



COMMUNITY SCIENCE BIRD MONITORING

2021 Project Report

PROJECT OVERVIEW

The Jordan River watershed traverses the most highly populated areas in the state of Utah. Despite years of degradation and alteration, riparian areas in the Jordan River watershed provide critical habitat for migratory and resident birds. In 2011, Tracy Aviary began its community science bird monitoring program. Working with land owners, managers, and other partners at 13 different monitoring sites, our goals are to:

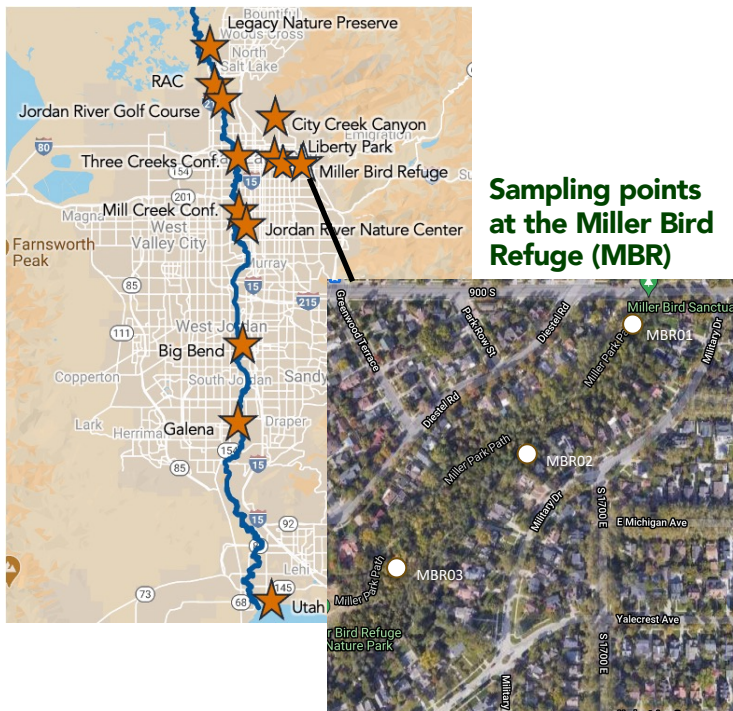
- 1) Establish a baseline understanding of the avian community, and monitor spatial and temporal trends in habitat use
- 2) Evaluate the impacts of human disturbances, different management methods, and restoration projects
- 3) Provide recommendations to project partners about how they can enhance the bird habitat

Here, we summarize results from our 2021 field season.

STUDY SITES

Our 13 study sites span the Jordan River watershed region. Sites were selected strategically as partners approached us with research questions or monitoring desires for their properties. By comparing the bird community at multiple sites, we can gain inference about larger scale patterns and trends in urban and riparian birds communities. At each site, we generated a number of sampling points where we conduct bird and habitat surveys. The number of points at each site varies depending on the size of the site.

Bird Monitoring Sites



BIRD SURVEY METHODS

Breeding season point count surveys



During May – July of 2021, 37 community scientists and Tracy Aviary staff conducted 1-10 breeding season point count surveys at each site. Point count surveys were conducted by pairs of community scientists between dawn and 10am. The pair would navigate to each sampling point within the site. 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, 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 2021. 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.

Owl surveys

Because owls are less likely to be detected by traditional survey methods, we also conducted 1-5 owl surveys at each site during 2021. During February through June, when owls are most likely to be vocalizing, groups of volunteers led by a trained Tracy Aviary staff person walked the site in the evening listening for owls, stopping periodically to play owl calls and listen for responses.

2021 SURVEY SUMMARY

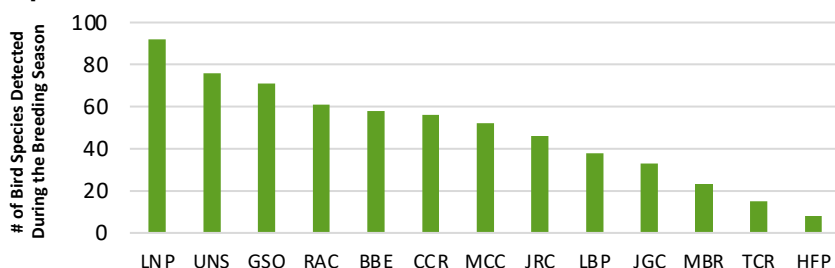
During 2021, we conducted 85 breeding season surveys at our 13 bird monitoring sites. We had 11,245 bird observations and detected 140 species. During 81 non-breeding season surveys, we had 67,881 bird observations and detected 186 species. During 23 owl surveys, we had 56 owl observations and detected 5 owl species. With our combined survey effort, we detected 199 species across all bird monitoring sites in 2021.

Study Site	Breeding Season Surveys	Non-breeding Surveys	Owl Surveys
Big Bend (BBE)	6	6	1
City Creek Canyon (CCR)	3	6	5
Galena (GSO)	5	7	2
Legacy Nature Preserve (LNPO)	6	7	2
Liberty Park (LBP)	10	8	3
Herman Franks Park (HFP)	1	0	0
Miller Bird Refuge (MBR)	9	7	2
Mill Creek Confluence (MCC)	10	8	1
Three Creeks Conf. (TCR)	1	6	0
Jordan River Nature Center (JNC)	10	8	1
Utah Lake North Shore (UNS)	6	7	2
Regional Athletic Complex (RAC)	9	5	2
Jordan River Golf Course (JGC)	9	6	2

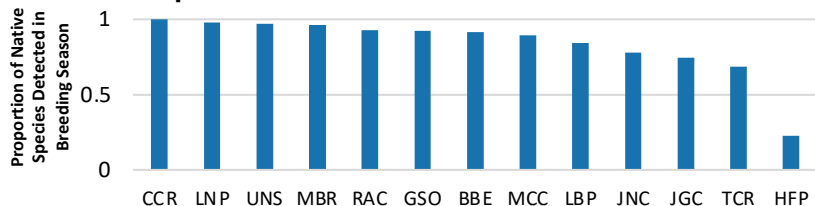
COMPARISON ACROSS BIRD MONITORING SITES

We can measure the health of an urban riparian site by looking at several metrics, including species richness (the number of species detected), and the proportion of native, urban-sensitive, and riparian-associated birds that use the site. Here, we compare all of the sites monitored in 2021.

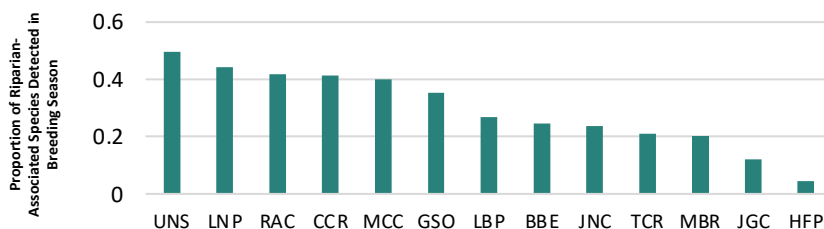
Species Richness



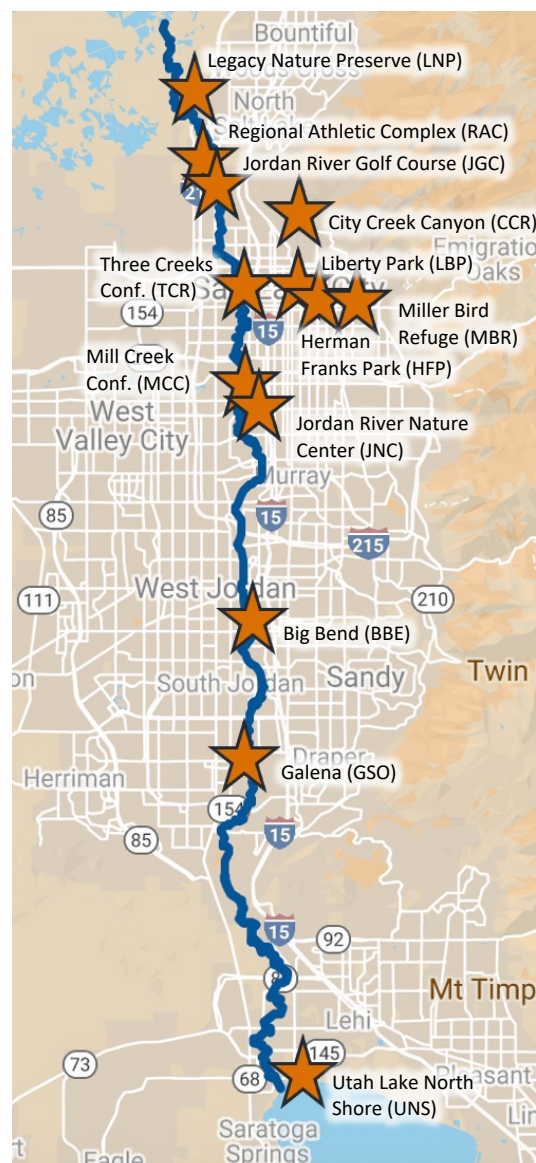
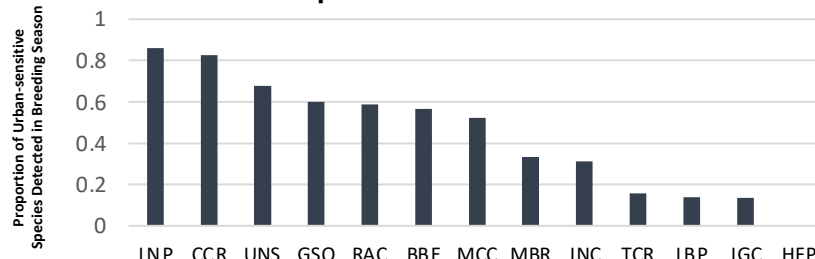
Native Bird Species



Riparian-Associated Bird Species



Urban-Sensitive Bird Species

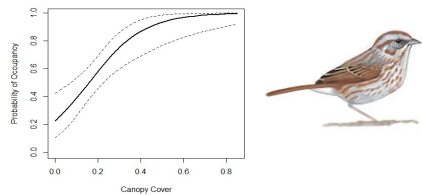


COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

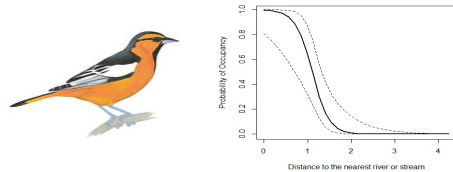
HABITAT USE PATTERNS

We use breeding season data to help understand the how habitat features and landscape attributes impact where different bird species are found. This helps our partners with land management and restoration decisions as they try to 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 a number of species across the 12 bird monitoring sites.

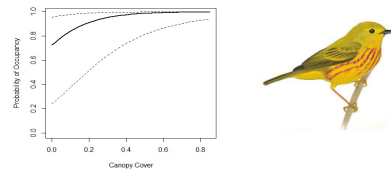
Song Sparrow habitat use increases with increasing **tree canopy cover**



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



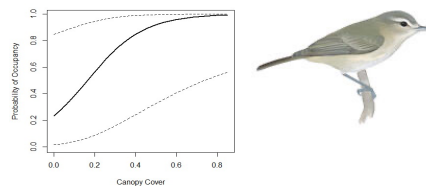
Yellow Warbler habitat use increases with increasing **tree canopy cover**



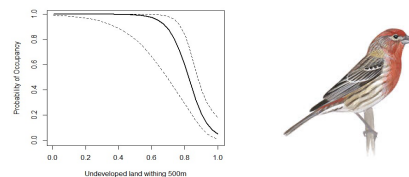
Red-winged Blackbird habitat use decreases with **distance from a river or stream**, and increases with the proportion of **riparian/wetland habitat** within 125m of the sampling point



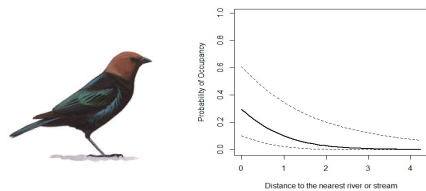
Warbling Vireo habitat use increases with increasing **tree canopy cover**



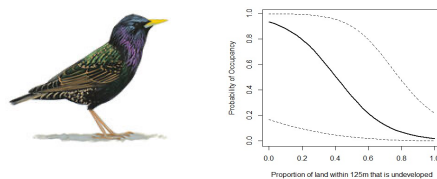
House Finch habitat use decreases with the proportion of **undeveloped habitat** within 500m of the sampling point



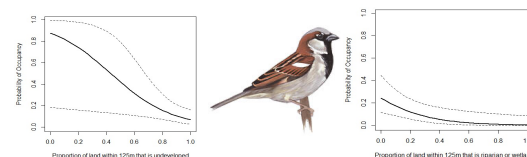
Brown-headed Cowbird habitat use decreases as you get further from a **river or stream**



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



RECOMMENDATIONS TO ENHANCE BIRD HABITAT

Although individual sites may vary slightly in their management needs, below are general recommendations for site managers and surrounding communities to enhance and maintain these areas as healthy bird habitat.

Recommendations for site managers to enhance bird habitat:

- Maintain water flow in the stream throughout the year
- Protect the vegetation immediately surrounding the stream
- Maintain vertical structure with a variety of native and/or desirable riparian vegetation throughout the site
- Any tree removal should be done outside of the breeding season (during mid-July - Feb), and in a phased manner rather than "clear-cutting" so large swaths of habitat are not removed all at once.
- Add and enhance wetland and ephemeral water elements.

Recommendations for neighboring communities to enhance bird habitat:

- Keep dogs on leash and cats indoors
- Stay on designated trails
- Maintain bird-friendly yards and gardens in the surrounding neighborhood.
- Outdoor lighting should be used minimally, and be shielded with warm color temperatures.
- Windows should be made bird-friendly

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
Red-winged Blackbird	9.153	29.988	0
American Robin	7.682	17.148	0
Song Sparrow	6.118	4	0
Mourning Dove	4.188	3.926	0
Mallard	4.118	46.457	0
Western Meadowlark	4.082	0.728	0
Bullock's Oriole	3.976	0.025	0
House Finch	3.918	12.247	0
Yellow Warbler	3.776	0.691	0
Cliff Swallow	3.447	0.025	0
Black-billed Magpie	3.282	5.062	0
California Gull	2.871	61.494	0
Barn Swallow	2.859	2.519	0
Western Kingbird	2.859	0.099	0
European Starling	2.788	248.012	0
Brown-headed Cowbird	2.541	0	0
Ring-necked Pheasant	2.518	0.321	0
Yellow-headed Blackbird	2.459	1.074	0
Killdeer	2.447	1.333	0
White-faced Ibis	2.306	0.741	0
Canada Goose	2.106	43.21	0
Northern Rough-winged Swallow	1.859	0.099	0
Black-capped Chickadee	1.753	4.432	0
Eurasian Collared-Dove	1.659	8.617	0
Black-necked Stilt	1.612	0	0
House Sparrow	1.506	7.543	0
Lesser Goldfinch	1.482	5.062	0
Black-headed Grosbeak	1.329	0.025	0

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED, CONT.

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
Spotted Towhee	1.247	1.654	0
Warbling Vireo	1.247	0.074	0
Savannah Sparrow	1.153	0.321	0
Lazuli Bunting	1.141	0.296	0
Rock Pigeon	1.118	13.691	0
Franklin's Gull	1.071	39.531	0
American Goldfinch	1.059	3.914	0
Black-chinned Hummingbird	0.976	0.667	0
Bank Swallow	0.847	0.531	0
Cinnamon Teal	0.8	0.506	0
Common Raven	0.753	0.593	0
California Quail	0.741	2.062	0
Red-tailed Hawk	0.718	1.531	0
Double-crested Cormorant	0.706	1.494	0
American Coot	0.659	8.358	0
Forster's Tern	0.659	0	0
Willet	0.659	0	0
American Kestrel	0.635	1.173	0
Cedar Waxwing	0.576	3.333	0
American Avocet	0.565	1.938	0
Gadwall	0.541	5.975	0
Western Tanager	0.541	0.309	0
Western Wood-Pewee	0.541	0.099	0
Common Yellowthroat	0.518	0.16	0
Downy Woodpecker	0.494	0.802	0
Spotted Sandpiper	0.482	0.099	0
Horned Lark	0.459	2.457	0
Great Blue Heron	0.435	0.556	0

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED, CONT.

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
Black-crowned Night-Heron	0.388	0.049	0
Wilson's Phalarope	0.388	0.062	0
Caspian Tern	0.376	0.148	0
Snowy Egret	0.353	0.037	0
Sandhill Crane	0.341	0.370	0
Long-billed Curlew	0.318	0	0
Belted Kingfisher	0.282	0.383	0
Blue-gray Gnatcatcher	0.282	0.222	0
Cordilleran Flycatcher	0.259	0.012	0
White-crowned Sparrow	0.259	9.741	0
Yellow-rumped Warbler	0.259	2.519	0
Lark Sparrow	0.247	0.025	0
Eastern Kingbird	0.235	0	0
American White Pelican	0.224	1.173	0
Marsh Wren	0.224	0.235	0
Northern Shrike	0.212	0.012	0
Fox Sparrow	0.2	0.025	0
Swainson's Thrush	0.2	0	0
MacGillivray's Warbler	0.188	0.222	0
Northern Flicker	0.188	4.062	0
Great Egret	0.165	0	0
Ring-billed Gull	0.165	35.593	0
Pine Siskin	0.153	0.556	0
Plumbeous Vireo	0.153	0	0
Redhead	0.153	0.123	0
Yellow-breasted Chat	0.153	0	0
Northern Harrier	0.141	0.679	0
Orange-crowned Warbler	0.141	0.494	0

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED, CONT.

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
Turkey Vulture	0.141	0.444	0
Willow Flycatcher	0.129	0	0
Pied-billed Grebe	0.118	0.407	0
Sora	0.118	0.025	0
Chipping Sparrow	0.106	0.062	0
Great-tailed Grackle	0.106	0.074	0
Green-winged Teal	0.106	6.469	0
Virginia Rail	0.106	0.185	0
Brewer's Blackbird	0.094	1.309	0
Brewer's Sparrow	0.094	0.136	0
Broad-tailed Hummingbird	0.094	0.025	0
Cooper's Hawk	0.094	0.321	0
Peregrine Falcon	0.094	0.037	0
Gray Catbird	0.082	0.012	0
Wilson's Snipe	0.082	0.049	0
Wilson's Warbler	0.082	0.272	0
American Wigeon	0.071	3.815	0
Cattle Egret	0.071	0	0
Tree Swallow	0.071	0.259	0
Violet-green Swallow	0.071	0.259	0
American Crow	0.059	3.469	0
Bald Eagle	0.059	0.37	0
Blue Grosbeak	0.059	0.037	0
Blue-winged Teal	0.059	0	0
Hermit Thrush	0.059	0.160	0
Ruddy Duck	0.059	0	0
Western Grebe	0.059	0.074	0
Wild Turkey	0.059	0.309	0

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED, CONT.

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
Say's Phoebe	0.047	0.062	0
Woodhouse's Scrub-Jay	0.047	0.210	0
American Pipit	0.035	3.222	0
Canyon Wren	0.035	0.062	0
Clark's Grebe	0.035	0.074	0
Common Nighthawk	0.035	0.062	0
Acorn Woodpecker	0.024	0.049	0
American Dipper	0.024	0.049	0
Eared Grebe	0.024	0.012	0
House Wren	0.024	0.012	0
Northern Mockingbird	0.024	0.049	0
Northern Pintail	0.024	18.605	0
Osprey	0.024	0.025	0
Ring-necked Duck	0.024	2.062	0
Ruby-crowned Kinglet	0.024	1.049	0
Solitary Sandpiper	0.024	0.037	0
Swainson's Hawk	0.024	0.025	0
Common Merganser	0.012	0.901	0
Dark-eyed Junco	0.012	4.444	0
Dusky Flycatcher	0.012	0.012	0
Evening Grosbeak	0.012	0.543	0
Great Horned Owl	0.012	0.062	0.696
Green-tailed Towhee	0.012	0.012	0
Long-billed Dowitcher	0.012	0	0
Northern Goshawk	0.012	0.025	0
Sharp-shinned Hawk	0.012	0.173	0
Steller's Jay	0.012	0.037	0
Townsend's Solitaire	0.012	0.222	0

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED, CONT.

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
American Tree Sparrow	0	0.16	0
Barn Owl	0	0.025	0.130
Blue Jay	0	0.012	0
Bonaparte's Gull	0	0.037	0
Brown Creeper	0	0.235	0
Bufflehead	0	0.284	0
Cackling Goose	0	0.111	0
Calliope Hummingbird	0	0.037	0
Canvasback	0	0.012	0
Cassin's Vireo	0	0.012	0
Chukar	0	0.049	0
Clark's Nutcracker	0	0.012	0
Clay-colored Sparrow	0	0.012	0
Common Goldeneye	0	1.531	0
Common Redpoll	0	0.247	0
Ferruginous Hawk	0	0.012	0
Flammulated Owl	0	0	0.391
Golden Eagle	0	0.049	0
Golden-crowned Kinglet	0	0.086	0
Gray Flycatcher	0	0.012	0
Graylag Goose	0	0.037	0
Greater Yellowlegs	0	0.086	0
Hairy Woodpecker	0	0.012	0
Harris's Sparrow	0	0.012	0
Herring Gull	0	0.049	0
Hooded Merganser	0	0.136	0
Iceland Gull	0	0.012	0
Least Flycatcher	0	0.012	0

COMMUNITY SCIENCE BIRD MONITORING- 2021 RESULTS

2021 LIST OF BIRDS DETECTED, CONT.

Species	Detections per survey in Breeding Season	Detections per survey in Non-breeding Season	Detections per survey during Owl Surveys
Lesser Black-backed Gull	0	0.012	0
Lesser Scaup	0	0.42	0
Lincoln's Sparrow	0	0.086	0
Loggerhead Shrike	0	0.012	0
Merlin	0	0.111	0
Mexican Duck	0	0.012	0
Mountain Bluebird	0	0.099	0
Mountain Chickadee	0	0.111	0
Nashville Warbler	0	0.074	0
Neotropic Cormorant	0	0.012	0
Northern Pygmy-Owl	0	0.025	0
Northern Saw-whet Owl	0	0	0.435
Northern Shoveler	0	23.21	0
Olive-sided Flycatcher	0	0.012	0
Pacific Wren	0	0.062	0
Prairie Falcon	0	0.037	0
Red-breasted Nuthatch	0	0.16	0
Red-naped Sapsucker	0	0.025	0
Rough-legged Hawk	0	0.21	0
Ruffed Grouse	0	0.012	0
Rufous Hummingbird	0	0.049	0
Swan Goose	0	0.012	0
Townsend's Warbler	0	0.012	0
Tundra Swan	0	6.173	0
Upland Sandpiper	0	0.012	0
Vesper Sparrow	0	0.235	0
Western Bluebird	0	0.037	0
Western Screech-owl	0	0	0.783
White-breasted Nuthatch	0	0.086	0
White-throated Sparrow	0	0.037	0
Wood Duck	0	0.123	0

PHOTOS FROM THE FIELD



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 our many program partners.*