

Community Science Bird Monitoring at MILLER BIRD REFUGE

2022 Project Report



PROJECT OVERVIEW

In partnership with Salt Lake City, Tracy Aviary began conducting community science bird monitoring at the Miller Bird Refuge (MBR) in 2021. Our goals for the study are to:

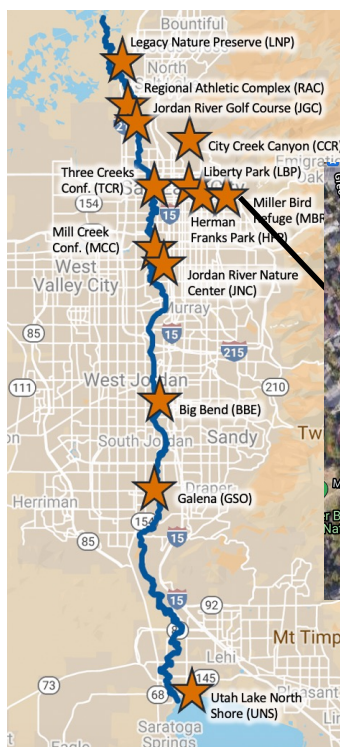
- 1) collect data on the avian community to establish a baseline understand the birds that occur in the refuge,
- 2) determine how the bird community is changing over time, and
- 3) provide recommendations for how the city and surrounding residence can enhance the bird habitat in the refuge.

Here, we summarize results from our 2022 field season.

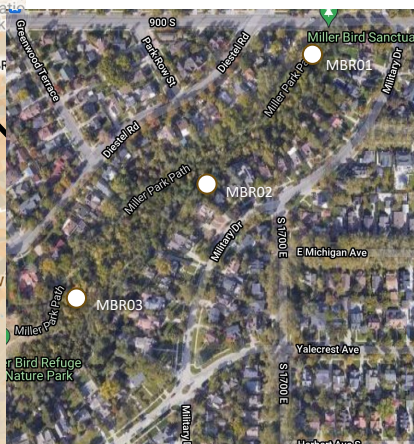
STUDY SITES

We generated 3 sampling points across Miller Bird Refuge where we conducted bird and vegetation surveys. These surveys are part of a larger community science bird monitoring program that includes twelve other study sites in the Salt Lake region.

Bird Monitoring Sites



Miller Bird Refuge (MBR)



BIRD SURVEY METHODS



Breeding Season Point Count Surveys

During May – July of 2022, 7 community scientists and Tracy Aviary staff conducted 4 breeding season point count surveys at Miller Bird Refuge. 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, 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, and November 2022. 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 Playback Surveys

During April and March, when owls are most likely to be vocalizing, groups of volunteers led by a trained aviary staff person walked the site in the evening listening for owls, stopping periodically to play owl calls and listen for responses.

2022 BIRD MONITORING RESULTS

4 Breeding Season Surveys

- 103 bird observations
- 24 species

7 Non-breeding Surveys

- 286 bird observations
- 31 species

2 Owl Surveys

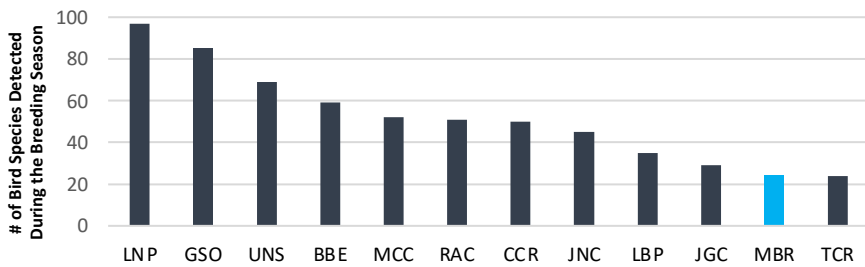
- 3 owl detections
- 1 species

39 total bird species were detected at Miller Bird Refuge in 2022

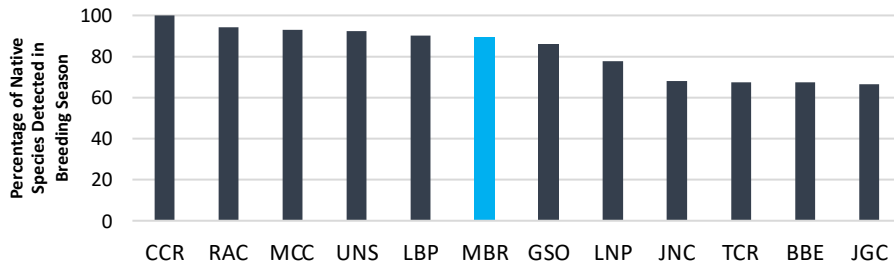
Comparison to Other Sites Along the Jordan River

We can measure the health of an urban riparian site such as the Miller Bird Refuge by looking at several metrics, including species richness (the number of species detected), and the proportion of native, riparian-associated and urban-sensitive birds that use the site. When comparing Miller Bird Refuge (light blue) to other monitoring sites (dark blue), we found high breeding season species richness, average native and urban-sensitive bird species.

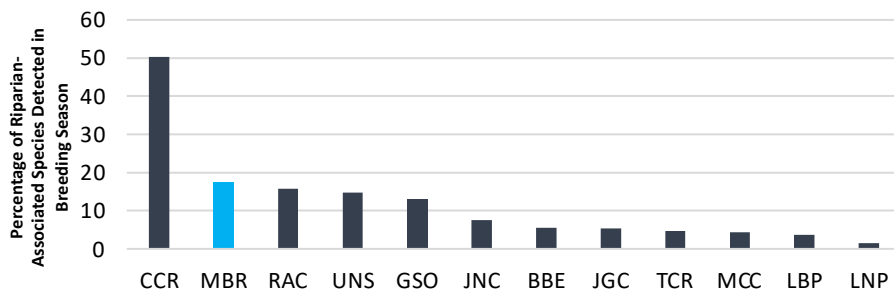
Species Richness



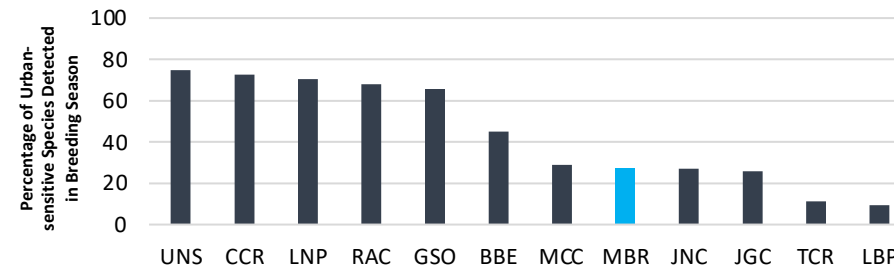
Native Bird Species



Riparian-associated Bird Species



Urban-sensitive Bird Species



2022 BIRD MONITORING RESULTS

Bird Habitat Use Patterns Throughout the Jordan River

We use breeding season data to help understand 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 multi-season occupancy modeling analysis using bird survey data from 2013-2022 identified the most important factors influencing habitat use by three target riparian-associated and three urban-associated species across our bird monitoring sites. Our analysis examined which habitat attributes (Table 1) influenced the probability that these species would use an area within our sampling sites, or locally colonize or go extinct from an area.

Occupancy Analysis: Species Results

Canopy Cover was found to be an important factor for habitat use by Song Sparrows. They were more likely to occupy and less likely to go locally extinct from areas with higher canopy cover. Bullock's Orioles were more likely to occupy areas with more herbaceous vegetation, and were more likely to locally colonize areas with greater shrub cover. **These results highlight the importance of maintaining and enhancing vertical structure, including canopy trees, shrubs, and herbaceous plants on the ground.**

Distance to River was found to be an important factor for habitat use by all of the target species examined. All species had decreased habitat use as distance from river increased, and Yellow Warblers were also less likely to locally colonize areas further from the river. **This finding highlights the importance of enhancing habitat directly surrounding the river.**

Urban-associated species such as House Finches and House Sparrows were less likely to use habitat with a greater **Buffer Distance** to the developed area, and House Sparrows were more likely to go locally extinct from areas further from development. This finding highlights the importance of providing a large area of protected space that can buffer sites from development, and decrease use by non-target urban-adapted species.

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

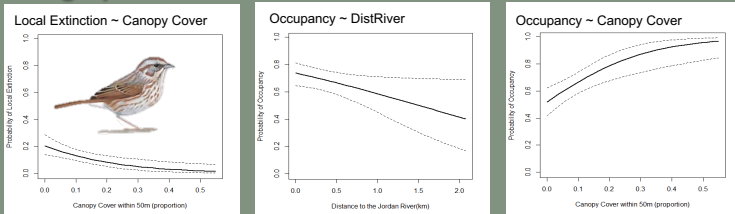
Variable	Measurement (unit)
Canopy Cover	Tree canopy cover within 50m (%)
Canopy Lost*	Decrease in canopy cover from first to last year of monitoring
Shrub Cover	Shrub cover within 50m (%)
Shrub Lost*	Decrease in shrub cover from first to last year of monitoring
Herb Cover	Herbaceous cover within 50m (%)
Water Cover	Cover of water within 50m (%)
Native Canopy	Cover of native canopy trees within 50m
DistRiver	Distance to the river or stream (km)
Riparian125	Riparian or wetland habitat within 125m (%)
Buffer	Buffer distance to nearest developed area (km)

*Variable only included as covariate for local extinction or colonization parameters

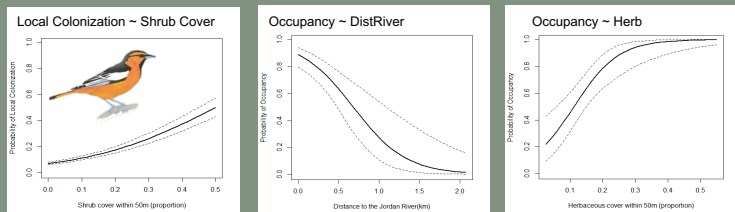
Riparian-Associated Birds

Habitat Relationship Graphs

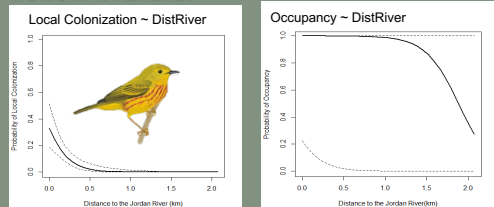
Song Sparrow



Bullock's Oriole



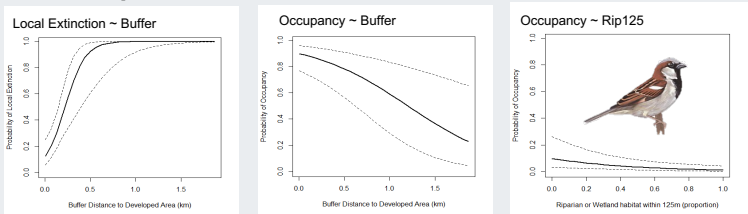
Yellow Warbler



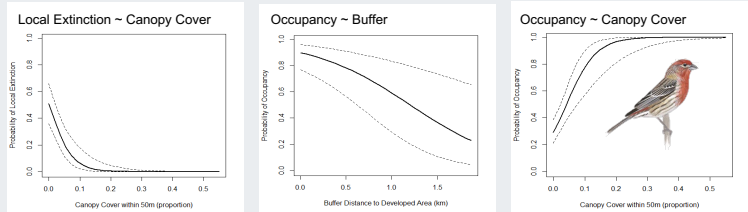
Urban-Associated Birds

Habitat Relationship Graphs

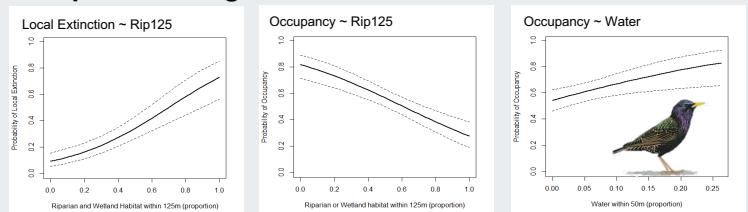
House Sparrow



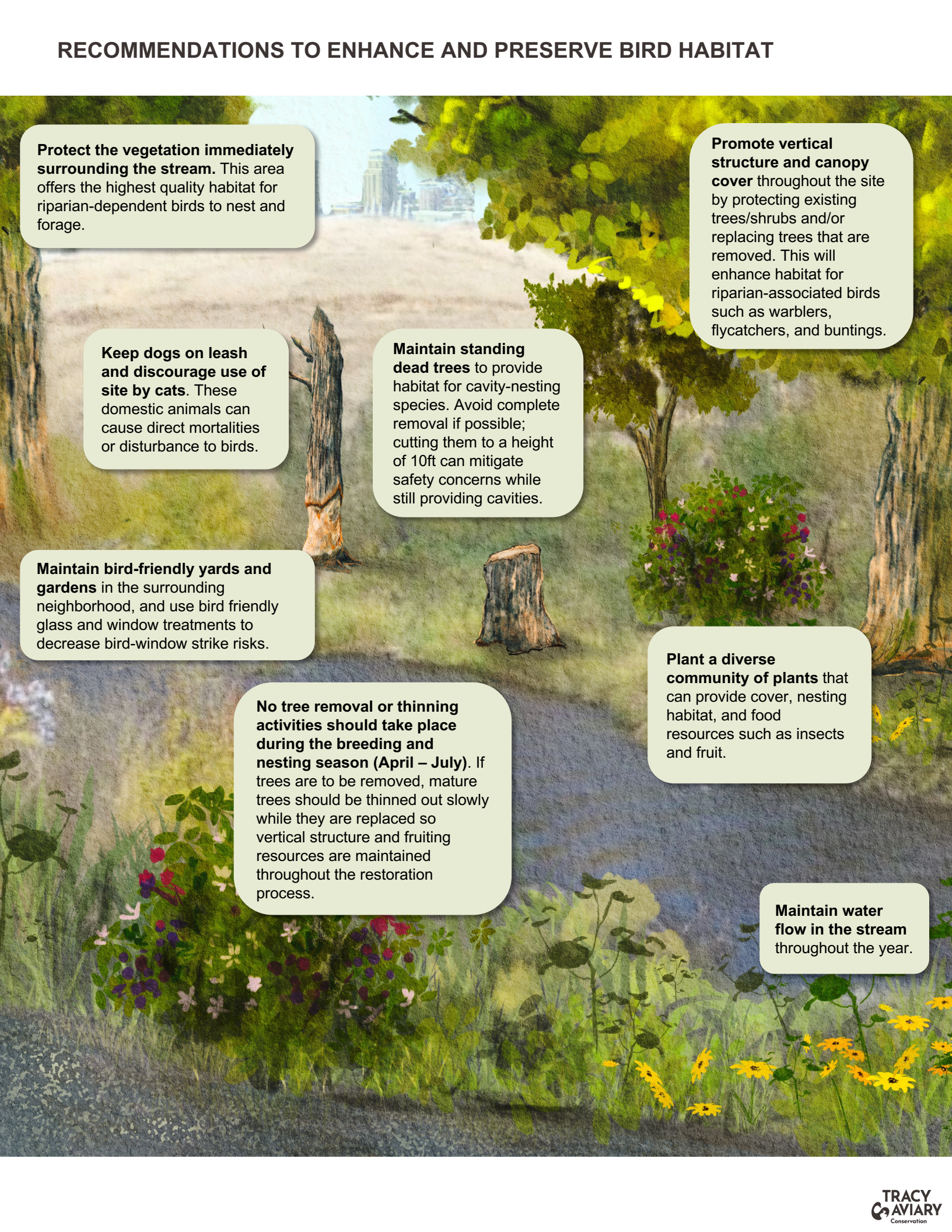
House Finch



European Starling



RECOMMENDATIONS TO ENHANCE AND PRESERVE BIRD HABITAT



Protect the vegetation immediately surrounding the stream. This area offers the highest quality habitat for riparian-dependent birds to nest and forage.

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

Keep dogs on leash and discourage use of site by cats. These domestic animals can cause direct mortalities or disturbance to birds.

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 cavities.

Maintain bird-friendly yards and gardens in the surrounding neighborhood, and use bird friendly glass and window treatments to decrease bird-window strike risks.

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.

Plant a diverse community of plants that can provide cover, nesting habitat, and food resources such as insects and fruit.

Maintain water flow in the stream throughout the year.

BIRD MONITORING AT MILLER BIRD REFUGE

Complete List of Birds Detected during Breeding Season (BSS) and Non-breeding Season (NBS) Surveys

Species	Number of Observations (detections/survey)			
	2021		2022	
	BSS	NBS	BSS	NBS
American Goldfinch	0.33	0.14	4.5	0.43
American Kestrel	0	0	0	0.14
American Robin	3	3.29	0	1.86
Bald Eagle	0	0	0	0.14
Black-billed Magpie	0.22	2.14	0	3
Black-capped Chickadee	1.22	5.29	2	3.86
Black-chinned Hummingbird	1.67	0.86	0	0.29
Black-headed Grosbeak	1.11	0.14	0.75	0
Broad-tailed Hummingbird	0	0.14	0.25	0.14
Brown-headed Cowbird	0.11	0	0	0
Bullock's Oriole	0	0	0.75	0
California Quail	0	0	0	0.71
Calliope Hummingbird	0	0	0	0.29
Canada Goose	0	0.14	0	0
Cedar Waxwing	0	0	0.25	2
Common Nighthawk	0	0	0	0.14
Cooper's Hawk	0	0	0	0.14
Dark-eyed Junco	0	6.71	0	4
Downy Woodpecker	0.67	0.71	0	0.14
Dusky Flycatcher	0	0	0.25	0
Eurasian Collared-Dove	0.11	0.14	1	1.71
European Starling	0.89	1.14	1	4.29
Hermit Thrush	0	0.14	0.25	0.43
House Finch	8.67	16	2.75	6.43
House Sparrow	1	1.43	0.5	0.86
Lazuli Bunting	1	0	0.75	0
Lesser Goldfinch	5	6.86	4.25	2.14
Mallard	0.56	0.29	0	0
Mourning Dove	0.56	1	0.75	0.29
Northern Flicker	0	0.86	0	0.71
Northern Goshawk	0	0	0	0.14
Orange-crowned Warbler	0	0	0.25	0
Pine Siskin	0.44	0.14	0.5	1.29
Ruby-Crowned Kinglet	0	0.57	0.25	0.71
Song Sparrow	0.78	0.71	0.25	0.86
Spotted Towhee	0.22	0.71	0.25	1.57
Townsend's Solitaire	0	0	0	0.14
Warbling Vireo	1.67	0.14	1	0
Western Screech Owl	0	1	0	1.5
Western Tanager	0.44	0	0.25	0.29
Wilson's Warbler	0	0.14	0	0
Yellow Warbler	2	0.14	0.25	0
Yellow-rumped Warbler	0.22	0.57	0	1.14

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 Miller Bird Refuge project partners.