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Bird Community Monitoring at Homestead National Monument of America, Nebraska

Status Report

Natural Resource Technical Report NPS/HTLN/NRTR—2014/853

ON THE COVER
Prairie-woodland interface at Homestead National Monument of America, Nebraska
Photograph by: HTLN

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Executive Summary

In 2009, the Heartland I&M Network (HTLN) initiated breeding bird surveys at Homestead National Monument of America (HOME), Nebraska 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) Central Mixed-grass Prairie 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-nine 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. Two of the breeding species are *species of concern* for the Central Mixed-grass Prairie Bird Conservation Region. Fifteen species (including 1 of regional concern) have positive trends on the park while their 46-year regional trends have been negative. However, 16 species recorded at HOME (including one of regional concern) show negative population trends, while their 46-year regional trends have been positive.

Results from our most recent bird surveys (2013) are similar to previous years and show Brown-headed Cowbird, Red-winged Blackbird, American Goldfinch, Grasshopper Sparrow, and Dickcissel are the most commonly occurring species at HOME. Red-winged Blackbird and Grasshopper Sparrow are the most widely distributed species. However, like American Goldfinch and Dickcissel, the Grasshopper Sparrow was only recorded in prairie habitat. Dickcissel and Grasshopper Sparrow, as well as Eastern Meadowlark and Savanna Sparrow are grassland obligate species. Both the Brown-headed Cowbird and Red-winged Blackbird occurred in prairie and woodland habitats. No woodland obligates were reported on the park.

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 HOME. 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

The HTLN would like to thank the staff of Homestead National Monument of America, Nebraska for allowing us access to the park during our breeding bird surveys, and for assisting with 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.

Homestead National Monument of America (HOME), Nebraska is located in the North-east section of the Central Mixed-grass Prairie Bird Conservation Region (Figure 1). The Central Mixed-grass Prairie 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).

The Central Mixed-grass Prairie extends from the edge of shortgrass prairie on the west to the beginning of the tallgrass prairie and savanna-like habitat to the east (NABCI 2013). Large areas in the center of this region have been converted to agriculture. However, extensive areas of high-quality grassland in the Nebraska Sandhills and shrublands in Texas remain. The importance of prairie in this region as a historic landscape has led the Park Service to restore former agricultural fields to native prairie at HOME. The first seed and sod transfer efforts date back to 1939, making the HOME prairie the second oldest prairie restoration in the United States. In subsequent years, park managers have been diligent towards their goal of prairie restoration, and have utilized increasingly sophisticated techniques to restore and maintain the tallgrass prairie.

The Central Mixed-grass Prairie is a continentally important migration area for shorebirds and waterfowl. Between 10 and 14 million waterfowl migrate through Nebraska and utilize the staging habitat in the seasonal, depressional rainwater basins and other wetlands. Wetland drainage, modification and sediment accumulation have jeopardized the integrity of these important landscape features. The riparian forest along Cub Creek is comprised of two distinct zones based on past land use. The woodland in the northern part of the monument is consistent with the description of a mesic bur oak forest, a critically imperiled (S1) community in Nebraska (Steinauer & Rolfsmeier 2000). The southern portion is characterized as an eastern lowland forest and was heavily logged in the 1930's. Fire suppression, grazing cessation, and changes in the hydrology of Cub Creek have produced significant changes in the woodlands since the establishment of the first homestead. For a complete description, inventory and evaluation of the lowland forest along Cub Creek, see Mlekush and DeBacker (2003) and Rolfsmeier (2007).

Widespread habitat loss to agriculture, as well as urban and industrial development threaten the birds of the area. Currently 138 species of breeding birds can be found in the area around HOME (Stokes and Stokes 1996). However, 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 species recorded at HOME show evidence of population decline (Sauer et al. 2012). In fact, 34% of the breeding species have populations reported to be in decline, with species such as the House Sparrow (*Passer domesticus*), Grasshopper Sparrow (*Ammodramus savannarum*), Northern Shoveler (*Anas clypeata*), Northern Flicker (*Colaptes auratus*), and Chimney Swift (*Chaetura pelagica*) declining at alarming rates.

Long-term trends in community composition and abundance of breeding birds provide one measure for assessing the ecological integrity and sustainability of a system. We will use trends in the composition and abundance of bird populations as long-term indicators of ecosystem integrity in their habitat found at HOME. *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 historic environment encountered by early homesteaders and which provides important bird habitat at HOME.

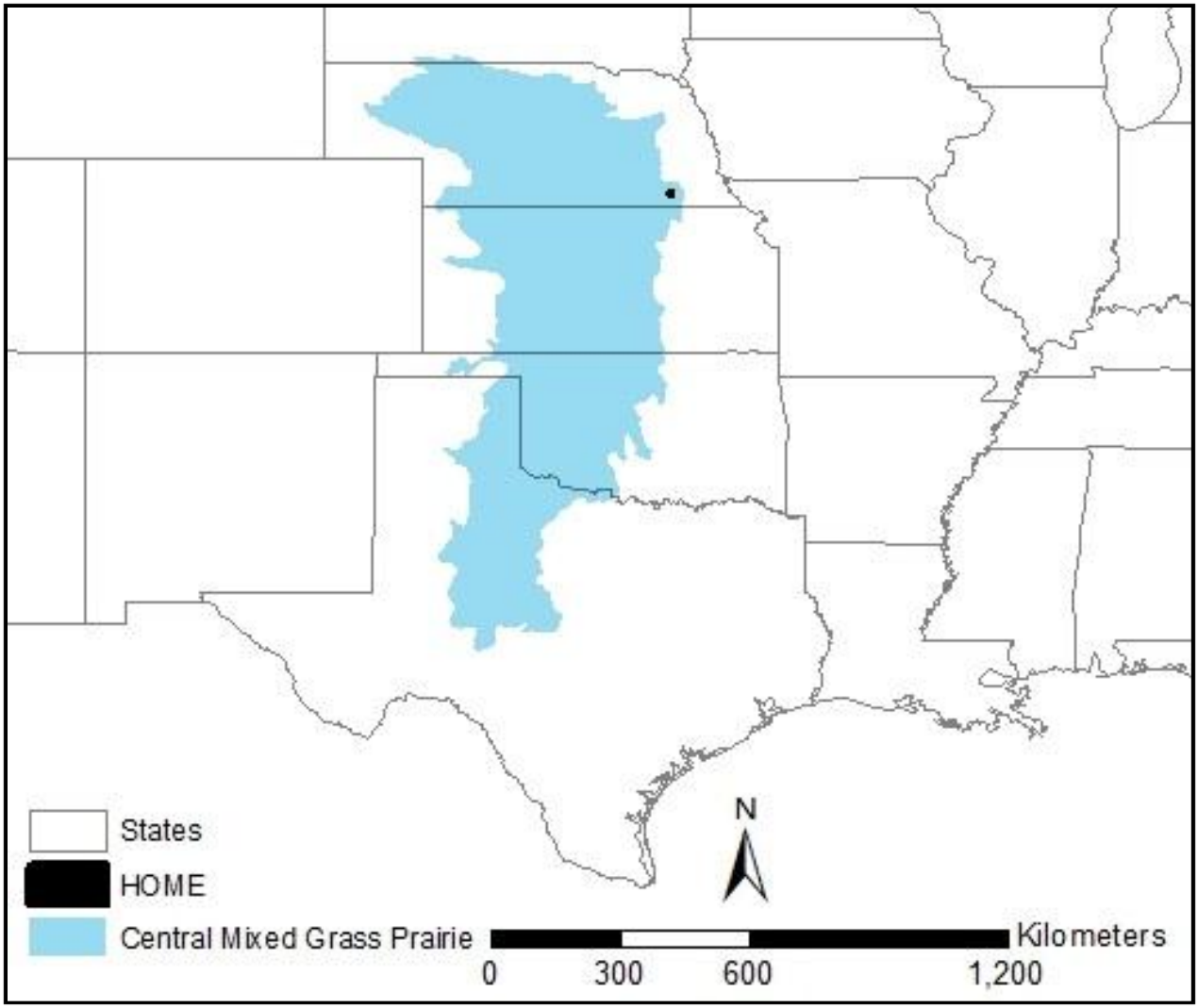

Figure 1. Location of Homestead National Monument of America (HOME), Nebraska within the Central Mixed-grass Prairie Bird Conservation Region

Objectives

There are two primary objectives for monitoring breeding birds at Homestead National Monument of America:

- Identify significant temporal changes in the species composition and abundance of bird communities that occur at HOME 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. We established 48 permanent plots in the various habitats across the park (Figure 2). Monitoring occurred on the majority of the 48 sites across years (Table 1).

Table 1. Number of plots sampled, and sampling dates for breeding bird surveys conducted at Homestead National Monument of America, Nebraska, 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 12 – May 13	44	D.G. Peitz*	Yes
2010	May 18 – June 5	47	J.M. Bolli, G. Grover and S.E. Rehme	No
2011	June 2 – June 16	44	J.M. Bolli, K.L. DeJong and S.C. Lao	No
2012	June 5 – June 15	43	J.M. Bolli, K.A. Manktelow and C.N. Schrage	No
2013	May 14 – May 14	9	J.M. Bolli and 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.

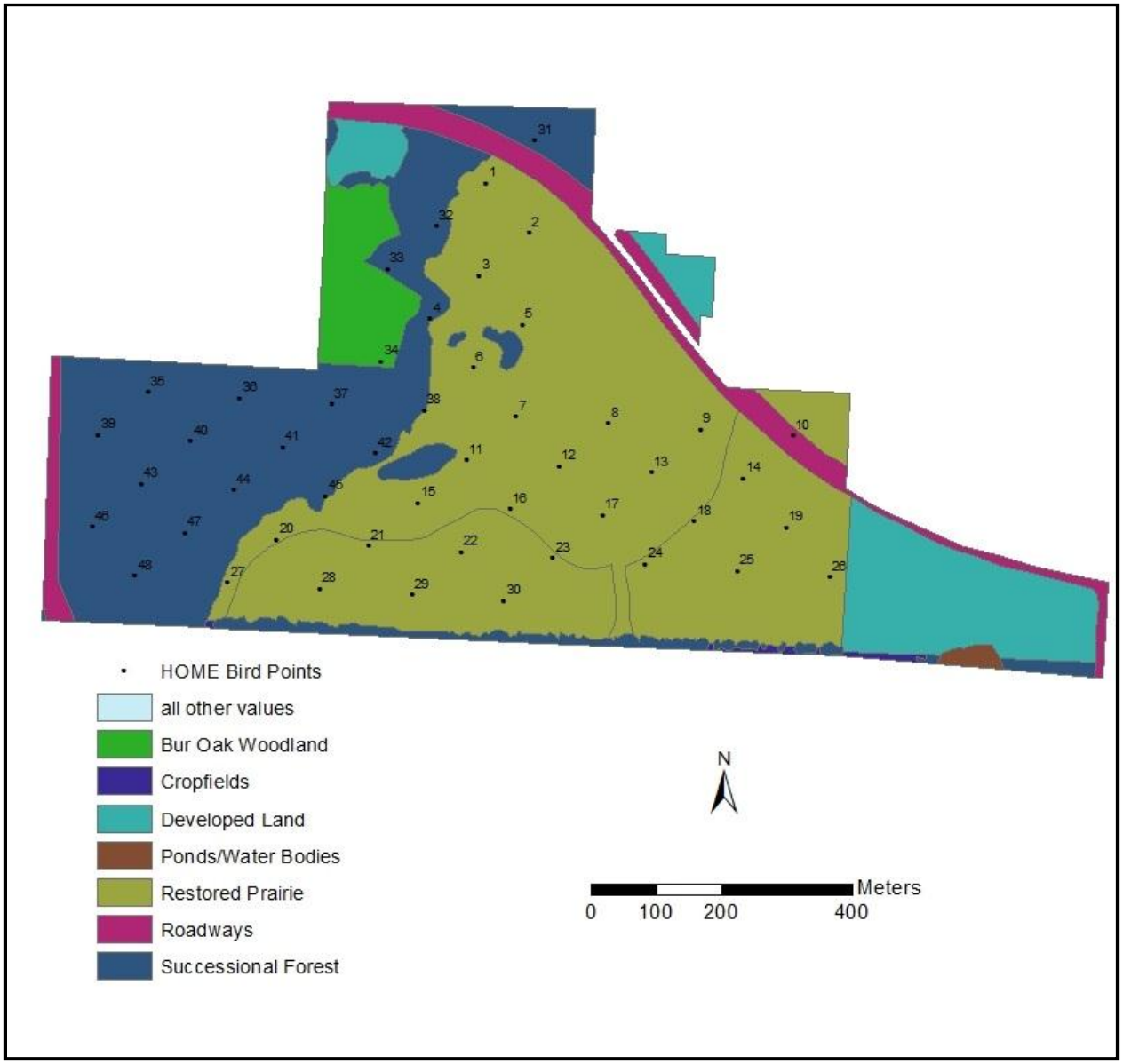

Figure 2. Bird plot locations at Homestead National Monument of America, Nebraska. Vegetation mapping and classification provided by Kindscher et.al. (2011).

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 recorded 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 for 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 was treated as a separate observation. 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 HOME. 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 Central Mixed-grass Prairie 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 HOME with these trends. 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. 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 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, 9 - 47 plots at HOME were surveyed yearly for breeding birds (Table 1). During this five year period, 187 plots were surveyed, and 79 different bird species were recorded, 71 of which have the potential to breed within the park (Table 2; Sharpe et al. (2001). Three breeding species, American Woodcock (*Scolopax minor*), Common Grackle (*Quiscalus quiscula*), and Northern Shoveler (*Anas clypeata*) were only observed outside the 5-min survey periods. Two breeding species recorded, Bell's Vireo (*Vireo bellii*) and Red-headed Woodpecker (*Melanerpes erythocephalus*) are considered species of regional concern for the Central Mixed-grass Prairie Bird Conservation Region (U.S. Fish and Wildlife Service 2008).

Table 2. Species recorded at Homestead National Monument of America, Nebraska 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 Crow	*Corvus brachyrhynchos*	AMCR	R
American Goldfinch	*Carduelis tristis*	AMGO	R
American Redstart	*Setophaga ruticilla*	AMRE	SR
American Robin	*Turdus migratorius*	AMRO	R
American Woodcock*	*Scolopax minor*	AMWO	SR
Baltimore Oriole	*Icterus galbula*	BAOR	SR
Bank Swallow	*Riparia riparia*	BANS	SR
Barn Swallow	*Hirundo rustica*	BARS	SR
Barred Owl	*Strix varia*	BDOW	R
Bell's Vireo	***Vireo bellii***	**BEVI**	**SR**
Black-capped Chickadee	*Poecile atricapillus*	BCCH	R
Blue Jay	*Cyanocitta cristata*	BLJA	R
Blue-gray Gnatcatcher	*Polioptila caerulea*	BGGN	SR
Brown Creeper	*Certhia americana*	BRCR	R
Brown Thrasher	*Toxostoma rufum*	BRTH	R
Brown-headed Cowbird	*Molothrus ater*	BHCO	R
Canada Goose	*Branta canadensis*	CAGO	R
Cedar Waxwing	*Bombycilla cedrorum*	CEDW	R
Chestnut-sided Warbler	*Dendroica pensylvanica*	CSWA	M
Chimney Swift	*Chaetura pelagica*	CHSW	SR
Chipping Sparrow	*Spizella passerina*	CHSP	SR
Clay-colored Sparrow*	*Spizella pallida*	CCSP	M
Common Grackle*	*Quiscalus quiscula*	COGR	R
Common Yellowthroat	*Geothlypis trichas*	COYE	SR
Cooper's Hawk	*Accipiter cooperii*	COHA	R
Dickcissel	*Spiza americana*	DICK	SR
Downy Woodpecker	*Picoides pubescens*	DOWO	R

Table 2. Species recorded at Homestead National Monument of America, Nebraska 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]
Eastern Bluebird	*Sialia sialis*	EABL	R
Eastern Kingbird	*Tyrannus tryannus*	EAKI	SR
Eastern Meadowlark	*Sturnella magna*	EAME	R
Eastern Phoebe	*Sayornis phoebe*	EAPH	SR
Eastern Towhee	*Pipilo erythrophthalmus*	EATO	R
Eastern Wood-pewee	*Contopus virens*	EAWP	SR
European Starling	*Sturnus vulgaris*	EUST	R
Field Sparrow	*Spizella pusilla*	FISP	R
Grasshopper Sparrow	*Ammodramus savannarum*	GRSP	SR
Gray Catbird	*Dumetella carolinensis*	GRCA	SR
Great Blue Heron	*Ardea herodias*	GBHE	SR
Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	SR
Hairy Woodpecker	*Picoides villosus*	HAWO	R
Hermit Thrush*	*Catharus guttatus*	HETH	M
House Sparrow	*Passer domesticus*	HOSP	R
House Wren	*Troglodytes aedon*	HOWR	SR
Indigo Bunting	*Passerina cyanea*	INBU	SR
Killdeer	*Charadrius vociferus*	KILL	SR
Lark Sparrow	*Chondestes grammacus*	LASP	SR
Least Flycatcher	*Empidonax minimus*	LEFL	M
Mourning Dove	*Zenaida macroura*	MODO	R
Northern Bobwhite	*Colinus virginianus*	NOBO	R
Northern Cardinal	*Cardinalis cardinalis*	NOCA	R
Northern Flicker	*Colaptes auratus*	YSFL	R
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	NRWS	SR
Northern Shoveler*	*Anas clypeata*	NSHO	SR
Orchard Oriole	*Icterus spurius*	OROR	SR
Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	R
Red-eyed Vireo	*Vireo olivaceus*	REVI	SR
Red-headed Woodpecker	***Melanerpes erythocephalus***	**RHWO**	**R**
Red-tailed Hawk	*Buteo jamaicensis*	RTHA	R
Red-winged Blackbird	*Agelaitus phoeniceus*	RWBL	R
Ring-necked Pheasant	*Phasianus colchicus*	RPHE	R
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	SR
Ruby-throated Hummingbird	*Archilochus colubris*	RTHU	SR
Savannah Sparrow	*Passerculus sandwichensis*	SAVS	SR
Song Sparrow	*Melospiza melodia*	SOSP	R
Spotted Towhee	*Pipilo maculatus*	SPTO	R
Summer Tanager	*Piranga rubra*	SUTA	SR

Table 2. Species recorded at Homestead National Monument of America, Nebraska 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]
Swainson's Thrush	*Catharus ustulatus*	SWTH	M
Tennessee Warbler*	*Vermivora peregrina*	TEWA	M
Tufted Titmouse	*Baeolophus bicolor*	ETTI	R
Turkey Vulture	*Cathartes aura*	TUVU	SR
Warbling Vireo	*Vireo gilvus*	WAVI	SR
White-breasted Nuthatch	*Sitta carolinensis*	WBNU	R
Wild Turkey	*Meleagris gallopavo*	WITU	R
Wood Duck	*Aix sponsa*	WODU	SR
Worm-eating Warbler	*Helmitheros vermivorum*	WEWA	M
Yellow Warbler	*Dendroica petechia*	YWAR	SR
Yellow-bellied Sapsucker	*Sphyrapicus varius*	YBSA	WR
Yellow-billed Cuckoo	*Coccyzus americanus*	YBCU	SR
Yellow-throated Vireo	*Vireo flavifrons*	YTVI	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; M = late season migrant; WR = winter resident (Sharpe et al. 2001).

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 Central Mixed-grass Prairie Bird Conservation Region (U.S. Fish and Wildlife Service 2008).

Twenty-four breeding species at HOME, or 34% of breeding species observed have shown negative population trends within the larger Central Mixed-grass Prairie Bird Conservation Region between 1966 and 2011 (46 years; Table 3). And between 2001 and 2011 (11 years) this number increased by one to 25 species or 35% of all the breeding species recorded. During our monitoring, 20 of the breeding species or 28% recorded at HOME have shown negative population trends within the park. Our results suggest that between 17% (1966-2011 estimates) and 20% (2001-2011 estimates) fewer species are declining at HOME as compared to the region. However, we were unable to calculate trends on species recorded outside the 5-min survey periods, and 10 additional species showed neither a positive nor negative population trend. Differences in population trends in the park, as opposed to those in the region, may be an artifact of our short sampling period (5-years) 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.

Sixteen species recorded at HOME, including one of regional concern the Bell's Vireo show negative population trends, while their 46-year regional trends have been positive (Table 3).

However, 15 species showing negative population trends in the region, including one of regional concern the Red-headed Woodpecker have positive trends on the park.

During our most recent bird surveys (2013) the Brown-headed Cowbird (*Molothrus ater)*, Red-winged Blackbird (*Agelaitus phoeniceus*), American Goldfinch (*Carduelis tristis*), Grasshopper Sparrow, and Dickcissel (*Spiza americana*) were the most commonly occurring species at HOME. Red-winged Blackbird and Grasshopper Sparrow are the most widely distributed species. However, like American Goldfinch and Dickcissel, the Grasshopper Sparrow was only recorded in prairie habitat. Dickcissel and Grasshopper Sparrow, as well as Eastern Meadowlark (*Sturnella magna*), and Savanna Sparrow (*Passerculus sandwichensis*) are grassland obligate species. Both the Brown-headed Cowbird and Red-winged Blackbird occurred in prairie and woodland habitats. No woodland obligates were reported on the park.

Table 3. Trends in breeding birds recorded at Homestead National Monument of America, Nebraska and the Central Mix-grass Prairie Bird Conservation Region for comparison.

	Region				HOME
	1966 - 2011		2001 - 2011		2009 - 2013
Common name	Trend	95% CI	Trend	95% CI	Trend
American Crow	-0.9	-1.5, -0.2	-5.2	-7.0, -3.3	Increasing
American Goldfinch	2.0	0.8, 3.2	-2.9	-6.0, 0.3	Increasing
American Redstart	--	--, --	--	--, --	Stable
American Robin	1.5	0.9, 2.0	2.2	0.8, 3.7	Increasing
American Woodcock*	--	--, --	--	--, --	--
Baltimore Oriole	-0.4	-0.9, 0.2	1.1	-0.4, 2.9	Increasing
Bank Swallow	2.3	-1.8, 7.5	7.7	-3.7, 31.4	Decreasing
Barn Swallow	-0.4	-0.8, 0.2	1.0	-0.3, 2.5	Increasing
Barred Owl	7.2	3.6, 11.0	7.3	1.2, 13.9	Decreasing
Bell's Vireo	1.4	-0.3, 3.0	8.5	3.8, 14.0	Decreasing
Black-capped Chickadee	-1.3	-2.7, 0.0	-7.7	-11.7, -3.7	Decreasing
Blue Jay	-0.8	-1.4, -0.2	-3.7	-5.5, -1.8	Increasing
Blue-gray Gnatcatcher	1.9	0.2, 3.5	2.6	-1.2, 6.5	Increasing
Brown Creeper	--	--, --	--	--, --	Stable
Brown Thrasher	-0.7	-1.2, -0.3	-0.9	-2.1, 0.2	Decreasing
Brown-headed Cowbird	0.0	-0.5, 0.5	1.4	0.1, 2.8	Decreasing
Canada Goose	13.6	9.2, 19.3	21.7	11.0, 41.3	Stable
Cedar Waxwing	11.9	5.1, 20.6	6.0	-7.5, 21.7	Decreasing
Chimney Swift	-1.8	-2.6, -1.0	-2.2	-5.1, 0.5	Increasing
Chipping Sparrow	7.0	5.2, 8.8	7.2	3.2, 10.8	Increasing
Common Grackle*	-0.7	-1.3, 0.0	-1.2	-2.7, 0.5	--
Common Yellowthroat	1.2	0.3, 2.2	-0.7	-3.1, 1.4	Increasing
Cooper's Hawk	8.4	5.3, 11.8	11.8	4.9, 19.4	Increasing

Table 3 (continued). Trends in breeding birds recorded at Homestead National Monument of America, Nebraska and the Central Mix-grass Prairie Bird Conservation Region for comparison.

	Region				HOME
	1966 - 2011		2001 - 2011		2009 - 2013
Common name	Trend	95% CI	Trend	95% CI	Trend
Dickcissel	0.0	-1.1, 0.9	-2.4	-5.3, 0.2	Increasing
Downy Woodpecker	1.1	0.2, 2.1	1.1	-1.8, 4.2	Decreasing
Eastern Bluebird	3.8	2.7, 4.9	3.4	0.5, 6.5	Decreasing
Eastern Kingbird	-0.7	-1.2, -0.2	-0.7	-2.0, 0.6	Increasing
Eastern Meadowlark	1.0	0.3, 1.8	-0.1	-2.3, 2.3	Increasing
Eastern Phoebe	4.0	2.9, 4.9	3.4	0.6, 5.9	Increasing
Eastern Towhee	3.8	-0.2, 8.5	6.9	-3.7, 21.5	Increasing
Eastern Wood-pewee	3.0	1.2, 4.6	4.3	-0.2, 9.5	Increasing
European Starling	-0.3	-1.2, 0.5	-0.3	-2.6, 2.2	Decreasing
Field Sparrow	-0.3	-1.3, 0.6	3.0	0.6, 5.5	Increasing
Grasshopper Sparrow	-1.1	-1.9, -0.3	-1.4	-3.2, 0.5	Increasing
Gray Catbird	0.9	-0.2, 1.9	-0.5	-3.5, 2.0	Increasing
Great Blue Heron	2.4	1.3, 3.5	1.5	-1.7, 4.4	Decreasing
Great Crested Flycatcher	1.4	0.6, 2.2	2.9	0.8, 5.2	Decreasing
Hairy Woodpecker	-0.4	-2.5, 1.4	-1.4	-7.2, 4.2	Stable
House Sparrow	-5.0	-5.6, -4.4	-4.9	-6.5, -3.4	Stable
House Wren	0.9	0.2, 1.7	-1.3	-3.0, 0.4	Increasing
Indigo Bunting	2.0	1.1, 3.0	1.5	-1.1, 4.0	Increasing
Killdeer	0.4	-0.2, 0.9	0.5	-1.0, 2.0	Decreasing
Lark Sparrow	-0.9	-1.8, -0.1	0.5	-1.2, 2.5	Stable
Mourning Dove	-1.0	-1.4, -0.6	-0.8	-1.8, 0.2	Increasing
Northern Bobwhite	-1.0	-1.7, -0.4	0.0	-1.9, 1.9	Increasing
Northern Cardinal	2.0	1.5, 2.5	2.4	1.1, 3.8	Increasing
Northern Flicker	-1.8	-2.5, -1.2	-0.5	-2.7, 2.0	Increasing
Northern Rough-winged Swallow	-0.2	-1.5, 1.1	-0.2	-3.6, 2.8	Stable
Northern Shoveler*	-4.5	-9.8, 0.2	-2.9	-16.9, 12.7	--
Orchard Oriole	0.3	-0.5, 1.1	5.5	2.9, 8.3	Increasing
Red-bellied Woodpecker	3.0	2.3, 3.8	4.1	2.3, 6.2	Increasing
Red-eyed Vireo	5.6	3.4, 7.6	6.2	2.1, 10.2	Increasing
Red-headed Woodpecker	-0.7	-1.3, -0.1	0.5	-1.3, 2.4	Increasing
Red-tailed Hawk	2.0	1.3, 2.6	2.5	1.1, 4.0	Decreasing
Red-winged Blackbird	-0.5	-0.9, -0.1	-0.7	-1.6, 0.5	Increasing
Ring-necked Pheasant	-0.3	-1.0, 0.5	-0.1	-2.2, 1.8	Increasing
Rose-breasted Grosbeak	0.6	-1.3, 2.7	2.0	-2.0, 6.3	Increasing
Ruby-throated Hummingbird	3.1	-1.1, 7.0	3.8	-7.4, 16.0	Stable
Savanna Sparrow	--	--, --	--	--, --	Stable
Song Sparrow	8.7	6.0, 11.2	8.6	3.2, 13.4	Increasing
Spotted Towhee	4.8	0.9, 8.9	5.4	-0.2, 14.9	Stable
Summer Tanager	2.3	-1.2, 5.5	2.9	-4.3, 11.5	Decreasing

Table 3 (continued). Trends in breeding birds recorded at Homestead National Monument of America, Nebraska and the Central Mix-grass Prairie Bird Conservation Region for comparison.

	Region				HOME
	1966 - 2011		2001 - 2011		2009 - 2013
Common name	Trend	95% CI	Trend	95% CI	Trend
Tufted Titmouse	1.4	0.2, 2.5	-0.2	-3.0, 2.7	Decreasing
Turkey Vulture	2.4	0.8, 3.7	2.6	0.4, 4.9	Decreasing
Warbling Vireo	2.1	1.2, 3.0	2.3	0.4, 4.3	Decreasing
White-breasted Nuthatch	4.6	2.9, 6.2	5.0	1.9, 8.2	Increasing
Wild Turkey	7.1	4.9, 9.2	10.5	5.2, 14.8	Increasing
Wood Duck	6.3	3.3, 9.5	6.0	-2.7, 14.1	Decreasing
Yellow Warbler	2.8	1.6, 4.1	3.9	1.5, 7.1	Increasing
Yellow-billed Cuckoo	-1.1	-1.8, -0.3	-1.2	-3.5, 1.2	Increasing
Yellow-throated Vireo	--	--, --	--	--, --	Decreasing

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

Bolded species names are those species considered of concern for the Central Mix-grass Prairie 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 HOME 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, 79 bird species have been recorded. Seventy-one are permanent or summer residents to the area (Sharpe et al. 2001). Therefore, these 71 species have some value in characterizing the breeding bird community of HOME, and the habitat upon which they rely.

Habitat availability and quality dictates bird population trends within a region (in this case the Central Mixed-grass Prairie 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 HOME 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, HOME may be able to enhance populations through habitat management.

With regards to local versus regional trends, 15 species recorded at HOME have populations that are benefitted by the current habitat on the park and surrounding area. However, sixteen species may find inadequate habitat on the park and surrounding area relative to regional availability.

Similar to 2009 values reported by Peitz (2010), the Red-winged Blackbird, American Goldfinch, Grasshopper Sparrow, and Dickcissel were the most commonly occurring species at HOME, and Red-winged Blackbird and Grasshopper Sparrow the most widely distributed. Changes in population sizes of these common species on 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 Dickcissel, Grasshopper Sparrow, Eastern Meadowlark, and Savanna Sparrow which are grassland obligates. Relatively common species like the Northern Cardinal and Indigo Bunting have improved reproductive success when shrub cover is dense and mid-canopy trees are present (Stokes and Stokes 1996). Therefore, a decline in either species' abundance could very well indicate a control of woody species in the prairie, changes in the amount of shrubs in developed areas, or changes in understory and midstory vegetation along Cub Creek. Currently both species have local populations trending upward, which could very well be the results of infrequent use of prescribed fire in the prairie, leading to increased shrubby plant cover. 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 at HOME provides potentially satisfactory habitat for 68% of the breeding birds observed, these habitats are easily altered if trees along Cub Creek are thinned, insect infestations occur, or the prairie is burned. Our survey data suggests that a number of

species occur frequently enough at HOME 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 Northern Cardinal and Indigo Bunting, the habitat requirement of most these species can be readily identified: i.e. Red-winged Blackbird are associated with marshes and meadows; American Goldfinch requires open areas with some shrubs and trees; Grasshopper Sparrow requires prairie and dry weedy fields; etc. (Stokes and Stokes 1996). Habitat management decisions aimed at influencing bird populations should center on those identified as species of concern for the Central Mixed-grass Prairie Bird Conservation Region.

Conclusions

Since initiating breeding bird surveys at HOME in 2009, HTLN staff and volunteers have surveyed between 9 and 47 plots annually, and recorded 79 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 appears to have habitat favorable to15 bird species, but conditions have resulted in decreasing representation by 16 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 is a baseline for placing bird populations at the park into the context of those seen in the larger Central Mixed-grass Prairie Bird Conservation Region. Over half the species on the park have population trends that are either stable or mirroring those of the region.

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Appendix

Appendix 1. Number of individuals encountered per plot visit, and proportion of 9 plots occupied by breeding bird species at Homestead National Monument of America, Nebraska 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 plots occupied
American Goldfinch	1.00	0.44
American Redstart	0.11	0.11
American Robin	0.11	0.11
Baltimore Oriole	0.33	0.22
Blue Jay	0.33	0.33
Blue-gray Gnatcatcher	0.33	0.33
Brown Thrasher	0.11	0.11
Brown-headed Cowbird	1.33	0.33
Chimney Swift	0.22	0.11
Common Yellowthroat	0.56	0.44
Dickcissel	0.78	0.33
Eastern Meadowlark	0.22	0.22
Eastern Wood-pewee	0.11	0.11
Field Sparrow	0.11	0.11
Grasshopper Sparrow	0.89	0.56
Gray Catbird	0.11	0.11
House Wren	0.22	0.22
Indigo Bunting	0.11	0.11
Northern Bobwhite	0.11	0.11
Northern Cardinal	0.22	0.22
Northern Flicker	0.11	0.11
Orchard Oriole	0.56	0.22
Red-bellied Woodpecker	0.33	0.33
Red-eyed Vireo	0.11	0.11
Red-headed Woodpecker	0.56	0.22
Red-winged Blackbird	1.22	0.56
Ring-necked Pheasant	0.22	0.22
Wild Turkey	0.11	0.11
Yellow Warbler	0.67	0.44
Yellow-billed Cuckoo	0.11	0.11

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

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