	0.2	0	0	0	0	0	0.1	0	0.2	0	0.1
Merlin	0	0.3	0	0.3	0	0	0	0.1	0	0.2	0	0.1

**REGIONAL ATHLETIC COMPLEX (RAC)**  
**COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON**  
**SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)**

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
Mountain Chickadee	0	0.3	0	0	0	0	0	0	0	0	0	0.3
Mourning Dove	7	7.5	7	5.8	3.5	3.4	2.4	1.8	3.2	2.2	3.2	2.1
Nashville Warbler	0	0	0	0.1	0	0	0	0	0	0.2	0	0.1
Northern Flicker	0	6.7	0	8.1	0	2.9	0	2.4	0	4.2	0.2	1.6
Northern Parula	0	0	0	0	0	0	0	0	0	0	0	0.1
Northern Harrier	0	0	0	0.3	0	0.4	0	0	0	0.6	0	0
Northern Mockingbird	0	0	0	0	0	0	0	0.4	0	0	0	0
Northern Rough-winged Swallow	12.2	0	3.3	0.8	0.8	0.3	2.2	0.5	4.8	0.6	1.8	0
Northern Shoveler	0	1.2	0	0.1	0	0.3	0	0	0	2.4	0	1.9
Northern Shrike	0	0	0	0	0	0.1	0	0	0	0	0	0
Northern Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0.1
Olive-sided Flycatcher	0	0.3	0	0	0	0.1	0	0	0	0	0	0
Orange-crowned Warbler	0	0.5	0	0.5	0	0	0	1.4	0	1.2	0	0.3
Osprey	0	0	0	0	0	0	0	0	0	0	0.2	0.1
Pied-billed Grebe	0.2	1.5	0.3	1.3	0	1.4	0	1.4	0	0.8	0.2	0.5
Pine Siskin	0.2	0.3	0	0	0	0	0	0	0	0.6	0	0.1
Prairie Falcon	0	0	0	0	0	0	0	0.1	0	0	0	0
Red Crossbill	0	0	0	0	0	0	0	0	0	0	2.2	0
Red-breasted Nuthatch	0	0	0	0	0	0.1	0	0	0	0.2	0	0
Red-naped Sapsucker	0	0.2	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	0	1.2	0	1.5	0	1.4	0	1.9	0.2	0.8	0	0.9
Red-winged Blackbird	2.4	3.7	1.8	10.9	2.5	13.8	0.6	14.1	5.2	12.2	2	2.5
Ring-billed Gull	0	8.8	0	13.3	0	1.9	0	6	0	8	0	1.5
Ring-necked Duck	0	0	0	0	0	2.6	0	4.3	0	3.4	0	0.1
Ring-necked Pheasant	1	0.3	0.2	0.3	0.8	1	0.6	0.1	0	0.2	0.5	0
Rock Pigeon	0	16.8	0.3	19	0.3	4.5	0.2	2.5	1.2	9.8	0.3	5.4
Rough-legged Hawk	0	0	0	0	0	0	0	0.3	0	0	0	0
Ruby-crowned Kinglet	0	4.2	0	2.6	0	0.5	0	1.4	0.2	2.2	0.2	0.9
Rufous Hummingbird	0	0	0	0	0	0.1	0	0	0	0	0	0
Sandhill Crane	0	0	0.2	0	0	0	0	0	0	0	0.2	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0.2	0	0
Say's Phoebe	0.2	0	0	0	0	0	0	0	0	0	0	0
Sharp-shinned Hawk	0	0.3	0.2	0.5	0	0.4	0	0	0	0	0	0.1
Snow Goose	0	0.2	0	0	0	0	0	0	0	0	0	0
Snowy Egret	0	0.2	0.2	0	0	0.1	0	0.8	0	0	0	0.3
Solitary Sandpiper	0	0	0	0.4	0	0.3	0	0.1	0	0	0	0
Song Sparrow	9.4	6.5	8.8	8.1	8.3	8.4	10.4	8.4	10	16	13	9.1
Sora	0	0	0	0.1	0	0	0	0	0	0.2	0	0
Spotted Sandpiper	0.6	0	0.2	0.1	0	0	0	0.3	0	0	0	0.1
Spotted Towhee	0.4	1.3	0.2	0.9	0	0.1	0	1.4	0	1.6	0	2
Swainson's Hawk	0	0.2	0.2	0	0	0	0	0	0	0	0.2	0.1
Townsend's Solitaire	0	0	0	0.1	0	0	0	0.1	0	0	0	0
Tree Swallow	0	0	2.5	0.3	0	0	0	0.8	0	0	0.3	0



**REGIONAL ATHLETIC COMPLEX (RAC)**  
**COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON**  
**SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)**

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
Tundra Swan	0	0	0	0	0	0	0	0	0	0	0	3.8
Turkey Vulture	0	0	0.2	0	0	0.1	0	0.1	0.4	0	0	0
Vesper Sparrow	0	0.2	0.3	0	0	0	0	0	0	0	0	0
Violet-green Swallow	0	0	0	0	0	0	0.2	0	0.4	0	0	0
Virginia's Warbler	0	0	0	0	0	0	0	0	0	0	0	0.1
Warbling Vireo	0.2	0.2	0	0.1	0.2	0	0.2	0.1	0.2	0	0	0.3
Western Kingbird	2.4	0.3	4.7	0.1	2.3	0.8	3	1	2.8	1.2	2.8	0.9
Western Meadowlark	0.2	0	0.3	0	0.2	0.1	1.6	0	1	2.6	0.5	0
Western Tanager	1	0.5	1.5	2.1	1.2	0.4	0.8	0.3	1.6	1.2	0.3	0.6
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0.1
Western Wood-pewee	0	0	0.3	0.4	0	0	0.6	0.1	0	0	0.5	0
White-crowned Sparrow	1.4	7.7	0	5.6	0.5	5.1	0	8.4	0	11.6	0.2	14.1
White-faced Ibis	4	0	1.3	1.8	0.2	9	0.2	6.5	2.6	27.8	5	0.8
Willow Flycatcher	0	0	0	0.3	0	0	0	0	0.4	0	0	0
Wilson's Snipe	0	3.7	0	1.5	0	0.6	0	1.1	0	0.2	0	0
Wilson's Warbler	0	0.5	0	0.6	0.8	0	0	0.1	0.4	0	0.2	0.5
Wood Duck	0	0.3	0	0.1	0	0	0	0	0	0.4	0	0
Woodhouse's Scrub-Jay	0	0.7	0	1	0	0	0	0	0	0	0	0
Yellow Warbler	3.4	0.5	3.5	1.9	4.3	1.9	5	2.5	4.8	2	5.2	1
Yellow-breasted Chat	0	0	0	0	0	0	0	0	0	0	0	0.1
Yellow-headed Blackbird	1.6	0	3.2	0	4.8	0.1	4.6	0.8	4.4	0.2	1.7	0.4
Yellow-rumped Warbler	0.2	6.5	2.8	5.4	1.2	1.5	0.4	2.5	1	15.4	0.5	5

# JORDAN RIVER GOLF COURSE (JGC)

## COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
American Avocet	0	1.3	0	1.3	0	0	0	0	0	0	0	0
American Coot	0.2	8.5	0	15.1	0	0	0	2.4	0	2.2	0.2	4.8
American Crow	0	1.2	0.2	1.6	0	0	0.2	9	0	3.8	1	4.6
American Goldfinch	0.6	8.3	1	5.6	0.3	0.3	0.8	6.7	0	1.6	0	2.4
American Kestrel	0	0.5	0	1.1	0	0	0	0.3	0	0.2	0.2	0
American Pipit	0	1	0	0.4	0	0	0	0.1	0	0	8.3	0.2
American Robin	4.2	15.8	5.8	32.8	7.5	7.5	7	15.6	7.6	9	0.2	23.8
American Tree Sparrow	0	0.2	0	0	0	0	0	0	0	0	0	0
American Wigeon	0	0.5	0	0	0	0	0	0	0	0	0	0
Bald Eagle	0	0	0	0.1	0	0	0	0	0	0	0	0
Bank Swallow	0	0	0	0.4	0	0	0	0	0	0	0	0
Barn Owl	0	0	0	0	0	0	0	0	0	0	0	0.2
Barn Swallow	2.4	1.7	3.8	4.4	3	3	3.2	6.6	5.4	0	5.7	2.8
Belted Kingfisher	0	0.7	0	0.4	0.3	0.3	0	0.4	0	0.6	0	0.4
Black-billed Magpie	1.8	8.2	0.3	11.1	1.7	1.7	0	6.9	0	2	0	3.8
Black-capped Chickadee	0.8	8.5	1	8.9	0.3	0.3	1	3.7	1.8	2	1	2.8
Black-chinned Hummingbird	0.2	0.5	0.2	1.4	0	0	0	0.6	0.4	0	0.8	0.8
Black-crowned Night-Heron	0	0.2	0	0.5	0	0	0	0	0	0	0	0
Black-headed Grosbeak	0	0	0.2	0.1	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0.3	0	0.6	0	0	0	0	0	0	0	0
Blue-winged Teal	0	0.2	0	0.1	0	0	0	0	0	0	0	0
Brewer's Blackbird	0	0.3	0	1	0	0	0.2	0	0	0	0	0
Brewer's Sparrow	0	0	0	0	0	0	0	0	0	0	0.3	0
Brown Creeper	0	0.8	0	0.9	0	0	0	0.1	0	0.2	0	0.6
Brown-headed Cowbird	0	0	0.2	0.1	1.3	1.3	0.6	0	1.4	0	0.2	0
Bullock's Oriole	0.4	0.2	0.7	0.1	0.5	0.5	0.4	0	0.4	0	0	0
Cackling Goose	0	0	0	0.1	0	0	0	0	0	0	0	0
California Gull	0.4	29	0.7	1.8	1.8	1.8	0.2	1.4	0	3.2	0	1.2
California Quail	0.4	1.5	0	4.4	0	0	0	0	0	0	0	1
Canada Goose	0	86	0	78.8	0	0	0	23.4	0	59	0.2	49.6
Caspian Tern	0	0.3	0	0	0	0	0	0	0	0	0	0
Cassin's Finch	0	0	0	0	0	0	0	0	0	0	0.2	0
Cedar Waxwing	0	12.8	0.8	6.1	0.2	0.2	0.6	2.3	0.6	1	0	2
Chipping Sparrow	0	0.8	0	0.5	0	0	0	0	0	0.6	0	0
Cinnamon Teal	0	0	0	0	0	0	0	0	0	0	0	0
Cliff Swallow	0.4	0	0.3	0	1.3	1.3	1.2	0	0.6	0	3	0
Common Goldeneye	0	0	0	0.1	0	0	0	0	0	0	0	0
Common Merganser	0	0.2	0	0	0	0	0	0	0	0	0	0
Common Nighthawk	0	0	0	0.1	0	0	0.2	0.1	0	0	0	0
Common Raven	0	0.2	0	0	0	0	0	0.3	0	0	0	0
Common Yellowthroat	0	0	0	0.1	0	0	0	0	0.2	0	0	0.2
Cooper's Hawk	0	0.5	0	0.6	0	0	0.2	0	0	0.6	0	0.8
Cordilleran Flycatcher	0	0	0	0.1	0	0	0	0	0	0	0	0

# JORDAN RIVER GOLF COURSE (JGC)

## COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
Dark-eyed Junco	0	32.2	0	14.4	0	0	0	18.3	0	16.6	0	12.4
Double-crested Cormorant	0	0.3	0.7	0	0	0	0.2	0.3	0.2	0	0.2	0
Downy Woodpecker	0	2.7	0.8	2.8	0	0	0.4	1.4	0.6	0.4	0.3	1.2
Eurasian Collared-Dove	0.8	22.2	2.3	38.4	1.5	1.5	0.8	14.6	1.8	3.6	1.3	6.6
European Starling	2	597	5.8	602	4.8	4.8	4	403	2.8	154	5.5	432
Evening Grosbeak	0	0.2	0.3	0	0	0	0	0.4	0	0.6	0	2
Forster's Tern	0	0.2	0	0	0	0	0	0	0	0	0	0
Franklin's Gull	0.4	21.3	5.2	3.6	0	0	0.2	0.4	0	0	0	0
Gadwall	0	0.7	0	1.4	0	0	0	0	0	0	0.2	0
Gray Catbird	0	0.2	0	0	0	0	0	0	0	0	0	0.2
Great Blue Heron	0	0.2	0	0.1	0.2	0.2	0	0.3	0	0.2	0	0
Great Horned Owl	0	0	0	0.3	0	0	0	0	0	0	0	0
Great-tailed Grackle	0	0.2	0	0	0	0	0	0	0	0	0	0.2
Greater Yellowlegs	0	1.2	0	0.6	0	0	0	0	0	0	0	0
Green-winged Teal	0	0.2	0	0	0	0	0	0	0	0	0	0
Hammond's Flycatcher	0	0	0	0.1	0	0	0	0.4	0	0	0	0.2
Hermit Thrush	0	0	0	0.6	0	0	0	0.4	0	0.2	0	0.4
Herring Gull	0	0.5	0	0	0	0	0	0	0	0	0	0
House Finch	0.8	25	1.7	24.9	1.5	1.5	2	14.9	2.2	4.2	6.5	7
House Sparrow	2	21.3	4.5	25.1	3.5	3.5	2.2	13.7	3.8	10.2	3.2	12.2
Killdeer	0	2.2	0.2	1.3	0	0	0.2	0.1	0	0	0	0
Lark Sparrow	0	0	0	0	0	0	0	0	0	0	0	0.2
Lazuli Bunting	0	0.5	0	0.4	0	0	0	0	0	0	0	0
Lesser Goldfinch	1.4	3.2	1.8	5.9	0.8	0.8	1.2	3.9	2.6	1	3.2	1.6
Lincoln's Sparrow	0	0.3	0	0.1	0	0	0	0	0	0	0	0
MacGillivray's Warbler	0	0.2	0	0.3	0	0	0	0.1	0	0	0	0.4
Mallard	1.6	30.2	4.2	77.5	3.8	3.8	2.2	30.9	2.8	24.2	3.3	41.4
Marsh Wren	0	0.2	0	0	0	0	0	0	0	0	0	0
Merlin	0	0.3	0	0.3	0	0	0	0	0	0.2	0	0
Mountain Chickadee	0	0.3	0	0	0	0	0	0	0	0	0	0
Mourning Dove	2.4	7.5	1.2	5.8	1.7	1.7	1.4	0.9	0.8	0.4	0.2	1
Nashville Warbler	0	0	0	0.1	0	0	0	0	0	0	0	0
Northern Flicker	0	6.7	0	8.1	0	0	0	6	0	6.6	0	8
Northern Harrier	0	0	0	0.3	0	0	0	0	0	0	0	0.2
Northern Mockingbird	0	0	0	0	0	0	0	0.1	0	0	0	0
Northern Pintail	0	0	0	0	0	0	0	1	0	0	0	0
Northern Rough-winged Swallow	0	0	0.5	0.8	0	0	0.4	0	0	0	0.2	0
Northern Shoveler	0	1.2	0	0.1	0	0	0	0	0	0	0	0
Olive-sided Flycatcher	0	0.3	0	0	0	0	0	0.1	0	0	0	0
Orange-crowned Warbler	0	0.5	0	0.5	0	0	0	0.3	0	0	0	1.2
Pacific Wren	0	0	0	0	0	0	0	0	0	0.2	0	0
Pied-billed Grebe	0	1.5	0	1.3	0	0	0	1.1	0	0.4	0	0.4
Pine Siskin	0	0.3	0.5	0	0	0	0	0	0	0	0	0.6
Pinyon Jay	0	0	0	0	0	0	0	0	0	0	0	2.2

# JORDAN RIVER GOLF COURSE (JGC)

## COMPLETE LIST OF BIRDS DETECTED DURING BREEDING SEASON SURVEYS (BSS) AND NON-BREEDING SEASON SURVEYS (NBS)

Species	Year											
	2015		2016		2017		2018		2019		2020	
	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS	BSS	NBS
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0.6
Red-naped Sapsucker	0	0.2	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	0	1.2	0	1.5	0	0	0	0.7	0	1.6	0	0.8
Red-winged Blackbird	0	3.7	0	10.9	0	0	0.2	0.7	0.2	12	0	38
Redhead	0	0	0	0	0	0	0	0	0	0	0	0
Ring-billed Gull	0	8.8	0	13.3	0	0	0	1.6	0	2	0	3.8
Ring-necked Pheasant	0	0.3	0	0.3	0	0	0	0	0	0	0	0
Rock Pigeon	0	16.8	1.2	19	1.3	1.3	1	35.7	6.4	8.8	9.5	16
Ruby-crowned Kinglet	0	4.2	0	2.6	0	0	0	4.7	0.2	0.4	1.3	3
Sandhill Crane	0	0	0	0	0	0	0	0	0	0	0	0
Say's Phoebe	0	0	0	0	0	0	0.2	0	0	0	0	0
Sharp-shinned Hawk	0	0.3	0	0.5	0	0	0	0.3	0	0.4	0	0.2
Snow Goose	0	0.2	0	0	0	0	0	0	0	0	0	0
Snowy Egret	0	0.2	0	0	0	0	0	0	0	0	0	0
Solitary Sandpiper	0	0	0	0.4	0	0	0	0	0	0	0	0
Song Sparrow	0.2	6.5	0.8	8.1	0.3	0.3	1.2	1.6	1.4	0	0.2	4.2
Sora	0	0	0	0.1	0	0	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0.1	0	0	0	0	0	0	0	0
Spotted Towhee	0	1.3	0	0.9	0	0	0	2.7	0	2	0	1.6
Swainson's Hawk	0	0.2	0	0	0	0	0	0	0	0	0	0
Townsend's Solitaire	0	0	0	0.1	0	0	0	0	0	0	0	0
Tree Swallow	0	0	0	0.3	0	0	0	0	0	0	0	0
Vesper Sparrow	0	0.2	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0.2	0.2	0.3	0.1	0.3	0.3	1.2	0.1	0.4	0	0.5	0
Western Kingbird	0	0.3	0	0.1	0	0	0.2	0	0	0	0	0.4
Western Meadowlark	0	0	0	0	0	0	0	0	0.2	0	0	0
Western Tanager	0	0.5	0.2	2.1	0.2	0.2	0.4	0.9	0.4	0	0.2	0.8
Western Wood-pewee	0.2	0	0	0.4	0	0	0.4	0	0.4	0	0	0
White-crowned Sparrow	0	7.7	0.2	5.6	0	0	0	0	0	0	0	4.8
White-faced Ibis	0.2	0	0	1.8	0	0	0	0	0	0	0.2	30
Willow Flycatcher	0	0	0	0.3	0	0	0	0	0	0	0	0
Wilson's Snipe	0	3.7	0	1.5	0	0	0	0	0	0	0	0
Wilson's Warbler	0	0.5	0	0.6	0	0	0	0.4	0	0	0	0.2
Wood Duck	0	0.3	0	0.1	0	0	0	0	0	0	0	0.8
Woodhouse's Scrub-jay	0	0.7	0	1	0	0	0	0.7	0	0.2	0	0
Yellow Warbler	0.8	0.5	1.2	1.9	1	1	2	0.7	0.8	0	1.5	4
Yellow-headed Blackbird	0	0	0	0	0	0	0.2	0	0	0	0	0
Yellow-rumped Warbler	0	6.5	0.8	5.4	0.2	0.2	0	5.9	0.4	2.6	1.3	7

**Acknowledgements:** We'd like to thank the extremely dedicated team of volunteers from Tracy Aviary's Community Science Program who braved early mornings and long hours to collect these data. Thanks also to the RAC and JGC project partners.