Bird Monitoring at City Creek Canyon

2016 Project Report

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**Executive Summary**

City Creek Canyon is a unique and important natural area at the wildland-urban interface, and is also beloved by many residents of Salt Lake City. The canyon needs to be maintained as an intact and ecologically healthy riparian area in order to effectively provide drinking water, wildlife habitat, and natural space for people to enjoy. Evaluating the bird community can provide information about the health of the ecosystem as a whole, and also help us better understand how the canyon provides wildlife habitat to species of interest. Since 2011, Tracy Aviary has conducted a citizen science bird monitoring project in City Creek Canyon. Our goal for this project is to conduct long-term, year-round monitoring of the birds that use City Creek Canyon in order to 1) contribute to the understanding overall watershed health for the canyon, 2) increase public awareness of riparian areas, birds, and the relationship between ecosystem health and water quality, and 3) improve the public’s understanding of urban riparian management issues by engaging volunteer citizen scientists.

We conducted breeding and non-breeding bird surveys at 31 sampling points in City Creek Canyon during January through October of 2016. These surveys were a continuation of long-term monitoring data collected in the same locations since 2013.

Surveyors noted 1,214 birds and detected 54 species during the 4 breeding bird survey visits in 2016. During the monthly non-breeding surveys in January, February, March, April, August, September, and October of 2016, we detected 56 species, making the total species 2016 species count 76 different birds.

During the breeding season, we had the most observations of Warbling Vireos (141 observations), Yellow Warblers (115), American Robins (113), Spotted Towhees (104), and Lazuli Buntings (92). Although in a slightly different order, these birds were also the top five species of 2015 and 2014. Warbling Vireos were the most widespread species throughout the study area, and were detected at 87% of the sampling points. American Robins and Yellow Warblers were also widespread throughout the study area, and were detected at 84% of the sampling points. We detected several new species, or species of interest, including the Peregrine Falcon, Pacific Wren, American Dipper, Olive-sided Flycatcher, and Broad-tailed Hummingbird.

City Creek Canyon supports a diverse bird community and provides important habitat for migratory and resident bird species, including several species of conservation concern. Our results highlight the importance of the canyon for avian habitat, assess the health of the riparian area based on key bird species, and identify new threats to that should be examined and better understood with continued monitoring of the area.

**Acknowledgements**

We’d like to thank the extremely dedicated team of volunteers from Tracy Aviary’s Citizen Science Program who braved the early mornings and long hours to collect this data. Thanks also to Patrick Nelson and the Salt Lake City Department of Public Utilities for their partnership and help with coordination for this project. Finally, thank you to Russell Norvell and the Utah Division of Wildlife for their partnership and help with transportation through the canyon.



**Introduction**

City Creek Canyon is a unique and important natural area. It is situated at the wildland-urban interface, with the entrance to the lower canyon adjacent to the stark urban landscape of Salt Lake City’s downtown. Moving up in elevation, the canyon stretches into a contiguous and relatively untouched natural landscape. The canyon is a riparian area, a habitat type that makes up less than 3% of Utah’s land area but is extremely important and heavily used by Utah’s wildlife. For example, over 70% of the bird species in Utah are completely or partially dependent on riparian areas (Walters and Sorensen 1983).

City Creek is also a beloved and important canyon for Salt Lake City residents. As a beautiful natural space near the city center, it gives urban dwellers outdoor recreation opportunities, and many people use the canyon to walk their dog, run, picnic, hike, bike, hunt, and birdwatch. Perhaps more importantly, the canyon also provides city residents with a precious natural resource: drinking water. City Creek has supplied drinking water to the area since Mormon pioneers settled the valley, and it is designated as a protected watershed and nature preserve (Salt Lake City Public Utilities 2016).

Because this area provides an important natural resource, wildlife habitat, and a natural space for people to enjoy, it is important to understand its ecology and maintain its health. Often riparian areas are evaluated using measurements of the stream and the surrounding vegetation (Burton et al. 2008), but understanding the bird community provides a more complete picture of the ecosystem as a whole (Bureau of Land Management 1998; Young et al. 2013). The occurrence of certain birds, especially those that are dependent on intact, healthy riparian areas, can indicate the health of the ecosystem. Understanding the bird communities is especially important in an area such as City Creek, which is situated at the wildland-urban interface. If human-sensitive bird species are present in the area, there is evidence that the canyon is providing high-quality wildlife habitat despite nearby developed and disturbed land.

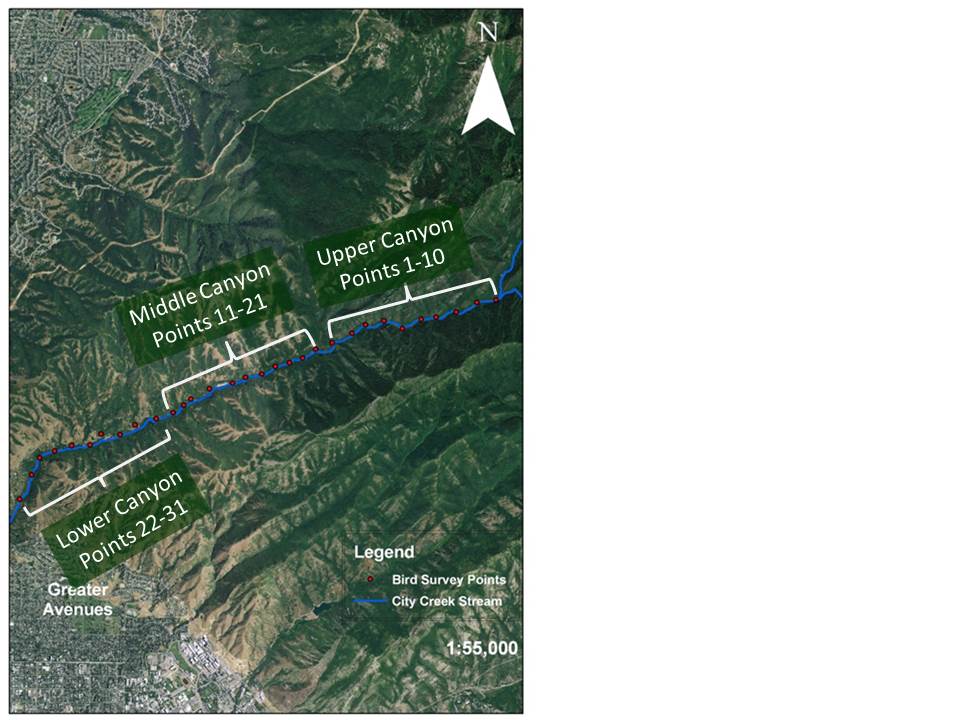
Since 2011, Tracy Aviary has conducted a citizen science bird monitoring project in City Creek Canyon. Our goal for this project is to conduct long-term, year-round monitoring of the birds that use City Creek Canyon in order to 1) contribute to the understanding overall watershed health for the canyon, 2) increase public awareness of riparian areas, birds, and the relationship between ecosystem health and water quality, and 3) improve the public’s understanding of urban riparian management issues by engaging volunteer citizen scientists. By collecting baseline data and monitoring birds over the long-term, this project will also provide important information on bird populations and communities as they face future changes in the climate and environment.

**Methods**

***Study Design***

We conducted breeding and non-breeding bird surveys in City Creek Canyon during January through October of 2016. These surveys were a continuation of long-term monitoring data collected in the same locations since 2013.

In 2013, we randomly created 31 sampling points that ran the length of the riparian area in City Creek Canyon from the entrance gate in the lower canyon and 7.5km into the upper canyon (Figure 1). Points were located within the riparian area on slopes of less than 13% and within 40m of the stream. To ensure independence between sampling areas, points were separated by a distance of at least 250m.



***Citizen Scientist Participation and Training***

We recruited a total of 14 participants to complete breeding bird surveys in City Creek Canyon. These participants were trained as part of Tracy Aviary’s Citizen Science Program, which is made up of 32 participants that conducted breeding bird surveys in 8 project locations throughout Salt Lake County. Training for the Citizen Science Program began in late February and continued through the survey season. We provided 6 indoor trainings (2-3 hours), 35 field trainings (2-5 hours), and we required citizen scientists to attend at least one indoor training and 4-6 field trainings. Before citizen scientists conducted surveys, they were required to pass two tests: a bird identification by sound test, where they had to identify the calls and songs of 30 of the most common birds, and a field survey test, where they had to successfully complete a series of

**Figure 1.** Map of bird survey points location in upper, middle, and lower City Creek Canyon.

Mock breeding bird surveys.

A total of 28 people participating in non-breeding surveys in City Creek Canyon. Many of these participants were part of Tracy Aviary’s Citizen Science Program, but other members of the public were also invited to attend. In addition to Tracy Aviary volunteers, we were joined by Utah Division of Wildlife Resources Biologists, University students, other Tracy Aviary staff, and friends/family of our citizen scientist volunteers.

***Surveys***

We conducted 4 breeding bird surveys during the 2016 breeding season, between May 28th and July 16th. Breeding bird surveys were conducted by six people divided into three teams of two. Each team was assigned 10 or 11 of the 31 survey points, and conducted unlimited radius point count surveys at these locations between sunrise and approximately 10am. The ‘observer’ of the team identified all birds seen and heard at the point during a six minute point count, and noted the exact distance using a laser rangefinder, direction, detection type (visual, singing, calling, other), and any other information they could determine about the bird (age, sex, etc.). The ‘recorder’ of the team wrote all of the observations on the datasheet, noted the minute during the survey (1-6) when the observation was made, and also noted weather and site variables, such as wind speed, cloud cover, ambient noise levels, and presence of water/snow.

In addition to the breeding bird surveys conducted in the spring and summer, we also completed monthly non-breeding surveys to better understand the birds that use the area year-round. These surveys were conducted once a month in January, February, March, April, August, September, and October (and they will continue throughout the winter). During the non-breeding surveys, at least one trained Tracy Aviary staff person lead groups of participants on a walk through the sampling area, and noted any birds seen and heard during that time. Participants were allowed to point out and identify birds, but they survey leader made the final decision for identification of the bird species and the number of individuals present. The survey leader also noted weather variables, the total amount of time, and the total distance traveled during the survey.

***Data Analysis***

We used point count data to calculate species richness and the relative abundance, or total number of observations, for each species. We also examined the community composition, and assessed how the species types and community changed throughout the year and along the elevational gradient through the study area.

We compared species richness and relative abundance during the breeding season of 2016 to 2015, 2014, and 2013. We highlight new species detected during 2016, and species that may be good indicators of the canyon’s ecosystem health.

**Results**

***Breeding Bird Surveys***

From May 28 to July 16, 2016, we had 1,214 bird observations and detected 54 species (Table 1) during the 4 breeding bird survey visits. These numbers are comparable to our past efforts; in 2015, we had 4 visits with 1014 detections of 52 species, in 2014 we had 7 visits with 1,988 observations of 58 species, and in 2013 we had 8 visits with 1,921 observations of 52 species.

**Table 1:** Complete list of species and the total number of observations for each species during breeding season surveys in 2013, 2014, 2015, and 2016. Years where there were no observations of the species are highlighted in gray. *Note: there were a different number of survey visits during each year, so the total observations are not directly comparable and they do not represent the abundance of these species in the area.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species** | **Number of Observations\*** | | | |
|  | **2013** | **2014** | **2015** | **2016** |
| Warbling Vireo | 257 | 219 | 95 | 141 |
| Yellow Warbler | 233 | 245 | 145 | 115 |
| American Robin | 92 | 223 | 73 | 113 |
| Spotted Towhee | 151 | 167 | 81 | 104 |
| Lazuli Bunting | 167 | 179 | 117 | 92 |
| Song Sparrow | 82 | 77 | 32 | 69 |
| Mourning Dove | 46 | 50 | 26 | 66 |
| Swainson’s Thrush | 91 | 69 | 47 | 65 |
| Cordilleran Flycatcher | 76 | 68 | 32 | 48 |
| Western Tanager | 95 | 66 | 44 | 40 |
| Black-capped Chickadee | 76 | 87 | 16 | 34 |
| MacGillivray’s Warbler | 86 | 50 | 24 | 34 |
| Chipping Sparrow | 29 | 57 | 34 | 27 |
| Black-headed Grosbeak | 63 | 24 | 41 | 24 |
| House Finch | 7 | 15 | 7 | 21 |
| Pine Siskin | 15 | 9 | 4 | 19 |
| Plumbeous Vireo | 5 | 25 | 9 | 14 |
| Broad-tailed Hummingbird | 21 | 38 | 7 | 12 |
| Peregrine Falcon | 0 | 0 | 0 | 12 |
| Lesser Goldfinch | 0 | 7 | 8 | 11 |
| Orange-crowned Warbler | 14 | 14 | 11 | 8 |
| Rock Pigeon | 0 | 0 | 0 | 8 |
| American Goldfinch | 0 | 4 | 4 | 7 |
| Black-chinned Hummingbird | 5 | 22 | 6 | 6 |
| Wild Turkey | 3 | 1 | 3 | 6 |
| American Dipper | 9 | 12 | 10 | 5 |
| Dusky Flycatcher | 9 | 6 | 4 | 5 |
| Red-tailed Hawk | 4 | 4 | 2 | 5 |
| Cedar Waxwing | 0 | 0 | 0 | 3 |
| Townsend’s Solitaire | 2 | 7 | 1 | 3 |
| Blue-gray Gnatcatcher | 0 | 8 | 4 | 2 |
| Fox Sparrow | 27 | 16 | 10 | 2 |
| Mallard | 1 | 7 | 7 | 2 |
| Mountain Chickadee | 10 | 25 | 5 | 2 |
| Northern Flicker | 8 | 11 | 6 | 2 |
| Pacific Wren | 0 | 0 | 1 | 2 |
| American Kestrel | 0 | 0 | 0 | 1 |
| Bullock’s Oriole | 0 | 0 | 2 | 1 |
| Cassin’s Finch | 0 | 0 | 1 | 1 |
| California Quail | 0 | 1 | 1 | 1 |
| Cooper’s Hawk | 1 | 6 | 1 | 1 |
| Downy Woodpecker | 2 | 5 | 1 | 1 |
| Green-tailed Towhee | 6 | 1 | 0 | 1 |
| Hammond’s Flycatcher | 1 | 8 | 2 | 1 |
| Hermit Thrush | 0 | 13 | 0 | 1 |
| Olive-sided Flycatcher | 0 | 0 | 0 | 1 |
| Red-breasted Nuthatch | 3 | 8 | 5 | 1 |
| Ruby-crowned Kinglet | 1 | 0 | 0 | 1 |
| Ruffed Grouse | 0 | 3 | 2 | 1 |
| Sharp-shinned Hawk | 0 | 0 | 1 | 1 |
| Steller’s Jay | 2 | 8 | 7 | 1 |
| Violet-green Swallow | 0 | 4 | 1 | 1 |
| White-breasted Nuthatch | 0 | 0 | 0 | 1 |
| Western Wood-pewee | 1 | 3 | 1 | 1 |
| Dark-eyed Junco | 2 | 3 | 7 | 0 |
| American Crow | 0 | 0 | 3 | 0 |
| Belted Kingfisher | 0 | 1 | 3 | 0 |
| Common Yellowthroat | 0 | 0 | 2 | 0 |
| Brown-headed Cowbird | 0 | 0 | 1 | 0 |
| Red Crossbill | 0 | 0 | 1 | 0 |
| Western (Woodhouse’s) Scrub-Jay | 1 | 4 | 1 | 0 |
| Virginia Warbler | 2 | 10 | 0 | 0 |
| Black-billed Magpie | 0 | 5 | 0 | 0 |
| Western Kingbird | 0 | 5 | 0 | 0 |
| Northern Rough-winged Swallow | 0 | 2 | 0 | 0 |
| Brown Creeper | 0 | 1 | 0 | 0 |
| Canada Warbler | 0 | 1 | 0 | 0 |
| Golden-crowned Kinglet | 0 | 1 | 0 | 0 |
| House Wren | 0 | 1 | 0 | 0 |
| Ruby-crowned Kinglet | 0 | 1 | 0 | 0 |
| Turkey Vulture | 0 | 1 | 0 | 0 |
| White-throated Swallow | 0 | 1 | 0 | 0 |
| Yellow-rumped Warbler | 1 | 1 | 0 | 0 |
| Common Raven | 2 | 0 | 0 | 0 |
| Yellow-breasted Chat | 2 | 0 | 0 | 0 |
| Wilson’s Warbler | 1 | 0 | 0 | 0 |

\**Note: there were a different number of survey visits during each year, so the total observations are not directly comparable and they do not represent the abundance of these species in the area.*

We had the most observations of Warbling Vireos (141 observations), Yellow Warblers (115), American Robins (113), Spotted Towhees (104), and Lazuli Buntings (92) (Figure 2). Although in a slightly different order, these birds were also the top five species of 2015 and 2014. In 2013, Western Tanager replaced American Robins in the top five species detected.

**Figure 2**. The top 10 species with the most observations during 2013-2016 and the total number of observations per visit.

Warbling Vireos were the most widespread species throughout the study area, and were detected at 87% of the sampling points. American Robins and Yellow Warblers were also widespread throughout the study area, and were detected at 84% of the sampling points.

A majority of the species that we detected were either those that are primarily associated with open woodlands (46%) or forests (39%) (Figure 3). The rest of the birds we detected were scrub species (6%), river/pond species (4%), urban species (4%) or cliff/rock species (2%).

**Figure 3.** The total number of species of different types of habitat guilds detected at each of the sampling points throughout City Creek Canyon.

***Species of Note from Breeding Bird Surveys***

During the 2016 breeding season, we had several observations of notable or new species that we detail below:

**Peregrine Falcons** – We had 12 observations of Peregrine Falcons in City Creek Canyon in 2016, which is the first time we have detected this species since we started doing surveys in the area. Multiple Peregrine Falcon individuals were observed in the lower canyon at points 26-29, and they appeared to be nesting. It is hypothesized that one of the Peregrine Falcons that used to nest in downtown Salt Lake City moved to this location and found another mate after its previous mate had died.

**Pacific Wren –** This year, we observed breeding Pacific Wrens at point 7 and point 9 in the upper canyon. This species appears to consistently use City Creek Canyon both during the breeding and non-breeding season; we have observed them since 2013 during non-breeding seasons, and we also had breeding-season observations in 2015. This species is an uncommon resident in the area (generally they breed much further north in the Pacific Northwest and Canada), so it is notable that we find them year-round in City Creek Canyon.

**American Dipper –** We detected American Dippers in the upper canyon (point 1) and middle canyon (points 13, 16, 17, and 18).This species is highly dependent on functioning riparian areas with healthy aquatic invertebrate communities, and its presence in the area could indicate the quality and health of the watershed.

**Olive-sided Flycatcher –** This flycatcher has had a cumulative decline of about 81% since 1966, and has been designated a Tri-National Concern species. This year is the first time we detected the Olive-sided Flycatcher in City Creek Canyon during the breeding season.

**Broad-tailed Hummingbird –** We regularly detected Broad-tailed Hummingbirds throughout the middle and lower canyon at points 8, 9, 12, 16, 20, 23, 28, 30, 31, and we have been observing them since 2013. This species is listed as a Utah Partners in Flight Priority Species because it is understudied and has declined 55% since 1966. It breeds in lowland riparian and mountain riparian areas, and, because they are found in the area consistently, City Creek appears to provide useful habitat for the species.

***Non-breeding Surveys***

During the monthly non-breeding surveys in January, February, March, April, August, September, and October of 2016, we detected 56 species (Table 2). Of these species, 22 were detected exclusively during the non-breeding surveys, making the total 2016 species count 76 different bird species.

**Table 2:** Species detected during non-breeding surveys in 2016, and the month or months in which they were detected.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **January** | **February** | **March** | **April** | **August** | **September** | **October** |
| American Dipper | X | X |  |  |  |  | X |
| American Goldfinch |  |  | X |  | X | X | X |
| American Kestrel |  | X |  |  |  |  |  |
| American Robin |  | X | X | X |  | X | X |
| Belted Kingfisher |  |  |  |  | X |  |  |
| Black-billed Magpie | X | X | X | X |  | X | X |
| Black-capped Chickadee | X | X | X | X | X | X | X |
| Blue-gray Gnatcatcher |  |  |  | X | X | X |  |
| Broad-tailed Hummingbird |  |  |  | X | X |  |  |
| Brown Creeper | X | X | X |  |  |  |  |
| California Quail |  |  | X |  |  |  |  |
| Canyon Wren | X |  |  | X | X | X |  |
| Cassin's Vireo |  |  |  |  | X |  |  |
| Chipping Sparrow |  |  |  | X |  |  |  |
| Chukar | X |  |  |  |  |  |  |
| Common Raven | X |  | X |  |  | X |  |
| Cooper's Hawk |  |  |  |  | X | X | X |
| Dark-eyed Junco | X | X | X |  |  | X | X |
| Downy Woodpecker |  |  |  | X | X | X |  |
| Dusky Flycatcher |  |  |  |  | X |  |  |
| Eurasian Collared-Dove |  |  | X |  |  |  |  |
| European Starling |  |  | X |  |  |  |  |
| Evening Grosbeak |  |  |  |  |  |  | X |

**Table 2** continued.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **January** | **February** | **March** | **April** | **August** | **September** | **October** |
| Golden Eagle | X |  | X |  |  |  |  |
| Gray-crowned Rosy-Finch | X |  |  |  |  |  |  |
| Hammond's Flycatcher |  |  |  |  |  | X |  |
| Hermit Thrush |  |  |  | X |  |  | X |
| House Finch |  | X | X | X | X | X | X |
| Lazuli Bunting |  |  |  | X | X |  |  |
| Lesser Goldfinch |  |  | X | X | X |  | X |
| Mallard | X | X | X | X | X | X |  |
| Mourning Dove |  |  |  | X |  |  |  |
| Nashville Warbler |  |  |  |  |  | X |  |
| Northern Flicker | X | X | X |  | X | X | X |
| Northern Goshawk |  |  |  | X |  |  |  |
| Orange-crowned Warbler |  |  |  | X |  |  |  |
| Pacific Wren | X |  |  |  |  |  | X |
| Peregrine Falcon |  |  |  | X |  |  |  |
| Plumbeous Vireo |  |  |  | X | X | X |  |
| Red-naped Sapsucker |  |  |  |  |  | X |  |
| Red-tailed Hawk | X | X | X | X | X |  |  |
| Rock Pigeon |  |  |  |  | X | X |  |
| Ruby-crowned Kinglet | X | X | X | X |  | X | X |
| Rufous Hummingbird |  |  |  |  | X |  |  |
| Sharp-shinned Hawk |  |  | X |  |  | X |  |
| Song Sparrow |  | X | X | X | X | X | X |
| Spotted Towhee |  |  | X | X | X | X |  |
| Turkey Vulture |  |  | X | X |  |  |  |
| Violet-green Swallow |  |  |  | X |  |  |  |
| Virginia's Warbler |  |  |  | X | X |  |  |
| Warbling Vireo |  |  |  |  | X |  |  |
| Western Meadowlark |  |  | X |  |  |  |  |
| Western Tanager |  |  |  |  | X |  |  |
| Western Wood-Pewee |  |  |  |  | X |  |  |
| Woodhouse's Scrub-Jay | X | X | X | X | X | X | X |
| Yellow-rumped Warbler |  |  |  | X |  | X | X |

***Species of Note from Non-breeding Surveys***

During 2016 non-breeding surveys, we had several observations of notable or new species that we detail below:

**Golden Eagle –** We observed Golden Eagles in the rugged cliff area at approximately mile marker 1. Although their presence in the canyon is inconsistent, it is interesting to see these large raptors using the area because they indicate healthy prey population and cliff habitat.

**Evening Grosbeak –** Populations for this species have been dropping steeply since 1966, and they were listed on the 2016 State of North America’s Birds Watch List.

**Northern Goshawk –** Northern Goshawks are widespread but uncommon, and their populations have declined about 21% since 1966. They are very secretive and prefer large and relatively intact mature forest patches, so their presence indicates sufficiently healthy and large forest habitat in the area.

**Virginia’s Warbler -** This species is listed as a Utah Partners in Flight Priority Species because they are understudied and the ecology, threats, management requirements are largely unknown. They often use riparian areas during migration, so City Creek Canyon appears to be a good habitat resource for these birds as they move through the area.

**Conclusion**

City Creek Canyon supports a diverse bird community, and provides important habitat for migratory and resident bird species. The species richness of the area is comparable, and even higher, than yearly counts of species in other riparian areas in Northern Utah. For example, in a study by Parrish et al. (2007) of Utah’s riparian birds surveyed during May to August in 1992-2005, the sites near Ogden, Provo, Logan, and Salt Lake City had an average of 29 to 56 species detected per year. We detected 54 species during the 2016 breeding season. At a broad level, the community composition also appears to be similar to other riparian areas in the state; the four most commonly observed species at City Creek Canyon mirrored the most common species statewide: the American Robin, Spotted Towhee, Warbling Vireo, and Yellow Warbler.

We also detected several species of conservation concern during both the breeding and non-breeding surveys, indicating the importance of this area as wildlife habitat. We detected two of the 24 Partners in Flight Utah Avian Conservation Strategy priority species: the Broad-tailed Hummingbird and Virginia’s Warbler (Parrish et al. 2002), and two of the seven USDA Forest Service Species of concern: the Northern Goshawk and Peregrine Falcon (Utah Steering Committee 2005). We also detected five of the 37 Great Basin Ecoregional Conservation Blueprint priority species, seven of the 29 Colorado Plateau Ecoregional Conservation Plan (TNC) priority species, and two of the 23 State of Utah Sensitive Species List (1998) (Utah Steering Committee 2005).

Other than species of conservation concern, it is important to note the presence of birds that depend heavily on riparian areas in order to understand the overall watershed health of City Creek Canyon. The presence of a suite of riparian obligate and dependent birds can indicate high quality vegetation, water, and insect communities within a riparian area (Young et al. 2013). We compared the bird community in City Creek Canyon to a list of riparian obligate species, or birds that place >90% of nests in riparian vegetation, or spend 90% of their time in riparian areas during the breeding season, and riparian dependent species, or birds that place 60-90% of their nests in riparian vegetation and spend 60-90% of their time in riparian areas during the breeding season (Bureau of Land Management 1998). City Creek’s breeding bird community contained a high proportion of riparian obligate and dependent birds commonly found in Salt Lake County: with 4 of the 9 obligate riparian species in Salt Lake County, and 13 of the 19 riparian dependent species found in Salt Lake County.

While City Creek Canyon appears to provide good habitat for many species and support a diverse community of riparian birds, our results also identify some threats that the bird community faces. For example, an examination of the representation of birds from different habitat guilds throughout the canyon (Figure 3) shows the presence of urban-adapted birds (e.g., Rock Pigeons, House Finches) in the lower canyon up to sampling point #16. In urban areas, human-sensitive species are often outcompeted and replaced by a small group of urban-adapted species (Rottenborn 1999). Given the presence of these species in lower and middle City Creek Canyon, the nearby developed area at the urban interface appears to be impacting the bird community. The canyon also experiences heavy recreational use, which can negatively impact certain birds and groups of species, ultimately changing the community composition in a highly used area (Kangas et al. 2010). Another looming threat is climate change, which is predicted to imperil nearly half the bird species in the United States in the next 100 years and have countless unknown impacts (National Audubon Society 2014). Continued monitoring in City Creek Canyon will provide important information about the bird communities over the long-term as they face future changes in the climate and environment.

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