Bird Monitoring of Restoration Outcomes
O'Dell Creek Project Area

2018 Annual Report

Submitted by:

Anna Noson

University of Montana Bird Ecology Lab

Division of Biological Sciences

Missoula, Montana 59812


umbel
UNIVERSITY OF MONTANA
BIRD ECOLOGY LAB

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Executive Summary

This document is the Annual Report to the Northwestern Energy Wildlife Technical Advisory Committee summarizing 2018 bird monitoring conducted by the University of Montana Bird Ecology Lab (UMBEL) within the O'Dell Creek restoration project area in southwestern Montana. Since 2004, the University of Montana (UM), with funding from Northwestern Energy and the Bureau of Land Management (BLM), has monitored bird populations and riparian vegetation to meet Northwestern Energy's Federal Energy Regulatory Commission (FERC) license requirements for hydroelectric operations on the river system by:

1. Monitoring bird distributions and population trends as an indicator of wildlife habitat conditions within the river corridor,
2. Identifying critical wildlife habitats based on analysis of bird habitat use, and
3. Measuring bird and vegetative responses to management actions to evaluate project benefits for wildlife.

In 2005 restoration of O'Dell Creek, a tributary of the Madison River, was initiated to reestablish one of southwest Montana's largest spring-fed wetlands, restoring critical fisheries and wildlife habitat, and recreating a diverse wetland complex. Since restoration work began, UMBEL has monitored bird community response, providing science-based measures of project outcomes for wildlife.

During the 2018 breeding season, we conducted point count surveys targeting songbirds, broadcast playbacks for secretive marshbirds, and completed two vantage and flush surveys of open water for waterbirds and waterfowl. Results from this monitoring program provide science-based measures of the significant contribution that this large-scale restoration effort has made to breeding populations of wetland and riparian bird species, from songbirds to waterfowl. Twelve years after restoration began, we continue to observe significant changes in the bird community, providing further insight to long-term benefits of this project. Highlights from the 2018 monitoring program include:

- 68 bird species documented within the project area during the breeding season, bringing the total across years to 116 species, including 18 Montana Species of Concern (SOC);
- Increased summer breeding abundance for 5 of 12 waterfowl species, including American White Pelican, Gadwall, Green-winged Teal, Lesser Scaup, and Mallard;
- Significant increase in waterbird species richness in restored wetland areas;
- Significant increase in riparian obligate and dependent species richness in restored wetland areas;
- Significant increases in abundance of four focal species in restored wetland areas, including two new since 2016 (e.g. Common Yellowthroat and Wilson's Snipe).

Acknowledgements

We would like to thank Northwestern Energy and the Bureau of Land Management for supporting this monitoring effort. We are also very grateful to the Granger, Longhorn, and Coombs Ranches for allowing us access to their land and more importantly for the restoration work they've undertaken on their properties. Thanks to Montana Audubon for helping with monitoring, and Sacajawea Audubon volunteers whose passion for birding contributes to our understanding of migratory bird populations. Many more supported this large effort, to which we are grateful. A list of all partners is available upon request.

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Introduction

This document is the Annual Report to the Northwestern Energy Wildlife Technical Advisory Committee summarizing 2018 bird monitoring conducted by the University of Montana Bird Ecology Lab (UMBEL) within the O'Dell Creek restoration project area in southwestern Montana. Since 2004, the University of Montana (UM), with funding from Northwestern Energy and the Bureau of Land Management (BLM), has monitored bird populations and riparian vegetation to meet Northwestern Energy's Federal Energy Regulatory Commission (FERC) license requirements for hydroelectric operations on the river system by:

1. Monitoring bird distributions and population trends as an indicator of wildlife habitat conditions within the river corridor,
2. Identifying critical wildlife habitats based on analysis of bird habitat use, and
3. Measuring bird and vegetative responses to management actions to evaluate project benefits for wildlife.

Restoration of O'Dell Creek, a major tributary of the Madison River, was initiated in 2005 to reestablish one of southwest Montana's largest spring-fed wetlands, returning the channel to its natural dimensions and restoring critical fish and wildlife habitat. The work began on a single private ranch, but has since expanded to adjacent private and public lands through the support of a broad partnership of federal and state agencies, non-governmental organizations, and private landowners in the Madison Valley.

Integral to restoration is the inclusion of monitoring to evaluate the ecological outcomes of the project, provide feedback for adaptive management, and guide future restoration design[1]. Birds are ideal indicators of environmental conditions because they have diverse habitat requirements, are relatively abundant within a small area, are easily surveyed, and provide feedback from an entire community rather than a single species[2,3]. In addition, birds are a priority for monitoring during restoration of riparian and wetland areas, because these habitats are important for a large number of bird species during breeding, dispersal, and migration. Riparian areas are known to support the highest diversity of breeding birds of any habitats in the western U.S., including at least 134 (55%) of Montana's 245 bird species and 30 of the 66 Montana Species of Concern. Therefore, restoration and conservation of Montana's riparian and wetland areas is critical to the future of the state's bird populations.

The University of Montana has monitored bird communities since restoration projects began on O'Dell Creek. Monitoring was designed to track phases of restoration, providing science-based measures of individual project success as well as cumulative project outcomes. We documented immediate increases in riparian- associated species following completion of the first phases of restoration. Within five years of restoration, 75 new species were documented using the project area, including 13 Montana Species of Concern. In addition, the area has become an important migratory stop-over, with hundreds

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[1] Block, W. M., A. B. Franklin, J. P. Ward Jr, J. L. Ganey, and G. C. White. 2001. Design and implementation of monitoring studies to evaluate the success of ecological restoration on wildlife. Restoration Ecology 9:293–303.

[2] Carigan, V., and M.A. Villard. 2002. Selecting indicator species to monitor ecological integrity: a review. Environmental Monitoring and Assessment 78:45–61.

[3] Hutto, R.L. 1998. Using landbirds as an indicator species group. Pp. 75-92 in Marzluff, J.M. and R. Sallabanks (eds.), Avian conservation: research and management. Island Press, Covelo, CA.

of Sandhill Cranes counted in the fall, and over a dozen new waterfowl species utilizing the restored open water wetlands in the spring.

Each year we complete monitoring, we add to our understanding of how bird communities respond to restoration of riparian and wetland habitats over time.

Objectives for 2018

1. Measure wildlife outcomes of ongoing habitat enhancement and protection projects along the Madison River, and inform future conservation priorities in the area.
    a. Conduct multi-species monitoring of breeding birds, including targeted monitoring of priority bird species;
    b. Analyze changes in bird populations and vegetation conditions within project areas by treatment and year;

Project Area

O'Dell Creek is a spring-fed tributary of the Madison River, located seven miles south of Ennis, Montana (Fig. 1). The project area spans several private landowners and public lands, and includes approximately 8,000 acres of floodplain and a mosaic of riparian, grassland, and wetland habitats. (Fig. 1)

Historic land use along O'Dell Creek was primarily focused on hay and livestock production. Upper O'Dell creek was ditched, channelized, and riparian areas were drained, which subsequently reduced aquatic and streamside wetland habitat. In 2005 restoration of O'Dell Creek was initiated to rebuild critical trout spawning habitat and recreate one of southwest Montana's largest spring-fed wetlands. Since then, 13 miles of stream channel and 888 acres of wetland habitat have been restored.

Restoration of the creek floodplain is ongoing. The first phases (phases 1-4) of restoration involved filling drainage ditches, returning the upper section of the creek to a natural channel, and creating 17 acres of open water wetland to mimic natural oxbow and beaver complex habitats. Phases 5-6, completed from 2009-2011 involved restoring the lower sections of the Granger Ranch portion of the creek and restoring wetlands to the north, as well as improving upper channel bank structures and waterfowl nesting habitat within the wetland pond complex. Phases 7-9, started in 2012, entailed channel improvements and wetland creation west of the original complex. Additional activities are planned for future years.

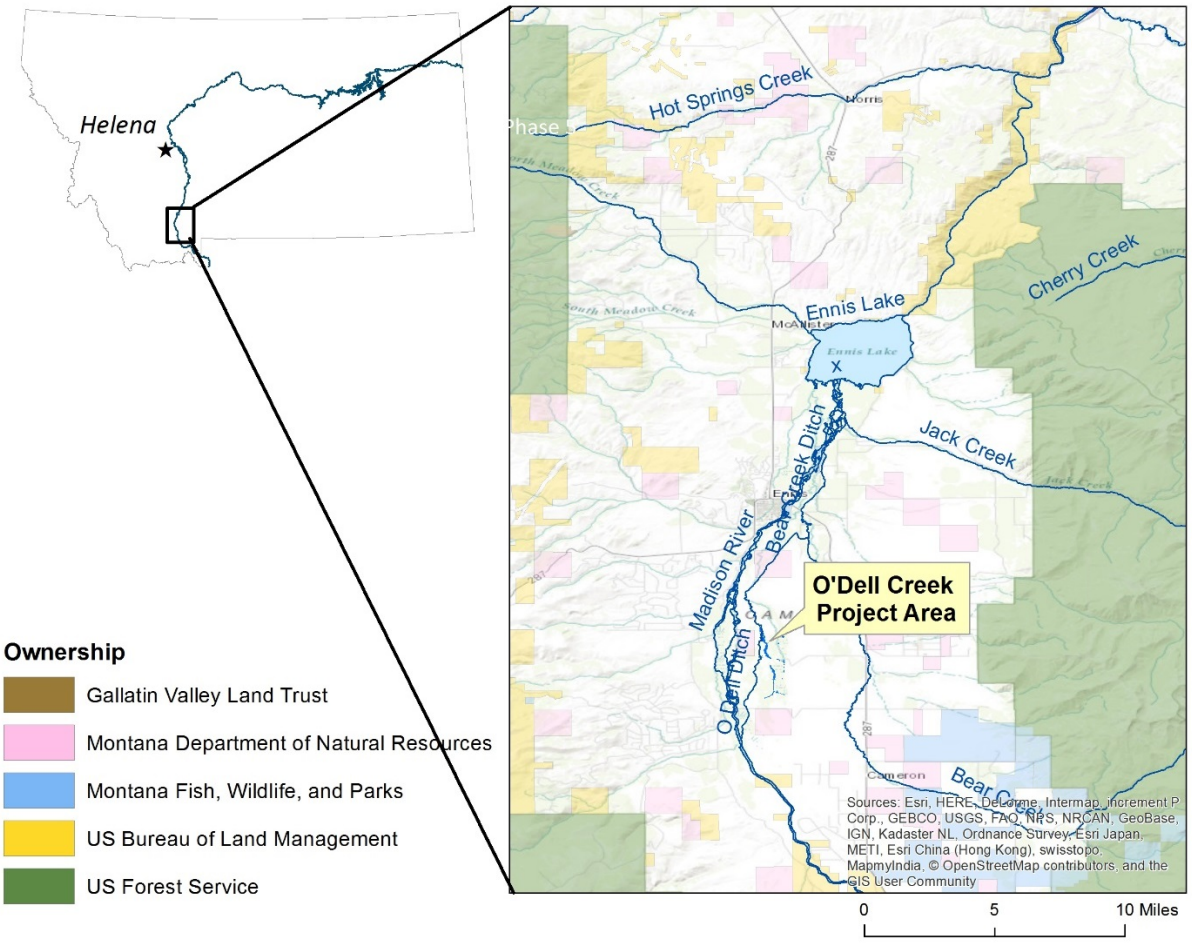

Figure 1. Location of O'Dell Creek project area within the Madison River corridor, Montana.

Methods

We developed a multi-method monitoring plan for the O'Dell Creek project area designed to measure bird species abundance and distribution for most species through point count surveys at established locations and targeted surveys for waterfowl and secretive marshbirds.

Point Count Surveys

We conducted point counts surveys of landbirds at permanently marked locations following standard point count procedures[4]. Surveys were conducted for the 5 hours after sunrise and were not conducted during high wind velocities (≥ 20 km/hr) or during consistent precipitation. During surveys, observers recorded all birds seen or heard, how individuals were detected (song, visual, or call), and distances of birds from the center point. Distances (m) to birds were measured using a rangefinder. All points were visited during the breeding season (late May-early July).

Secretive Marshbird Surveys

We conducted systematic playback surveys for secretive marshbirds at all point count survey locations over 400 m apart with suitable habitat, following the Standardized North American Marsh Bird Monitoring Protocol (Fig. 3). We broadcasted calls for four species known to breed in Montana: American Bittern, Pied-billed Grebe, Virginia Rail, and Sora.[5]

Waterfowl Surveys

Summer breeding surveys for waterfowl pairs and broods were conducted across all created ponds from vantage points located on the bench above, followed by an area search across all wetland habitats around the ponds to locate any species or broods not visible from above. As waterfowl begin incubating and caring for broods, males and females are less likely to be paired, making counts less reliable for evaluating breeding pairs. However, species presence and total number of individuals can be used to evaluate breeding season use.

Individual broods were identified to species, age, and number of ducklings following Gollop and Marshall[6]. We documented all nests encountered, including species, clutch size, and geographic coordinates. Given the low detectability of waterfowl (especially broods), the results should be viewed as an index of breeding activity level rather than a complete census.

Data Analysis

We evaluated bird response to restoration using a before-after-control-impact (BACI) analysis of point count data. Because restoration is ongoing, we evaluated restoration projects separately based on

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Fletcher, R., A. Cilimburg, and R. Hutto. 2007. Evaluating habitat restoration at O'Dell Creek using bird communities: 2006 report. Final report submitted to PPL-Montana.

[5] Conway, C. J. Standardized North American Marsh Bird Monitoring Protocol. Waterbirds, 34(3) : 319-346

[6] Gollop, J.B. and W.H. Marshall. 1954. A guide for ageing duck broods in the field. Mississippi Flyway Council Technical Section Report, Minneapolis, Minnesota.

timing and location. For phases 1-4, we considered 2006 a pre-treatment year, since although channel work was initiated in 2005, the project wasn't completed until 2008. We considered 2009-2016 as after treatment. For phases 5-6, we considered 2006-2011 as pre-treatment, and 2014-2016 as after treatment. Any points not falling within a restoration project area were considered unmanipulated controls.

The species that are expected to be most responsive to restoration are those specialized on the target habitat[7]. Therefore, we examined the responses of bird species that depend on riparian areas for nesting. We examined the overall bird community response as waterbird species richness (total number of waterbird species), and riparian species richness (total number of riparian obligate or dependent species, where obligate is defined as >90% nesting in riparian habitats and dependent is defined as >70% of nesting in riparian habitats).

We selected 8 focal species for analysis based on riparian breeding status, level of conservation concern, habitat associations, and abundance in the project area. Riparian focal species were split into two groups that represented a progression of conditions expected following restoration based on their foraging and nesting requirements. We selected four species that are associated with emergent herbaceous wetland habitats as indicators of early restoration response: Common Yellowthroat, Marsh Wren, and Wilson Snipe, and Red-winged Blackbird. We selected four riparian obligate shrub and tree nesting species as indicators of later restoration response: Song Sparrow, Least Flycatcher, Yellow Warbler, and Bullock's Oriole. The timing and extent of colonization of these species will be an indication of restoration outcomes for the project area.

We examined bird response to restoration using a generalized linear mixed model (GLMM). To account for natural annual variation and potential correlation between repeated measures across years, model fit was evaluated with year of survey and point included as random effects. We included treatment (binary: treatment/control), year (number of years since treatment, with 0=before), and a treatment-by-year interaction. We interpreted a significant ($P \leq 0.05$) treatment-by-year interaction as a response to treatment. When the treatment-by-year interaction was significant, pairwise comparisons were used to examine differences in treatments for each year of monitoring after restoration. A Sidak confidence interval correction was used to control for multiple comparisons among factors.

To visualize treatment effects, we generated plots of bird response using model-based estimates from the treatment × year model. We characterized uncertainty using 95% confidence intervals. SPSS 23.0 was used for all statistical analyses. We examined treatment effects by project phases for phases 1-4 , phases 5-6, and phases7-9.

If restoration has an effect on bird community composition, then we expect: 1) control and treatment sites to be most similar before restoration, 2) controls to remain similar throughout the study, and 3) post-restoration control and restored plots to differ significantly. If there is no effect then we expect no pattern of significance.

[7] Pearson, D.L., 1994. Selecting indicator taxa for the quantitative assessment of biodiversity. Philos. Trans. R. Soc. Lond. B: Biol. Sci. 345, 75–79.

Results

In 2018 we conducted point count surveys at a total of 83 locations across the project area. Playbacks for marshbirds were broadcast at 33 of these points. We conducted two waterfowl surveys timed for peak visibility of broods. Figure 2 shows the extent of monitoring conducted across the O'Dell Creek restoration project area.

We observed 68 bird species and counted 1,954 individual birds from 9 June- 3 July 2018. The most abundant species we observed was the Savannah Sparrow and the Western Meadowlark, both of which are associated with the grassland-dominated upland habitats within the project area. The most common wetland and riparian-dependent species we detected were the Red-wing Blackbird, Sandhill Crane, and Common Yellowthroat.

To date we have recorded 116 species including 18 Montana Species of Concern (SOC) within the project area. This year, we observed a Peregrine Falcon hunting open water habitats in the early phases of restoration. We also documented three locations with Sprague's Pipits. See Appendix A for a list of species detected in 2018.

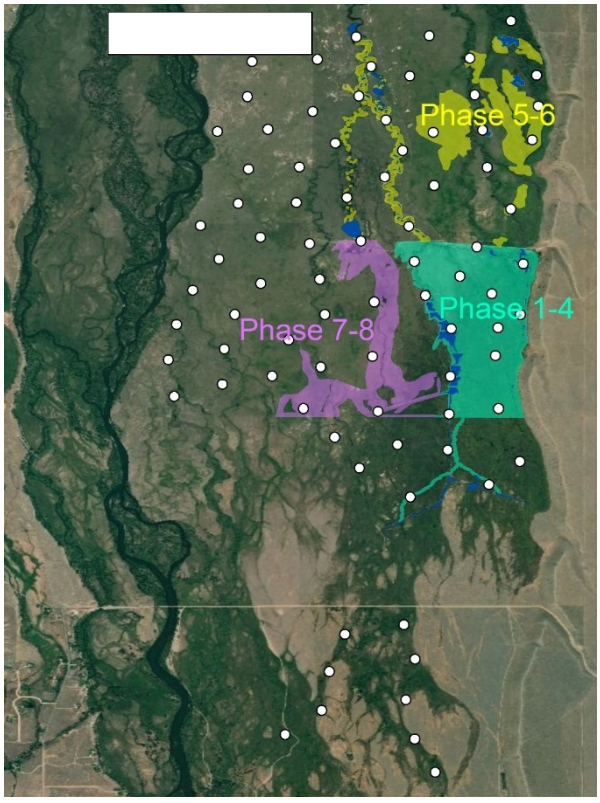

Figure 2. Locations of surveyed points in 2018 relative to restoration project phase.

Summer Breeding Waterfowl

Twelve waterfowl species were detected within the project area during the 2018 breeding season. Total waterfowl abundance increased by 84% from 2016 (Fig. 3). Abundance increases were recorded for five species, including American White Pelican, Gadwall, Green-winged Teal, Lesser Scaup, and Mallard. We observed approximately 55 American White Pelicans flying between the Madison River and the project area across multiple days in late June (Fig. 4).

Locations where species were most abundant can be used to evaluate habitat use within the project area. Figure 5 shows waterfowl use has expanded from Phases 1-4 to include open water and small channel areas created during more recent phases of restoration.

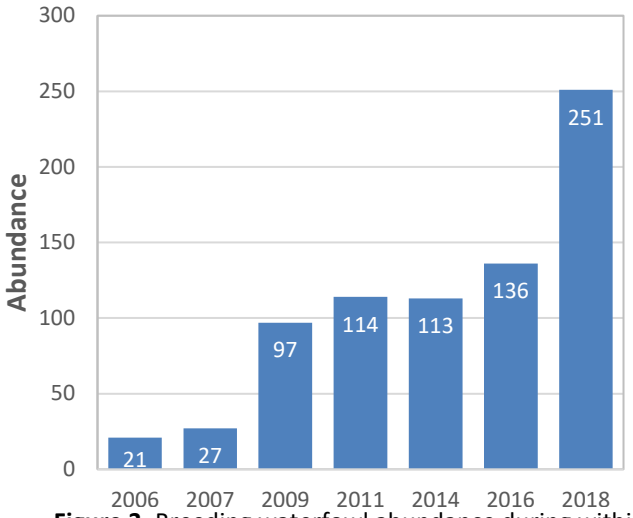

Figure 3. Breeding waterfowl abundance during within O'Dell Creek project area 2006-2018.

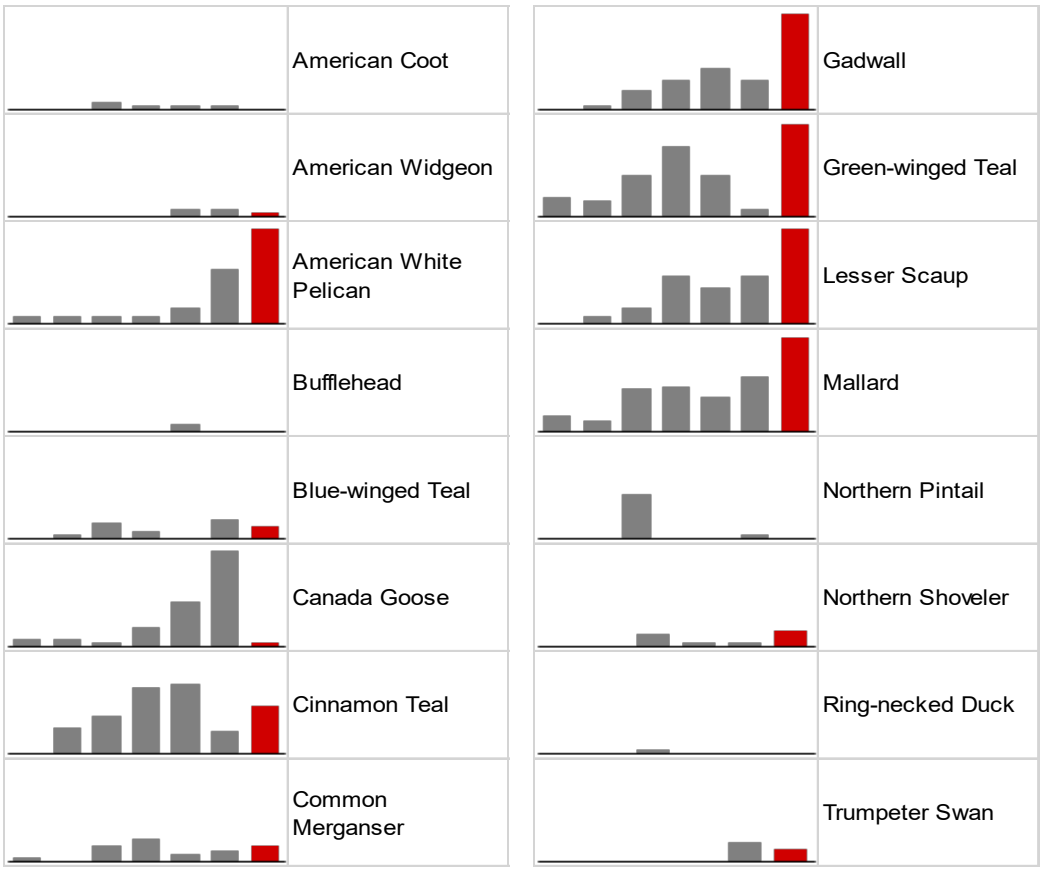

Figure 4. Abundance of waterfowl during summer surveys at O'Dell Creek from 2006-2018 (scale: 0-30, except Mallard scale 0-60). Abundance calculated as maximum number of individuals recording in a single survey.

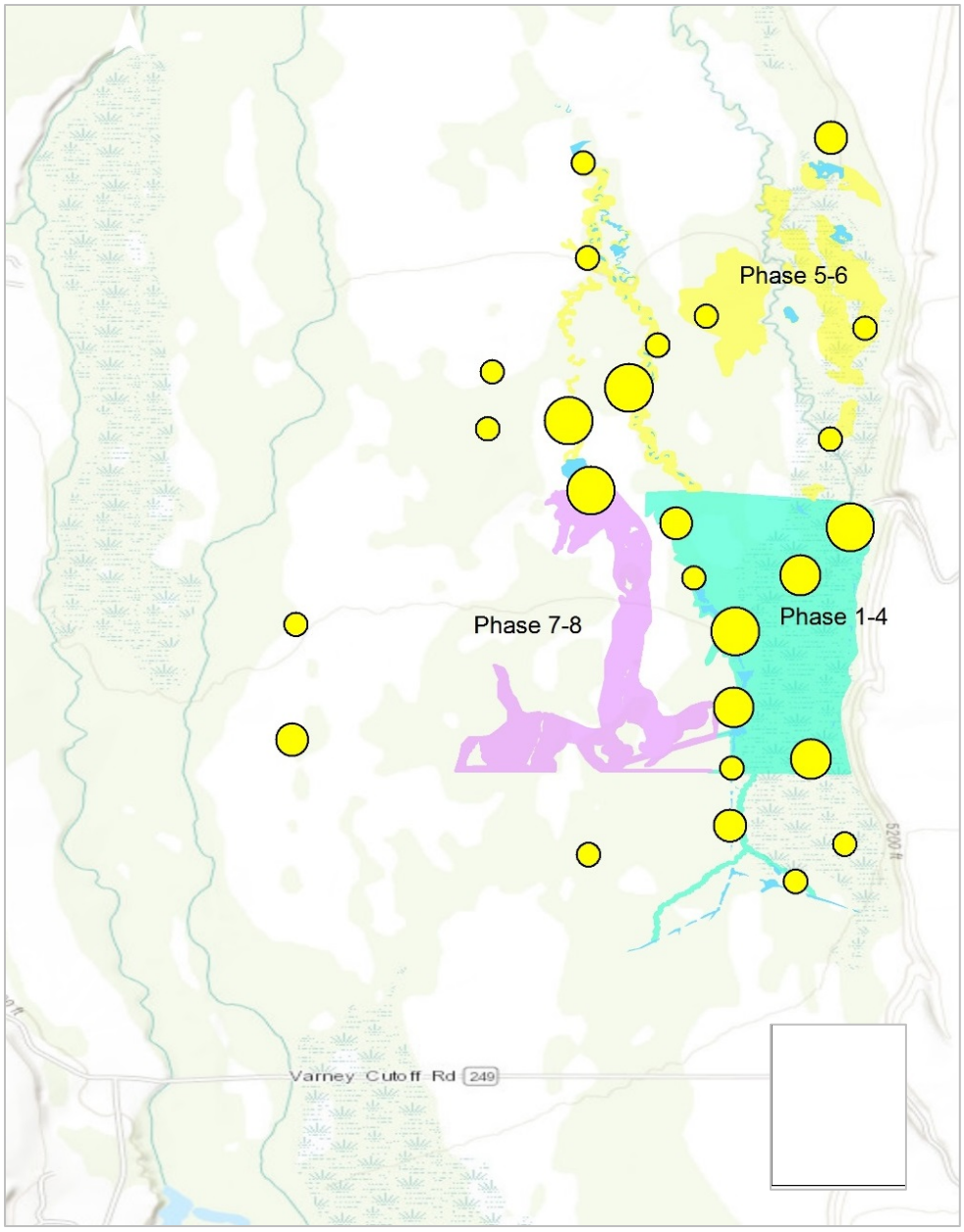

Figure 5. Abundance of waterfowl species detected in 2018 during point count surveys of O'Dell Creek project area relative to restoration phase (note: mapped locations are survey points, birds recorded were up to 200 m away).

Waterbird Species Richness

Across all phases of restoration, the number of waterbird species increased significantly after treatment (year X treatment: F-test, *P* = 0.016). We observed a dramatic increase in waterbird species richness immediately following the first restoration phases that has continued for 12 years (Fig.6). Waterbird species richness increased the most three years after treatment, and remained significantly higher across all monitoring years except 10 years after treatment (sequential Sidak pairwise contrast *P* <0.05). Most gains in waterbird species richness were observed in restoration phases 1-4, where were found an average of 2.4 more species than controls three years after treatment (Fig. 7).

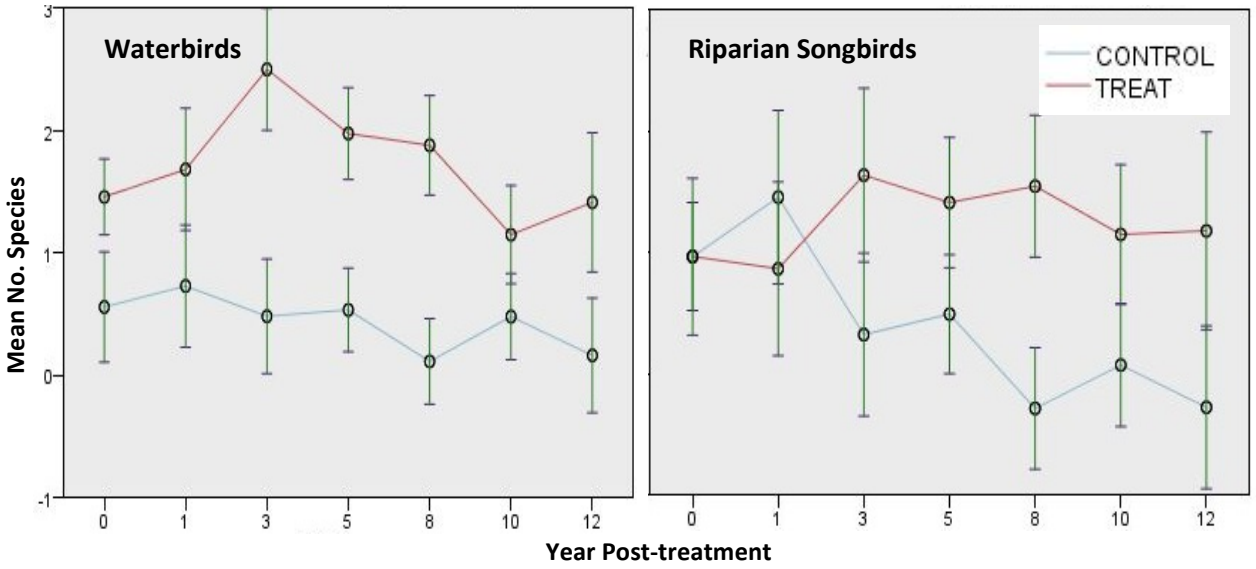

Figure 6. Mean number of waterbird species (left) and riparian obligate and dependent species (right) at restored (red) and control (blue) points by years post-treatment (0=before treatment). Error bars represent ±95% confidence intervals).

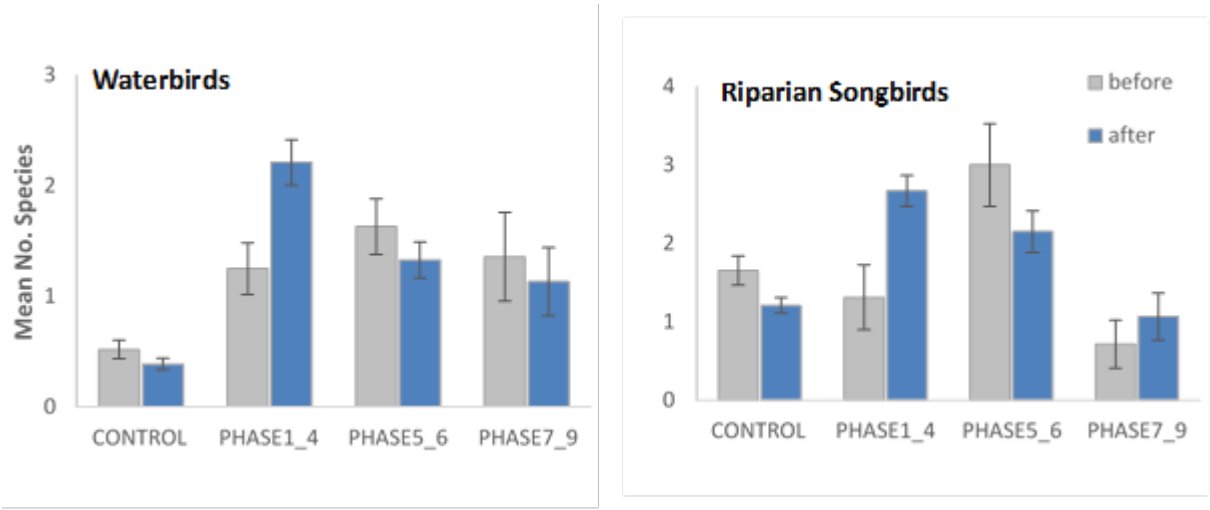

Figure 7. Mean number of waterbird species (left) and riparian obligate and dependent species (right) across treatment phases and controls before (grey) and after (blue) treatment Error bars represent ±1 SE.

Riparian Species Richness

For the first time since restoration began, we detected a significant increase in the number of riparian obligate and dependent songbird species (year X treatment: F-test, P =0.002; Fig.6). We measured significant increase in riparian species only in the first restoration phases, while later project areas have a mixed response (Fig. 7). We found high pre-treatment richness in phases 5-6, likely due to remnant riparian vegetation that supported shrub nesting species not found elsewhere in the project area. Species richness did not significantly change in more recent restoration (phases 7-9), completed in 2014.

Riparian Focal Species

Relative abundance of four focal species that breed in emergent wetlands (Common Yellowthroat, Marsh Wren, Red-winged Blackbird, and Wilson's Snipe) have increased significantly following restoration (year X treatment: F-test, P <0.05). Red-winged blackbirds were significantly more abundant within the first three years after restoration, while Marsh Wrens, Common Yellowthroat, and Wilson's Snipes showed a significant increase much later—8 , 10, and 12 years following restoration, respectively (sequential Sidak pairwise contrast: P <0.05; Fig. 8).

In restoration phases 1-4, completed 12 years ago, abundance was significantly higher for all four focal species that breed in emergent wetlands (Fig. 9). Three of these species (Common Yellowthroat, Marsh Wren, and Red-winged Blackbird) were also more abundant in phases 5-6, which were completed six years ago. This is new since 2016, when only Red-winged Blackbirds had increased significantly in phases 5-6. Less than five years after phases 7-9 were completed, we are seeing no response by emergent wetland focal species.

The Yellow Warbler was the only shrub nesting species with sufficient sample sizes to evaluate, and we did not measure a significant response to restoration (year X treatment: F-test, P =0.477), Abundances of all other shrub and tree-nesting riparian focal species remain too small to analyze (e.g. Song Sparrow,, Least Flycatcher, and Bullock's Oriole).

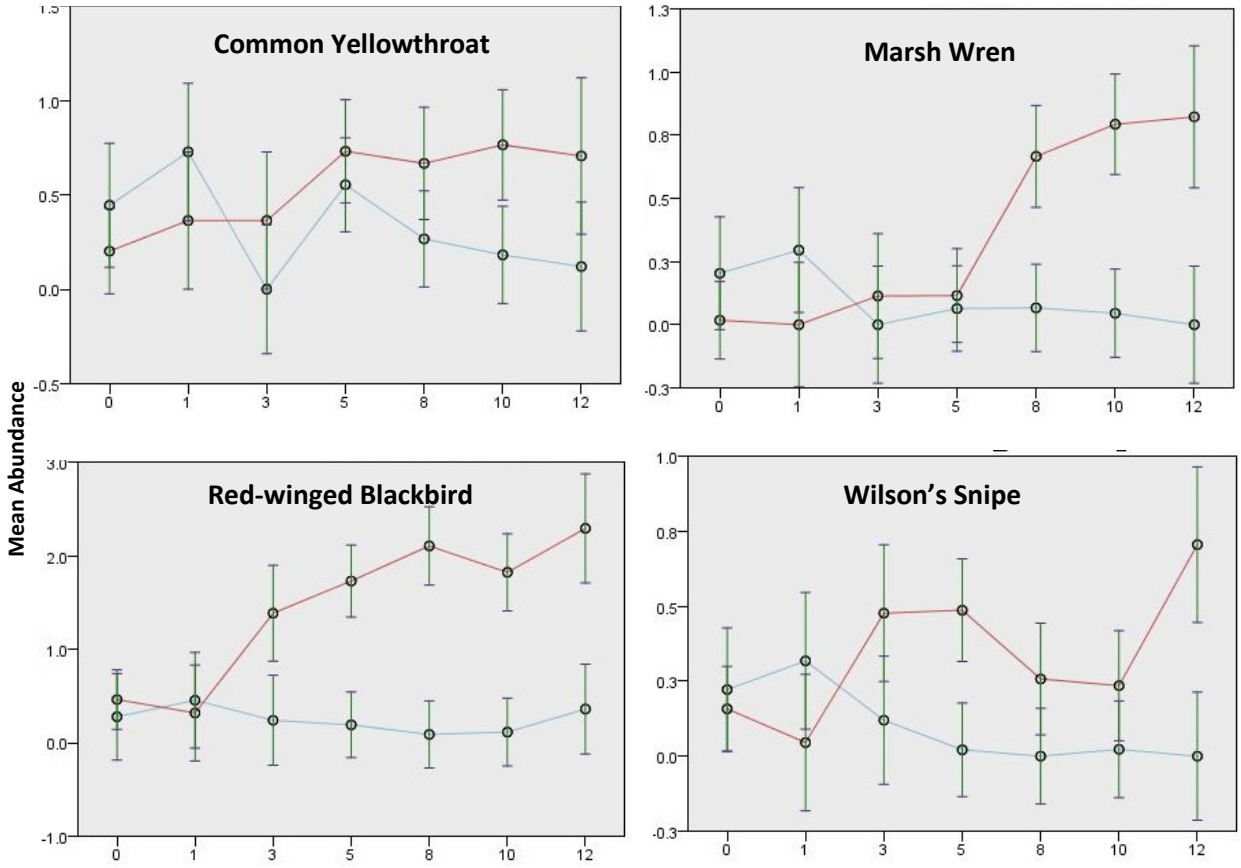

Figure 8. Mean abundance of focal riparian obligate and dependent species (clockwise from top: Common Yellowthroat, Marsh Wren, Red-winged blackbird, and Wilson's Snipe) at restored (red) and control (blue) points by years post-treatment (0=before treatment). Error bars represent ±95% confidence intervals).

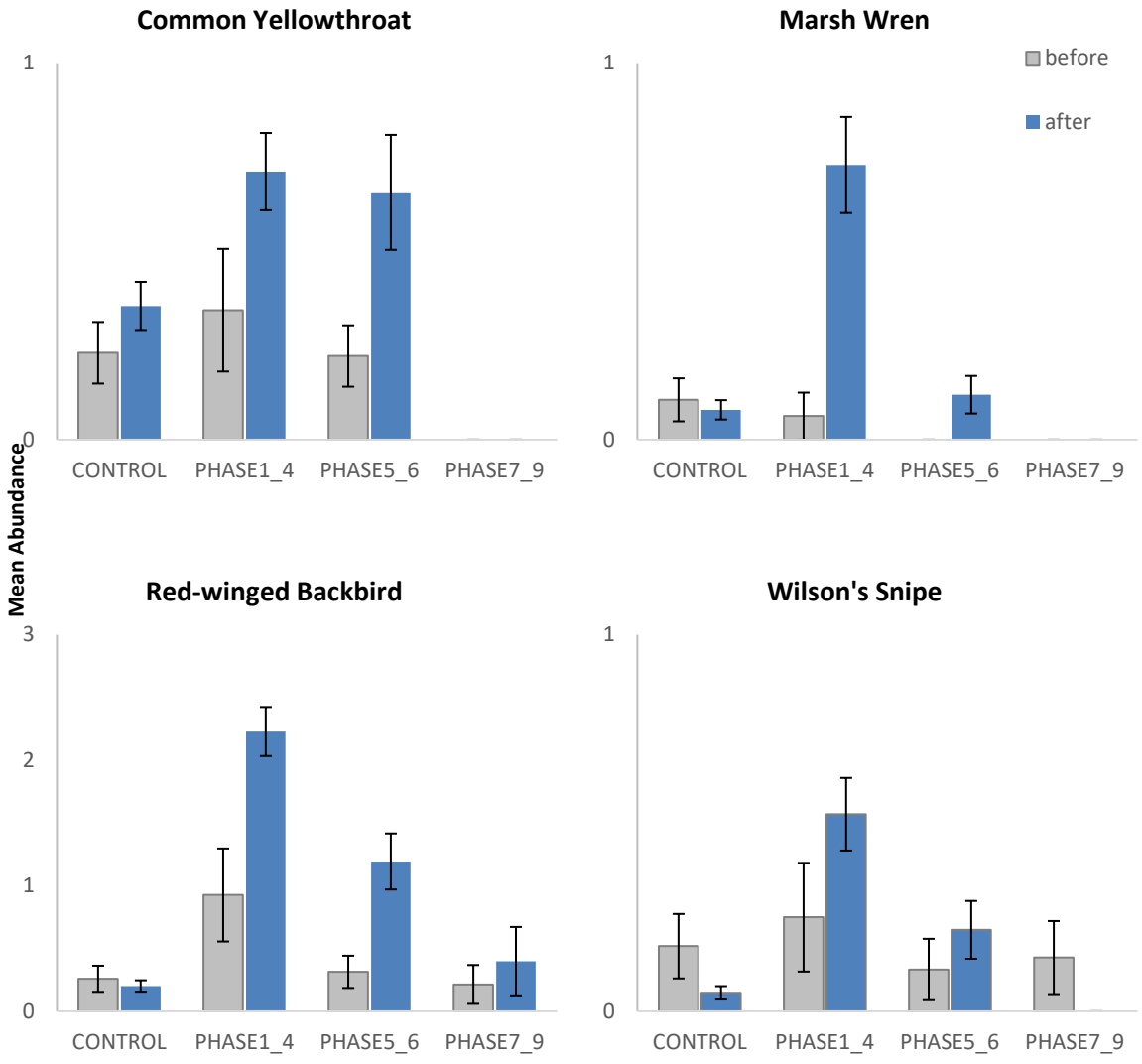

Figure 9. Mean abundance of focal riparian obligate and dependent species (clockwise from top: Common Yellowthroat, Marsh Wren, Red-winged blackbird, and Wilson's Snipe) across restoration phases and controls before (grey) and after (blue) treatment. Error bars

Secretive Marshbirds

Of the four marshbird species we broadcast playback calls for, two species were detected: Sora and Virginia Rail (Fig. 10). We recorded three Sora utilizing emergent wetlands within the project area, down from nine observed in 2016, (Fig. 11). Two Virginia Rail were observed together near the Phase 4 ponds.

A Sora observed foraging at the edge of a restored open water wetland in the O'dell Creek Project Area on May 31st (photo by Paul Bjornen).

Marshbird species are associated with dense emergent vegetation including cattails, reeds, and sedges within shallow wetlands. The Virginia Rail and Sora are often found together, but their diets differ: the short-billed Sora eats mostly seeds, while the long-billed Virginia Rail eats primarily insects. Both species are considered a conservation priority due to restricted habitat requirements. We did not detect American Bittern this year. This species is considered particularly vulnerable because they require large wetland complexes, and have undergone substantial population declines across the United States.

All marshbirds were detected by sound first. Two Sora were detected during the standard point count survey period, and one after the first playback. The Virginia Rail was only detected after 2 playbacks were broadcast.

We observed fewer birds in 2018, likely because failure of our playbacks limited us to one playback survey which we conducted in late June through early July. In 2009, the majority of birds were detected during the second survey in early July (63%), while in 2016 only 2 Sora were observed during the second survey in July, and the majority were found in May-early June. Seasonal fluctuations in hydrology may drive peak use and distribution, meaning multiple visits are important for adequately sampling these species.

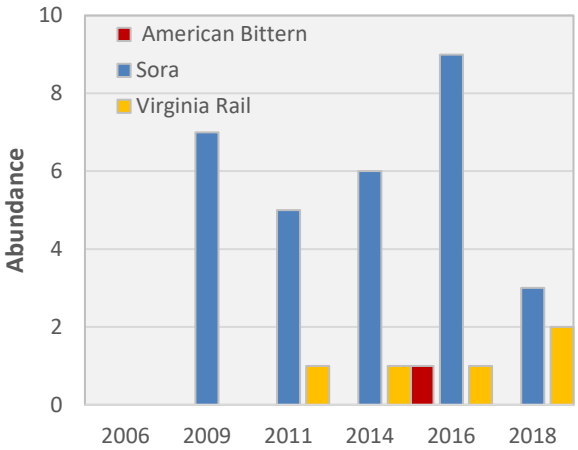

Figure 10. Marshbird detections within the O'Dell Creek Project area from 2006-2016.

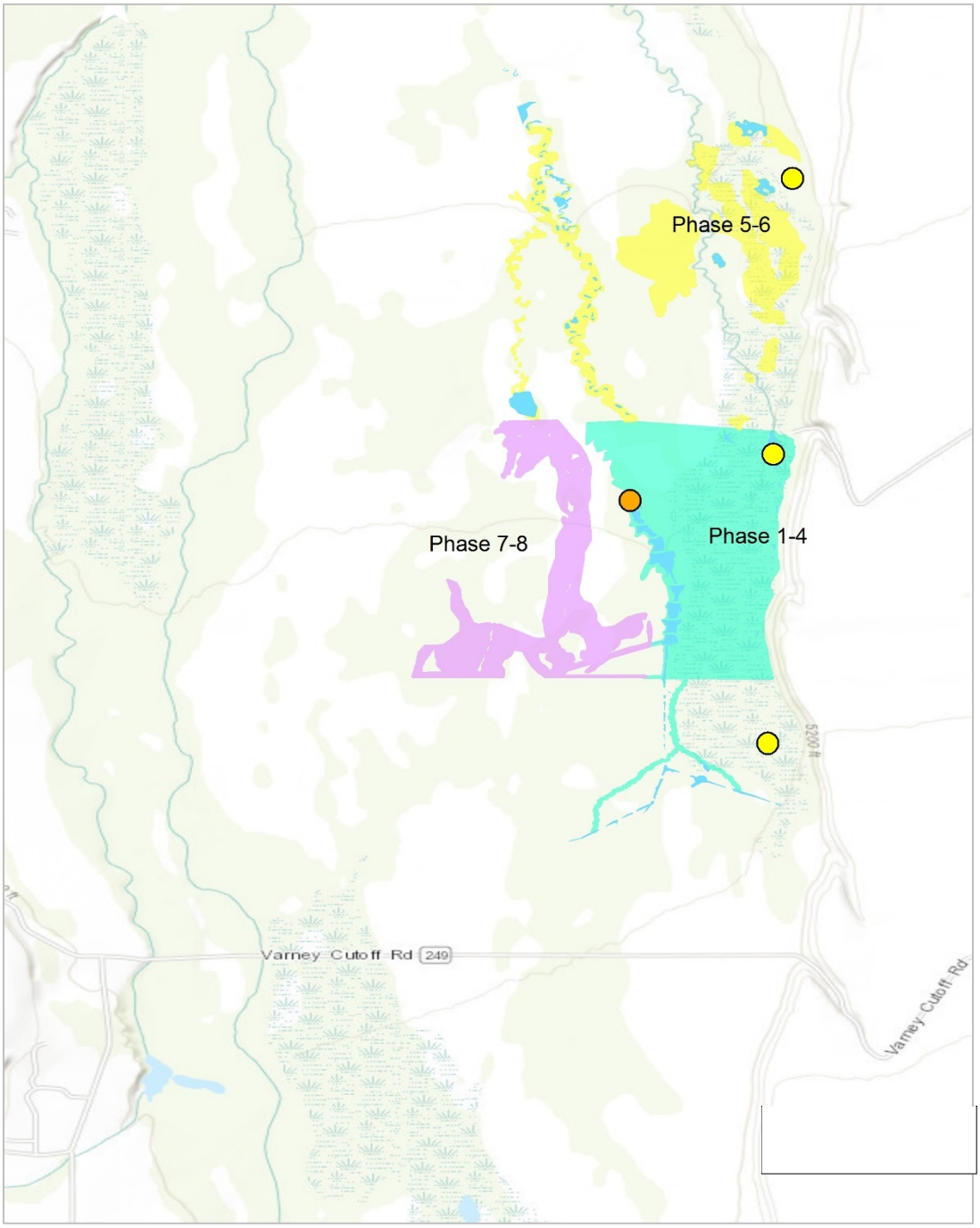

Figure 11. Locations of marshbirds detected during standard point count and playback surveys in 2018. Colored areas correspond to wetlands restored by project phase. Note: mapped locations are survey points, birds recorded were up to 200 m away.

Conclusions

Restoration projects on O'Dell Creek, funded in part by the Northwestern Energy Wildlife TAC, serve as a showcase of the immense value that habitat projects in the right place can accomplish. Results from this monitoring program provide science-based measures of the significant contribution that this large-scale restoration effort has made to breeding populations of wetland and riparian bird species, from songbirds to waterfowl. Twelve years after restoration began, we continue to observe significant changes in the bird community, providing further insight to long-term benefits of this project.

This year, we documented a big increase in total waterfowl numbers and expanding breeding waterfowl use of created open water wetlands and restored stream channel throughout the project area. For the first time this year, we also detected a significant increase in the number of riparian obligate and dependent songbird species. And, two wetland obligate species, Common Yellowthroat and Wilson's Snipe, were significantly more abundant in restored areas for the first time this year.

To date, all bird species that have increased significantly within restored areas are associated with herbaceous and aquatic habitats. We predicted these species would be the first to respond to restoration. However, among the songbird species we evaluated, only Red-winged Blackbirds increased within the first three years after restoration began, while others took 8-12 years to increase significantly, pointing to the importance of long-term monitoring even for species expected to respond quickly to habitat improvements. We have yet to document a significant increase in riparian shrub or tree nesting species. While riparian shrub cover has increased across the restored areas, riparian shrub heights remain low (see Tara Luna results), and do not yet provide sufficient structure to support shrub nesting riparian bird species. In response to these findings, future restoration plans will try planting of native riparian shrubs to improve woody structure in the project area.

Improving wildlife habitat is one of the primary goals of restoration, yet few projects are monitored for wildlife outcomes, and most monitoring is only conducted for several years after project completion, despite the slow recovery of many critical habitat components. The results of this monitoring effort represent a valuable contribution to our understanding of how breeding birds respond to restoration over time, providing insight into both the quality of habitat created and the timing of ecological response to specific restoration actions (phases). Many critical riparian habitats take decades to respond to restoration, particularly forest and shrub vegetation, and therefore continued monitoring is crucial to understanding the outcomes of this project for many priority riparian bird species that require mature woody habitats.

Appendix A. *Bird species encountered during surveys within the O'Dell Creek project area.*

Common Name	Abundance[a]	Habitat Association	Species of Concern
American White Pelican	55	Wetland/Riparian	S3B
Great Blue Heron	P	Wetland/Riparian	S3
Canada Goose	P	Wetland/Riparian	
Trumpeter Swan	6	Wetland/Riparian	S3, IWJV
Gadwall	31	Wetland/Riparian	
American Widgeon	1	Wetland/Riparian	IWJV
Mallard	59	Wetland/Riparian	IWJV
Blue-winged Teal	6	Wetland/Riparian	
Canada Goose	1	Wetland/Riparian	
Cinnamon Teal	15	Wetland/Riparian	IWJV
Green-winged Teal	29	Wetland/Riparian	
Lesser Scaup	43	Wetland/Riparian	IWJV
Northern Shoveler	2	Wetland/Riparian	
Common Merganser	5	Wetland/Riparian	
Osprey	1	Wetland/Riparian	
Bald Eagle	P	Wetland/Riparian	BCC
Northern Harrier	3	Wetland/Riparian	
Red-tailed Hawk	2	Conifer	
American Kestrel	1	Savannah	
Peregrine Falcon	P	Cliffs	S3, BCC
Virginia Rail	2	Wetland/Riparian	
Sora	3	Wetland/Riparian	IWJV
Sandhill Crane	7	Wetland/Riparian	IWJV
Killdeer	3	Wetland/Riparian	
American Avocet	P	Wetland/Riparian	IWJV
Spotted Sandpiper	P	Wetland/Riparian	
Long-billed Curlew	P	Grassland	S3B, BCC, IWJV
Wilson's Snipe	12	Wetland/Riparian	
Wilson's Phalarope	3	Wetland/Riparian	IWJV
Mourning Dove	P	Generalist	
Short-eared Owl	2	Grassland	S4
Common Nighthawk	P	Grassland	
Northern Flicker	P	Generalist	
Western Wood-Pewee	1	Wetland/Riparian	
Least Flycatcher	P	Wetland/Riparian	
Dusky Flycatcher	P	Conifer	
Eastern Kingbird	2	Wetland/Riparian	
Warbling Vireo	P	Wetland/Riparian	
Black-billed Magpie	6	Grassland	
American Crow	P	Generalist	

Common Raven	1	Conifer	
Tree Swallow	21	Wetland/Riparian	
Northern Rough-winged Swallow	3	Wetland/Riparian	
Bank Swallow	38	Wetland/Riparian	
Cliff Swallow	26	Wetland/Riparian	
Barn Swallow	6	Generalist	
House Wren	7	Wetland/Riparian	
Marsh Wren	19	Wetland/Riparian	
American Robin	1	Generalist	
European Starling	8	Human	
Sprague's Pipit	3	Grassland	S3B
Cedar Waxwing	4	Wetland/Riparian	
Yellow Warbler	5	Wetland/Riparian	
Common Yellowthroat	36	Wetland/Riparian	
Western Tanager	P	Conifer	
Vesper Sparrow	5	Grassland	
Savannah Sparrow	374	Grassland	
Song Sparrow	5	Wetland/Riparian	
Lincoln's Sparrow	P	Wetland/Riparian	
Black-headed Grosbeak	P	Wetland/Riparian	
Red-winged Blackbird	81	Wetland/Riparian	
Western Meadowlark	44	Grassland	
Yellow-headed Blackbird	P	Wetland/Riparian	
Brewer's Blackbird	31	Grassland	
Common Grackle	1	Grassland	
Brown-headed Cowbird	16	Grassland	
Bullock's Oriole	2	Wetland/Riparian	
Pine Siskin	P	Conifer	
American Goldfinch	3	Wetland/Riparian	

[a] Abundance was calculated as the number of individuals detected within 100 m summed across points.P= species recorded only outside of standard survey period/distance.

[b] Sx=Montana Species of Concern ranking of native taxa due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. (Source: Montana Natural Heritage Program). BCC=USFWS birds of conservation concern in BCR Region 10. IWJV=Intermountain West Joint Venture priority species.