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Natural Resource Stewardship and Science

Wetland Breeding Bird Survey

Cuyahoga Valley National Park, 2012

Natural Resource Report NPS/HTLN/NRR—2018/1632

ON THIS PAGE
Photograph of an immature Red-tailed Hawk (*Buteo jamaicencis*) surveying the forest in spring.
Photography by NPS/DOUG MARCUM

ON THE COVER
Photograph of a Red-winged Blackbird (*Agelauis phoeniceus*) nest with a hatchling.
Photography by NPS/DOUG MARCUM

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May 2018

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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Please cite this publication as:

Marcum, D. J., and S. N. Bingham. 2018. Wetland breeding bird survey: Cuyahoga Valley National Park, 2012. Natural Resource Report NPS/HTLN/NRR—2018/1632. National Park Service, Fort Collins, Colorado.

NPS 644/145001, May 2018

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Abstract

The objective of this work was to provide foundational information related to avian communities and their use of important wetland areas in Cuyahoga Valley National Park (NP), Ohio. Breeding bird surveys were performed at 22 wetland locations throughout the park from late May through July 2012. All birds detected during this time were recorded and assigned a code based on observed breeding behavior. Breeding codes were categorized according to the strength of evidence for breeding: *confirmed*, *probable*, *possible*, and *not likely*. Sixty-six species were documented during timed surveys; 24 were confirmed as breeding, 24 as probable, 19 as possible, and 3 were not likely breeding at these sites. A few species of note are discussed briefly related to their use of wetland habitat in Cuyahoga Valley NP. We also make recommendations for future surveys that will enhance our understanding of breeding birds and their use of wetland areas in the park.

Acknowledgments

Thanks to Dave Peitz and Craig Young with the Heartland Network Inventory and Monitoring Program, who provided review of previous versions of this report.

Introduction

In Cuyahoga Valley National Park (NP), Ohio, wetlands are a prominent natural resource that comprise roughly 6% of the total surface area of the park. Wetlands are studied both hydrologically and botanically to track changes in their health over time (Bingham et al. 2016). The Ohio Rapid Assessment Method for Wetlands (ORAM; Mack 2001), the Vegetative Index of Biotic Integrity (VIBI; Mack and Gara 2015), and water quality monitoring are useful tools for the long-term monitoring program. Wildlife surveys can help supplement these assessments by providing a direct and valuable measurement of biological health.

Our initial goal in 2012 was to generate a list of birds that occur and likely breed within a set of seven wetland complexes designated as wetlands of management concern (WOMC) by the Resource Management division at Cuyahoga Valley NP and a set of eight reference wetlands selected by the Heartland Network wetland monitoring team. The WOMC are composed of 15 individual wetlands in the park that are intensively surveyed for the distinct purpose of diagnosing problems related to high visitation, flooding, protection of rare plants and animals, and restoration of disturbed sites (Bingham et al. 2016). Reference wetlands reflect our perceptions of a high quality, least-disturbed example of a particular hydrogeomorphic (HGM) class. Since these sites have been the focus of various ecological surveys already, the value and application of a wildlife-focused dataset is increased.

Two male yellow warblers (Dendroica petechia) battle over territory in spring. NPS/DOUG MARCUM

Methods

Sites

Breeding bird surveys were conducted at 22 locations, including 18 within the WOMC and four at reference sites (Table 1; Figure 1). These 22 point locations were already visited regularly as part of the existing wetland monitoring program to collect water quality data at wells with persistent water tables. We streamlined the process by using these wells as the centroids for the breeding bird surveys. Well locations were originally selected using random points within certain plant community and HGM classes (Bingham et al. 2016). Larger wetland complexes with a variety of water sources and plant community types have up to five wells; therefore they have multiple potential bird survey point locations. Topographic and hydrologic characteristics partition the park's wetlands into four major HGM classes (i.e., riverine, slope, depressional, and lacustrine fringe), which are defined by three fundamental factors: geomorphic setting, water source, and hydrodynamics (Bingham et al. 2016). Breeding bird survey points span all of these HGM classes. Some survey points were located less than 500 m from each other, which is a deviation from the Ohio Breeding Bird Atlas protocol (Ohio State University 2010). However, this deviation should not affect analysis of the data. Using these locations was convenient for field personnel.

Survey Methods

In the summer of 2012, breeding bird surveys were conducted throughout the WOMC (Figure 1). Surveys occurred between the hours of 8:00 AM until 3:00 PM from late May through July. The survey protocol followed Ohio Breeding Bird Atlas methodology (Rodewald et al. 2016) and consisted of three-minute point counts conducted at each site. Point counts differed from the traditional variable circular-plot method (Reynolds et al. 1980) by not recording abundance or distance (which allows for the estimation of population densities). Counts occurred within designated "safe dates" for all birds (see Ohio Breeding Bird Atlas II: Atlas Volunteer Handbook for safe dates; also see Table 3 in the Results section). Safe dates are designated for each species based on

Table 1. Wetlands of management concern (WOMC) and reference sites included in the 2012 Breeding Bird Survey at Cuyahoga Valley National Park, Ohio. Survey points, hydrogeomorphic (HGM) class (SP = slope, DP = depression, RH = riverine headwater, RM = riverine mainstem, and IMP = Impoundment), wetland size (acres), and dates of each visit are also given.

Wetland ID	Wetland Name	Points	HGM	Acres	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5
365	Beaver Marsh	4	RM	67.95	5/30	6/11	6/26[b]	7/17[b]	7/27
977	Fawn Pond	4	SP	136.21	5/29	6/11	6/25	7/13	7/20
526	Stumpy Basin	3	SP	30.70	6/6[b]	6/14[b]	–	–	–
241	Virginia Kendall Lake	2	SP	5.66	6/5	6/13	7/20[b]	–	–
242	Virginia Kendall Lake	2	SP	8.44	6/5[b]	6/13	7/20	–	–
968	Pleasant Valley	1	IMP	15.04	6/12	7/3[b]	7/13	7/20	–
1047	Pleasant Valley	1	RM	13.65	6/12[b]	7/3	7/13	7/20	–
1079	Rockside	1	DP	6.42	6/12	7/3	7/13	–	–
554	*Columbia*[a]	1	SP	2.08	6/6	6/14	6/25	7/20	–
398	*Snowville*[a]	1	RH	10.66	6/13[b]	6/25	7/24[b]	–	–
683	*Boston Mills*[a]	1	DP	1.61	6/13[b]	7/3	7/13[b]	–	–
124	*Langes*[a]	1	DP	0.31	6/14	7/17	–	–	–

[a] reference sites (also in *italics*)
[b] survey was completed before 10:00 AM.

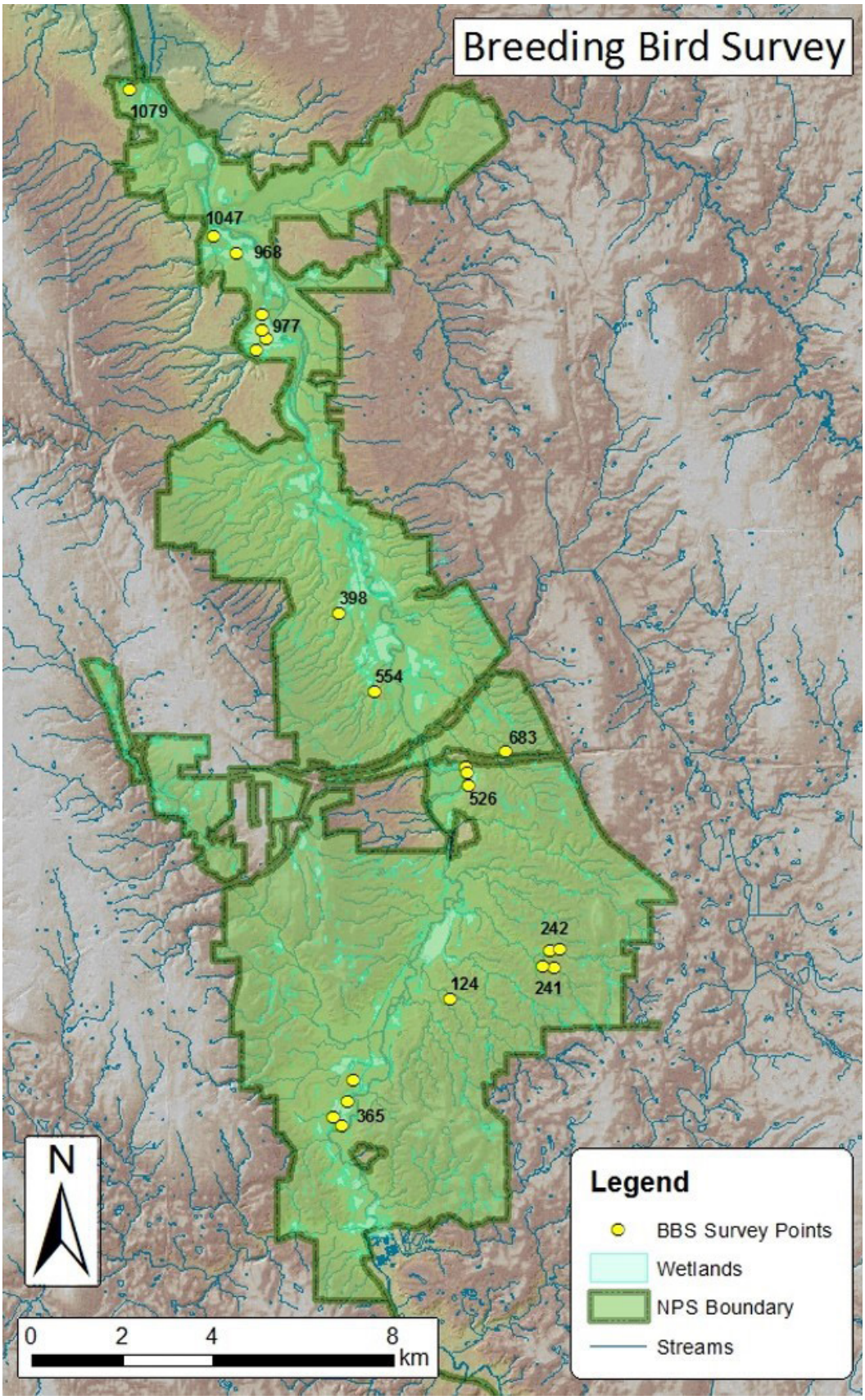

Figure 1. Map displaying the locations of 22 breeding bird survey (BBS) points in wetlands of Cuyahoga Valley National Park, Ohio.

local breeding records and represent dates at which migrants should have moved on (i.e. if a species is present during safe dates it will likely stay for the summer). Two sites were visited prior to safe dates (see May dates in Table 1), but breeding behavior was not inferred during these visits. There were two to five site visits for each survey point with at least seven days between visits. The number of site visits was determined by the water quality monitoring schedule.

After arriving at a survey point and allowing birds to acclimate to the presence of a human, the observer initiated the three-minute period of listening and watching for birds. All species observed during this period were recorded. Any activity related to breeding (e.g., singing, territorial behavior, carrying material, etc.) was classified using breeding codes (Rodewald et al. 2016; Table 2). Evidence of breeding behavior for each species was compiled throughout the duration of the surveys.

Data analysis

To analyze these data, we calculated frequency of occurrence for each species across the 22 points. An occurrence during any of the field visits to that point was coded as presence. Number of observations (visits) made and species documented were totaled for each point. Percentage of new species was calculated for each subsequent visit to each point. Incidental observations of birds and breeding behaviors were also made while navigating to points. These observations may have been made outside of wetland areas and were not included in calculations of frequency.

Table 2. Breeding codes used for birds recorded during surveys in wetlands in Cuyahoga Valley National Park, Ohio in 2012. Breeding codes are categorized according to the strength of evidence for breeding: "confirmed," "probable," "possible," and "unlikely."

Category	Breeding Code	Description
Confirmed	UN	Used nest; only built during the atlas period.
	CM	Carrying nest material, nest site not observed.
	NB	Nest building observed.
	DD	Distraction display or dive-bombing humans.
	PE	Gravid condition or fluid filled brood patch (bird in hand only).
	CF	Carrying food or fecal sac.
	ON	Occupied nest, contents not observed.
	NE	Nest with eggs or identifiable eggshells below nest.
	NY	Nest with young.
	FY	Fledged young (incapable of sustained flight).
Probable	PO	Pair interacting non-aggressively within safe dates/habitat.
	T1	Territorial behavior; aggressive behavior between same species.
	T7	Singing male present at same location 7 or more days apart.
	AB	Agitated behavior of adult suggesting presence of young/nest.
	CC	Courtship behavior or copulation.
	VS	Repeatedly visiting probable nest site (for cavity nesters).
Possible	OS	Observed within safe dates in a suitable breeding habitat.
Not likely	X	Observed within safe dates, but not in appropriate breeding habitat.

Results

During the survey, we documented 66 bird species across 12 wetlands (Table 3). An additional 16 species were detected while walking to and between wetland sites. During point counts, 20 (30.3%) species were confirmed to be breeding at sites, while another 24 (36.4%) species were probable breeders based on behavioral observations. Nineteen (28.8%) of the remaining species were observed within suitable habitat and safe dates for breeding although no direct behavioral observations supported breeding. Only three (4.5%) species were suspected to be non-breeding migrants.

American goldfinch (*Spinus tristas*) and song sparrow (*Melospiza melodia*) were encountered at the most survey points (81.8%). In all, 11 (16.7%) species were detected at 50% or more of the wetland sites (Table 3). Species counts were highest at Beaver Marsh, where surveys occurred most frequently. Number of species documented was positively correlated with the number of visits made to each point ($r = 0.548$, $p = 0.008$; Table 4). Surveys at seven locations (31.8%) provided documentation of over 20 bird species each. Table 5 displays percentages of new species detected during subsequent visits to each point, and illustrates the importance of multiple visits.For sites visited four or five times, only 36-64% of the species were observed on the first visit. For sites visited five times, 7-18% of the species were not observed until the fifth visit.

Table 3. Species documented during wetlands breeding bird surveys in Cuyahoga Valley National Park, Ohio in 2012, ordered by breeding status and then frequency. Status is based on field observation of breeding behaviors (see Table 2 for breeding codes). Frequency is determined by the proportion of points (n=22) at which each species was detected. "Safe" indicates the date at which each species is likely to be settled to summering grounds (Rodewald et al. 2016). "AOU" indicates the four-letter code for each species. Birds with 0% frequency were detected outside three-minute survey periods.

Common Name	Scientific Name	AOU	Safe	Breeding Code	Status	Frequency
Song Sparrow	*Melospiza melodia*	SOSP	5/5	CF/FY	Confirmed	82%
Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	5/1	CF	Confirmed	77%
American Robin	*Turdis migratorius*	AMRO	5/1	CF	Confirmed	73%
Blue Jay	*Cyanocitta cristata*	BLJA	6/1	FY	Confirmed	64%
Cedar Waxwing	*Bombycilla cedrorum*	CEDW	6/5	ON	Confirmed	50%
Gray Catbird	*Dumatella carolinensis*	GRCA	5/25	CF/FY	Confirmed	45%
Northern Flicker	*Coloptes auratus*	YSFL	5/15	FY	Confirmed	45%
White-breasted Nuthatch	*Sitta carolinensis*	WBNU	5/1	CF/FY	Confirmed	45%
Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	3/15	FY	Confirmed	41%
Common Grackle	*Quiscalus quiscula*	COGR	4/15	ON/CF	Confirmed	36%
Tree Swallow	*Tachycinetta bicolor*	TRES	5/20	ON	Confirmed	36%
Great-crested Flycatcher	*Myiarchus crinitus*	GCFL	5/25	CM	Confirmed	32%
Baltimore Oriole	*Icterus galbula*	BAOR	5/25	FY/CF	Confirmed	32%
Pileated Woodpecker	*Dryocopus pileatus*	PIWO	3/15	ON	Confirmed	27%
American Crow	*Corvus brachyrhynchos*	AMCR	5/1	FY	Confirmed	23%
Red-tailed Hawk	*Buteo jamaicencis*	RTHA	5/1	FY	Confirmed	23%
Brown-headed Cowbird	*Molothrus ater*	BHCO	5/10	FY	Confirmed	14%
Ruby-throated Hummingbird	*Archilochus colubris*	RTHU	6/1	CM	Confirmed	14%
Blue-gray Gnatcatcher	*Polioptila caerulea*	BGGN	5/15	CM	Confirmed	9%
Common Starling	*Sturna vulgaris*	COST	4/15	ON	Confirmed	9%
Eastern Phoebe	*Sayornis phoebe*	EAPH	5/1	ON	Confirmed	0%

Table 3 (continued). Species documented during wetlands breeding bird surveys in Cuyahoga Valley National Park, Ohio in 2012, ordered by breeding status and then frequency. Status is based on field observation of breeding behaviors (see Table 2 for breeding codes). Frequency is determined by the proportion of points (n=22) at which each species was detected. "Safe" indicates the date at which each species is likely to be settled to summering grounds (Rodewald et al. 2016). "AOU" indicates the four-letter code for each species. Birds with 0% frequency were detected outside three-minute survey periods.

Common Name	Scientific Name	AOU	Safe	Breeding Code	Status	Frequency
Peregrine Falcon	*Falco peregrinus*	PEFA	5/15	ON	Confirmed	0%
Rock Dove	*Columba livia*	RODU	1/1	CM	Confirmed	0%
Wood Duck	*Aix sponsa*	WODU	5/1	FY	Confirmed	0%
American Goldfinch	*Spinus tristas*	AMGO	6/1	PO	Probable	82%
Northern Cardinal	*Cardinalis cardinalis*	NOCA	3/15	T7	Probable	77%
Common Yellowthroat	*Geothlypis trichas*	COYE	5/25	T7	Probable	73%
Eastern Wood Pewee	*Contopes virens*	EAWP	6/1	T7	Probable	59%
Black-capped Chickadee	*Poecile atricapillus*	BCCH	4/15	T7	Probable	55%
Tufted Titmouse	*Baeolophus bicolor*	EATI	3/15	T7	Probable	55%
Swamp Sparrow	*Melospiza georgiana*	SWSP	5/5	T7	Probable	45%
Yellow Warbler	*Dendroides petechia*	YEWA	5/25	T1	Probable	45%
Mourning Dove	*Zenaida macroura*	MODO	5/1	PO/T7	Probable	41%
Warbling Vireo	*Vireo gilvus*	WAVI	6/1	PO/AB	Probable	36%
Downy Woodpecker	*Picoides pubescens*	DOWO	3/15	PO	Probable	27%
Yellow-throated Vireo	*Vireo flavifrons*	YTVI	6/1	T7	Probable	27%
Indigo Bunting	*Passerina cyanea*	INBU	5/25	T7	Probable	23%
Red-eyed Vireo	*Vireo olivaceous*	REVI	6/1	T7	Probable	23%
Willow Flycatcher	*Empidonax traillii*	WIFL	6/5	T7	Probable	23%
Eastern Bluebird	*Sialias sialias*	EABL	5/1	T7	Probable	18%
Yellow-billed Cuckoo	*Coccyzus erythropthalmus*	YBCU	6/5	T1	Probable	18%
Acadian Flycatcher	*Empidonax virescens*	ACFL	6/1	T7	Probable	14%
House Wren	*Troglodytes aedon*	HOWR	5/25	T7	Probable	14%
Red-shouldered Hawk	*Buteo lineatus*	RSHA	5/1	PO	Probable	14%
Scarlet Tanager	*Piranga olivacea*	SCTA	5/25	T7	Probable	14%
Barn Swallow	*Hirundo rustica*	BARS	5/25	CC	Probable	9%
Red-headed Woodpecker	*Melanepres erythrocephalus*	RHWO	5/25	T7	Probable	9%
Dark-eyed Junco	*Junco hyemalis*	DEJU	6/1	T7	Probable	5%
Belted Kingfisher	*Ceryle alcyon*	BEKI	4/15	OS	Possible	14%
Carolina Wren	*Thryothorus ludovicianus*	CARW	4/1	OS	Possible	14%
Hooded Warbler	*Wilsonia citrina*	HOWA	5/25	OS	Possible	14%
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	6/1	OS	Possible	14%
American Redstart	*Setophaga ruticilla*	AMRE	6/1	OS	Possible	9%
Brown Creeper	*Certhia americana*	BRCR	5/15	OS	Possible	9%
Marsh Wren	*Cistothorus palustris*	MAWR	5/25	OS	Possible	9%
Veery	*Catharus fuscescens*	VEER	6/5	OS	Possible	9%
Wood Thrush	*Hylocichla mustelina*	WOTH	5/25	OS	Possible	9%

Table 3 (continued). Species documented during wetlands breeding bird surveys in Cuyahoga Valley National Park, Ohio in 2012, ordered by breeding status and then frequency. Status is based on field observation of breeding behaviors (see Table 2 for breeding codes). Frequency is determined by the proportion of points (n=22) at which each species was detected. "Safe" indicates the date at which each species is likely to be settled to summering grounds (Rodewald et al. 2016). "AOU" indicates the four-letter code for each species. Birds with 0% frequency were detected outside three-minute survey periods.

Common Name	Scientific Name	AOU	Safe	Breeding Code	Status	Frequency
American Kestrel	*Falco sparverius*	AMKE	5/15	OS	Possible	5%
Blue-winged Warbler	*Vermivora pinus*	BWWA	5/25	OS	Possible	5%
Canada Goose	*Branta canadensis*	CAGO	5/1	OS	Possible	5%
Chestnut-sided Warbler	*Dendroica pensylvanica*	CSWA	6/1	OS	Possible	5%
Chipping Sparrow	*Spizella passerina*	CHSP	5/20	OS	Possible	5%
Eastern Kingbird	*Tyrannus tyrannus*	EAKI	5/25	OS	Possible	5%
House Sparrow	*Passer domesticus*	HOSP	2/1	OS	Possible	5%
Killdeer	*Charadrius vociferus*	KILL	4/20	OS	Possible	5%
Mallard	*Anas platyrhynchos*	MALL	5/1	OS	Possible	5%
Yellow-throated Warbler	*Dendroica dominica*	YTWA	5/15	OS	Possible	5%
American Woodcock	*Scolopax minor*	AMWO	4/10	OS	Possible	0%
Broad-winged Hawk	*Buteo platypterus*	BWHA	6/1	OS	Possible	0%
Eastern Towhee	*Pipilo erythrophthalmus*	EATO	5/20	OS	Possible	0%
Field Sparrow	*Spizella pusilla*	FISP	5/15	OS	Possible	0%
Green Heron	*Butorides virescens*	GRHE	5/20	OS	Possible	0%
House Finch	*Carpodacus mexicanus*	HOFI	5/1	OS	Possible	0%
Louisiana Waterthrush	*Seiurus noveboracensis*	LOWA	5/1	OS	Possible	0%
Northern Mockingbird	*Mimus polyglottos*	NOMO	5/10	OS	Possible	0%
Orchard Oriole	*Icterus spurius*	OROR	6/1	OS	Possible	0%
Spotted Sandpiper	*Actitus macularia*	SPSA	6/1	OS	Possible	0%
White-eyed Vireo	*Vireo griseus*	WEVI	5/25	OS	Possible	0%
Great Blue Heron	*Ardea herodias*	GBHE	5/20	X	Not Likely	18%
Turkey Vulture	*Cathartes aura*	TUVU	5/1	X	Not Likely	14%
Chimney Swift	*Chaetura pelagica*	CHSW	5/25	X	Not Likely	5%
Lincoln's Sparrow	*Melospiza lincolnii*	LISP	N/A	X	Not Likely	0%

Table 4. Summary of 2012 wetland breeding bird survey effort in Cuyahoga Valley National Park, Ohio. Uneven sampling occurred between sites (difference in number and time of visits). "Confirmed" and "Probable" breeding status are derived from observed behaviors described by Ohio Breeding Bird Atlas II methodology (Rodewald et al. 2016). "Other" statuses largely consist of species recorded with "possible" breeding behavior while "not likely" was only logged for a handful of observations.

Wetland ID	Point	Visits	# Species Confirmed	# Species Probable	# Species Other	Total # Species
365	BM2	5	7	2	18	27
365	BM3	5	0	2	22	24
365	BM4	5	2	2	20	24
977	FP4	5	3	6	11	20
365	BM6	5	0	2	11	13
977	FP3	4	1	5	21	27
977	FP2	4	0	4	18	22
1047	PV1047	4	0	1	20	21
977	FP5	4	3	5	11	19
554	554	4	1	8	5	14
968	PV968	4	0	1	10	11
242	VK1	3	0	3	17	20
398	398	3	2	2	13	17
241	VK4	3	2	2	13	17
242	VK2	3	0	3	12	15
241	VK3	3	0	1	14	15
683	683	3	1	5	5	11
1079	RS1079	3	0	4	7	11
526	SB3	2	1	0	19	20
526	SB2	2	0	1	18	19
124	124	2	0	3	7	10
526	SB1	2	2	1	7	10

Table 5. New species detected during subsequent visits to 22 wetland points in Cuyahoga Valley National Park, Ohio. Percentages represent the proportion of new species added each visit in relation to the total number of species documented at each point. Visits varied by time and date for each point.

Wetland ID	Point	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5
365	BM2	37.0%	25.9%	11.1%	7.4%	18.5%
365	BM3	45.8%	12.5%	25.0%	8.3%	8.3%
365	BM4	37.5%	12.5%	25.0%	12.5%	12.5%
977	FP4	55.0%	25.0%	10.0%	0.0%	10.0%
365	BM6	53.8%	23.1%	7.7%	7.7%	7.7%
977	FP3	55.6%	37.0%	0.0%	7.4%	N/A
977	FP2	40.9%	18.2%	36.4%	4.5%	N/A
1047	PV1047	57.1%	28.6%	0.0%	14.3%	N/A
977	FP5	57.9%	5.3%	10.5%	26.3%	N/A
554	554	64.3%	14.3%	7.1%	14.3%	N/A
968	PV968	36.4%	36.4%	0.0%	27.3%	N/A
242	VK1	80.0%	15.0%	5.0%	N/A	N/A
398	398	64.7%	23.5%	11.8%	N/A	N/A
241	VK4	29.4%	52.9%	17.6%	N/A	N/A
242	VK2	46.7%	26.7%	26.7%	N/A	N/A
241	VK3	53.3%	20.0%	26.7%	N/A	N/A
683	683	54.5%	45.5%	N/A	N/A	N/A
1079	RS1079	72.7%	27.3%	N/A	N/A	N/A
526	SB3	65.0%	35.0%	N/A	N/A	N/A
526	SB2	63.2%	36.8%	N/A	N/A	N/A
124	124	80.0%	20.0%	N/A	N/A	N/A
526	SB1	80.0%	20.0%	N/A	N/A	N/A

Discussion

The wetland areas sampled in this study included nearly two-thirds of the birds known to nest at Cuyahoga Valley NP and surrounding lands (Greater Akron Audubon Society 2017). Wetlands can provide unique foraging and nesting habitats (Stewart 1996; Sheehan and Master 2010). The birds encountered in this survey included species that usually breed in wetlands such as swamp sparrow (*Melospiza georgiana*) and red-winged blackbird (*Agelaius phoeniceus*). Other species, including the yellow warbler (*Dendroica petechia*) and Baltimore oriole (*Icterus galbula*) are typically found around wetlands but do not nest in them exclusively. Because our surveys included upland habitat in the vicinity of the wetlands, we detected generalist species as well, such as blue jay (*Cyanocitta cristatta*) and gray catbird (*Dumetella carolinensis*; McCormac and Kennedy 2004; Rodewald et al. 2016).

Species of Note

Some of the birds detected during this survey are considered to be of note due to their relative rarity in the region during the breeding season. Brown creeper (*Certhia americana*) was heard singing at two sites: Virginia Kendall Lake (VK1) and Langes (124). In both cases, each bird was heard in an upland slope forest; neither bird was confirmed as nesting. Brown creepers require exfoliating tree bark in which they build their nests (McCormac and Kennedy 2004). Wetlands at Cuyahoga Valley NP often host dead standing trees or live trees, such as hickories (*Carya* spp.), that offer this habitat requirement. Brown creepers are generally considered forest-interior species that rely on mature forests and are found to be sensitive to forest fragmentation (Poulin et al. 2013). As an urban park, Cuyahoga Valley NP suffers from fragmentation, so confirmation of breeding for

Bridle trail along Langes Run in Cuyahoga Valley National Park, Ohio in spring. NPS/DOUG MARCUM

this species would suggest that the park plays a role in providing important habitat for birds with specialized breeding requirements.

The marsh wren (*Cistothorus palustris*), an Ohio-listed "species of concern" (Ohio Division of Wildlife 2016), is a possible breeder from this study. Marsh wrens rely on large emergent marshes with dense vegetation for nesting (Rodewald et al 2016.). These birds typically prefer cattail (*Typha* spp.). Two marsh wrens were found during this survey at the Pleasant Valley Wetland Complex (PV968) and Rockside (1079), but neither was confirmed as nesting. Interestingly, these two sites were both wetland mitigation sites that are essentially shallow ponds for much of the year with large cattail marsh components. Despite the poor ecological condition of the Pleasant Valley Wetland Complex as measured by the Vegetation Index of Biotic Integrity (VIBI), these mitigation wetlands are capable of hosting an Ohio "species of concern." This clearly adds value to their often unimpressive reputation and suggests these ponded habitats may have regional importance for wildlife. Additional marsh birds such as rails, grebes, and bitterns rely on dense emergent vegetation that is often provided by cattails for breeding as well (Rodewald et al. 2016). Previous marsh monitoring surveys at the Pleasant Valley Wetland Complex have produced records for some of these species (unpublished data).

Dark-eyed junco (*Junco hyemalis*), a third species of note, is a northern species that breeds locally in some cooler microclimates of Northeast Ohio (Rodewald et al. 2016). One bird was documented as a probable nester since it maintained a territory for over seven days and was observed counter-singing with another male nearby. We observed this bird at Columbia Run (554), a site that contains ample seeps within deep valleys. The landscape here provides the cooler microclimate that is more typical of northern forests. Further investigation would likely provide confirmation of breeding, as Cuyahoga Valley NP is at the southern extent of the defined breeding range for dark-eyed junco in the state (Rodewald et al. 2016). As an edge of range species in Cuyahoga Valley NP, dark-eyed junco breeding incidence may serve as an indicator of climate change impacts to wildlife.

Suggestions for Future Studies

Bird surveys took place largely from June through July and counts often occurred during less than optimal times during the day such as the afternoon (Table 1). Because many birds observe periods of relative inactivity during the middle of the day, our detection rates may have been lower than for early morning surveys (Robbins 1981; Lynch 1995). Future surveys should be conducted during optimal morning hours.

Additionally, certain marsh birds (rails, grebes etc.) typically breed earlier in the year than songbirds and become quiet and shy while they are attending eggs or young (Peterjohn and Zimmerman 1989;+ Rodewald et al. 2016). The secretive nature of these birds requires special efforts for study and monitoring (Sheehan and Master 2010). Targeted effort towards surveying marsh birds would provide more comprehensive information about the birds breeding in the wetlands of Cuyahoga Valley National Park. The Great Lakes Marsh Monitoring protocol (Bird Studies Canada 2009) was previously used for this purpose. Lastly, data collection that incorporated variable circular point count methodology (Reynolds et al. 1980) in addition to breeding behavior observations would allow for estimation of population density and provide a greater depth of information.

Literature Cited

Bingham, S. N., C. C. Young, J. L. Haack-Gaynor , L. W. Morrison, and G. A. Rowell. 2016. Wetland monitoring protocol for Cuyahoga Valley National Park: Narrative. Natural Resource Report NPS/HTLN/NRR—2016/1336. National Park Service, Fort Collins, Colorado.

Bird Studies Canada. 2009. Great Lakes marsh monitoring program. Available at http://www.birdscanada.org/volunteer/glmmp/index.jsp?targetpg=glmmpbird / (Accessed October 19, 2016).

Greater Akron Audubon Society. 2017. Summer bird census. Available at http://www.akronaudubon.org/gaas/activ04.html. (Accessed July 2017).

Lynch, J. F. 1995. Effects of point count duration, time-of-day, and aural stimuli on detectability of migratory and resident bird species in Quintana Roo, Mexico. *In* Ralph, C. J., and J. R. Sauer, eds., Monitoring Bird Populations by Point Counts. General Technical Report PSW-GTR-149. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. Albany, California.

Mack, J. J. 2001. Ohio rapid assessment method for wetlands, manual for using version 5.0. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit, Columbus, Ohio.

Mack, J. J., and B. D. Gara. 2015. Integrated wetland assessment program. Part 9: Field manual for the vegetation index of biotic integrity for wetlands v. 1.5. Ohio EPA Technical Report WET/2015-2. Ohio Environmental Protection Agency, Wetland Ecology Group, Division of Surface Water, Columbus, Ohio. Available at http://epa.ohio.gov/portals/35/wetlands/Part9_field_manual_v1_5rev15aug15.pdf (accessed 26 September 2016).

McCormac, J. S., and G. Kennedy. 2004. Birds of Ohio. Lone Pine Publishing, Auburn, WA.

Ohio State University. 2010. Ohio breeding bird atlas II: Atlas volunteer handbook. Available at http://www.ohiobirds.org/obba2/newsite/?page_id=80 (Accessed 3 June 2016).

Ohio Division of Wildlife (ODW). 2016. Wildlife that are considered to be endangered, threatened, species of concern, special interest, extirpated or extinct in Ohio. Ohio Department of Natural Resources, Columbus, OH.

Peterjohn, B. G., and W. Zimmerman. 1989. Birds of Ohio. Indiana University Press.

Poulin, J. -F, E. D'Astous, M. -A. Villard, S. J. Hejl, K. R. Newlon, M. E. McFadzen, J. S. Young, and C. K. Ghalambor. 2013. Brown creeper (Certhia americana): Birds of North America online. Available at https://birdsna.org/Species-Account/bna/species/brncre (Accessed: June 3, 2016).

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor, 309-313.

Robbins, C. S. 1981. Effect of time of day on bird activity. *In* Ralph, C. J., and J. M. Scott, eds., Estimating Numbers of Terrestrial Birds. Studies in Avian Biology 6:275–286.

Rodewald, P. G., M. B. Shumar, A. T. Boone, D. L. Slager, and J. McCormac. 2016. The second atlas of breeding birds in Ohio. Penn State University Press, University Park, PA.

Sheehan, J., and T. Master. 2010. Birds of wetland habitats in Delaware Water Gap National Recreation Area. Natural Resource Technical Report NPS/NER/ERMN/NRTR—2010/152. National Park Service, Philadelphia, PA.

Stewart, R. E., Jr. 1996. Wetlands as bird habitat. In Fretwell, J. D., J. S. Williams, and P. J. Redman, eds., National Water Summary on Wetland Resources, USGS Water-Supply Paper, 2425, 49-56.

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NPS 644/145001, May 2018

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