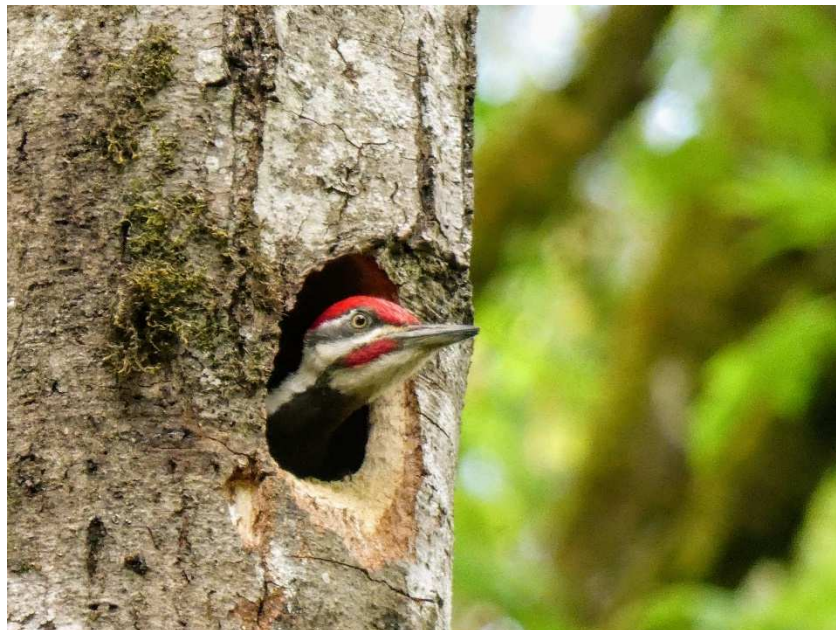# Avian community monitoring and public engagement at Thomas Dairy & Cook Park in the Fanno Creek drainage

2021 Interim Report to Clean Water Services

Report prepared by Joe Liebezeit (Staff Scientist) & Candace Larson (Field Biologist) at Portland Audubon

Pileated Woodpecker in Cook Park (Photo: Anne Buckley, Portland Audubon community scientist)

INTRODUCTION & BACKGROUND

Portland Audubon and Clean Water Services are partnering to (1) evaluate avian response at CWS-managed properties through a combination of professional and community-science survey efforts, and (2) to facilitate opportunities for increased community engagement through equity-focused youth programming and public events. Building on the scientific results and community relationships that have developed over the past 5 years of research and public engagement at both Fernhill and PCC Rock Creek, these new efforts provide needed bird community metrics to help CWS evaluate its habitat enhancement efforts, inform the overall health of the ecosystem, and increase public awareness and investment in habitat connectivity across Washington County natural areas.

   Here we report on the first year of monitoring at Thomas Dairy wet prairie, the adjacent Beaver Pond (shrub-scrub habitat), and the riparian habitat along the Tualatin River in Cook Park. The monitoring during 2021 in the Thomas Dairy wet prairie will serve as the only year

of baseline data in advance of increased water irrigation at the site as part of habitat enhancement efforts. The monitoring of the riparian habitat is performed by community scientists using eBird while the other two habitats are being monitored via professional surveys.

OBJECTIVES

1. Quantify relative avian abundance, species richness, and species diversity in two habitat types at the site during the spring season: Wetland Prairie (Thomas Dairy) and Scrub-Shrub Wetlands (Beaver Pond).
2. Quantify relative avian abundance and species richness for the Cook Park Riparian Forest for the period April to October 2021 (extent of time eBird surveys performed[1]).
3. Quantify overall species relative abundance and species richness of the entire site (all habitats combined).
4. Assess spring season avian community and response to habitat changes, including increased water inundation, using professional-level surveys to evaluate on-going habitat restoration and enhancement activities and to inform subsequent management actions at the site.

Candace Larson conducting a bird survey at Thomas Dairy, May 2021 (Photo: J. Liebezeit)

[1] eBird surveys are continuing year round at Cook Park. We only analyzed these data through the end of October 2021 for this report. Next annual report will include at least a full year assessment.

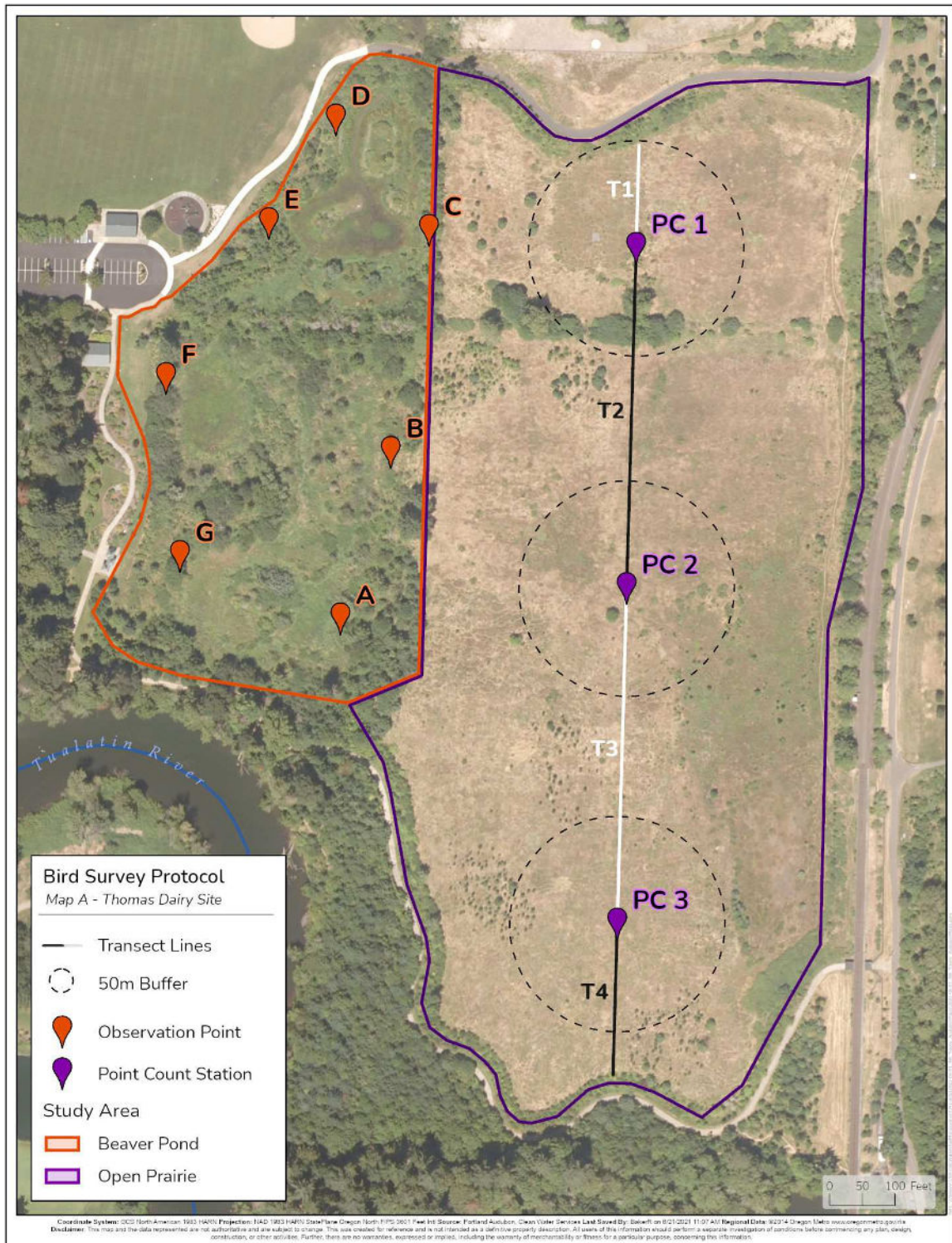**STUDY AREA: Thomas Dairy and Beaver Pond (professional surveys)**

Figure 1. Thomas Dairy wet prairie and adjacent beaver pond shrub-scrub habitat. Point count stations, line-transect, and area search observation points are denoted.

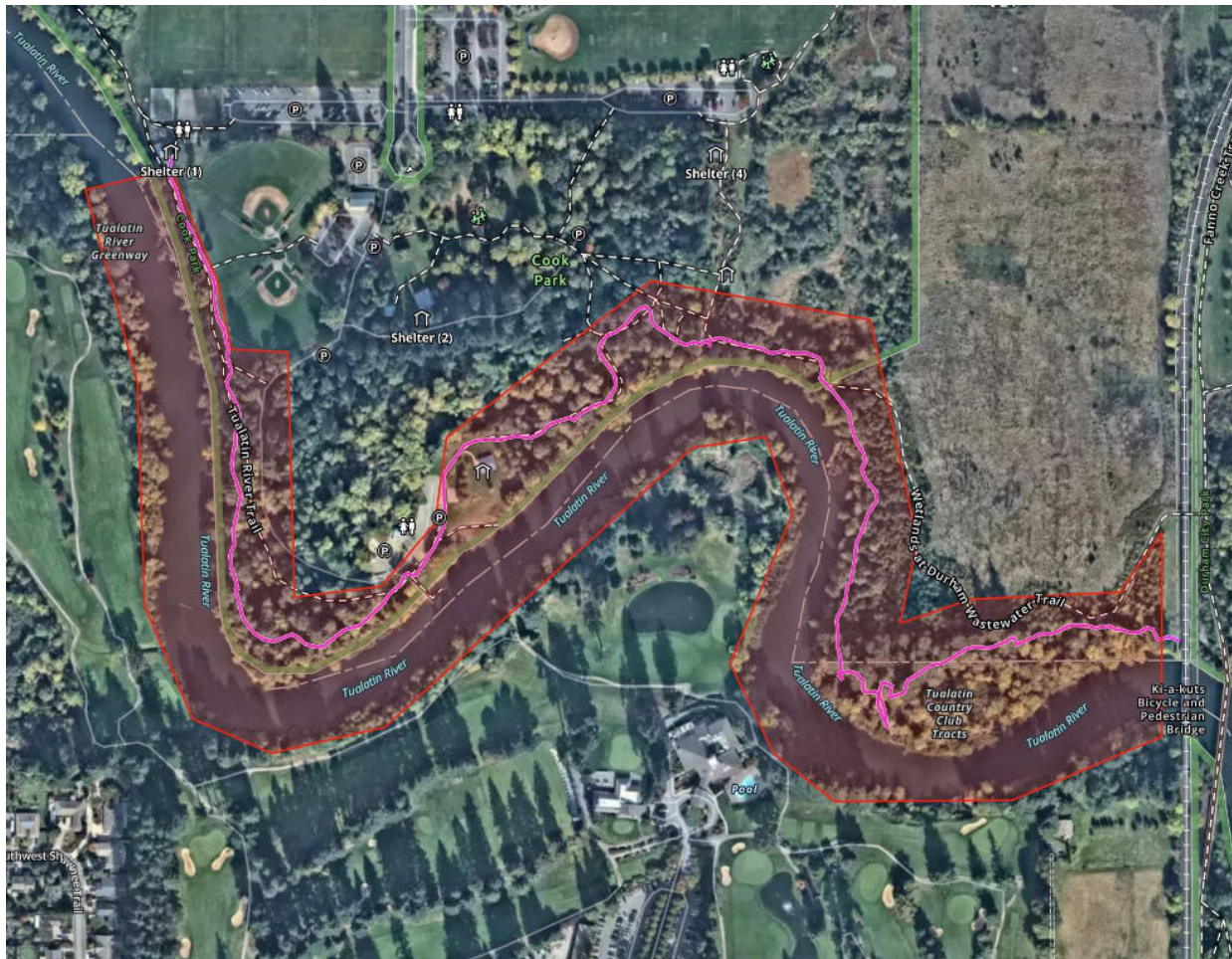**STUDY AREA: Cook Park (eBird Community Science survey)**

Figure 2. Survey transect (pink) and boundary for bird detections (red-bounded shaded area) for community scientists to record eBird data at Cook Park riparian forest habitat. Note: Thomas Dairy and beaver pond are north of the east end of the site.

BIRD SURVEY METHODOLOGY

Field methods: professional and eBird surveys

We developed both point count and line-transect avian monitoring protocols to conduct spring surveys (mid-April to late June) at Thomas Dairy in the wetland prairie habitat. We developed an area count methodology to survey birds at the adjacent beaver pond shrub-scrub wetland habitat during the same timeframe. Protocols are based on standard bird survey monitoring protocols used widely in the Pacific Northwest. Study design emphasized baseline data collection to allow comparison in subsequent years – particularly for the wetland prairie habitat at Thomas Dairy which started receiving water irrigation in the summer 2021 (after bird surveys were completed) as a major component of the habitat enhancement at that site.

We also developed an eBird community science protocol used by volunteers to collect bird data focused on riparian forest habitat in Cook Park along the Tualatin River. Unlike the

professional surveys, the eBird surveys are intended to be conducted year-round. For details on survey methodology, the full protocols are included as appendices to this report.

Analysis - Species richness assessment

Species richness is simply an inventory of all species detected at the site accrued from all point count and line-transect surveys in the Thomas Dairy wetland prairie, area search surveys at the shrub-scrub wetlands Beaver Pond (5 surveys between 18 April to 15 June 2021) and eBird surveys along the Cook Park riparian forest corridor (1 April to 31 October 2021). We provide full species richness assessment for all sites/habitat sites as well as a breakdown per site/habitat.

Analysis – Comparison of Point Count and Line-Transect Survey methodology

We conducted both point count and line-transect surveys at the Thomas Dairy wetland prairie site to determine which type of survey will provide the best measure of avian use and response to enhancement efforts. We assume the survey type with the most detections will provide the most comprehensive assessment of bird use of the site so in subsequent years we will use only the survey which provides the most detections for analyses. We compared survey types by examining differences in species richness (# of species detected per survey) and also species abundance (total # of birds detected per survey).

Analysis – Relative abundance for site and per habitat type

We report individual bird species abundance as the average number of detections per survey (summed all detections per species divided by the number of survey replicates). We used typical detections and associated flyover data for this analysis. For point count and line-transect surveys both within and outside 50m detections were included in the analysis excluding detections outside of the Thomas Dairy wet prairie study area boundary (Fig. 1). Similarly, area search estimates only included birds detected within the delineated Beaver Pond shrub-scrub boundary (Fig. 1). The species abundance estimates also reflected abundance per habitat type since each survey method represented one habitat type (i.e. point count and line-transect were performed only in wetland prairie habitat and area search only in the shrub-scrub Beaver Pond habitat).

We used the Shannon Diversity Index to estimate spring avian species diversity. Species diversity is a measure of both species richness and species evenness[2]. The Shannon Diversity index[3] is a widely accepted and utilized technique for assessing species diversity that allows comparison within and among sites. We used point count data to assess overall spring species diversity in the wetland prairie habitat and the area search data for shrub-scrub Beaver Pond spring species diversity. We did not estimate species diversity for the riparian forest habitat since the eBird data was not standardized in the same way or as rigorously as the other survey types. To make the Shannon Diversity index estimate more biologically intuitive, we convert it to the "Effective Number of Species" (ENS) which represents the number of species that would be present if they were all equally-common (100% evenness) based on a given Shannon Diversity Index estimate (H'). ENS is calculated as exp (H').

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2 Species evenness refers to how close in number each species in an environment is.
3 http://www.tiem.utk.edu/~gross/bioed/bealsmodules/shannonDI.html

Analysis – eBird Cook Park Riparian Forest Community Science Surveys

A virtual Zoom training for Cook Park community scientists was held March 17th and field trainings were held on March 20th 2021. eBird community science surveys began after the field trainings. Data were obtained from eBird for the period 1 April to 31 Oct 2021 for the Cook Park eBird hotspot. Only data from trained volunteers who were evaluated to have "intermediate to high" skill level in both visual and auditory bird identification were used for analysis. If there was more than one survey in a day reported we retained the survey of the longest duration. We also removed data reported more than once in situations where volunteers working as a team submitted the same checklists separately. In this situation, we retained the checklist from the most experienced birder in the group. We only included morning surveys in the analysis.

We examined overall bird relative abundances of the site per month for five species guilds (songbirds[4], waterfowl, waterbirds, shorebirds, raptors) and for 13 selected species that represented either the most common species detected or species that are of conservation concern (Neotropical migrants including Swainson's Thrush, Common Yellowthroat, and Tree Swallow). For all analyses we estimated relative abundance as bird detections per hour (dividing total birds observed per category by the total hours of survey effort by experienced observers on unique surveys). In this way the relative abundance estimates are controlled for effort. As mentioned previously, we added species detected during eBird counts to the species richness inventory which contains the comprehensive summary of species richness at the site (Table 1).

RESULTS & DISCUSSION

Comparison of point count and line-transect avian surveys (wetland prairie habitat)

More bird species were detected during point counts for all 5 surveys (Fig. 3) with the average bird species detected on point count vs line-transect surveys being 18.6 vs. 13.8 respectively. Similarly, the number of all bird detections was consistently higher during point count surveys (except for the April 30 survey) with the average number of birds detected on point count vs line-transect surveys being 42.8 vs. 31.6 respectively (Fig. 4). The higher number detected on the April 30 line-transect survey was due to flocking together of 10 Savannah Sparrows on that particular count. Because the point count data consistently provided a more representative and comprehensive sample of the wetland prairie habitat, for the subsequent analyses we will only use the point count data. In 2022 we will compare these survey methods again and if point counts again provide better representation of the local avifauna, we will only use the point count data to examine potential influence of CWS's wetland prairie habitat enhancement on bird community response over time. In subsequent years, we will continue to conduct the transect surveys but will only use that data for species richness assessment.

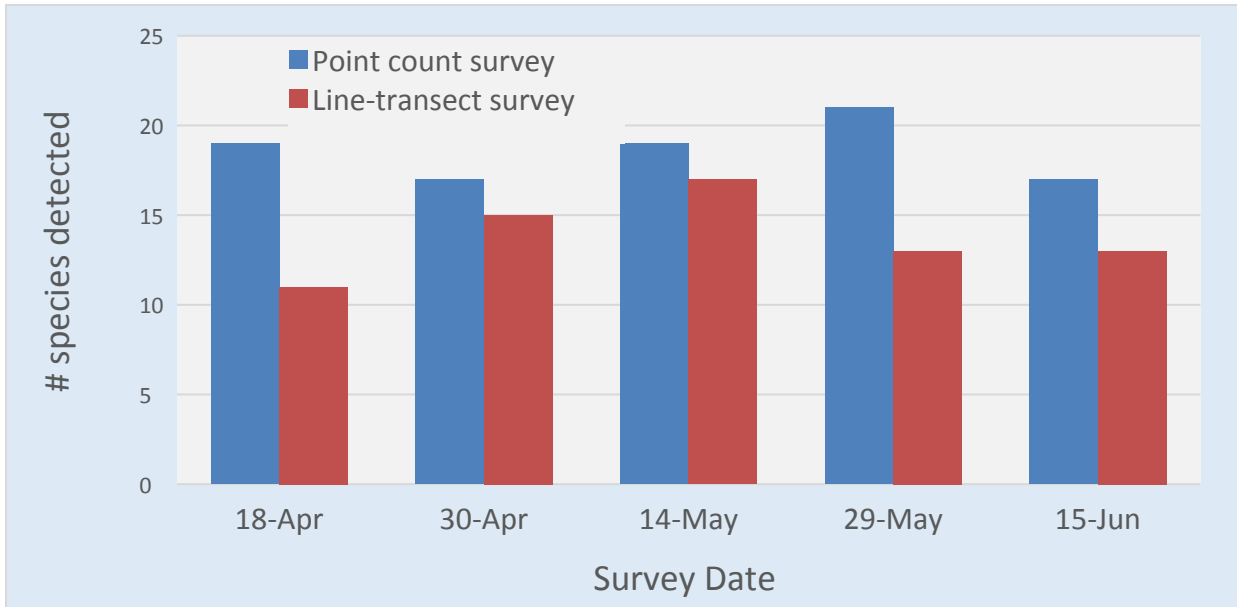[4] Songbirds include all passerines and near-passerines

Figure 3. Number of all bird species detected during spring 2021 point count vs. line-transect surveys at Thomas Dairy Wetland Prairie habitat.
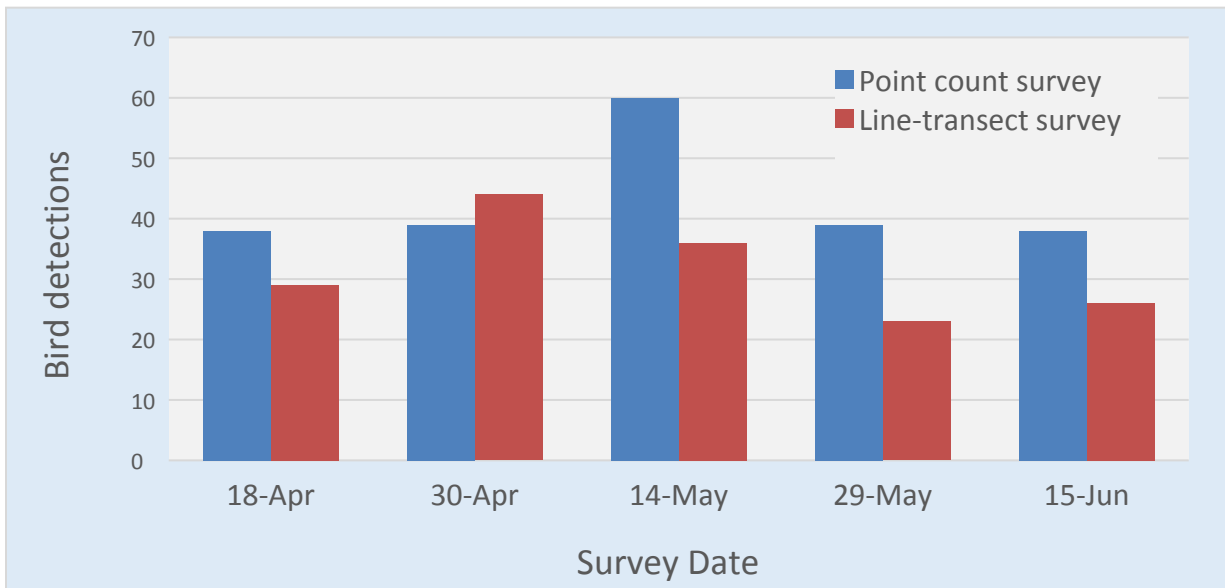
Figure 4. Number of all bird detections during spring 2021 point count vs. line-transect surveys at Thomas Dairy Wetland Prairie habitat.

Overall bird species richness & individual species abundances

Among all survey types using the entire site including the Cook Park riparian forest corridor, Thomas Dairy Wetland Prairie, and Beaver Pond Shrub-Scrub habitats we documented 89 species during the period 1 April to 31 October 2021 (Table 1). This includes 74 species using riparian forest, 45 using wetland prairie, and 44 using shrub-scrub habitat. It is important to note that only the eBird riparian habitat surveys were conducted beyond the spring/early summer into late summer and the fall.

Table 1. Overall species richness and relative abundance of individual bird species (± SD) including a breakdown of habitat types used per species from 1 April through 31 October, 2021 at the Cook Park and Thomas Dairy/Beaver Pond sites (Figs. 1 & 2). Species are listed in order of abundance using point count survey estimates as the default (for the Thomas Dairy site only). For Cook Park eBird riparian habitat surveys, abundance estimates were not included as they are not directly comparable to professional survey estimates. Species only detected on eBird counts are listed alphabetically at the end of the table and only include data from experienced eBird surveyors. Habitat types: RF=Riparian Forest, SS=Scrub-Shrub beaver pond, and WP=Wetland Prairie. Survey types: PC=Point Count, T=Line-transect, A=Area Search, E=eBird

Species	Spring relative abundance (Avg. # of detections per survey ± SD)	Habitat types detected in	Survey type detected in
Cedar Waxwing	11 ± 9.9	ALL	PC, T, A, E
Green-winged Teal	7 ± 5.7	SS, RF	A, E
Common Yellowthroat	6.6 ± 0.9	ALL	PC, T, A, E
Northern Shoveler	6 ± 0	SS, RF	A, E
Evening Grosbeak	5 ± 0	SS	A
Cliff Swallow	4 ± 0	WP	PC
Song Sparrow	3.6 ± 1.1	ALL	PC, T, A, E
Red Crossbill	3.5 ± 0.7	WP	PC
Savannah Sparrow	2.6 ± 1.5	WP	PC, T
Lazuli Bunting	2.5 ± 0.7	WP	PC, T
American Crow	2.4 ± 2.6	ALL	PC, T, A, E
Red-winged Blackbird	2.4 ± 1.1	WP, RF	PC, T, A, E
American Robin	2.3 ± 1.3	ALL	PC, T, A, E
Northern Flicker	2 ± 1.4	ALL	PC, T, A, E
Orange-crowned Warbler	2 ± 1.4	ALL	PC, T, A, E
Spotted Towhee	2 ± 1	ALL	PC, T, A, E
American Goldfinch	2 ± 0	ALL	PC, T, A, E
Bushtit	2 ± 0	SS,RF	A, E
Canada Goose	2 ± 0	ALL	PC, T, A, E
Greater Yellowlegs	2 ± 0	SS	A
Yellow-rumped Warbler	2 ± 0	ALL	PC, A, E
Mallard	1.7 ± 1.2	ALL	PC, T, A, E
California Scrub-Jay	1.7 ± 0.6	ALL	PC, T, A, E
Anna's Hummingbird	1.6 ± 0.5	ALL	PC, T, A, E
Tree Swallow	1.5 ± 0.7	ALL	PC, T, A, E
Wood Duck	1.5 ± 0.7	WP, RF	PC, T, E
Brown-headed Cowbird	1.3 ± 0.6	ALL	PC, T, A, E
Great Blue Heron	1.3 ± 0.6	ALL	PC, T, A, E
Bald Eagle	1 ± 0	SS, RF	A, E
Belted Kingfisher	1 ± 0	WP, RF	PC, E
Bewick's Wren	1 ± 0	ALL	PC, T, A, E
Black-capped Chickadee	1 ± 0	ALL	PC, T, A, E
Black-headed Grosbeak	1 ± 0	ALL	PC, T, A, E
Black-throated Gray Warbler	1 ± 0	SS, RF	A, E
Chipping Sparrow	1 ± 0	WP	T
Cooper's Hawk	1 ± 0	ALL	PC, T, A, E
Dark-eyed Junco	1 ± 0	ALL	PC, T, A, E
Downy Woodpecker	1 ± 0	WP, RF	T, E

Species (Table 1. Continued)	Spring relative abundance (Avg. # of detections per survey ± SD)	Habitat types detected in	Survey type detected in
European Starling	1 ± 0	ALL	PC, T, A, E
Great Egret	1 ± 0	WP, SS	PC, A
House Finch	1 ± 0	ALL	PC, A, E
Lesser Goldfinch	1 ± 0	ALL	PC, T, A, E
Lincoln's Sparrow	1 ± 0	SS	A
Mourning Dove	1 ± 0	WP, RF	PC, E
Pied-billed Grebe	1 ± 0	SS, RF	A, E
Pine Siskin	1 ± 0	ALL	PC, A, E
Purple Finch	1 ± 0	SS, RF	A, E
Red-tailed Hawk	1 ± 0	WP, RF	T, E
Ruby-crowned Kinglet	1 ± 0	SS, RF	A, E
Sharp-shinned Hawk	1 ± 0	WP	PC, T
Swainson's Thrush	1 ± 0	SS, RF	A, E
Unidentified Duck	1 ± 0	SS	A
Vaux's Swift	1 ± 0	WP, SS	PC, T, A
Violet-green Swallow	1 ± 0	WP, SS	PC, A
Western Tanager	1 ± 0	ALL	PC, A, E
Wilson's Snipe	1 ± 0	WP	T
Wilson's Warbler	1 ± 0	ALL	PC, A, E
Yellow Warbler	1 ± 0	WP	PC, T
American Kestrel	n/a	RF	E
Band-tailed Pigeon	n/a	RF	E
Barred Owl	n/a	RF	E
Brown Creeper	n/a	RF	E
Bullock's Oriole	n/a	RF	E
Cackling Goose	n/a	RF	E
Chestnut-backed Chickadee	n/a	RF	E
Eurasian Collared Dove	n/a	RF	E
Fox Sparrow	n/a	RF	E
Gadwall	n/a	RF	E
Golden-crowned Kinglet	n/a	RF	E
Golden-crowned Sparrow	n/a	RF	E
Hermit Thrush	n/a	RF	E
Hooded Merganser	n/a	RF	E
House Sparrow	n/a	RF	E
Hutton's Vireo	n/a	RF	E
Killdeer	n/a	RF	E
Osprey	n/a	RF	E
Pacific-slope Flycatcher	n/a	RF	E
Pileated Woodpecker	n/a	RF	E
Red-breasted Nuthatch	n/a	RF	E
Red-breasted Sapsucker	n/a	RF	E
Ring-necked Duck	n/a	RF	E
Rufous Hummingbird	n/a	RF	E
Spotted Sandpiper	n/a	RF	E
Steller's Jay	n/a	RF	E

Species (Table 1. Continued)	Spring relative abundance (Avg. # of detections per survey ± SD)	Habitat types detected in	Survey type detected in
Townsend's Warbler	n/a	RF	E
Varied Thrush	n/a	RF	E
Warbling Vireo	n/a	RF	E
Western Wood-pewee	n/a	RF	E
White-breasted Nuthatch	n/a	RF	E

Results: Thomas Dairy (wet prairie habitat) vs Beaver pond (shrub-scrub habitat)

Overall species abundance was higher in the Beaver Pond shrub-scrub habitat (54 vs. 42.8 bird detections per survey) compared to the wet prairie at Thomas Dairy. This difference was driven by the much higher number of waterfowl species detected at the Beaver Pond site (Fig. 5). We detected more birds in the wet prairie habitat in every other guild category (Fig. 5). Species richness was very similar between these two habitat types (sites) overall and among species guilds (Fig. 6).
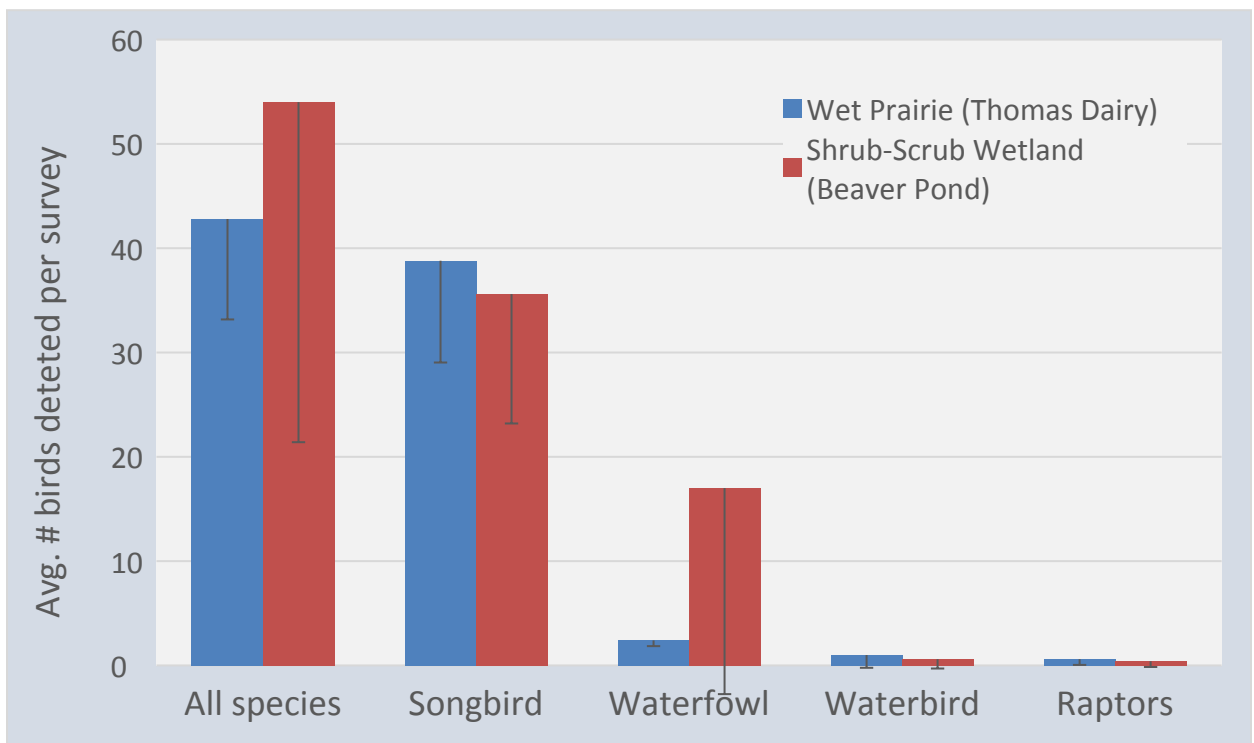

Figure 5. Bird abundance (overall and by guild) measured as bird detections/survey in wet prairie habitat at Thomas Dairy (point count data) versus in shrub-scrub wetland habitat at the adjacent Beaver Pond, spring 2021.
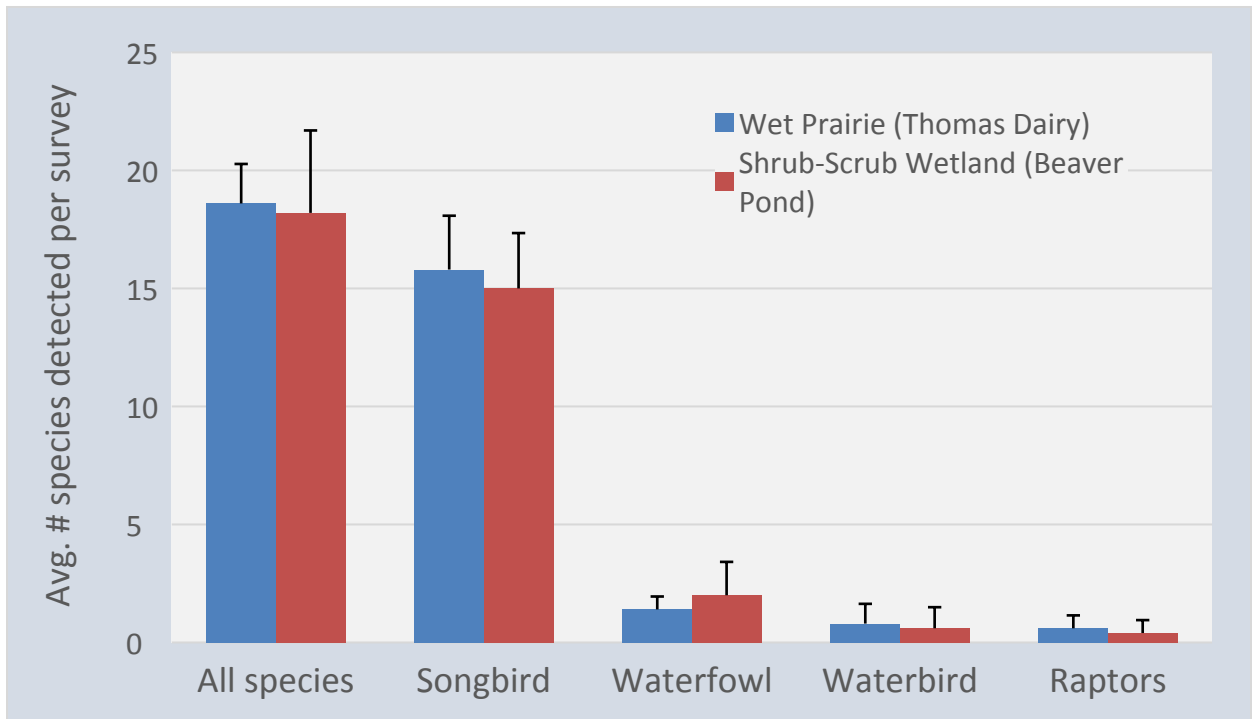
Figure 6. Avian species richness (overall and by guild) measured as number of bird species detected/survey in wet prairie habitat at Thomas Dairy (point count data) versus in shrub-scrub wetland habitat at the adjacent Beaver Pond, spring 2021.

Across the sampling period, abundance was highest in at the Beaver Pond during the first survey with 111 total detections after which surveys at both sites had detections ranging between 30 and 60 birds per survey (Fig. 7). The high detections during the first beaver pond survey was driven largely by high songbird and waterfowl numbers (57 and 51 detections, respectively). The higher waterfowl numbers (mostly Mallard and Green-winged Teal) is likely due to wintering waterfowl still being present during this first survey (April 18) and likely leaving for breeding areas prior to the second survey. We also detected 12 Yellow-rumped Warblers and 11 Red-winged Blackbirds – by far the most compared to any other survey (42% of all songbird detections during the first survey). Higher songbird numbers during the first survey can likely be explained as 1) a pulse in migration (i.e. Yellow-rumped activity spring migration peaks in mid-April[5]) and 2) greater ability to detect species early in the nesting period as some bird species (like Red-winged Blackbirds) can be particularly more vocal defending territories at this time.

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[5] Marshall, D.B., M.G. Hunter, and A.L. Contreras, Eds. 2003. Birds of Oregon: A general reference. Oregon State University Press, Corvallis, OR. (pg.511)
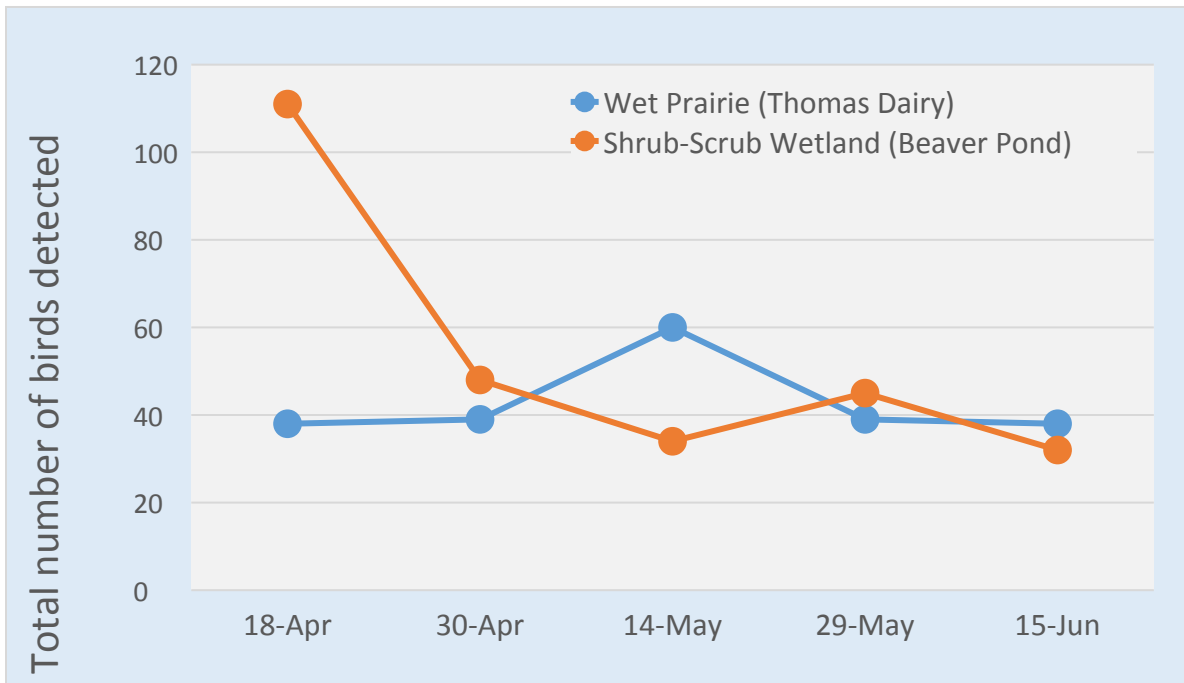
Figure 7. Overall bird abundance per survey date detected in wet prairie habitat at Thomas Dairy (point count data) versus in shrub-scrub wetland habitat at the adjacent Beaver Pond across survey counts, spring 2021.

Shannon species diversity index results across the survey period indicated the shrub-scrub Beaver Pond habitat in general had lower diversity compared to Thomas Dairy (Fig. 8). Species diversity peaked during the third survey (conducted on May 14) only at the Thomas Dairy site with an effective number of species at ~25 (Fig. 8). These results differ from the species richness results (Fig. 6) suggesting even though species richness appears similar between the two sites/habitats, species diversity is noticeably higher at Thomas Dairy. This could be explained by higher species evenness at Thomas Dairy.

A key caveat to mention with the comparison of Thomas Dairy and the Beaver Pond is we used different sampling methods so some of the differences detected may be partly due to differences in methodology. In particular, survey time at Thomas Dairy was exactly 40 minutes per survey (5 8-min point counts)[6] while the average time per survey was 28 min at the Beaver Pond. Since more time was spent at Thomas Dairy it might be expected that there would be more bird detections. However, our results indicate the opposite which may suggest that the differing survey times was probably not a significant source of bias.

Our first year results at Thomas Dairy were informative and will serve as the only baseline year (pre-enhancement) as CWS began irrigation of water to the site in the summer. Our findings and observations this year indicate we will need to carefully consider potential confounding factors (e.g. changes in species abundance and diversity over the survey period due to migration or breeding season timing) when trying to measure a bird response to the increased water at the site. Collection of water data (i.e. height of standing water) and vegetation data at Thomas Dairy (particularly information on vegetation height, complexity per

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[6] Only used point count data for the comparison analysis of these 2 sites/habitat types

unit area) during the spring (mid-May) would help inform the examination of bird response to water enhancement (and resulting) habitat change at the site.
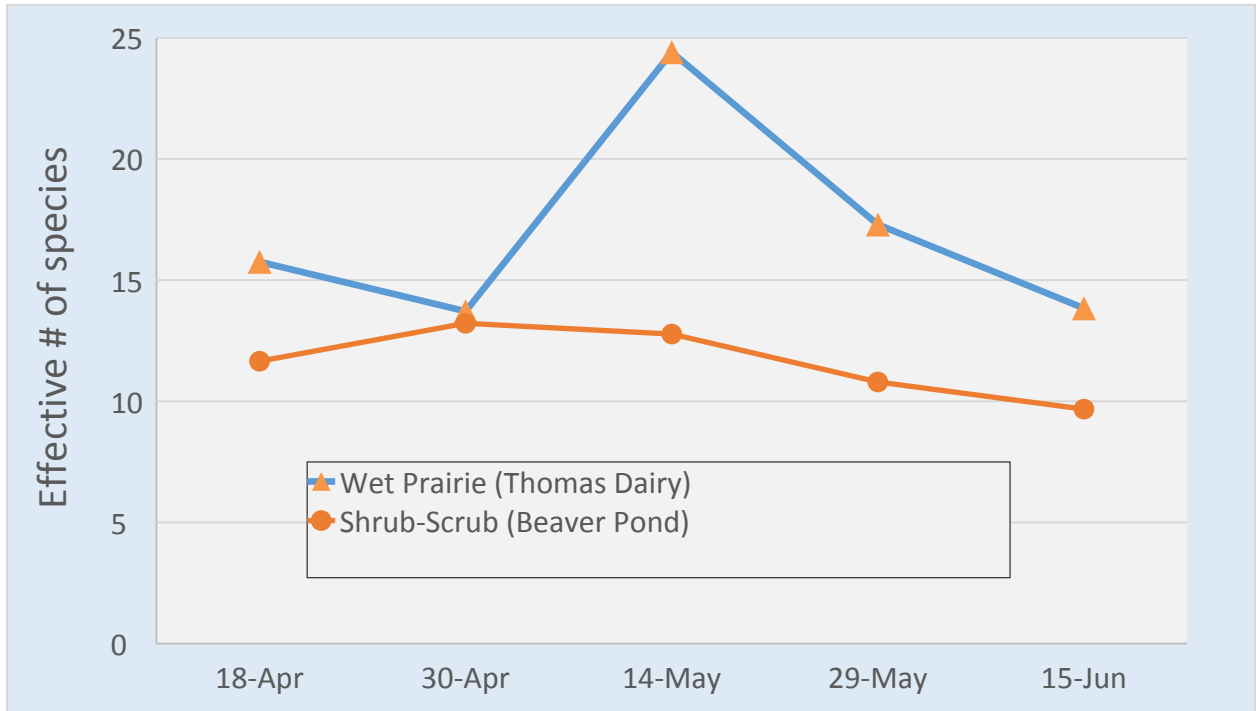

Figure 8. Effective number of species (species diversity) per habitat type across survey counts, spring 2021 at Thomas Dairy and adjacent Beaver Pond.

Results: Community Science eBird surveys (Cook Park riparian area)
Analyses were performed using data collected by 10 community scientists whom were evaluated as "intermediate to high competency" in identifying birds by sight and sound. A total of 47 unique surveys were conducted by the experienced eBird surveyors during the 1 April to 31 October, 2021 timeframe. A total of 3,637 detections were logged ranging from 840 to 290 per month (Table 2). The average time conducting a given survey was 82 minutes and average distance traveled along the survey transect was 1.8 kilometers (1.1 miles). Surveys conducted by experienced observers ranged from 4 to 10 per month (Table 2) with the average being 6.7.

A total of 74 species were documented during community science surveys at the site including 31 species that were only detected during the eBird surveys (Table 1). The top species observed in the seven month period at the Cook Park riparian area were: Spotted Towhee (298 detections), Black-capped Chickadee (306 detections), American Robin (415 detections), Song Sparrow (459 detections) and Mallard (514 detections).

Table 2. Breakdown of eBird survey effort, bird detections and species counted per month by experienced surveyors at Cook Park riparian area.

	Apr	May	Jun	Jul	Aug	Sep	Oct
# surveys	10	9	4	9	6	4	5
Bird detections	814	744	373	711	350	355	290
# Species	52	52	40	50	29	31	31

When controlling for effort (birds/hour), the average number of bird detections per month were relatively consistent ranging from 63.6 in June to 47.3 in both August and October (Fig. 9). Songbirds were by far the most numerous guild with an average of 43.76 detections per hour across the 7-month time period (Fig. 10). Next most abundant guild was waterfowl with an average of 11.24 detections per hour across the 7-month time period - markedly lower than the songbird average. Mallards and Canada Geese were the two most common waterfowl species making up 91.2% of all waterfowl detections. Songbird detections peaked in June while waterfowl detections peaked in the late summer (Fig. 10). Raptor, waterbird, and shorebird guild detections were much lower (<1.25 detections/hour) than the other two guilds (Fig. 10). Raptor detections were highest in the summer months while the waterbird detections had a slight uptick in August and September. The most commonly detected raptor at the site were Bald Eagles (~48% of detections) and the most common waterbird species was Pied-billed Grebe (87% of detections). Shorebird detections were very low across the months (Fig. 10). There were only 3 shorebird detections during the 7-month period (2 Spotted Sandpiper and 1 Killdeer).
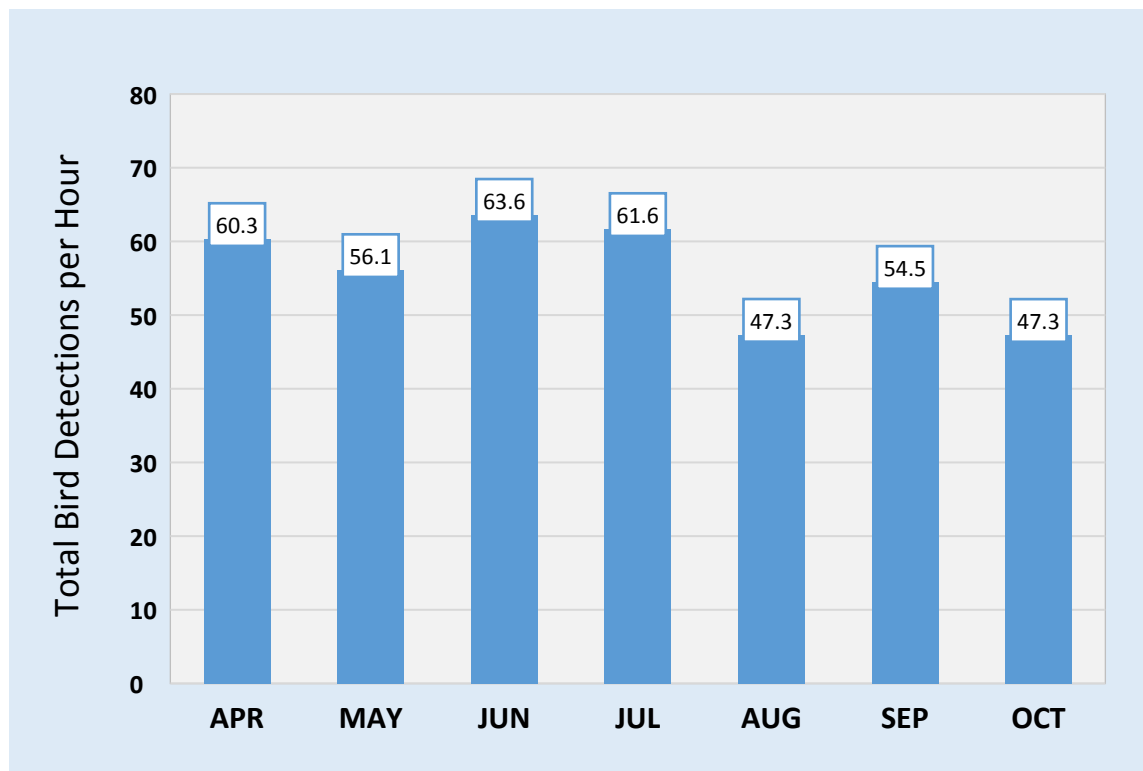
Figure 9. Average overall bird detections per month (April to October 2021) at Cook Park Riparian area by experienced eBird surveyors.
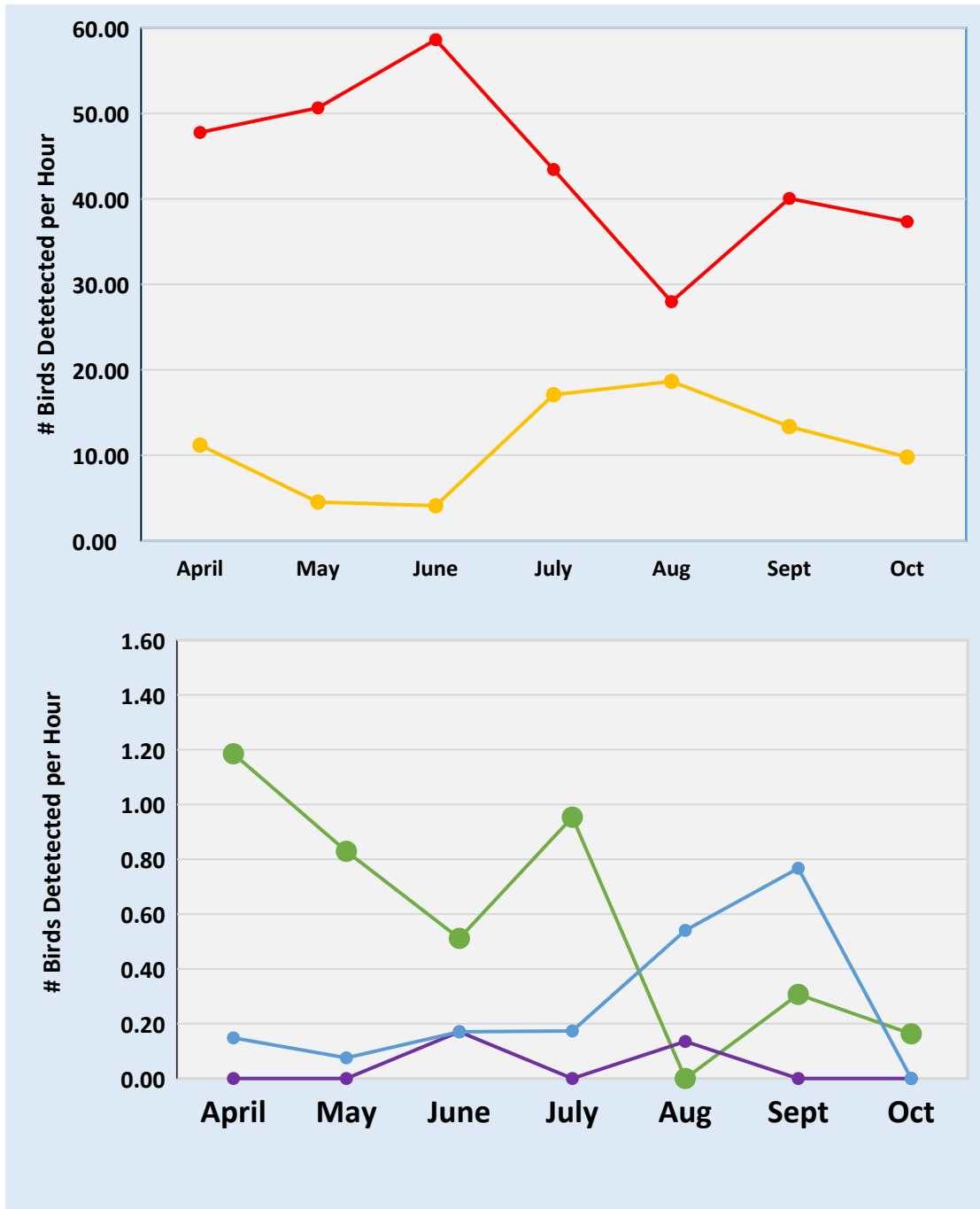
Figure 10. Detections per hour per month for five bird guilds from eBird surveys by experienced community scientists from 1 April 2021 to 31 October 2021 at Cook Park riparian area. Top chart includes bird guilds with relatively high hourly detection rates >5 detections/hr (Waterfowl and Songbird). Bottom chart includes bird guilds with low hourly detection rates <1.5 detections/hr (Raptor, Shorebird, and Waterbird).

At the individual species level, the 13 selected species we analyzed match the guild level results as is expected but offers a detailed look at inter-species differences in abundance by month across the 7-month time period (Table 3).

Table 3. Bird detections per hour per month for 13 select species detected during eBird surveys at Cook Park riparian area by experienced community scientists between 1 April 2021 and 31 October 2021. Orange shading = "higher detection months", Yellow shading = "lower detection months". No shading indicates species were not detected.

Species	Apr	May	Jun	Jul	Aug	Sep	Oct	AVG
AMERICAN GOLDFINCH	0.00	0.00	0.17	0.43	0.00	0.31	0.33	0.18
AMERICAN ROBIN	5.63	8.07	10.57	6.42	2.57	2.76	4.08	5.73
BLACK-CAPPED CHICKADEE	5.56	3.69	4.94	5.03	5.14	4.14	4.24	4.68
BLACK-HEADED GROSBEAK	0.00	1.36	1.36	0.61	0.00	0.00	0.00	0.48
COMMON YELLOWTHROAT	0.15	0.38	0.17	0.09	0.00	0.00	0.00	0.11
DARK-EYED JUNCO	1.48	2.26	3.24	1.82	0.81	3.07	1.96	2.09
GREEN-WINGED TEAL	2.07	0.00	0.00	0.00	0.00	0.00	0.00	0.30
MALLARD	3.93	2.04	2.39	12.40	17.43	11.97	5.54	7.96
SONG SPARROW	5.85	8.67	9.89	6.33	3.24	8.75	6.85	7.08
SPOTTED TOWHEE	4.00	5.80	6.65	5.64	0.81	3.22	2.61	4.10
SWAINSON'S THRUSH	0.00	0.30	0.34	0.17	0.00	0.00	0.00	0.12
TREE SWALLOW	0.07	0.53	0.00	0.00	0.00	0.00	0.00	0.09
WHITE-BREASTED NUTHATCH	0.67	0.45	0.34	0.26	0.41	0.31	0.16	0.37

higher detection months
Lower detection months
No detection months

Outreach and engagement

On March 17, 2021, Portland Audubon conducted a virtual orientation and training event for the Cook Park community science survey portion of this project, followed by a series of four field trainings for enrolled volunteers on March 20. These trainings were attended by over 40 participants. Following these trainings, a series of three "beginner bird walks" was offered to any volunteer who desired additional practice with protocol use and/or bird identification in the field. Each field training and beginner bird walk was conducted using Covid-safe protocols (group size limited to a maximum of 10, all participants wearing face masks.)

Twenty-four participants went on to conduct over 60 field surveys at the site between April 1 and October 31, 2021. From these surveys, we selected data from trained volunteers who were evaluated to have "intermediate to high" skill level in both visual and auditory bird identification, and de-duplicated any surveys conducted by teams. It is worth noting that even novice birders whose skills are still building to a level that allows their data to be included in the quantitative analysis contributed multiple surveys to the effort, and that survey quality improved over time as these volunteers gained practice and experience. We look forward to providing additional field trainings for both new and returning volunteers in spring 2022 and also potentially starting to work with the Portland Audubon Education team on community science focused education events with the community.

Acknowledgements

Special thanks to our team of community scientists as well as volunteer Janet McCurdy who helped with data entry and analysis. Front Cover photo of Pileated Woodpecker by Cook Park community scientist Anne Buckley.

Part of the Cook Park Trail used for the riparian eBird surveys (Photo: C. Larson)