



Bird Community Monitoring at Pipestone National Monument, Minnesota

Status Report

Natural Resource Technical Report NPS/HTLN/NRTR—2014/854



ON THE COVER

Prairie on Pipestone National Monument, Minnesota
Photograph by: Lisa P. Thomas

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March 2014

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:

Peitz, D. G. 2014. Bird community monitoring at Pipestone National Monument, Minnesota: Status report. Natural Resource Technical Report NPS/HTLN/NRTR—2014/854. National Park Service, Fort Collins, Colorado.

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Executive Summary

In 2009, the Heartland I&M Network (HTLN) initiated breeding bird surveys at Pipestone National Monument (PIPE), Minnesota to address two objectives. First, we monitored changes in bird community composition and abundance. Secondly, we monitored the responses of bird communities to changes in habitat structure and other habitat variables related to management activities. This report attempts to put trends in the park's breeding bird populations into the context of trends observed within the North American Bird Conservation Initiative's (NABCI) Prairie Potholes Bird Conservation Region, the bird conservation region in which the park is located. By doing so, we can assess the influence of habitat management within the park on bird populations with an understanding of what population trends are doing regionally. In other words, we have tried to separate variability occurring within the region from that seen strictly within the park, and thus, potentially attribute the within-park variability to park conditions.

Seventy-six species of birds were recorded during May-June site visits in the five years since initiating monitoring. Seventy-one of the species are considered breeding species because they are permanent or summer residents. Six of the breeding species - Black Tern, Dickcissel, Grasshopper Sparrow, Least Bittern, Swainson's Hawk, and Upland Sandpiper - are *species of concern* for the Prairie Potholes Bird Conservation Region. Fifteen species recorded at PIPE show negative population trends (including one of regional concern: Upland Sandpiper) while their 46-year regional trends have been positive. However, 19 species (including two of regional concern: Dickcissel and Grasshopper Sparrow) have positive trends on the park while their 46-year regional trends have been negative.

Results from our most recent bird surveys (2013) are similar to previous years with the Brown-headed Cowbird, Bobolink, Rock Dove, Savanna Sparrow, and Ring-necked Pheasant being the most commonly occurring species at PIPE. Bobolink, Savanna Sparrow, and Ring-necked Pheasant are the most widely distributed. Two species recorded in 2013 – Dickcissel and Grasshopper Sparrow – are species of regional concern for the Prairie Potholes Bird Conservation Region.

This report provides current regional and local trends for breeding birds for future comparisons with bird data collected as part of the long-term monitoring efforts at PIPE. With this report, park staff can better account for the potential effects of management actions on breeding birds. Monitoring data also provides park staff with additional information useful for interpreting natural resources.

Acknowledgments

We would like to thank the staff of Pipestone National Monument (PIPE), Minnesota for allowing us access to the park and assisting with breeding bird surveys.

Introduction

Birds are an important component of park ecosystems, as their high body temperature, rapid metabolism, and high ecological position in most food webs make them good indicators of the effects of local and regional changes in ecosystems. It has been suggested that management activities intended to preserve habitat for bird populations, such as for neotropical migrants, can have the added benefit of preserving entire ecosystems and their attendant ecosystem services (Karr 1991, Maurer 1993). Additionally, the National Park Service plays a role in bird conservation, as it complies with the requirements of the Migratory Bird Treaty Act of 1918 (as amended) and the Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. Moreover, birds have a tremendous following among the public and many parks provide information on the status and trends of birds through their interpretive programs.

Pipestone National Monument (PIPE), Minnesota is located on the southeastern edge of the Prairie Potholes Bird Conservation Region (Figure 1). The Prairie Potholes Bird Conservation Region is one of 67 regions identified in the North American Bird Conservation Initiative (NABCI). Started in 1999, the NABCI is a coalition of government agencies and private organizations in the United States working to ensure the long-term health of North America's native bird populations (NABCI 2013). Bird monitoring is also critical as widespread habitat loss to agriculture and urban and industrial development threaten the integrity of the region for birds.

The Prairie Potholes Bird Conservation Region is a glaciated area of mixed-grass prairie in the west and tallgrass prairie in the east (NABCI 2013). This is the most important waterfowl production area on the North American continent, despite extensive wetland drainage and tillage of native grasslands. The region comprises the core of the breeding range of most dabbling duck and several diving duck species, as well as providing critical breeding and migration habitat for over 200 other bird species, including many species of continental concern. Continued wetland degradation, widespread habitat loss to agriculture and urban and industrial development, and fragmentation of remaining grasslands threaten many species in the region.

Data collected during the U.S. Geological Survey's annual North American Breeding Bird Surveys (BBS) between 1966 and 2011 indicate that a number of breeding bird species occurring at PIPE show evidence of population decline (Sauer et al. 2012). In fact, 41% of the species have populations reported to be in decline, with species such as the House Sparrow (*Passer domesticus*), Bank Swallow (*Riparia riparia*), Northern Flicker (*Colaptes auratus*), and Grasshopper Sparrow (*Ammodramus savannarum*) declining at alarming rates.

Long-term trends in community composition and abundance of breeding bird populations provide one measure for assessing the ecological integrity and sustainability of a system. Trends in the composition and abundance of bird populations are long-term indicators of ecosystem integrity at PIPE. *Ecosystem integrity* is defined as the system's capability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition,

diversity, and functional organization comparable to that of the natural habitats of the region (Karr and Dudley 1981). Research has demonstrated that birds serve as good indicators of changes in ecosystems (Cairns et al. 2004, Mallory et al. 2006, Wood et al. 2006). Therefore, changes in the numbers and composition of bird communities may reflect the effectiveness of management in restoring and maintaining the cultural landscape, particularly tallgrass prairie, which also provides important bird habitat at PIPE.

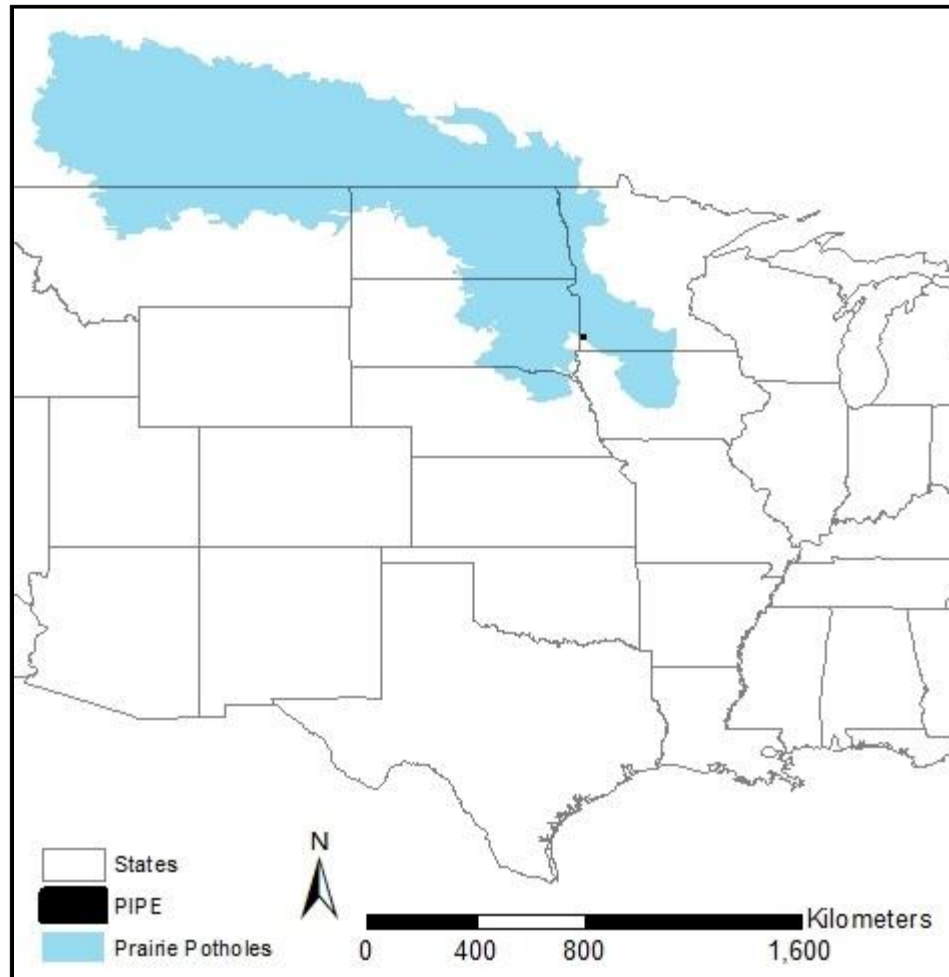


Figure 1. Location of Pipestone National Monument (PIPE), Minnesota within the Prairie Potholes Bird Conservation Region.

Objectives

There are two primary objectives for monitoring breeding birds at Pipestone National Monument:

- Identify significant temporal changes in the species composition and abundance of bird communities that occur at WICR during the breeding season.
- Improve our understanding of breeding bird – habitat relationships and the effects of management actions such as stand thinning or prescribed fire on bird populations, by correlating changes in bird community composition and abundance with changes in specific habitat variables (e.g., vegetation structure, ground cover).

As a first step in meeting monitoring objectives, this report summarizes population trends for birds recorded during the first five years of monitoring. A more comprehensive report on habitats found within the park is forthcoming and should be consulted when making habitat management decisions (James and Peitz, in draft).

Methods

Site Selection

Permanent monitoring locations or 'plots' were selected by overlaying a systematic grid of 100 x 100 meter cells (originating from a random start point). The orientation of the grid was rotated 45 degrees to prevent monitoring sites from being influenced by man-made features (roads, fences, etc.) located along cardinal directions. Areas with sensitive cultural or natural resources were excluded from sampling. We established 68 permanent plots in the various habitats across the park (Figure 2). Monitoring occurred on the majority of the 68 sites across years (Table 1).

Table 1. Number of plots sampled, and sampling dates for breeding bird surveys conducted at Pipestone National Monument, Minnesota, by year. Also listed are observer(s) who conducted the surveys and whether or not habitat data was collected during the survey year.

Year	Sampling Dates	Number of Plots Sampled	Observer(s)	Habitat Data Collected
2009	May 14 – May 16	68	D.G. Peitz*	Yes
2010	May 27 – June 4	67	L.A. Blauert, J.W. Croatt, S.B. Hendriks and P.R. Loso	No
2011	May 26 – June 9	68	S.B. Hendriks, J.L. Pierson and C.C. Schroyer	No
2012	June 5 – June 8	67	S.B. Hendriks and J.A. Wendel	No
2013	May 15 – May 16	17	D.G. Peitz*	Yes

*Heartland I&M Network staff.

During bird surveys in 2009 and 2013, monitoring plots were located using navigation waypoints (Peitz 2010) in a GPS unit and temporarily marked with 36-inch pin flags to aid in relocating the plots for habitat assessment, eliminating the need for permanent plot markers. We collected pin

flags from each plot once the habitat work was completed. During bird surveys in 2010 – 2012, years when habitat assessments were not conducted, monitoring plots were located using a GPS unit. However, plot locations were not marked with pin flags.

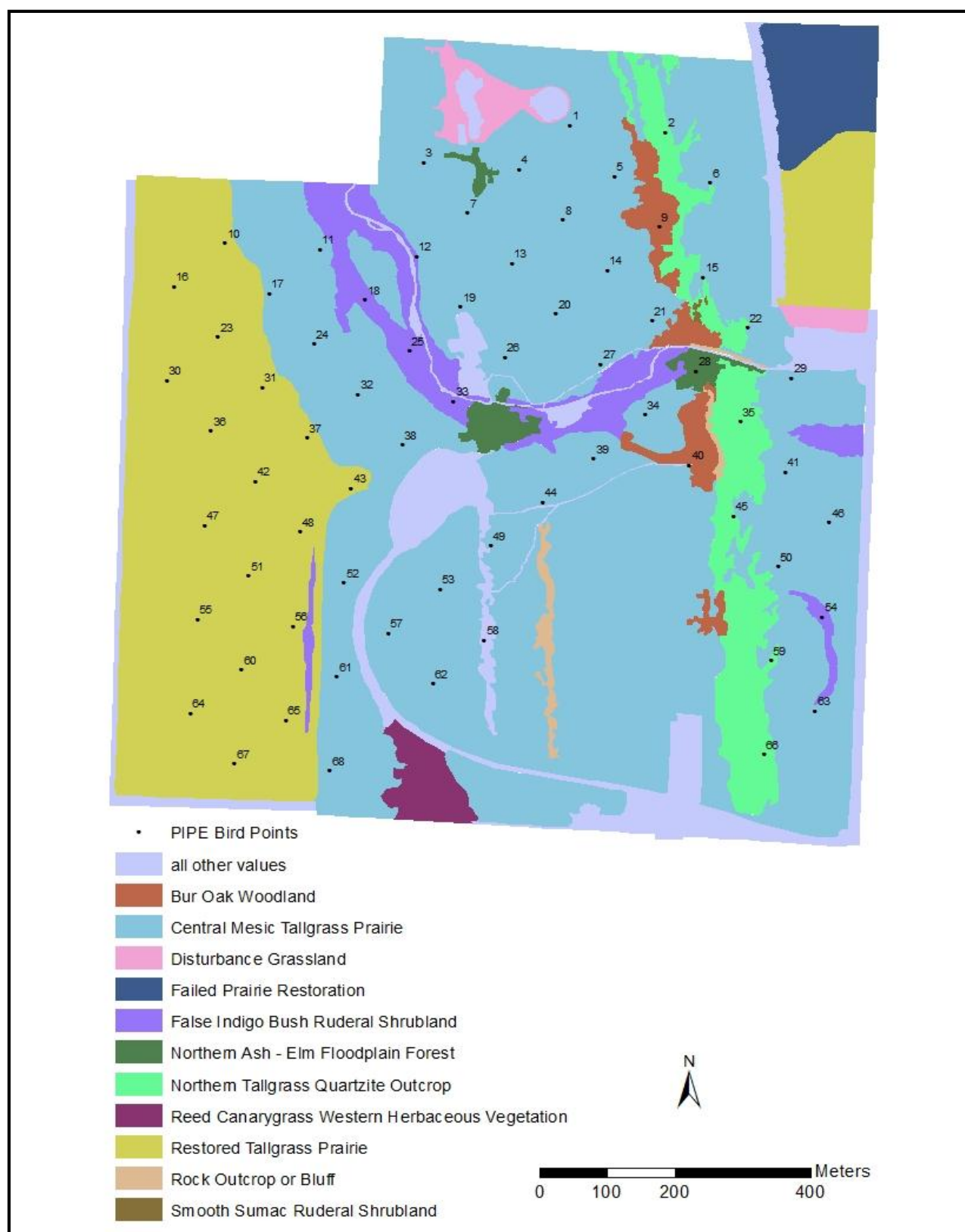


Figure 2. Bird plot locations at Pipestone National Monument, Minnesota. Vegetation mapping and classification provided by Diamond et.al. (in press).

Bird Surveys

Bird surveys followed methods outlined in the bird monitoring protocol by Peitz et al. (2008) and summarized in this text. Variable circular plot counts, a point count methodology that incorporates a measure of detectability into population estimates, were used to survey birds present (Fancy 1997). All birds seen or heard at plots during 5-min sampling periods were counted along with their corresponding distance from observer. Bird observations were separated into two time segments: those detected during the first three minutes of the count (to allow future comparisons with the national Breeding Bird Survey data), and any new birds detected during the final two minutes of the count. For most species, we recorded each individual bird as a separate observation. For species that usually occur in clusters or flocks, the units recorded were cluster or flock size, and not the individual bird. During analysis, each individual in a cluster or flock were treated as separate observations. After completing a count at a plot and filling out the data sheet, the observer navigated to the next plot using a GPS unit. While traveling between plots, the observer was vigilant for the presence of species not recorded during timed surveys. These species help formulate a more complete species list for the park by identifying species missed during timed surveys. We sampled birds during a period when it was light enough to observe birds to four hours after sunrise.

Variable circular plot counts were conducted in an attempt to get an “instantaneous count” of all birds present. The observer recorded birds flushed from a plot when approached and the counts were started as soon as the observer reached plot center. We recorded all birds seen or heard, including flyovers, along with distance from the observer when possible. For this report, all birds seen or heard during the full 5-min are included. Birds recorded from a previous plot were noted and excluded from analysis.

Data Analysis

Prior to summary analysis, the residency status (permanent resident, summer resident, migrant) of each bird species recorded was determined. Identifying the residency of each species helps to exclude migrants from analysis of breeding birds within PIPE. Population trend estimates, expressed as a percent change per year, is the simplest measures of population changes over a time period. For this report we obtained regional breeding bird trends for the Prairie Potholes Bird Conservation Region during two periods, 1966-2011 and 2001-2011 (Sauer et al. 2012). We then compare trends seen in the bird populations at EFMO with these trends. In this report, the word increasing is used to represent positive trends, and decreasing negative trends in individual bird populations within EFMO. Stable populations or those with too few observations to calculate trends are denoted with dash lines. The proportion of plots occupied by each species annually was determined (total number of plots occupied by a species/plots surveyed) and used in calculating trends based on average percent annual change. Population trends at PIPE are reported as increasing, decreasing, or stable based on the direction of percent annual change. The frequency and abundance of bird species recorded in 2013 were reported as well (Appendix 1),

using the proportion of plots occupied by each species, and for each species, the number of individuals encountered per plot visit (individuals/plot visit).

Results

Bird Surveys

Between years 2009 and 2013, 17 to 68 plots at PIPE were surveyed yearly for breeding birds (Table 1). During this five year period, 287 plots were surveyed, and 76 different bird species were recorded, 71 of which have the potential to breed within the park (Table 2; Janssen et al. (2003). Six breeding species recorded – Black Tern (*Chlidonias niger*), Dickcissel (*Spiza americana*), Grasshopper Sparrow, Least Bittern (*Ixobrychus exilis*), Swainson’s Hawk (*Buteo swainsoni*), and Upland Sandpiper (*Bartramia longicauda*) - are considered species of regional concern for the Prairie Potholes Bird Conservation Region (U.S. Fish and Wildlife Service 2008).

Table 2. Species recorded at Pipestone National Monument, Minnesota during breeding bird surveys in 2009 through 2013. The American Ornithologists’ Union Code (AOU code) and residency status of each species is given.

Common name	Species name	AOU code	Residency Status ¹
American Coot	<i>Fulica americana</i>	AMCO	SR
American Crow	<i>Corvus brachyrhynchos</i>	AMCR	R
American Goldfinch	<i>Carduelis tristis</i>	AMGO	R
American Robin	<i>Turdus migratorius</i>	AMRO	R
Baltimore Oriole	<i>Icterus galbula</i>	BAOR	SR
Bank Swallow	<i>Riparia riparia</i>	BANS	SR
Barn Swallow	<i>Hirundo rustica</i>	BARS	SR
Belted Kingfisher	<i>Megaceryle alcyon</i>	BEKI	SR
Black Tern	<i>Chlidonias niger</i>	BLTE	SR
Black-capped Chickadee	<i>Poecile atricapillus</i>	BCCH	R
Blue Jay	<i>Cyanocitta cristata</i>	BLJA	R
Blue Grosbeak	<i>Passerina caerulea</i>	BLGR	SR
Blue-winged Teal	<i>Anas discors</i>	BWTE	SR
Bobolink	<i>Dolichonyx oryzivorus</i>	BOBO	SR
Brewer’s Blackbird	<i>Euphagus cyanocephalus</i>	BRBL	O
Brown Thrasher	<i>Toxostoma rufum</i>	BRTH	SR
Brown-headed Cowbird	<i>Molothrus ater</i>	BHCO	SR
Canada Goose	<i>Branta canadensis</i>	CAGO	SR
Cedar Waxwing	<i>Bombycilla cedrorum</i>	CEDW	R
Chimney Swift	<i>Chaetura pelagica</i>	CHSW	SR
Chipping Sparrow	<i>Spizella passerina</i>	CHSP	SR
Clay-colored Sparrow	<i>Spizella pallida</i>	CCSP	SR
Common Grackle	<i>Quiscalus quiscula</i>	COGR	SR

Table 2 (continued). Species recorded at Pipestone National Monument, Minnesota during breeding bird surveys in 2009 through 2013. The American Ornithologists' Union Code (AOU code) and residency status of each species is given.

Common name	Species name	AOU code	Residency Status ¹
Common Nighthawk	<i>Chordeiles minor</i>	CONI	SR
Common Yellowthroat	<i>Geothlypis trichas</i>	COYE	SR
Dickcissel	<i>Spiza americana</i>	DICK	SR
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	DCCO	SR
Downy Woodpecker	<i>Picoides pubescens</i>	DOWO	R
Eastern Kingbird	<i>Tyrannus tyrannus</i>	EAKI	SR
Eastern Meadowlark	<i>Sturnella magna</i>	EAME	O
Eastern Phoebe	<i>Sayornis phoebe</i>	EAPH	SR
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	EATO	SR
European Starling	<i>Sturnus vulgaris</i>	EUST	R
Field Sparrow	<i>Spizella pusilla</i>	FISP	SR
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	GRSP	SR
Gray Catbird	<i>Dumetella carolinensis</i>	GRCA	SR
Great Blue Heron	<i>Ardea herodias</i>	GBHE	SR
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	GCFL	SR
Green Heron	<i>Butorides virescens</i>	GRHE	SR
Hairy Woodpecker	<i>Picoides villosus</i>	HAWO	R
Henslow's Sparrow	<i>Ammodramus henslowii</i>	HESP	SR
House Finch	<i>Carpodacus mexicanus</i>	HOFI	R
House Sparrow	<i>Passer domesticus</i>	HOSP	SR
House Wren	<i>Troglodytes aedon</i>	HOWR	SR
Killdeer	<i>Charadrius vociferus</i>	KILL	SR
Lapland Longspur*	<i>Calcarius lapponicus</i>	LALO	WR
Least Bittern	<i>Ixobrychus exilis</i>	LEBI	SR
Mallard	<i>Anas platyrhynchos</i>	MALL	R
Marsh Wren	<i>Cistothorus palustris</i>	MAWR	SR
Mourning Dove	<i>Zenaida macroura</i>	MODO	R
Northern Flicker	<i>Colaptes auratus</i>	YSFL	R
Northern Harrier	<i>Circus cyaneus</i>	NOHA	R
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	NRWS	SR
Northern Shoveler	<i>Anas clypeata</i>	NSHO	SR
Orchard Oriole	<i>Icterus spurius</i>	OROR	SR
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	RWBL	SR

Table 2 (continued). Species recorded at Pipestone National Monument, Minnesota during breeding bird surveys in 2009 through 2013. The American Ornithologists' Union Code (AOU code) and residency status of each species is given.

Common name	Species name	AOU code	Residency Status ¹
Ring-necked Pheasant	<i>Phasianus colchicus</i>	RPHE	R
Rock Dove	<i>Columba livia</i>	RODO	R
Savannah Sparrow	<i>Passerculus sandwichensis</i>	SAVS	SR
Sedge Wren	<i>Cistothorus platensis</i>	SEWR	SR
Song Sparrow	<i>Melospiza melodia</i>	SOSP	R
Sora	<i>Porzana carolina</i>	SORA	SR
Swainson's Hawk	<i>Buteo swainsoni</i>	SWHA	SR
Tree Swallow	<i>Tachycineta bicolor</i>	TRES	SR
Turkey Vulture	<i>Cathartes aura</i>	TUVU	SR
Upland Sandpiper	<i>Bartramia longicauda</i>	UPSA	SR
Vesper Sparrow	<i>Poocetes gramineus</i>	VESP	SR
Western Kingbird	<i>Tyrannus verticalis</i>	WEKI	SR
Western Meadowlark	<i>Sturnella neglecta</i>	WEME	SR
White-crowned Sparrow*	<i>Zonotrichia leucophrys</i>	WCSP	M
Wild Turkey	<i>Meleagris gallopavo</i>	WITU	R
Wood Duck	<i>Aix sponsa</i>	WODU	SR
Yellow Warbler	<i>Dendroica petechia</i>	YWAR	SR
Yellow-breasted Chat	<i>Icteria virens</i>	YBCH	O
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	YHBL	SR
Yellow-rumped Warbler	<i>Dendroica coronata</i>	MYWA	SR

* Species recorded between point transects or other times outside of 5-min survey periods.

¹ Residency status: SR = summer resident; R = year around resident; WR = winter resident; M = late season migrant; O = outside of normal range (Janssen et al. 2003).

Species names are valid and verified names obtained from ITIS. (Integrated Taxonomic Information System. Accessed 6 August 2013, <http://www.itis.gov/>).

Bolded species names are those species considered of conservation concern for the Prairie Potholes Bird Conservation Region (U.S. Fish and Wildlife Service 2008).

Twenty-nine breeding species at PIPE, or 41% have shown negative population trends within the larger Prairie Potholes Bird Conservation Region between 1966 and 2011 (46 years; Table 3). However, between 2001 and 2011 (11 years) this number declined to 24 species or 34% of all the breeding species recorded. During our monitoring, 19 of the breeding species or 28% recorded have shown negative population trends within the park. Our results suggests that between 34% (1966-2011 estimates) and 21% (2001-2011 estimates) fewer species are declining at PIPE as compared to the region. However, 15 species showed neither a positive or negative population

trend and with additional survey years these results may change. Differences in population trends in the park, as opposed to those in the region, may be an artifact of our short sampling period within the park. These differences, however, may also be attributable to the quality of habitat within the park as well. More years of data will help assess this question.

Fifteen species recorded show negative population trends, including one of regional concern, the Upland Sandpiper, while their 46-year regional trends have been positive (Table 3). However, 19 species showing negative population trends in the region, including two of regional concern, Dickcissel and Grasshopper Sparrow have positive trends on the park.

During our most recent bird surveys (2013), the Brown-headed Cowbird (*Molothrus ater*), Bobolink (*Dolichonyx oryzivorus*), Rock Dove (*Columba livia*), Savanna Sparrow (*Passerculus sandwichensis*), and Ring-necked Pheasant (*Phasianus colchicus*) were the most commonly occurring species at PIPE (Appendix 1). Bobolink, Savanna Sparrow, and Ring-necked Pheasant were the most widely distributed species.

Table 3. Trends in breeding birds recorded at Pipestone National Monument, Minnesota, and the Prairie Potholes Bird Conservation Region for comparison.

Common name	Region				PIPE
	1966 – 2011		2001 - 2011		2009 - 2013
	Trend	95% CI	Trend	95% CI	Trend
American Coot	1.7	-0.7, 3.8	9.6	3.7, 16.6	Decreasing
American Crow	-2.0	-2.5, -1.5	-4.0	-5.0, -2.9	Increasing
American Goldfinch	0.4	-0.2, 0.9	0.4	-1.0, 1.8	Increasing
American Robin	2.2	1.9, 2.6	2.8	2.0, 3.6	Increasing
Baltimore Oriole	-1.0	-1.6, -0.4	-0.5	-2.0, 1.0	Increasing
Bank Swallow	-2.9	-4.1, -1.3	-1.8	-4.4, 2.6	Stable
Barn Swallow	-0.8	-1.1, -0.3	0.5	-0.6, 1.7	Increasing
Belted Kingfisher	0.8	-0.7, 2.2	4.3	0.4, 9.0	Decreasing
Black Tern	-1.3	-3.0, 0.4	4.6	-1.2, 11.1	Stable
Black-capped Chickadee	0.2	-0.9, 1.1	-1.5	-3.9, 0.9	Stable
Blue Jay	-0.9	-1.5, -0.2	-1.5	-3.7, 0.7	Decreasing
Blue Grosbeak	0.0	-2.1, 2.1	-0.5	-6.3, 4.8	Stable
Blue-winged Teal	1.4	0.1, 2.6	5.3	1.4, 9.8	Increasing
Bobolink	-0.1	-0.7, 0.5	0.1	-1.4, 1.3	Increasing
Brown Thrasher	-1.4	-1.9, -0.9	-0.9	-2.3, 0.5	Decreasing
Brown-headed Cowbird	0.3	-0.2, 0.7	2.3	1.2, 3.5	Increasing
Canada Goose	12.0	9.4, 14.8	14.8	10.1, 20.1	Increasing
Cedar Waxwing	1.0	-0.3, 2.3	-0.3	-3.3, 2.9	Decreasing
Chimney Swift	-1.1	-2.6, 0.3	-3.1	-7.3, 0.9	Stable
Chipping Sparrow	2.2	1.4, 2.8	2.9	1.7, 4.2	Increasing
Clay-colored Sparrow	-1.0	-1.5, -0.5	-0.2	-1.3, 0.9	Increasing
Common Grackle	0.2	-0.2, 0.7	0.8	-0.4, 1.9	Decreasing

Table 3 (continued). Trends in breeding birds recorded at Pipestone National Monument, Minnesota, and the Prairie Potholes Bird Conservation Region for comparison.

Common name	Region				PIPE
	1966 – 2011		2001 - 2011		2009 - 2013
	Trend	95% CI	Trend	95% CI	Trend
Common Nighthawk	-0.6	-2.0, 0.9	0.1	-2.3, 2.9	Increasing
Common Yellowthroat	-0.4	-0.8, -0.1	-1.2	-2.2, -0.3	Increasing
Dickcissel	-0.6	-1.6, 0.8	6.4	2.5, 10.6	Increasing
Double-crested Cormorant	5.3	1.8, 8.3	-0.7	-9.4, 7.0	Decreasing
Downy Woodpecker	0.7	-0.1, 1.5	1.2	-0.9, 3.2	Decreasing
Eastern Kingbird	-0.5	-0.9, -0.1	-0.9	-2.1, 0.3	Increasing
Eastern Phoebe	-0.4	-1.3, 0.6	-0.8	-3.4, 1.8	Stable
Eastern Towhee	2.2	-0.6, 5.9	6.8	-0.6, 22.6	Increasing
European Starling	-1.8	-2.5, -1.1	-0.7	-2.2, 0.9	Increasing
Field Sparrow	3.6	1.8, 5.5	6.1	2.8, 10.8	Decreasing
Grasshopper Sparrow	-2.3	-3.3, -1.3	-0.4	-2.8, 2.1	Increasing
Gray Catbird	0.6	0.1, 1.2	1.2	0.0, 2.6	Decreasing
Great Blue Heron	0.5	-0.7, 1.8	5.1	1.6, 9.2	Decreasing
Great Crested Flycatcher	1.6	0.8, 2.4	1.9	-0.3, 3.9	Stable
Green Heron	-1.4	-4.0, 1.4	-2.4	-12.4, 5.3	Increasing
Hairy Woodpecker	1.9	0.9, 2.9	2.1	-0.3, 4.1	Stable
Henslow's Sparrow	--	--, --	--	--, --	Stable
House Finch	13.8	9.5, 18.4	2.9	-5.6, 11.3	Decreasing
House Sparrow	-3.6	-4.1, -3.1	-4.1	-5.4, -2.8	Increasing
House Wren	0.8	0.4, 1.2	0.5	-0.5, 1.5	Increasing
Killdeer	-0.3	-0.7, 0.2	0.7	-0.3, 1.7	Increasing
Least Bittern	70.6	9.6, 629.9	52.0	-40.0, 737.8	Stable
Mallard	0.7	-0.2, 1.5	1.3	-0.9, 3.7	Increasing
Marsh Wren	3.7	2.1, 5.2	4.1	0.6, 7.8	Increasing
Mourning Dove	-0.4	-0.8, -0.1	-0.6	-1.5, 0.3	Increasing
Northern Flicker	-2.8	-3.3, -2.3	-1.9	-3.2, -0.5	Increasing
Northern Harrier	-0.6	-1.3, 0.0	0.0	-1.6, 1.6	Decreasing
Northern Rough-winged Swallow	0.8	-1.4, 3.6	5.4	-0.7, 14.8	Decreasing
Northern Shoveler	3.2	1.4, 5.0	11.6	6.8, 17.1	Decreasing
Orchard Oriole	2.5	1.7, 3.4	0.9	-1.4, 2.9	Stable
Red-winged Blackbird	-0.4	-0.7, 0.0	0.4	-0.5, 1.3	Increasing
Ring-necked Pheasant	1.0	0.1, 1.9	3.8	0.9, 6.8	Increasing
Rock Dove	-0.6	-1.4, 0.2	0.8	-0.6, 2.4	Increasing
Savannah Sparrow	0.5	0.1, 0.9	-0.1	-1.1, 0.8	Increasing
Sedge Wren	4.8	3.2, 6.3	3.8	0.6, 7.1	Increasing
Song Sparrow	0.7	0.2, 1.1	0.7	-0.3, 1.7	Increasing
Sora	1.8	0.0, 3.3	10.5	7.0, 14.1	Stable
Swainson's Hawk	-0.1	-0.7, 0.6	0.5	-0.9, 2.0	Stable
Tree Swallow	2.1	1.3, 2.9	2.6	1.0, 4.1	Increasing

Table 3 (continued). Trends in breeding birds recorded at Pipestone National Monument, Minnesota, and the Prairie Potholes Bird Conservation Region for comparison.

Common name	Region				PIPE
	1966 – 2011		2001 - 2011		2009 - 2013
	Trend	95% CI	Trend	95% CI	Trend
Turkey Vulture	14.0	9.0, 19.9	19.2	7.8, 30.1	Increasing
Upland Sandpiper	0.4	-0.2, 1.1	1.1	-0.5, 2.9	Decreasing
Vesper Sparrow	0.4	0.0, 0.7	0.5	-0.3, 1.3	Stable
Western Kingbird	-0.3	-0.9, 0.4	-0.1	-1.8, 1.5	Stable
Western Meadowlark	-2.1	-2.6, -1.7	-0.9	-1.7, -0.1	Increasing
Wild Turkey	13.4	10.2, 17.3	12.6	5.7, 23.4	Decreasing
Wood Duck	5.2	3.4, 7.0	6.4	2.2, 11.7	Increasing
Yellow Warbler	1.4	1.0, 1.9	1.7	0.5, 2.9	Increasing
Yellow-headed Blackbird	0.7	-0.4, 1.7	0.6	-2.5, 3.8	Decreasing
Yellow-rumped Warbler	-1.1	-4.9, 2.8	-0.3	-7.8, 7.9	Decreasing

Bolded species names are those species considered of concern for the Prairie Potholes Bird Conservation Region (U.S. Fish and Wildlife Service 2008).

Regional trend data from BBS surveys (Sauer et al. 2012).

Discussion

Breeding bird surveys were initiated at PIPE in 2009 to assist the park in assessing the integrity of various habitats through time. During the five years of monitoring that occurred since 2009, 76 bird species have been recorded. Seventy-one are permanent or summer residents to the area (Janssen et al. 2003). Therefore, these 71 species have some value in characterizing the breeding bird community of PIPE, and the habitat on which they rely.

Habitat availability and quality dictates bird population trends within a region (in this case the Prairie Potholes Bird Conservation Region). Similarly, locally available habitat predicates the species expected to be represented at the locale. A local lack of habitat in sufficient quantity to sustain representatives of a regionally common species will limit the local distribution of that species. Identifying regional trends in breeding birds observed at PIPE is the first step in assessing natural variability, versus the potential local effects of habitat management. For instance, if the prevailing trend in a species regionally is negative and their abundance is low, then efforts to manage habitat for that species will in all likelihood have little success. However, for species that are regionally common or have populations trending upward, PIPE may be able to enhance local populations through habitat management.

Based on local versus regional trends, 19 species recorded at PIPE have populations that are benefitted by the current habitat on the park and surrounding area. However, 15 species may not find adequate habitat on the park and surrounding area relative to regional availability.

Similar to 2009 values reported by Peitz (2010), the Bobolink, Savanna Sparrow, and Ring-necked Pheasant are some of the most common and widely distributed species in the park. Grasshopper Sparrow is abundant, but only within prairie habitat. Changes in population sizes of these common species in the park make them good species for assessing changing habitat conditions locally, especially species with an affinity to a particular habitat type such as the Grasshopper Sparrow. For example, relatively common species like the Red-winged Blackbird (*Agelaius phoeniceus*) have improved reproductive success when shrubs and/or grass and reed cover is dense (Stokes and Stokes 1996). Therefore, a decline in this species' abundance could indicate a control of woody species in the prairie, changes in the amount of shrubs in the developed areas, or changes in the habitat along Pipestone Creek. Currently this species has a populations trending upward on the park, which could very well be the results of infrequent use of prescribed fire and the resulting increase in grasses, reeds, and shrubby plants along the margins of Pipestone Creek. Less common and widely distributed species will likely occur so infrequently that strong species-habitat relationships may not be established.

Although the mix of habitats in the park provides potentially satisfactory habitat for 52% of the breeding birds observed, this habitat is easily altered if trees are removed, insect infestations occur, or the prairie is burned. Our survey data suggests that a number of species occur frequently enough at PIPE to aid in assessing the influence of habitat management actions on

their numbers (Table 3, Appendix 1). Similar to the habitat requirements listed above for the Red-winged Blackbird, the habitat requirement of most of these species can be readily identified: i.e. Brown-headed Cowbird occupy pastures, wood edges, lawns, and forest clearings; Bobolink occupy hayfield and grasslands; and Savanna Sparrow occupy a variety of moist tallgrass areas; etc. (Stokes and Stokes 1996). Habitat management decisions aimed at influencing bird populations should center on those identified as species of concern for the Prairie Potholes Bird Conservation Region.

Conclusions

Since initiating breeding bird surveys at PIPE in 2009, HTLN staff and volunteers have surveyed between 17 and 68 plots annually, and recorded 76 different species. Seventy-one of the species recorded are permanent or summer residents to the area with the potential to breed within the park. Local and regional population trends from this study indicate that the park provides habitat favorable to 19 bird species, but conditions have resulted in decreasing representation of 15 species. A note of caution is needed here. The limited number of survey years within the park may provide a false trend. However, our reported data are a baseline for placing bird populations at the park into the context of those seen in the larger Prairie Potholes Bird Conservation Region. Almost half the species in the park have population trends that are either stable or mirroring those of the region.

Literature Cited

- Cairns Jr., J., P. V. McCormick, and B. R. Niederlehner. 2004. A proposed framework for developing indicators of ecosystem health. *Hydrobiologia* 263:1-44.
- Diamond, D.D., L.F. Elliott, M.D. DeBacker, K.M. James, and D.L. Pursell. In press. Vegetation mapping and classification of Pipestone National Monument. Natural Resource Report NPS/XXXX/NRR—20XX/XXX. National Park Service, Fort Collins, Colorado.
- Fancy, S.G. 1997. A new approach for analyzing bird densities from variable circular-plot counts. *Pacific Science* 51:107-114.
- ITIS (Integrated Taxonomic Information System). Accessed 6 August 2013, <http://www.itis.usda.gov/>.
- James, K.M. and D.G. Peitz. In draft. Plant community monitoring at Pipestone National Monument, Minnesota 2013 status report. Natural Resource Technical Report NPS/HTLN/NRTR—xxxx/xxx. National Park Service, Fort Collins, Colorado.
- Janssen, R.B., D.D. Tessen, and G. Kennedy. 2003. *Birds of Minnesota and Wisconsin*. Lone Pine Publishing, Auburn, Washington. 376 pp.
- Karr, J. R. 1991. Biological integrity: a long-neglected aspect of water resource management. *Ecological Applications* 1:66-84.
- Karr, J. R., and D. R. Dudley. 1981. Ecological perspective on water quality goals. *Environmental Management* 5:55-68.
- Mallory, M. L., H. G. Gilchrist, B. M. Braune, and A. J. Gaston. 2006. Marine birds as indicators of arctic marine ecosystem health: linking the northern ecosystem initiative to long-term studies. *Environmental Monitoring and Assessment* 113:31-48.

- Maurer, B. A. 1993. Biological diversity, ecological integrity, and neotropical migrants: New perspectives for wildlife managers. Pages 24-31 in D.M. Finch and P.W. Stangel, editors. Status and management of neotropical migratory birds. U.S. Forest Service General Technical Report RM-229.
- NABCI (North American Bird Conservation Initiative). Accessed 25 September 2013, <http://www.nabci-us.org/bcr23.html>.
- Peitz, D.G., G.A. Rowell, J.L. Haack, K.M. James, L.W. Morrison, and M.D. Debacker. 2008. Breeding bird monitoring protocol for the Heartland Network Inventory and Monitoring Program. Natural Resource Report NPS/HTLN/NRR-2008/044. National Park Service, Fort Collins, Colorado. 152 pp.
- Peitz, D. G. 2010. Bird community monitoring at Pipestone National Monument, Minnesota: 2009 status report. Natural Resource Data Series NPS/HTLN/NRDS—2010/045. National Park Service, Fort Collins, Colorado.
- Sauer, J.R., J.E. Hines, J.E. Fallon, K.L. Pardieck, D.J. Ziolkowski, Jr., and W.A. Link. 2012. The North American Breeding Bird Survey, Results and Analysis 1966 - 2011. Version 07.03.2013 USGS Patuxent Wildlife Research Center, *Laurel, MD*. Accessed 6 August 2013, <http://www.mbr-pwrc.usgs.gov/bbs/>.
- Stokes, D.W. and L.Q. Stokes. 1996. Stokes Field Guide to Birds: Eastern Region. Little, Brown and Company, New York, New York. 471 pp.
- U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at <http://www.fws.gov/migratorybirds/>]
- Wood, J. K., N. Nur, C. A. Howell, and G. R. Geupel. 2006. Overview of Cosumnes riparian bird study and recommendations for monitoring and management. A Report to the California Bay-Delta Authority Ecosystem Restoration Program. Petaluma, California. 18 pp.

Appendix

Appendix 1. Number of individuals encountered per plot visit, and proportion of 17 plots occupied by breeding bird species at Pipestone National Monument, Minnesota during the 2013 bird surveys. Number of individuals per plot, and proportion of plots occupied include all individuals recorded on plots during a 5-min survey, including flyovers.

Common name	Individuals/plot visit	Proportion of plot occupied
American Crow	0.71	0.12
American Goldfinch	0.06	0.06
American Robin	0.41	0.29
Baltimore Oriole	0.12	0.12
Bank Swallow	0.06	0.06
Barn Swallow	0.12	0.06
Bobolink	1.59	0.71
Brown-headed Cowbird	2.06	0.24
Canada Goose	0.71	0.35
Chipping Sparrow	0.06	0.06
Clay-colored Sparrow	0.06	0.06
Common Grackle	0.35	0.29
Common Yellowthroat	0.06	0.06
Dickcissel	0.06	0.06
Eastern Meadowlark	0.18	0.12
Eastern Towhee	0.06	0.06
Field Sparrow	0.06	0.06
Grasshopper Sparrow	0.35	0.24
House Sparrow	0.06	0.06
House Wren	0.06	0.06
Killdeer	0.18	0.18
Marsh Wren	0.41	0.24
Mourning Dove	0.12	0.06
Red-winged Blackbird	0.24	0.24
Ring-necked Pheasant	0.76	0.53
Rock Dove	1.47	0.06
Savannah Sparrow	1.00	0.59
Tree Swallow	0.12	0.06
Wood Duck	0.12	0.06
Yellow Warbler	0.18	0.18

Bolded species names are those species considered of concern for the Prairie Potholes Bird Conservation Region (U.S. Fish and Wildlife Service 2008).

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NPS 372/124016, March 2014

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