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Bird Community Monitoring at Tallgrass Prairie National Preserve, Kansas

Status Report 2001–2023

Tallgrass Prairie National Preserve, Kansas

NPS / HEARTLAND INVENTORY AND MONITORING NETWORK

Bird community monitoring at Tallgrass Prairie National Preserve, Kansas: Status report 2001–2023

Science Report NPS/SR—2024/204

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Abstract

In 2001, the Heartland Inventory and Monitoring Network (Heartland Network) initiated breeding bird surveys on Tallgrass Prairie National Preserve, Kansas, to assess the ecological integrity of the park habitat. Birds are an important component of ecosystems and can serve as valuable indicators of habitat change. In the 23 years of bird surveys at Tallgrass Prairie National Preserve (2001 to 2023, excluding 2003), there were 2,599 plot visits. A total of 146 different bird species were detected, 104 of which have the potential to breed within the park. These 104 species represent approximately 87% of the total species one would reasonably expect to have breeding populations on Tallgrass Prairie National Preserve. Fourteen breeding species and five other species are considered *species of conservation concern* for the Eastern Tallgrass Prairie Bird Conservation Region where the park is located. Nine breeding species and four migrant species on Tallgrass Prairie National Preserve are grassland obligates.

Twenty-one bird species in upland tallgrass prairie habitat and 16 bird species in riparian habitat were recorded in sufficient numbers to estimate annual abundances and population trends. The populations of three upland species (Dickcissel [*Spiza americana*], Mourning Dove [*Zenaida macroura]*, and Northern Bobwhite [*Colinus virginianus*]) and three riparian species (Blue-gray Gnatcatcher [*Polioptila caerulea*], Northern Cardinal [*Cardinalis cardinalis*], and Tufted Titmouse [*Baeolophus bicolor*]) increased significantly since 2001, the year when monitoring began. Killdeer (*Charadrius vociferus*), Red-winged Blackbird (*Agelaius phoeniceus*), and Upland Sandpiper (*Bartramia longicauda*) populations declined significantly in the upland habitat. All other species in both habitats had stable or uncertain population trends.

A comparison of population trends on Tallgrass Prairie National Preserve with trends for the Eastern Tallgrass Prairie Bird Conservation Region suggests that the bird community at the park is faring similarly to that of the region. One notable exception is the Northern Bobwhite, which is faring significantly better on the park than in the region. Stable park populations of Brown-headed Cowbird (*Molothrus ater*) and Grasshopper Sparrow (*Ammodramus savannarum*) also differ, but not significantly, from the region where populations are in decline.

Acknowledgments

We would like to thank the staff of Tallgrass Prairie National Preserve, Kansas, for allowing us access to the park during our site visits. We would also like to thank the staff and volunteers who assisted with bird surveys: D. M. Cameron, C. M, Chiappone, C. E. Defore, K. D. Edwardson, R. A. Guffy, C. D. Hase, K. J. Hase, R. M. Hicks, B. P. Lipp, D. W. Londe, D. L. McCullough, A. D. Page, K. M. Rice, J. A. Rundell, A. U. Rutter, W. B. Smith, L. M. Walker, and M. S. Wormington.

Introduction

Birds are an important component of park ecosystems. 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. Management activities aimed at preserving habitat for bird populations (e.g., habitat for neotropical migrants) can have the added benefit of preserving entire ecosystems and their attendant ecosystem services (Karr 1991; Maurer 1993). The National Park Service plays a role in conserving birds and their habitat under the authority of the Migratory Bird Treaty Act of 1918 (as amended) and Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. Birds also have a tremendous following among the public, and many parks provide information on the status and trends of birds through their interpretive programs.

Tallgrass Prairie National Preserve, Kansas, is in the west-central section of the Eastern Tallgrass Prairie Bird Conservation Region (Figure 1), one of the 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 2023).

The Eastern Tallgrass Prairie Bird Conservation Region consists of the tallest and lushest grasslands of the Great Plains (NABCI 2023). However, forests dominate the region in the east, creating an oak-savanna ecotone between the eastern woodlands and the western prairie. Tallgrass Prairie National Preserve is in the western-most section of the region, which consists of the Flint Hills with its remnant native tallgrass prairie (Fitzgerald et al. 2000). The rocky, rolling terrain of the Flint Hills has been largely untouched by the plow. Threats to the upland and wetland habitats of this region include urbanization, recreational development, energy infrastructure and development, and agricultural expansion. High priority grassland birds that persist in some areas include the Greater Prairie-chicken (*Tympanuchus cupido*) and Henslow's Sparrow (*Centronyx henslowii*). Approximately 119 species of breeding birds can be found in the habitat of the Flint Hills around Tallgrass Prairie National Preserve (Thompson et al. 2011).

Data collected during the U.S. Geological Survey's (USGS) annual North American Breeding Bird Surveys (BBS) between 1966 and 2019 indicate that several bird species that breed at Tallgrass Prairie National Preserve show evidence of long-term population decline (Sauer et al. 2020). In fact, 35% of the breeding species in the Eastern Tallgrass Prairie Bird Conservation Region have populations reported to be in decline, with species such as the Black-billed Cuckoo (*Coccyzus erythropthalmus*), Grasshopper Sparrow (*Ammodramus savannarum*), Loggerhead Shrike (*Lanius ludovicianus*), and Western Meadowlark (*Sturnella neglecta*) declining at alarming rates.

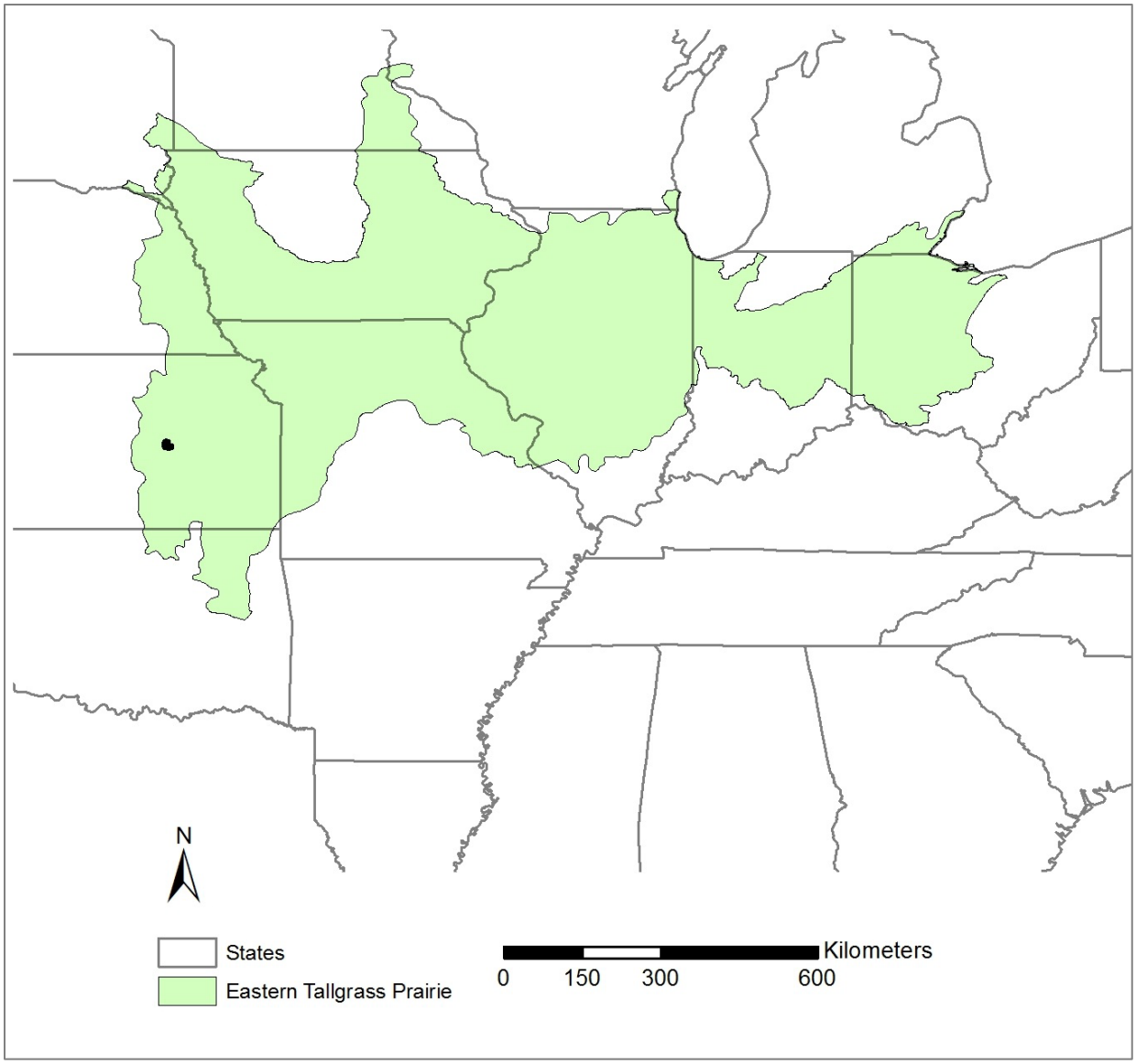

Figure 1. Location of Tallgrass Prairie National Preserve, Kansas, within the Eastern Tallgrass Prairie Bird Conservation Region. NPS

Long-term trends in community composition and abundance of breeding bird populations provide one measure for assessing the ecological integrity and sustainability of this system. We use trends in the composition and abundance of bird populations as long-term indicators of ecosystem integrity at Tallgrass Prairie National Preserve. *Ecosystem integrity* is defined here as the system's capability to support and maintain a balanced community of birds having a species composition, diversity, and functional organization comparable to that of the natural habitats of the region. 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 number of individuals and species composition of bird communities reflect the effectiveness of management actions taken to restore and maintain the landscape at the park.

Objectives

There is one primary objective for monitoring breeding birds at Tallgrass Prairie National Preserve.

- Identify significant temporal changes in the species composition and abundance of bird communities that occur at the park during the breeding season.

This report summarizes species composition and population trends for birds recorded during the 23 years of monitoring at Tallgrass Prairie National Preserve starting in 2001.

Methods

Site Selection

Permanent monitoring locations (plots) were created by overlaying a systematic grid of 400 × 400 m cells (originating from a random start point) across the upland habitat at Tallgrass Prairie National Preserve and placing plots at the intersection of grid lines. The orientation of the systematic grid was rotated 34 degrees from north to prevent sampling plots from being influenced by man-made features that are oriented along cardinal directions. Riparian corridors were identified as a separate stratum, with sampling extending 125 m on either side of the stream channel (Palmer and Fox creeks). The riparian stratum makes up 5.3% of the total area (4,398 ha) at Tallgrass Prairie National Preserve. Within the riparian stratum, plots were located at 250 m intervals along the extent of a stream. Any plots from the overall grid that fell within the riparian stratum were discarded. We established 242 upland (including brome plots) and 18 riparian plots (Figure 2). Monitoring occurred on 54 to 260 plots annually depending on the year (Table 1). After 2014, sampling of plot 223 was discontinued since the new visitor center was built on its location.

To limit the effort needed to complete annual breeding bird surveys from 2004 through 2008, an interpenetrating, split panel revisit plan (1-0,1-4) was utilized in which plots in one panel were sampled in all years (n = 41); and plots in five additional panels were visited on a rotating basis once every five years (n = 40 or 41). Panel membership was assigned to all plots in the systematic sample by numbering plots sequentially along transects aligned northwest to southeast, starting with the most northeastern plot. Assignment to panels A through F was done in a repeated fashion to the sequenced numbers (i.e., 1 = A, 2 = B, 3 = C, 4 = D, 5 = E, 6 = F, 7 = A, 8 = B, and so on). To determine membership in the annual panel and the sequence of the remaining panels, the six letters (A–F) were randomly sequenced. The result was E, A, D, B, F, and C. Therefore, panel E was visited annually, panel A in year 1, panel D in year 2, panel B in year 3, panel F in year 4, and panel C in year 5. Along with two panels, annual sampling included the 18 riparian plots, resulting in an annual workload of approximately 100 plots per year, with 50 percent of the annual sampling effort in upland tallgrass prairie allocated to the annually sampled panel. The interpenetrating, split panel revisit plan was designed by statistical consultant T. McDonald, Western Ecosystems Technology, Inc., Cheyenne, WY.

Starting in 2009, breeding bird monitoring was conducted by Tallgrass Prairie National Preserve staff and volunteers, allowing the Heartland Inventory and Monitoring Network (Heartland Network) to modify their sampling schedule to visit the preserve every fourth year. To facilitate this change, Tallgrass Prairie National Preserve staff and volunteers were asked to visit plots identified in panel E and riparian plots, and to sample as many other plots as their schedules would allow. Heartland Network monitored all available plots during the fourth-year visits—2010, 2014, 2018, and 2023 (fifth year because of travel restrictions due to a world-wide pandemic; Table 1).

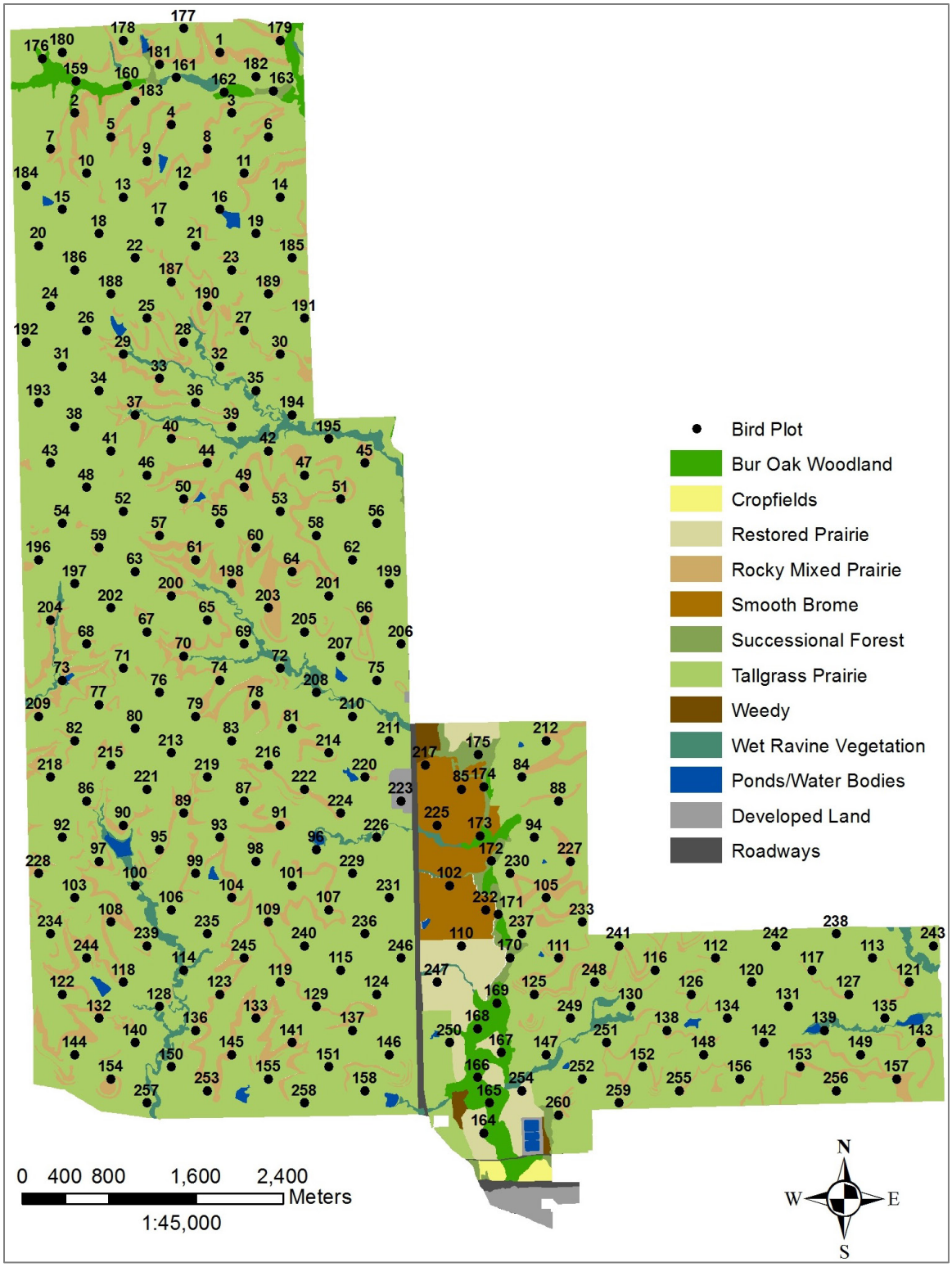

Figure 2. Bird plot locations on Tallgrass Prairie National Preserve, Kansas. Vegetation mapping and classification provided by Kindscher et al. (2011). NPS

Table 1. Number of plots sampled, sampling dates, and observers who conducted the surveys for breeding bird surveys conducted at Tallgrass Prairie National Preserve, Kansas, by year.

Year	Sampling Dates	Number of Plots Sampled	Observer(s)
2001	May 22–June 13	176	D. G. Peitz [A]
2002	May 20–June 20	260	D. G. Peitz [A]
2004	May 10–May 27	97	D. G. Peitz [A]
2005	May 17–May 24	97	D. G. Peitz [A]
2006	May 16–May 23	99	D. G. Peitz [A]
2007	May 17–May 23	89	D. G. Peitz [A]
2008	June 2–June 8	95	D. G. Peitz [A]
2009	May 30–June 4	58	C. D. Hase, K. J. Hase, D. L. McCullough, and J. A. Rundell
2010	May 11–May 24	260	D. L. McCullough and D. G. Peitz [A]
2011	May 23–June 3	58	C. D. Hase, K. J. Hase, D. L. McCullough, and J. A. Rundell
2012	May 24–June 13	54	R. A. Guffy, K. J. Hase, D. L. McCullough, A. D. Page, K. M. Rice, J. A. Rundell, A. U. Rutter, and M. S. Wormington
2013	May 6–June 17	58	K. J. Hase and D. L. McCullough
2014	May 13–May 21	259	D. W. Londe [A] and D. G. Peitz [A]
2015	May 30–June 14	58	K. J. Hase and L. M. Walker
2016	May 14–June 12	58	K. J. Hase
2017	May 13–June 16	58	C. E. Defore, K. J. Hase, R. M. Hicks, and D. L. McCullough
2018	May 15–May 25	255	D. W. Londe, D. G. Peitz [A], and B. S. Thornton [A]
2019	May 22–June 17	58	K. J. Hase and D. L. McCullough
2020	May 17–June 9	58	C. D. Hase, K. J. Hase, and D. L. McCullough
2021	May 8–June 11	56	D. M. Cameron, K. D. Edwardson, K. J. Hase, B. P. Lipp, D. L. McCullough, and W. B. Smith
2022	May 23–June 12	79	D. M. Cameron
2023	May 11–May 19	259	C. M. Chiappone, D. J Marcum [A], and D. G Peitz [A]

[A] Heartland Network staff.

Bird Surveys

Bird surveys followed methods outlined in the bird monitoring protocol by Peitz et al. (2008) and summarized in this report. 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-minute sampling periods were recorded along with their corresponding distance from the observer. 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 rather than 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 GNSS 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 Tallgrass Prairie National Preserve by identifying species missed during timed surveys. However, these observations were not included in any analysis as they did not directly relate to an individual plot. We sampled birds in the morning from the time it was light enough to observe birds to four hours after sunrise.

Variable circular plot counts were conducted 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 5-minute survey are included. Individual birds recorded from a previous plot were noted and excluded from analysis except when developing detection functions using the Distance software.

Data Analysis

Prior to summary analysis, the residency status (migrant, permanent resident, summer resident, transient, and winter resident) of each bird species recorded was determined (See Results). Identifying the residency of each species helps to exclude migrants, transients, and winter residents from analysis of breeding birds within Tallgrass Prairie National Preserve. The park's vegetation is primarily upland prairie or riparian woodlands. As such, plots were grouped in either an upland (242 plots) or riparian (18 plots) data set for analysis. The proportion of plots occupied by each bird species was calculated (total number of plots occupied by an observed species/plots surveyed) and reported in Appendices B and C for upland habitat and Appendices D and E for riparian habitat. By doing so we can assess how widespread each individual species is across their preferred habitat type.

For species with greater than 60 recorded observations, Distance software (Distance 6.0 Release 2) was used to determine the habitat-wide abundance of each (Buckland et al. 2001). A central part of the analysis in Distance is the modeling of a detection function to account for individuals present but not observed before calculating species abundance. Four candidate functions plus series expansion—half-normal + cosine, uniform + cosine, half-normal + hermite polynomial, and hazard-rate + simple polynomial—were considered in determining the detection function of each species, and the most robust models were selected by Distance based on the lowest Akaike Information Criterion (AIC) values.

For upland plots, the half-normal + cosine function was chosen for three species: Brown Thrasher (*Toxostoma rufum*), Greater Prairie-chicken, and Red-winged Blackbird (*Agelaius phoeniceus*). The half-normal function without series expansion was selected for three species: Great Crested Flycatcher (*Myiarchus crinitus*), Northern Cardinal (*Cardinalis cardinalis*), and Tufted Titmouse (*Baeolophus bicolor*). The hazard-rate + simple polynomial function was selected for three species: Dickcissel (*Spiza americana*), Grasshopper Sparrow, and Henslow's Sparrow. The hazard-rate function without series expansion was selected for 12 species: American Crow (*Corvus brachyrhynchos*), Brown-headed Cowbird (*Molothrus ater*), Eastern Kingbird (*Tyrannus tyrannus*), Eastern Meadowlark (*Sturnella magna*), Horned Lark (*Eremophila alpestris*), Killdeer (*Charadrius vociferus*), Lark Sparrow (*Chondestes grammacus*), Mourning Dove (*Zenaida macroura*), Northern

Bobwhite (*Colinus virginianus*), Orchard Oriole (*Icterus spurius*), Upland Sandpiper (*Bartramia longicauda*), and Western Meadowlark. Habitat-wide abundances for upland species with greater than 60 observations are reported in Appendix B.

For riparian plots, the half-normal + cosine function was chosen for four species: Dickcissel, Indigo Bunting (*Passerina cyanea*), Northern Cardinal, and Red-bellied Woodpecker (*Melanerpes carolinus*). The half-normal function without series expansion was selected for three species: Blue-gray Gnatcatcher (*Polioptila caerulea*), Carolina Wren (*Thryothorus ludovicianus*), and Tufted Titmouse. The hazard-rate + simple polynomial function was chosen for one species: American Crow. The hazard-rate function without series expansion was selected for eight species: Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), Eastern Wood-Pewee (*Contopus virens*), Great Crested Flycatcher, Northern Parula (*Setophaga americana*), Red-eyed Vireo (*Vireo olivaceus*), White-breasted Nuthatch (*Sitta carolinensis*), and Yellow-billed Cuckoo (*Coccyzus americanus*). Habitat-wide abundances for riparian species with greater than 60 observations are reported in Appendix D.

For each upland species with fewer than 60 observations, habitat-wide abundance was calculated by first deriving a species density from observations recorded within a 200 m radius (12.56 ha) around each plot center and then calculating abundance based on average plot densities. Habitat-wide abundances for upland species with less than 60 observations are reported in Appendix C. For each riparian species with fewer than 60 observations, habitat-wide abundance was calculated by first deriving a species density from observations recorded within a 125 m radius (4.91 ha) around each plot center and then calculating abundance based on average plot densities. Habitat-wide abundances for riparian species with less than 60 observations are reported in Appendix E.

For species with adequate abundance (those with greater than 60 observations) trends were calculated by regressing abundance against survey years in the statistical package "rtrim" (built under R version 3.6.3) and reported in Appendix F. Rtrim is the R version of the statistical software package "TRIM," a program developed for the analysis of count data obtained from wildlife population monitoring (Pannekoek and van Strien 2005). It analyzes time series of counts using Poisson regression and produces estimates of yearly indices and trends. We employed a linear trend model with changepoints selected by a stepwise procedure. Serial correlation in count data among years and overdispersion are accounted for with this software. Although TRIM has the capacity to estimate missing data, we restricted our regression analysis to the 40 upland plots identified in panel E for determining trends in upland habitat, and the 18 riparian plots for the riparian habitat (Appendix A). By doing this we analyzed a consistent ratio of upland plots and riparian plots across years.

For this report, we also obtained the 2001–2019 regional breeding bird trends for the Eastern Tallgrass Prairie Bird Conservation Region from the Breeding Bird Survey (BBS) website of the USGS Patuxent Wildlife Research Center (Appendix G; Sauer et al. 2020). It is possible to determine trends for many bird species and many regions of interest for periods ranging from 1966 to 2019 by using the interactive calculator available at the BBS Regional Trend Analysis Form website.

However, we chose the last 19-year period of available data to maximize the accuracy of regional trend results without going beyond the sampling period at Tallgrass Prairie National Preserve

We compared regional trends with those calculated using TRIM for the upland and riparian habitats of Tallgrass Prairie National Preserve. Regional trends with a confidence interval that straddled zero were classified as uncertain for comparison with results from the park. It should be noted that trends determined by the BBS were calculated using a different methodology. Due to limitations in the BBS field data collections, hierarchical modeling was used to produce an annual index of abundance, and trends were then estimated as constant annual rates based only on the first and last years of the intervals selected. Since all but the first and last year indices are ignored in this approach, trends based on BBS data tend to display variability when compared among different broadly overlapping intervals, and interpretation of BBS results should be made with caution.

Trends in the upland and riparian diversity, richness, and species distribution evenness of the breeding bird community on Tallgrass Prairie National Preserve were assessed by regressing each metric against survey years in the add-in statistical software of Microsoft Excel and graphing the results. Prior to trend analysis, bird community diversity values were calculated annually for each habitat type using the Shannon Diversity Index (*H'):*

$$H' = -\sum_{i=1}^{s} \left(\frac{n_i}{N}\right) \bullet \ln\left(\frac{n_i}{N}\right)$$

where n_i/N is the proportion of the total number of individuals in a community consisting of the *ith* species (Shannon 1949). Species richness values were determined as the total number of bird taxa recorded annually in each habitat type. Species distribution evenness values were calculated using Pielou's evenness index (*J'):*

$$J' = \frac{H'}{Hmax}$$

where *H'* is the Shannon Diversity Index and *Hmax* is the maximum possible diversity for a given number of species if all species are present in equal numbers (*ln(annual species richness)*). *J'* is a measure of how evenly individuals are distributed within a community when compared to the equal distribution and maximum diversity a community can have (Pielou 1969).

Results

Between 2001 and 2023, we surveyed for breeding birds on 54 to 260 plots annually at Tallgrass Prairie National Preserve (Table 1), excluding 2003 when no plots were sampled. During the sampling period, 2,599 plot visits were made. A total of 146 different bird species were recorded, 104 of which have the potential to breed within Tallgrass Prairie National Preserve (Table 2; Thompson et al. 2011). However, one breeding species, Great Egret (*Ardea alba*), was only observed outside of the 5-minute survey periods. Additionally, one winter resident (Song Sparrow [*Melospiza melodia]),* one transient (Burrowing Owl [*Athene cunicularia]*), and ten migrants (Franklin's Gull [*Leucophaeus pipixcan]*, Least Tern [*Sternula antillarum*], Lesser Yellowlegs [*Tringa flavipes*], Pectoral Sandpiper [*Calidris melanotos*], Ruddy Duck [*Oxyura jamaicensis*], Semipalmated Sandpiper [*Calidris pusilla*], Sora [*Porzana Carolina*], Swainson's Thrush [*Catharus ustulatus*], Wilson's Phalarope [*Phalaropus tricolor*], and White-faced Ibis [*Plegadis chihi*]) were recorded outside of the 5-minute survey periods.

Table 2. Bird species recorded during breeding bird surveys at Tallgrass Prairie National Preserve, Kansas, between 2001 and 2023. The American Ornithologists' Union Code (AOU code) and residency status of each species is given. Species names are valid and verified names taken from the Integrated Taxonomic Information System website (ITIS 2023).

Common Name	Scientific Name	AOU Code	Residency [A]
Acadian Flycatcher [B]	***Empidonax virescens***	**ACFL**	**M**
American Coot	*Fulica americana*	AMCO	R
American Crow	*Corvus brachyrhynchos*	AMCR	R
American Goldfinch	*Spinus tristis*	AMGO	R
American Robin	*Turdus migratorius*	AMRO	R
American Tree Sparrow	*Spizelloides arborea*	ATSP	WR
Bald Eagle [B]	***Haliaeetus leucocephalus***	**BAEA**	**WR**
Baltimore Oriole	*Icterus galbula*	BAOR	SR
Bank Swallow	*Riparia riparia*	BANS	SR
Barn Swallow	*Hirundo rustica*	BARS	SR
Barred Owl	*Strix varia*	BADO	R
Bell's Vireo [B]	***Vireo bellii***	**BEVI**	**SR**
Belted Kingfisher	*Megaceryle alcyon*	BEKI	R
Bewick's Wren [B]	***Thryomanes bewickii***	**BEWR**	**SR**
Black-billed Cuckoo [B]	***Coccyzus erythropthalmus***	**BBCU**	**SR**
Black-capped Chickadee	*Poecile atricapillus*	BCCH	R

[A] Residency: M = late migrant; SR = summer resident; R = year-round resident; WR = winter resident; T = Transient; according to Thompson et al. (2011).

[B] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[C] Resident species recorded between point transects or other times outside of 5-minute survey periods.

Table 2 (continued). Bird species recorded during breeding bird surveys at Tallgrass Prairie National Preserve, Kansas, between 2001 and 2023. The American Ornithologists' Union Code (AOU code) and residency status of each species is given. Species names are valid and verified names taken from the Integrated Taxonomic Information System website (ITIS 2023).

Common Name	Scientific Name	AOU Code	Residency [A]
Black Tern [B]	***Chlidonias niger***	**BLTE**	**M**
Blue Jay	*Cyanocitta cristata*	BLJA	R
Blue-gray Gnatcatcher	*Polioptila caerulea*	BGGN	SR
Blue Grosbeak	*Passerina caerulea*	BLGR	SR
Blue-winged Teal	*Spatula discors*	BWTE	SR
Bobolink	*Dolichonyx oryzivorus*	BOBO	M
Brown Creeper	*Certhia americana*	BRCR	WR
Brown-headed Cowbird	*Molothrus ater*	BHCO	R
Brown Thrasher	*Toxostoma rufum*	BRTH	SR
Buff-breasted Sandpiper [B]	***Calidris subruficollis***	**BBSA**	**M**
Burrowing Owl [C]	*Athene cunicularia*	BUOW	T
Canada Goose	*Branta canadensis*	CANG	R
Carolina Chickadee	*Poecile carolinensis*	CACH	T
Carolina Wren	*Thryothorus ludovicianus*	CARW	R
Cattle Egret	*Bubulcus ibis*	CAEG	SR
Cedar Waxwing	*Bombycilla cedrorum*	CEDW	R
Chimney Swift	*Chaetura pelagica*	CHSW	SR
Chipping Sparrow	*Spizella passerina*	CHSP	SR
Clay-colored Sparrow	*Spizella pallida*	CCSP	M
Cliff Swallow	*Petrochelidon pyrrhonota*	CLSW	SR
Common Grackle	*Quiscalus quiscula*	COGR	R
Common Nighthawk	*Chordeiles minor*	CONI	SR
Common Yellowthroat	*Geothlypis trichas*	COYE	SR
Cooper's Hawk	*Accipiter cooperii*	COHA	R
Dickcissel [B]	***Spiza americana***	**DICK**	**SR**
Downy Woodpecker	*Dryobates pubescens*	DOWO	R
Double-crested Cormorant	*Phalacrocorax auritus*	DCCO	M
Eastern Bluebird	*Sialia sialis*	EABL	R
Eastern Kingbird	*Tyrannus tyrannus*	EAKI	SR
Eastern Meadowlark	*Sturnella magna*	EAME	R

[A] Residency: M = late migrant; SR = summer resident; R = year-round resident; WR = winter resident; T = Transient; according to Thompson et al. (2011).

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Common Name	Scientific Name	AOU Code	Residency [A]
Eastern Phoebe	*Sayornis phoebe*	EAPH	SR
Eastern Towhee	*Pipilo erythrophthalmus*	EATO	SR
Eastern Wood-pewee	*Contopus virens*	EAWP	SR
Eurasian Collared-dove	*Streptopelia decaocto*	EUCD	R
European Starling	*Sturnus vulgaris*	EUST	R
Field Sparrow [B]	***Spizella pusilla***	**FISP**	**R**
Franklin's Gull [C]	*Leucophaeus pipixcan*	FRGU	M
Grasshopper Sparrow [B]	***Ammodramus savannarum***	**GRSP**	**SR**
Gray Catbird	*Dumetella carolinensis*	GRCA	SR
Great Blue Heron	*Ardea Herodias*	GBHE	R
Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	SR
Great Egret [C]	*Ardea alba*	GREG	SR
Great Horned Owl	*Bubo virginianus*	GHOW	R
Greater Prairie-chicken	*Tympanuchus cupido*	GRPC	R
Greater Roadrunner	*Geococcyx californianus*	GRRO	T
Great-tailed Grackle	*Quiscalus mexicanus*	GTGR	R
Green Heron	*Butorides virescens*	GRHE	SR
Golden-winged Warbler	*Vermivora chrysoptera*	GWWA	T
Hairy Woodpecker	*Leuconotopicus villosus*	HAWO	R
Henslow's Sparrow [B]	***Centronyx henslowii***	**HESP**	**SR**
Horned Lark	*Eremophila alpestris*	HOLA	R
House Finch	*Haemorhous mexicanus*	HOFI	R
House Wren	*Troglodytes aedon*	HOWR	SR
Indigo Bunting	*Passerina cyanea*	INBU	SR
Kentucky Warbler [B]	***Geothlypis formosa***	**KEWA**	**SR**
Killdeer	*Charadrius vociferus*	KILL	SR
Lark Sparrow	*Chondestes grammacus*	LASP	SR
Least Flycatcher	*Empidonax minimus*	LEFL	M
Least Tern [C]	*Sternula antillarum*	LETE	M
Lesser Yellowlegs [C]	*Tringa flavipes*	LEYE	M

[A] Residency: M = late migrant; SR = summer resident; R = year-round resident; WR = winter resident; T = Transient; according to Thompson et al. (2011).

[B] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[C] Resident species recorded between point transects or other times outside of 5-minute survey periods.

Table 2 (continued). Bird species recorded during breeding bird surveys at Tallgrass Prairie National Preserve, Kansas, between 2001 and 2023. The American Ornithologists' Union Code (AOU code) and residency status of each species is given. Species names are valid and verified names taken from the Integrated Taxonomic Information System website (ITIS 2023).

Common Name	Scientific Name	AOU Code	Residency [A]
Lincoln's Sparrow	***Melospiza lincolnii***	**LISP**	**M**
Loggerhead Shrike [B]	***Lanius ludovicianus***	**LOSH**	**R**
Louisiana Waterthrush	*Parkesia motacilla*	LOWA	SR
Mallard	*Anas platyrhynchos*	MALL	R
Mourning Dove	*Zenaida macroura*	MODO	R
Northern Bobwhite	*Colinus virginianus*	NOBO	R
Northern Cardinal	*Cardinalis cardinalis*	NOCA	R
Northern Flicker [B]	***Colaptes auratus***	**NOFL**	**R**
Northern Harrier	*Circus cyaneus*	NOHA	R
Northern Mockingbird	*Mimus polyglottos*	NOMO	R
Northern Parula	*Setophaga americana*	NOPA	SR
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	NRWS	SR
Northern Waterthrush	*Parkesia noveboracensis*	NOWA	T
Orchard Oriole	*Icterus spurius*	OROR	SR
Painted Bunting	*Passerina ciris*	PABU	SR
Palm Warbler	*Setophaga palmarum*	PAWA	M
Pectoral Sandpiper [C]	*Calidris melanotos*	PESA	M
Philadelphia Vireo	*Vireo philadelphicus*	PHVI	M
Pied-billed Grebe [B]	***Podilymbus podiceps***	**PBGR**	**SR**
Pileated Woodpecker	*Dryocopus pileatus*	PIWO	R
Prairie Warbler	*Setophaga discolor*	PRAW	T
Prothonotary Warbler [B]	***Protonotaria citrea***	**PROW**	**SR**
Purple Martin	*Progne subis*	PUMA	SR
Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	R
Red-eyed Vireo	*Vireo olivaceus*	REVI	SR
Red-headed Woodpecker [B]	***Melanerpes erythrocephalus***	**RHWO**	**R**
Red-tailed Hawk	*Buteo jamaicensis*	RTHA	R
Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	R
Ring-necked Pheasant	*Phasianus colchicus*	RNEP	R
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	SR

[A] Residency: M = late migrant; SR = summer resident; R = year-round resident; WR = winter resident; T = Transient; according to Thompson et al. (2011).

[B] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[C] Resident species recorded between point transects or other times outside of 5-minute survey periods.

Table 2 (continued). Bird species recorded during breeding bird surveys at Tallgrass Prairie National Preserve, Kansas, between 2001 and 2023. The American Ornithologists' Union Code (AOU code) and residency status of each species is given. Species names are valid and verified names taken from the Integrated Taxonomic Information System website (ITIS 2023).

Common Name	Scientific Name	AOU Code	Residency [A]
Rock Pigeon	*Columba livia*	ROPI	R
Ruby-throated Hummingbird	*Archilochus colubris*	RTHU	SR
Ruddy Duck [C]	*Oxyura jamaicensis*	RUDU	M
Savannah Sparrow	*Passerculus sandwichensis*	SAVS	M
Scarlet Tanager	*Piranga olivacea*	SCTA	SR
Scissor-tailed Flycatcher	*Tyrannus forficatus*	STFL	SR
Sedge Wren	*Cistothorus platensis*	SEWR	M
Semipalmated Sandpiper [C]	*Calidris pusilla*	SESA	M
Solitary Sandpiper [B]	***Tringa solitaria***	**SOSA**	**M**
Song Sparrow [C]	*Melospiza melodia*	SOSP	WR
Sora [C]	*Porzana Carolina*	SORA	M
Spotted Sandpiper	*Actitis macularius*	SPSA	SR
Summer Tanager	*Piranga rubra*	SUTA	SR
Swainson's Hawk	*Buteo swainsoni*	SWHA	SR
Swainson's Thrush [C]	*Catharus ustulatus*	SWTH	M
Tennessee Warbler	*Leiothlypis peregrina*	TEWA	M
Tree Swallow	*Tachycineta bicolor*	TRES	SR
Tufted Titmouse	*Baeolophus bicolor*	TUTI	R
Turkey Vulture	*Cathartes aura*	TUVU	SR
Upland Sandpiper [B]	***Bartramia longicauda***	**UPSA**	**SR**
Veery	*Catharus fuscescens*	VEER	M
Vesper Sparrow	*Pooecetes gramineus*	VESP	M
Warbling Vireo	*Vireo gilvus*	WAVI	SR
Western Flycatcher	*Empidonax difficilis*	WEFL	T
Western Kingbird	*Tyrannus verticalis*	WEKI	SR
Western Meadowlark	*Sturnella neglecta*	WEME	R
White-breasted Nuthatch	*Sitta carolinensis*	WBNU	R
White-crowned Sparrow	*Zonotrichia leucophrys*	WCSP	WR

[A] Residency: M = late migrant; SR = summer resident; R = year-round resident; WR = winter resident; T = Transient; according to Thompson et al. (2011).

[B] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[C] Resident species recorded between point transects or other times outside of 5-minute survey periods.

Table 2 (continued). Bird species recorded during breeding bird surveys at Tallgrass Prairie National Preserve, Kansas, between 2001 and 2023. The American Ornithologists' Union Code (AOU code) and residency status of each species is given. Species names are valid and verified names taken from the Integrated Taxonomic Information System website (ITIS 2023).

Common Name	Scientific Name	AOU Code	Residency [A]
White-eyed Vireo	*Vireo griseus*	WEVI	M
White-faced Ibis [C]	*Plegadis chihi*	WFIB	M
White-throated Sparrow	*Zonotrichia albicollis*	WTSP	WR
Wild Turkey	*Meleagris gallopavo*	WITU	R
Willow Flycatcher	*Empidonax traillii*	WIFL	M
Wilson's Phalarope [C]	*Phalaropus tricolor*	WIPH	M
Wood Duck	*Aix sponsa*	WODU	SR
Yellow-bellied Sapsucker	*Sphyrapicus varius*	YBSA	WR
Yellow-billed Cuckoo	*Coccyzus americanus*	YBCU	SR
Yellow-breasted Chat	*Icteria virens*	YBCH	SR
Yellow-throated Vireo	*Vireo flavifrons*	YTVI	SR
Yellow Warbler	*Steophaga petechia*	YEWA	SR

[A] Residency: M = late migrant; SR = summer resident; R = year-round resident; WR = winter resident; T = Transient; according to Thompson et al. (2011).

[B] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[C] Resident species recorded between point transects or other times outside of 5-minute survey periods.

Fourteen breeding species are considered *species of conservation concern* for the Eastern Tallgrass Prairie Bird Conservation Region where Tallgrass Prairie National Preserve is located: Bell's Vireo (*Vireo bellii*), Bewick's Wren (*Thryomanes bewickii*), Black-billed Cuckoo, Dickcissel, Field Sparrow (*Spizella pusilla*), Grasshopper Sparrow, Henslow's Sparrow, Kentucky Warbler (*Geothlypis formosa*), Loggerhead Shrike, Northern Flicker (*Colaptes auratus*), Pied-billed Grebe (*Podilymbus podiceps*), Prothonotary Warbler (*Protonotaria citrea*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), and Upland Sandpiper (Table 2; USFWS 2008). Five other *species of conservation concern* were also observed: Acadian Flycatcher (*Empidonax virescens*), Bald Eagle (*Haliaeetus leucocephalus*), Black Tern (*Chlidonias niger*), Buff-breasted Sandpiper (*Tryngites subruficollis*), and Solitary Sandpiper (*Tringa solitaria*). However, these five species are not likely to breed within habitats found on Tallgrass Prairie National Preserve.

Nine breeding species are considered grassland obligates: Dickcissel, Eastern Meadowlark, Grasshopper Sparrow, Greater Prairie-chicken, Henslow's Sparrow, Horned Lark, Northern Harrier (*Circus cyaneus*), Upland Sandpiper, and Western Meadowlark (USGS 2014). Four migrant species are also grassland obligates: Bobolink (*Dolichonyx oryzivorus*), Savannah Sparrow (*Passerculus sandwichensis*), Sedge Wren (*Cistothorus platensis*), and Vesper Sparrow (*Pooecetes gramineus;* USGS 2014).

Twenty-one breeding species in upland tallgrass prairie habitat and 16 in riparian habitat on Tallgrass Prairie National Preserve were observed in sufficient numbers to calculate annual abundances with some degree of confidence (Appendices B and D). Three of the 21 species in upland habitat (Dickcissel, Mourning Dove, and Northern Bobwhite) have populations with moderate increases over the 23-year monitoring period (Figure 3; Appendix F). Three of the 16 species in riparian habitat (Blue-gray Gnatcatcher, Northern Cardinal, and Tufted Titmouse) also have populations with moderate increases during the monitoring period (Figure 4; Appendix F). In the upland habitat, one species (Upland Sandpiper) had a population with a strong decline, and two species (Killdeer and Red-winged Blackbird) had populations with moderate declines since our monitoring began. None of the common species in riparian habitat showed evidence of decline. Two species in each habitat type had stable populations: Brown-headed Cowbird and Grasshopper Sparrow in upland habitat, and Eastern Wood-pewee and Great Crested Flycatcher in riparian habitat. All other species in both habitat types had uncertain population trends.

Park trend results for six common upland species (Dickcissel, Great Crested Flycatcher, Greater Prairie-chicken, Henslow's Sparrow, Red-bellied Woodpecker, and Upland Sandpiper) mirrored trends reported by Sauer et al. (2020) for the Eastern Tallgrass Prairie Bird Conservation Region (Appendix G). Three common riparian species (Northern Cardinal, White-breasted Nuthatch, and Yellow-billed Cuckoo) also had trends that mirrored those seen in the region. Trend results for the remaining common species in both habitats were less clear. When a park population trend for one of these remaining common species was positive, negative, stable, or uncertain, their corresponding population trend for the Eastern Tallgrass Prairie Bird Conservation Region was in the opposite direction or uncertain.

In park upland habitat, diversity ($P = 0.70$), richness ($P = 0.12$), and evenness in the distribution of individuals ($P = 0.14$) across breeding bird species were unchanged over the 23-year monitoring period (Figure 5). Similarly, diversity ($P = 0.38$), richness ($P = 0.15$), and evenness in distribution of individuals ($P = 0.21$) in the park riparian habitat did not change over time (Figure 6). Bird richness averaged 39 species annually in the park upland tallgrass prairie habitat and 31 species annually in park riparian habitat.

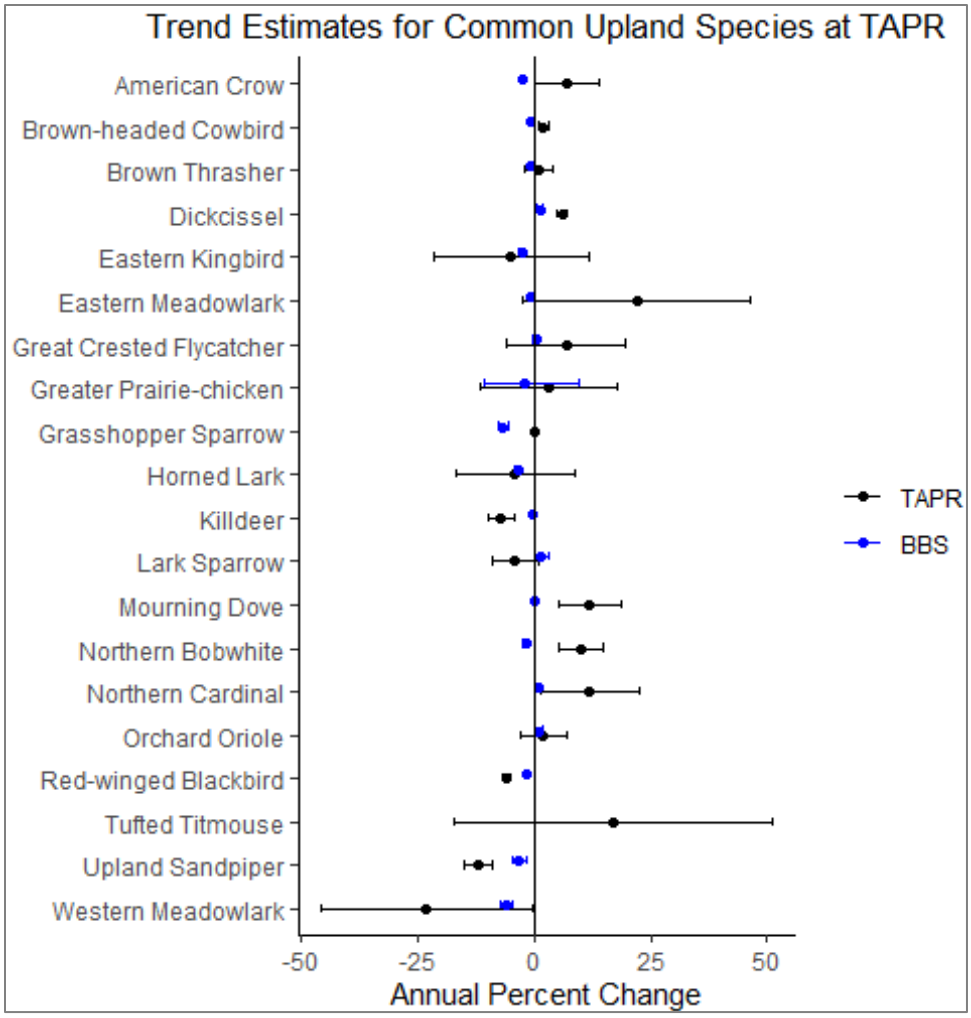

Figure 3. Comparison of bird population trends (2001–2023) in upland habitat on Tallgrass Prairie National Preserve, Kansas, with those of the larger Eastern Tallgrass Prairie Bird Conservation Region (2001–2019). Error bars represent 95% confidence intervals. The Henslow's Sparrow population trend in upland habitat was not graphed due to an exceedingly large confidence interval. NPS

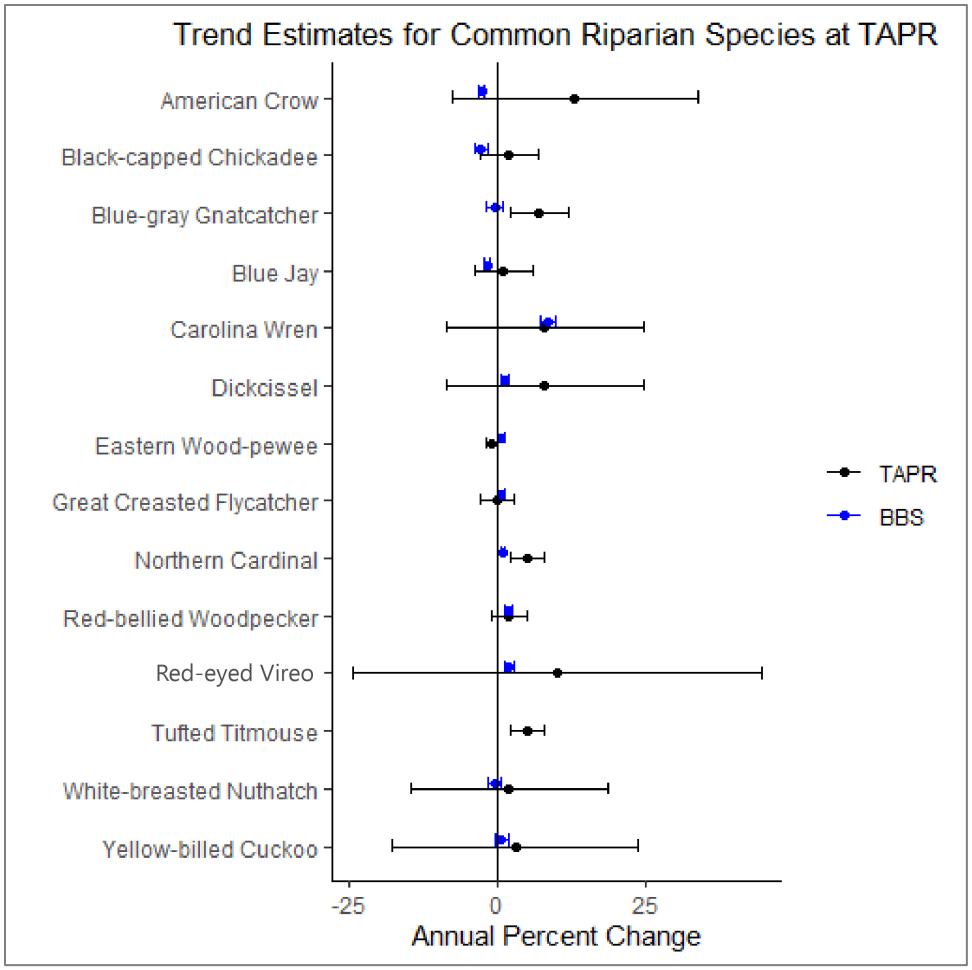

Figure 4. Comparison of bird population trends (2001–2023) in riparian habitat on Tallgrass Prairie National Preserve, Kansas, with those of the larger Eastern Tallgrass Prairie Bird Conservation Region (2001–2019). Error bars represent 95% confidence intervals. The Indigo Bunting and Northern Parula population trends in riparian habitat were not graphed due to exceedingly large confidence intervals. NPS

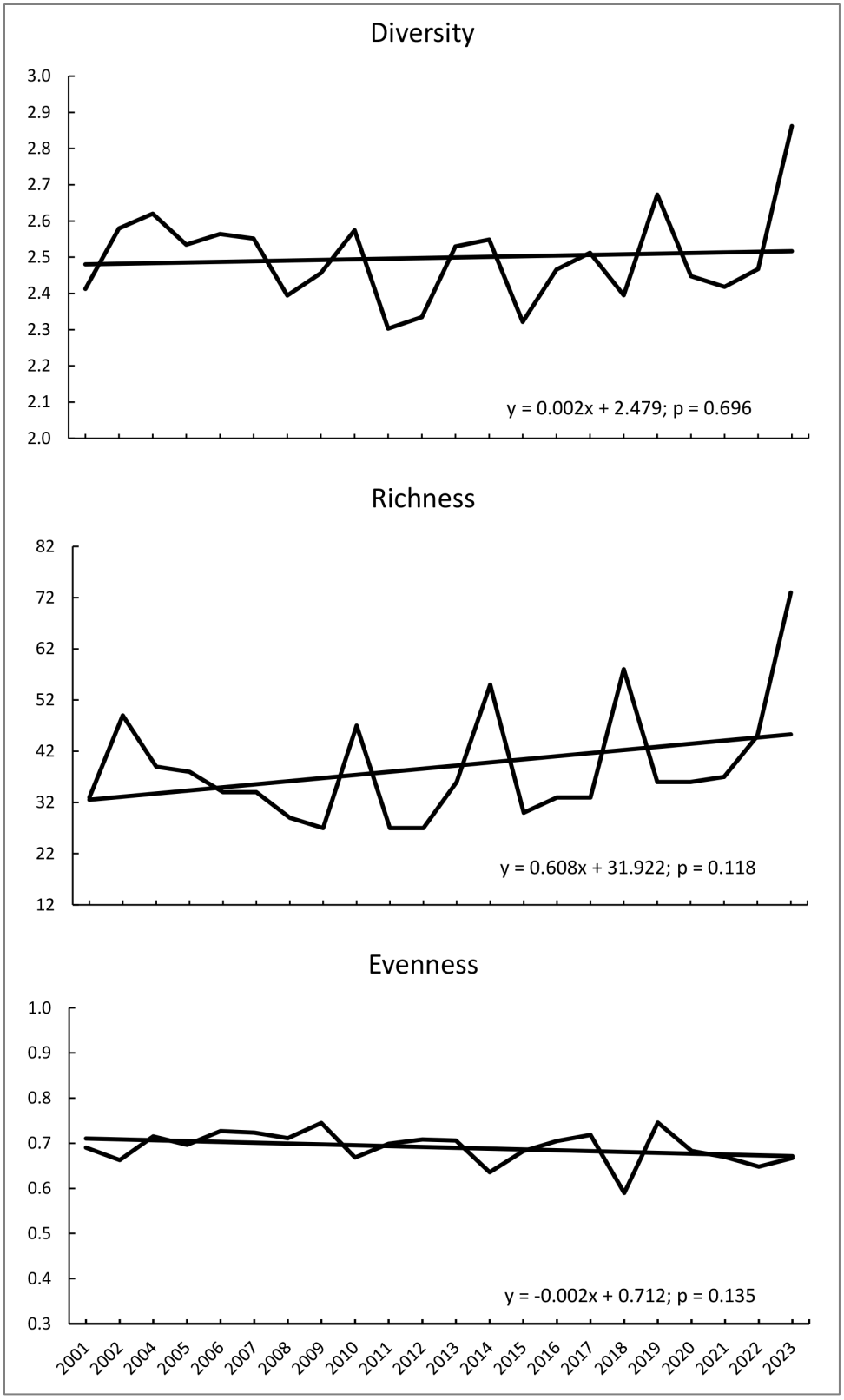

Figure 5. Trends in bird community diversity, richness, and species distribution evenness in upland habitat on Tallgrass Prairie National Preserve, Kansas (2001–2023, excluding 2003). NPS

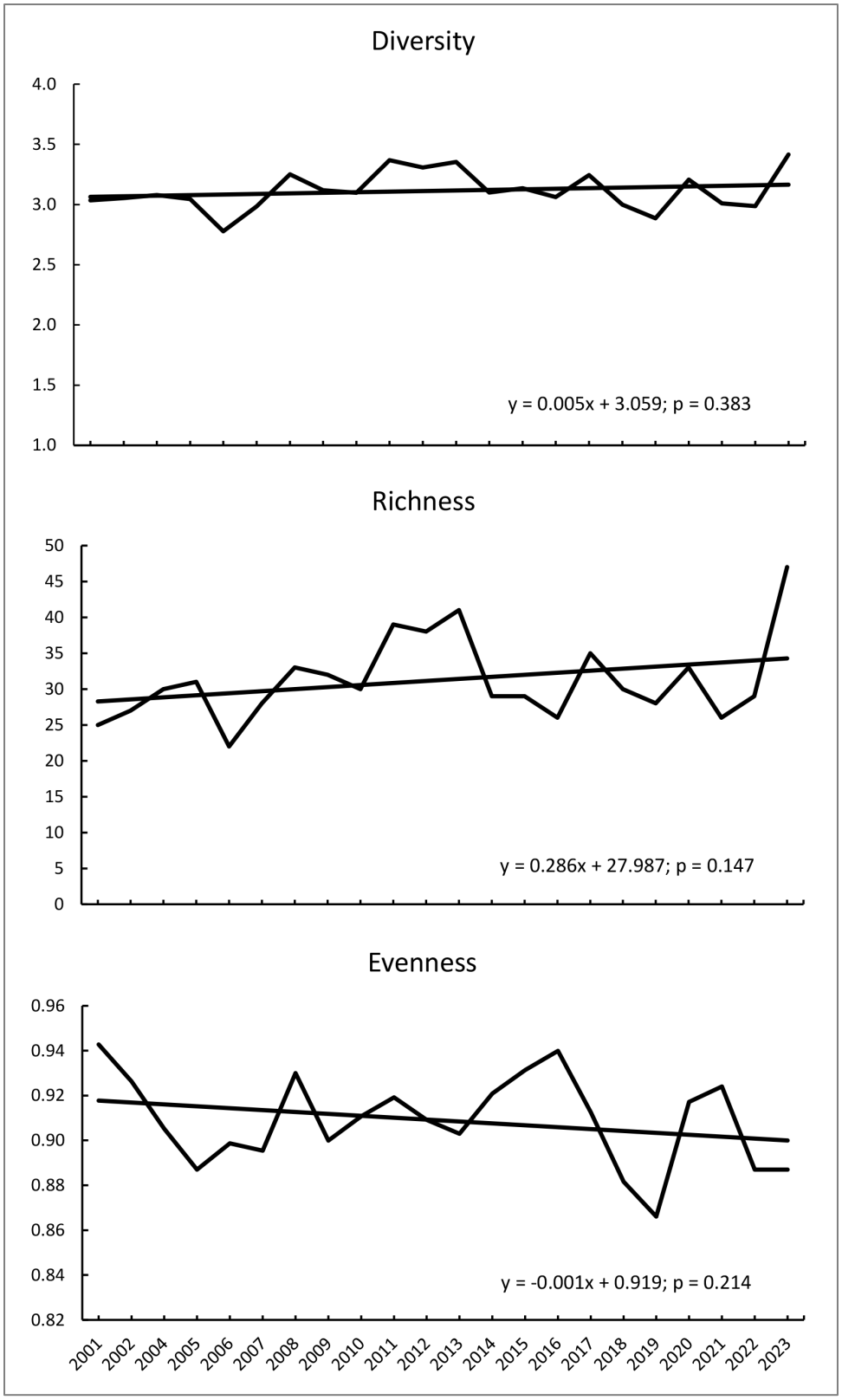

Figure 6. Trends in bird community diversity, richness, and species distribution evenness in riparian habitat on Tallgrass Prairie National Preserve, Kansas (2001–2023, excluding 2003). NPS

Discussion

Initiated in 2001, breeding bird surveys at Tallgrass Prairie National Preserve assist the park in assessing the integrity of habitat through time. During the 23-year monitoring period, 146 bird species were recorded. One hundred and four are permanent or summer residents to the area (Thompson et al. 2011). Data collected for these 104 species are valuable for characterizing the park's breeding bird community and bird habitat. These 104 species represent approximately 87% of the species one would reasonably expect to have breeding populations on Tallgrass Prairie National Preserve (Thompson et al. 2011). The 14 resident species on the park that are *species of conservation concern* for the Eastern Tallgrass Prairie Bird Conservation Region should be given special consideration in natural resource management decisions. Five of these species of conservation concern occur exclusively in one of the two habitat types found on Tallgrass Prairie National Preserve: Henslow's Sparrow, Loggerhead Shrike, and Pied-billed Grebe in the upland tallgrass prairie, and Kentucky Warbler and Prothonotary Warbler in riparian habitat. Thus, the needs of these five species should be given additional management considerations in their respective habitat types. The remaining nine species of conservation concern occur in both habitats on Tallgrass Prairie National Preserve; therefore, their needs should be given management considerations in both.

The tallgrass prairie habitat makes up 94.7% of Tallgrass Prairie National Preserve (Peitz and Rowell 2003), so managing this habitat for the nine breeding, grassland obligate bird species is of high importance. Managing for these breeding, grassland obligate species would also benefit four migrant grassland obligates recorded on the park, as well as a host of other grassland species, including the Eastern Kingbird, Northern Bobwhite, and Scissor-tailed Flycatcher (*Tyrannus forficatus*). Four grassland obligate species that are also species of conservation concern were observed in sufficient numbers to calculate annual abundances: Dickcissel, Grasshopper Sparrow, Henslow's Sparrow, and Upland Sandpiper. Therefore, these four species offer the best opportunity to track the effectiveness of management actions on conserving species in peril, and their habitat needs should be given the highest consideration in management decisions. Positive trends in the Dickcissel population in upland tallgrass prairie habitat (Figure 3; Appendix F) suggest current management actions favor their need for tall grass and thick grass litter—an old-field appearance (Dechant et al. 1999 [revised 2002]; Dechant et al. 2003; Hull 2003; Stokes and Stokes 1996). A negative trend in the Upland Sandpiper population suggests management actions are not meeting their needs. The Grasshopper Sparrow has a stable population on Tallgrass Prairie National Preserve, suggesting management actions are not causing increasing or decreasing trends in their population. The uncertain population trend of the Henslow's Sparrow may be an artifact of the species rarely being observed in the early years of monitoring. Recent management actions that have promoted more tall grasses and increased grass litter (Leis and Morrison 2018; Peitz and Kull 2020) have resulted in more Henslow's Sparrows recorded. These actions appear to be favoring their habitat needs, which are similar to the Dickcissel habitat requirements (Stokes and Stokes 1996).

A comparison of population trends on Tallgrass Prairie National Preserve with regional trends for the Eastern Tallgrass Prairie Bird Conservation Region (Figures 3 and 4) suggests that the bird

community at Tallgrass Prairie National Preserve is faring similarly to that of the region as a whole. One notable exception is the Northern Bobwhite, which is faring significantly better on the park than in the Eastern Tallgrass Prairie Bird Conservation Region. Increasing vegetation height, grass litter, and grass clumping along with reduced overall impacts of grazing favor the development of habitat used by this species (Stokes and Stokes 1996). Stable populations of Brown-headed Cowbird and Grasshopper Sparrow on Tallgrass Prairie National Preserve also differ, but not significantly, from the Eastern Tallgrass Prairie Bird Conservation Region, where populations are in decline.

Co-occurring with the declining number of Western Meadowlark is an increase in the number of Eastern Meadowlark, likely a result of the changing tallgrass prairie habitat. The change in management philosophies on Tallgrass Prairie National Preserve from the early years (2001 through 2005) to the later years (2006 through 2023) helps explain the increase in Eastern Meadowlark and decrease in Western Meadowlark populations. There has been a decline in the number of hectares burned annually and a reduction in cattle stocking rates (Leis and Morrison 2018). Additionally, in 2009, cattle were removed from the 436-hectare Windmill pasture and replaced with 13 head of bison (*Bison bison*). Since 2016, an average of 86 head of bison were roaming Windmill pasture annually. Overall, the higher intensity management in earlier years created a habitat with shorter and sparser vegetation (Leis et al. 2013) favored by Western Meadowlark for nesting and brood rearing (Dechant et al. 1999 [revised 2002]). Management in later years has produced taller and denser vegetation favored by Eastern Meadowlark (Granfors et al. 1996; Hull 2003).

While changes in population sizes of common and widely distributed species on Tallgrass Prairie National Preserve may be used to assess changing habitat conditions, weather and climate also play a role in determining habitat and should always be considered. Despite improving habitat structure on the park, declining Red-winged Blackbird populations suggest that climate can override the effects of management in some cases. Prolonged drought conditions across Kansas since the mid-2010s (National Weather Service 2024) have reduced brushy-cattail habitat along waterways and ponds on the park, a habitat that is utilized by the Red-winged Blackbird for roosting (Thompson et al. 2011). In the absence of suitable habitat, the number of Red-winged Blackbirds has declined significantly.

Vegetation management decisions should consider the potential impacts to bird habitat, especially for those species identified as species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region. However, species once common to the park, such as the Red-winged Blackbird, may need consideration within the broader context of bird conservation when making management decisions.

Over the 23 years of bird monitoring on Tallgrass Prairie National Preserve, the unchanging diversity, richness, and evenness in distribution of individuals across species suggest that the ability of the park habitat to meet most species' needs has remained similar (Figures 5 and 6) and provides for a rich array of breeding bird species (average of 39 species observed annually in upland tallgrass prairie habitat and 31 species observed annually in riparian habitat). However, this species-rich, stable community structure could be altered if significant portions of Tallgrass Prairie National Preserve were returned to more frequent fire return intervals and/or more intense grazing pressure.

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Appendix A. Plots Sampled

Table 3 presents the plots sampled at Tallgrass Prairie National Preserve and the years they were sampled.

Table 3. Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

	Monitoring Year																						
Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR1	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR2	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR3	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR4 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR5	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR6	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR7	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR8	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR9 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR10 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR11	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR12	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR13	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR14	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR15	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR16	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR17	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR18	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie

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Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

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TAPR19	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR20	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR21	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR22	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR23	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR24	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR25 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Rocky Mixed Prairie**
TAPR26	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR27	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR28	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR29	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR30	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR31 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR32	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR33	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR34	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR35	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR36	Y	Y	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR37	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR38 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR39 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR40	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie

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TAPR41	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR42	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR43	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR44	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR45 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR46	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR47	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR48	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR49	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR50	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR51	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR52	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR53 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR54	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR55	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR56	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR57	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR58	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR59	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR60	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR61 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR62	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie

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Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

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TAPR63	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR64 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR65	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR66	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR67 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR68	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR69 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR70	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR71	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR72	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR73	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR74	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR75	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR76	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR77	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR78	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR79	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR80	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR81	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR82	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR83 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR84 [A]	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**

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TAPR85 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Smooth Brome**
TAPR86	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR87	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR88	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR89	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR90	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR91	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Rocky Mixed Prairie
TAPR92	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR93	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR94	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR95 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR96	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR97	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR98 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR99	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR100 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Wet Ravine Vegetation**
TAPR101	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR102	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Smooth Brome
TAPR103	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR104	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR105	Y	Y	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR106	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie

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Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR107	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR108	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR109	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR110 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Restored Prairie**
TAPR111	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR112	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N	Y	Tallgrass Prairie
TAPR113 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR114 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Wet Ravine Vegetation**
TAPR115	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR116	Y	Y	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR117	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR118	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR119	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR120	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N	Y	Tallgrass Prairie
TAPR121	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR122	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR123	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR124 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Tallgrass Prairie**
TAPR125	Y	Y	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR126	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR127	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR128	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie

[A] Plots that were included in the analysis of individual bird species trends (also in bold).

Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

	Monitoring Year																					
Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR129	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Rocky Mixed Prairie
TAPR130	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR131	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR132	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR133	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR134	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR135	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR136	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR137 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Tallgrass Prairie**
TAPR138	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR139 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Wet Ravine Vegetation**
TAPR140	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR141	Y	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR142	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR143 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR144	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR145	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR146	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR147 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR148 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR149	Y	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR150	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie

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Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

	Monitoring Year																					
Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR151	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR152	Y	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR153	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR154	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR155 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR156	Y	Y	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR157	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR158	Y	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR159 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR160 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR161 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR162 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR163 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Successional Forest**
TAPR164 [A]	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR165 [A]	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR166 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR167 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR168 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR169 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR170 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Successional Forest**
TAPR171 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Successional Forest**
TAPR172 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Successional Forest**

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Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

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Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR173 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR174 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Successional Forest**
TAPR175 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Successional Forest**
TAPR176 [A]	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Bur Oak Woodland**
TAPR177	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR178 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR179	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR180	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR181	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR182	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR183	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR184	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR185	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR186	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR187	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR188	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR189	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR190 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR191 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR192	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR193	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR194	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie

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Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

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TAPR195	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR196	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR197	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR198	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR199	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR200	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR201	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR202	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR203	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR204	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR205	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR206	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR207	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR208	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Wet Ravine Vegetation
TAPR209 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR210	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR211	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR212	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR213	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR214	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR215	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR216	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie

[A] Plots that were included in the analysis of individual bird species trends (also in bold).

Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

	Monitoring Year																					
Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR217	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Smooth Brome
TAPR218	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR219 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR220 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR221	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR222	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR223	N	Y	N	N	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	Developed Land
TAPR224	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Rocky Mixed Prairie
TAPR225	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Smooth Brome
TAPR226	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Wet Ravine Vegetation
TAPR227	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Rocky Mixed Prairie
TAPR228	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR229	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR230	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR231	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR232 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Smooth Brome**
TAPR233	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR234 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR235	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR236	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR237	N	Y	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR238	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie

[A] Plots that were included in the analysis of individual bird species trends (also in bold).

Table 3 (continued). Plots sampled on Tallgrass Prairie National Preserve, Kansas, between 2001 (monitoring year 01) and 2023 (monitoring year 23) and gross habitat type. “Y” indicates plot was sampled; “N” indicates the plot was not sampled. Note: year 03 (2003) is not included here because no plots were sampled that year.

	Monitoring Year																					
Plot	**01**	**02**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**Plot Habitat Type**
TAPR239	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR240	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR241 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR242	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N	Y	Tallgrass Prairie
TAPR243	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR244	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR245	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR246	N	Y	N	N	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR247	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Restored Prairie
TAPR248	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR249	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR250	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR251	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR252	N	Y	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR253 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR254	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Restored Prairie
TAPR255	N	Y	N	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N	Y	Tallgrass Prairie
TAPR256 [A]	**N**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Tallgrass Prairie**
TAPR257	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	Y	Tallgrass Prairie
TAPR258	N	Y	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR259	N	Y	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie
TAPR260	N	Y	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	Tallgrass Prairie

[A] Plots that were included in the analysis of individual bird species trends (also in bold).

Appendix B. Proportion of Upland Plots Occupied and Abundance (Corrected for Undetected Individuals)

Table 4. presents proportion of upland plots occupied and abundance of breeding bird species (corrected for undetected individuals).

Table 4. Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using Distance software) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance using Distance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but distance measures from observers could not be determined.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
AMCR	0.00 (0)	0.06 (–)	0.06 (–)	0.01 (–)	0.05 (–)	0.04 (–)	0.00 (0)	0.05 (–)	>0.01 (–)	0.10 (58)	0.05 (58)	0.10 (58)	0.03 (–)	0.13 (68)	0.10 (44)	0.13 (87)	>0.01 (–)	0.10 (73)	0.13 (58)	0.21 (58)	0.39 (66)	0.13 (65)
BHCO	0.37 (2253)	0.51 (2098)	0.42 (2151)	0.49 (2253)	0.44 (1760)	0.51 (1915)	0.42 (1663)	0.50 (1802)	0.47 (2301)	0.53 (3239)	0.41 (1878)	0.63 (1127)	0.53 (2110)	0.45 (1314)	0.63 (2028)	0.55 (1287)	0.38 (1791)	0.53 (876)	0.65 (2065)	0.55 (1386)	0.57 (1706)	0.61 (2130)
BRTH	0.02 (869)	0.05 (869)	0.09 (993)	0.03 (869)	0.06 (1043)	0.03 (869)	0.01 (1738)	0.03 (869)	0.04 (869)	0.03 (1738)	0.00 (0)	0.00 (0)	0.01 (869)	0.08 (869)	0.05 (869)	0.05 (869)	0.02 (869)	0.03 (2608)	0.05 (869)	0.08 (869)	0.07 (869)	0.09 (869)
DICK [A]	**0.38 (3273)**	**0.38 (3875)**	**0.35 (3173)**	**0.46 (2912)**	**0.58 (4010)**	**0.54 (3207)**	**0.83 (3629)**	**0.93 (3756)**	**0.56 (2912)**	**0.88 (4148)**	**0.97 (4515)**	**0.98 (3808)**	**0.66 (4059)**	**0.98 (4052)**	**0.80 (4284)**	**0.93 (4631)**	**0.98 (5023)**	**0.83 (3808)**	**0.93 (4580)**	**0.97 (5146)**	**1.00 (7553)**	**0.95 (5396)**
EAKI	0.02 (2220)	0.04 (3053)	0.06 (2220)	0.05 (3701)	0.09 (3886)	0.10 (3330)	0.01 (2220)	0.08 (3330)	0.01 (3330)	0.00 (0)	0.03 (2220)	0.05 (–)	0.04 (2960)	0.05 (2220)	0.03 (2220)	0.05 (2220)	0.04 (2537)	0.05 (2220)	0.03 (2220)	0.00 (0)	0.02 (2220)	0.05 (2422)
EAME	0.18 (1158)	0.02 (442)	0.01 (884)	0.00 (0)	0.00 (0)	0.01 (1767)	0.43 (1187)	0.90 (1237)	0.75 (1438)	0.93 (1571)	0.85 (1537)	0.98 (1586)	0.81 (1667)	0.90 (1154)	0.90 (1792)	0.85 (1285)	0.81 (1346)	0.90 (1212)	0.90 (1178)	0.82 (1340)	0.97 (2815)	0.93 (1963)
GCFL	0.00 (0)	0.03 (318)	0.14 (350)	0.06 (318)	0.04 (318)	0.07 (318)	0.04 (318)	0.00 (0)	0.03 (318)	0.03 (318)	0.00 (0)	0.03 (318)	0.04 (354)	0.05 (212)	0.15 (318)	0.05 (318)	0.07 (356)	0.08 (318)	0.00 (0)	0.05 (478)	0.07 (318)	0.15 (396)
GRPC	0.01 (966)	0.02 (1208)	0.01 (483)	0.00 (0)	0.01 (–)	0.00 (0)	0.01 (483)	0.00 (0)	0.05 (2623)	0.00 (0)	0.05 (483)	0.00 (0)	0.04 (966)	0.03 (–)	0.03 (966)	0.00 (0)	0.01 (2577)	0.03 (483)	0.00 (0)	0.00 (0)	0.10 (483)	0.03 (966)
GRSP [A]	**0.65 (10683)**	**0.60 (9734)**	**0.73 (9776)**	**0.70 (9994)**	**0.62 (10043)**	**0.68 (11451)**	**0.75 (10881)**	**0.70 (8240)**	**0.66 (8864)**	**0.33 (5655)**	**0.23 (6786)**	**0.78 (8595)**	**0.63 (10778)**	**0.80 (8058)**	**0.60 (8200)**	**0.55 (8328)**	**0.69 (9284)**	**0.58 (5901)**	**0.70 (6059)**	**0.53 (7125)**	**0.59 (8859)**	**0.64 (11164)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 4 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using Distance software) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance using Distance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but distance measures from observers could not be determined.

AOU Code	Proportion of Plots Occupied (Abundance)																					
	2001 n=158	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
HESP [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.01 (9433)**	**0.01 (4716)**	**0.09 (8759)**	**0.10 (4716)**	**0.08 (5957)**	**0.23 (9433)**	**0.05 (4716)**	**0.10 (3537)**	**>0.01 (9433)**	**0.10 (5895)**	**0.30 (5895)**	**0.38 (6288)**	**0.30 (6681)**	**0.33 (5079)**	**0.60 (6092)**	**0.21 (4716)**	**0.31 (6950)**	**0.34 (7420)**
HOLA	0.02 (2788)	0.00 (0)	0.28 (3608)	0.11 (2788)	0.12 (2788)	0.06 (2788)	0.00 (0)	0.03 (2788)	0.04 (2788)	0.00 (0)	0.00 (0)	0.03 (2788)	0.02 (2091)	0.00 (0)	0.00 (0)	0.00 (0)	0.07 (2614)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (2788)
KILL	0.06 (2464)	0.10 (2772)	0.17 (2464)	0.25 (2710)	0.24 (2737)	0.11 (3285)	0.09 (2464)	0.05 (–)	0.06 (4435)	0.05 (2464)	0.03 (–)	0.05 (2464)	0.04 (3695)	0.03 (–)	0.08 (–)	0.03 (–)	0.04 (2464)	0.03 (2464)	0.08 (2464)	0.03 (4927)	0.07 (2464)	0.05 (3449)
LASP	0.01 (4512)	0.07 (6104)	0.04 (10527)	0.08 (4512)	0.03 (4512)	0.11 (5156)	0.08 (5414)	0.00 (0)	0.02 (6768)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (6316)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (6152)	0.03 (4512)	0.03 (4512)	0.00 (0)	0.03 (4512)	0.14 (4644)
MODO	0.07 (967)	0.05 (1290)	0.01 (967)	0.01 (–)	0.03 (967)	0.04 (1451)	0.08 (1451)	0.10 (484)	0.05 (967)	0.03 (–)	0.15 (1161)	0.25 (1161)	0.08 (1116)	0.18 (1741)	0.25 (1075)	0.23 (1161)	0.09 (1243)	0.15 (–)	0.18 (1161)	0.08 (967)	0.36 (1273)	0.37 (1172)
NOBO	0.00 (0)	0.04 (151)	0.05 (151)	0.10 (151)	0.14 (170)	0.09 (151)	0.05 (189)	0.28 (137)	0.05 (189)	0.20 (226)	0.36 (189)	0.15 (151)	0.05 (196)	0.13 (113)	0.10 (101)	0.18 (172)	0.14 (208)	0.20 (189)	0.25 (151)	0.24 (132)	0.31 (238)	0.33 (199)
NOCA	0.00 (0)	0.05 (247)	0.01 (247)	0.03 (247)	0.01 (247)	0.03 (247)	0.00 (0)	0.00 (0)	>0.01 (247)	0.03 (247)	0.05 (247)	0.08 (329)	0.02 (296)	0.03 (370)	0.08 (185)	0.05 (247)	0.02 (308)	0.10 (308)	0.00 (0)	0.08 (329)	0.10 (247)	0.12 (240)
ORORO	>0.01 (1036)	>0.01 (1036)	0.00 (0)	0.00 (0)	0.06 (1036)	0.00 (0)	0.01 (1036)	0.00 (0)	0.04 (1151)	0.03 (1036)	0.05 (1036)	0.05 (518)	0.02 (1036)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (1036)	0.00 (0)	0.03 (1036)	0.05 (1036)	0.03 (1036)	0.07 (1280)
RWBL	0.06 (1677)	0.15 (1406)	0.26 (857)	0.20 (1341)	0.25 (838)	0.20 (1341)	0.13 (671)	0.25 (1341)	0.16 (706)	0.18 (894)	0.21 (969)	0.28 (596)	0.07 (947)	0.08 (671)	0.15 (1006)	0.15 (805)	0.14 (927)	0.15 (671)	0.08 (671)	0.24 (671)	0.21 (719)	0.21 (751)
TUTI	0.00 (0)	0.06 (220)	0.03 (220)	0.00 (0)	0.03 (220)	0.03 (220)	0.01 (220)	0.00 (0)	0.01 (220)	0.00 (0)	0.03 (220)	0.05 (220)	0.02 (220)	0.03 (220)	0.10 (220)	0.08 (220)	0.02 (220)	0.08 (220)	0.13 (176)	0.13 (220)	0.08 (220)	0.09 (230)
UPSA [A]	**0.27 (1836)**	**0.62 (1432)**	**0.75 (1915)**	**0.57 (1277)**	**0.61 (1277)**	**0.47 (1277)**	**0.39 (1788)**	**0.48 (1490)**	**0.23 (1277)**	**0.43 (1561)**	**0.41 (1459)**	**0.23 (1277)**	**0.18 (1653)**	**0.28 (2554)**	**0.20 (1277)**	**0.13 (1596)**	**0.12 (1915)**	**0.13 (1277)**	**0.03 (–)**	**0.03 (1277)**	**0.20 (1809)**	**0.14 (958)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 4 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using Distance software) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance using Distance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but distance measures from observers could not be determined.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
WEME	0.23 (886)	0.72 (1090)	0.88 (1223)	0.85 (1651)	0.89 (1308)	0.83 (1066)	0.42 (1440)	0.00 (0)	0.03 (921)	0.00 (0)	0.00 (0)	0.03 (–)	>0.01 (819)	0.00 (0)	0.03 (819)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (819)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Appendix C. Proportion of Upland Plots Occupied and Abundance (Not Corrected for Undetected Individuals)

Table 5 presents the proportion of upland plots occupied and abundance of breeding bird species (not corrected for undetected individuals).

Table 5. Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
AMCO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)
AMGO	0.00 (0)	>0.01 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.03 (8)	0.03 (18)	0.03 (–)	0.05 (8)	0.00 (0)	0.01 (–)	0.03 (33)	0.05 (16)	0.00 (0)	0.03 (–)	0.12 (22)
AMRO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.03 (–)	0.00 (0)	0.03 (6)
BADO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
BANS	0.01 (–)	0.05 (–)	0.05 (–)	0.04 (–)	0.03 (–)	0.00 (0)	0.05 (–)	0.00 (0)	0.06 (–)	0.08 (–)	0.03 (8)	0.10 (–)	0.05 (3)	0.03 (–)	0.05 (–)	0.00 (0)	>0.01 (–)	0.03 (–)	0.00 (0)	0.03 (–)	0.00 (0)	0.01 (–)
BAOR	0.00 (0)	0.00 (0)	0.00 (0)	0.04 (8)	0.03 (4)	0.06 (23)	0.07 (22)	0.03 (8)	0.01 (5)	0.03 (8)	0.00 (0)	0.03 (8)	0.01 (4)	0.05 (8)	0.00 (0)	0.00 (0)	0.04 (10)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (6)
BARS	0.04 (–)	0.01 (–)	0.10 (–)	0.10 (–)	0.12 (8)	0.01 (–)	0.01 (–)	0.18 (8)	0.07 (3)	0.15 (–)	0.13 (17)	0.15 (–)	0.22 (4)	0.05 (17)	0.13 (66)	0.13 (–)	0.10 (–)	0.15 (17)	0.05 (–)	0.13 (26)	0.16 (60)	0.15 (3)
BBCU [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.01 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
BCCH	0.00 (0)	0.01 (3)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (17)	0.03 (11)	0.01 (5)
BEVI [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.03 (–)**	**0.00 (0)**	**0.02 (4)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.02 (8)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.10 (33)**	**0.12 (39)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 5 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																					
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
BEWR [A]	**0.00 (0)**	**0.01 (4)**	**0.01 (4)**	**0.01 (4)**	**0.00 (0)**	**0.01 (5)**	**0.01 (4)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
BGGN	0.01 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (5)	0.02 (3)
BLGR	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (5)	0.02 (8)
BLJA	0.01 (–)	0.04 (–)	0.03 (4)	0.05 (–)	0.06 (–)	0.06 (9)	0.00 (0)	0.05 (–)	>0.01 (–)	0.05 (17)	0.00 (0)	0.10 (17)	0.02 (1)	0.00 (0)	0.03 (–)	0.05 (8)	0.01 (–)	0.08 (17)	0.00 (0)	0.05 (–)	0.03 (16)	0.07 (18)
BWTE	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
CAEG	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
CANG	0.00 (0)	0.01 (–)	0.06 (–)	0.01 (–)	0.06 (–)	0.01 (–)	0.01 (–)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.03 (–)	0.01 (–)	0.08 (–)	0.00 (0)	0.03 (–)	0.02 (–)	0.01 (–)
CARW	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.03 (–)	0.00 (0)	0.03 (8)	0.01 (3)	0.03 (8)	0.08 (16)	0.00 (0)	0.05 (5)	0.04 (6)
CHSP	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (43)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (1)
CHSW	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
CLSW	0.08 (–)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (–)	0.00 (0)	0.03 (–)	0.02 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (–)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.05 (–)	0.03 (–)	0.00 (0)	0.00 (0)	0.05 (–)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 5 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
COGR	0.01 (–)	>0.01 (–)	0.01 (4)	0.01 (–)	0.01 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.08 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.03 (9)	0.05 (27)	0.02 (3)
CONI	0.11 (6)	0.19 (4)	0.04 (–)	0.32 (–)	0.14 (–)	0.17 (–)	0.09 (4)	0.10 (8)	0.09 (3)	0.03 (–)	0.21 (25)	0.05 (8)	0.05 (1)	0.05 (8)	0.08 (17)	0.05 (–)	0.08 (1)	0.05 (–)	0.15 (–)	0.05 (17)	0.08 (22)	0.14 (11)
COYE	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (7)	0.00 (0)	0.03 (–)	0.00 (0)	0.04 (14)	0.03 (8)	0.05 (8)	0.00 (0)	0.05 (11)	0.08 (28)
DOWO	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (7)
EABL	0.01 (2)	0.00 (0)	0.00 (0)	0.03 (13)	0.00 (0)	0.01 (5)	0.01 (17)	0.03 (8)	>0.01 (1)	0.00 (0)	0.03 (8)	0.03 (8)	0.03 (14)	0.00 (0)	0.05 (25)	0.03 (17)	>0.01 (1)	0.03 (8)	0.03 (8)	0.03 (9)	0.02 (–)	0.05 (12)
EAPH	0.00 (0)	>0.01 (1)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (8)	0.00 (0)	0.03 (9)	0.00 (0)	>0.01 (3)
EATO	0.01 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
EAWP	0.00 (0)	0.01 (1)	0.00 (0)	0.01 (4)	0.00 (0)	0.00 (0)	0.01 (4)	0.00 (0)	0.01 (4)	0.00 (0)	0.00 (0)	0.03 (8)	0.01 (3)	0.00 (0)	0.03 (8)	0.00 (0)	0.02 (6)	0.00 (0)	0.03 (–)	0.03 (–)	0.07 (16)	0.06 (15)
EUCD	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (3)
EUST	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)
FISP [A]	**0.00 (0)**	**0.01 (1)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.01 (1)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.02 (6)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.01 (3)**	**0.00 (0)**	**0.03 (–)**	**0.00 (0)**	**0.00 (0)**	**>0.01 (1)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 5 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																					
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
GBHE	0.01 (–)	>0.01 (–)	0.01 (–)	0.04 (–)	0.04 (–)	0.01 (–)	0.03 (4)	0.08 (8)	0.02 (3)	0.00 (0)	0.03 (8)	0.00 (0)	0.03 (4)	0.00 (0)	0.03 (–)	0.03 (–)	0.02 (–)	0.10 (–)	0.03 (–)	0.00 (0)	0.02 (–)	0.06 (3)
GHOW	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.03 (–)	0.00 (0)	0.00 (0)
GRCA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)
GTGR	0.01 (–)	0.00 (0)	0.01 (8)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
HAWO	0.01 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
HOWR	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)
INBU	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.08 (24)	0.03 (9)	0.02 (–)	0.04 (8)
LOSH [A]	**0.00 (0)**	**>0.01 (1)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.01 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
LOWA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
MALL	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
NOFL [A]	**0.00 (0)**	**>0.01 (–)**	**0.01 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.03 (8)**	**0.00 (0)**	**0.03 (–)**	**0.05 (17)**	**0.03 (8)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**>0.01 (–)**	**0.03 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 5 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
NOHA	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (–)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (1)
NOMO	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (–)	0.01 (–)	0.01 (5)	0.00 (0)	0.05 (8)	>0.01 (10)	0.03 (8)	0.00 (0)	0.03 (8)	0.02 (4)	0.00 (0)	0.00 (0)	0.03 (–)	0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
NOPA	0.00 (0)	0.00 (0)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.03 (8)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.03 (8)	0.03 (–)	0.03 (–)	0.01 (1)
NRWS	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.08 (33)	0.01 (–)	0.00 (0)	0.05 (–)	0.00 (0)	0.00 (0)	0.01 (6)
PABU	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (5)	0.00 (0)
PBGR [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.01 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
PUMA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
RBWO	0.01 (2)	0.03 (7)	0.03 (4)	0.03 (4)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (8)	0.05 (8)	0.01 (3)	0.00 (0)	0.05 (17)	0.05 (8)	0.02 (7)	0.00 (0)	0.08 (16)	0.11 (17)	0.05 (5)	0.05 (7)
REVI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (8)	0.01 (3)	0.00 (0)	0.00 (0)	0.03 (8)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (11)	0.03 (8)
RHWO [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.03 (13)**	**0.04 (8)**	**0.00 (0)**	**0.00 (0)**	**0.03 (–)**	**>0.01 (1)**	**0.00 (0)**	**0.00 (0)**	**0.03 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**>0.01 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.04 (12)**
RNEP	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (–)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 5 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																					
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
ROPI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
RTHA	0.00 (0)	0.00 (0)	0.01 (4)	0.01 (–)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (8)	0.03 (8)	0.00 (0)	0.01 (4)	0.00 (0)	0.08 (–)	0.05 (–)	>0.01 (–)	0.00 (0)	0.03 (–)	0.03 (9)	0.03 (–)	0.02 (1)
RTHU	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (–)	0.00 (0)	0.00 (0)	0.00 (0)
SCTA	0.00 (0)	>0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
SPSA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (26)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)
STFL	0.00 (0)	0.01 (–)	0.04 (16)	0.03 (8)	0.05 (12)	0.04 (23)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (3)	0.03 (–)	0.00 (0)	0.00 (0)	0.02 (5)	>0.01 (1)
SUTA	0.00 (0)	0.01 (4)	0.00 (0)	0.03 (4)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.03 (8)	0.00 (0)	0.03 (8)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.00 (0)	0.00 (0)	0.03 (9)	0.00 (0)	0.02 (3)
SWHA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
TRES	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)
TUVU	0.01 (–)	0.01 (–)	0.01 (–)	0.01 (–)	0.04 (–)	0.01 (–)	0.03 (–)	0.13 (8)	0.05 (3)	0.05 (–)	0.08 (–)	0.18 (33)	0.03 (6)	0.08 (–)	0.03 (–)	0.20 (8)	0.01 (–)	0.15 (–)	0.10 (–)	0.08 (–)	0.05 (5)	0.06 (25)
WAVI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (–)	0.00 (0)	0.00 (0)	0.04 (13)	0.00 (0)	0.00 (0)	0.03 (–)	0.02 (5)	0.03 (8)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 5 (continued). Annual proportion of upland plots occupied by each breeding bird species and estimated abundance (determined using birds within 200 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 200 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=158**	**2002 n=242**	**2004 n=81**	**2005 n=79**	**2006 n=81**	**2007 n=71**	**2008 n=77**	**2009 n=40**	**2010 n=242**	**2011 n=40**	**2012 n=39**	**2013 n=40**	**2014 n=241**	**2015 n=40**	**2016 n=40**	**2017 n=40**	**2018 n=237**	**2019 n=40**	**2020 n=40**	**2021 n=38**	**2022 n=61**	**2023 n=241**
WBNU	0.00 (0)	0.02 (3)	0.00 (0)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.08 (17)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (17)	0.05 (17)	>0.01 (1)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (6)
WEKI	0.02 (2)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.03 (–)	0.00 (0)	0.05 (25)	0.00 (0)	0.00 (0)	0.03 (8)	0.05 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (9)	0.00 (0)	0.00 (0)
WITU	0.00 (0)	>0.01 (–)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.02 (26)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (–)	0.03 (–)	0.00 (0)	0.03 (–)	0.02 (–)
WODU	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (–)	0.03 (–)	0.00 (0)	0.00 (0)	0.01 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
YBCH	0.00 (0)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
YBCU	0.00 (0)	0.04 (1)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.05 (8)	0.05 (8)	0.03 (–)	>0.01 (1)	0.00 (0)	0.03 (–)	0.00 (0)	0.08 (16)	0.02 (3)
YEWA	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.03 (8)	0.00 (0)	0.03 (8)	0.00 (0)	0.00 (0)	0.03 (8)	0.05 (17)	0.00 (0)	0.02 (7)
YTVI	0.00 (0)	>0.01 (1)	0.01 (4)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	>0.01 (1)	0.03 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Appendix D. Proportion of Riparian Plots Occupied and Abundance (Corrected for Undetected Individuals).

Table 6 presents the proportion of riparian plots occupied and abundance of breeding bird species (corrected for undetected individuals).

Table 6. Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using Distance software) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance using Distance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but distance measures from observers could not be determined.

	Proportion of Plots Occupied (Abundance)																					
AOU Code	**2001 n=18**	**2002 n=18**	**2004 n=16**	**2005 n=18**	**2006 n=18**	**2007 n=18**	**2008 n=18**	**2009 n=18**	**2010 n=18**	**2011 n=18**	**2012 n=15**	**2013 n=18**	**2014 n=18**	**2015 n=18**	**2016 n=18**	**2017 n=18**	**2018 n=18**	**2019 n=18**	**2020 n=18**	**2021 n=18**	**2022 n=18**	**2023 n=18**
AMCR	0.06 (126)	0.22 (–)	0.00 (0)	0.06 (–)	0.06 (–)	0.06 (–)	0.06 (–)	0.06 (126)	0.00 (0)	0.11 (252)	0.27 (126)	0.22 (126)	0.06 (378)	0.22 (158)	0.22 (158)	0.22 (126)	0.06 (126)	0.28 (126)	0.44 (126)	0.44 (158)	0.50 (236)	0.22 (126)
BCCH	0.06 (984)	0.33 (1312)	0.25 (492)	0.11 (492)	0.00 (0)	0.00 (0)	0.11 (738)	0.06 (492)	0.06 (–)	0.17 (656)	0.33 (591)	0.22 (369)	0.11 (492)	0.39 (703)	0.28 (689)	0.11 (492)	0.11 (492)	0.17 (1148)	0.11 (492)	0.22 (615)	0.22 (738)	0.11 (492)
BGGN	0.06 (–)	0.00 (0)	0.13 (1085)	0.28 (1085)	0.22 (1085)	0.17 (1085)	0.28 (1085)	0.06 (2170)	0.11 (1085)	0.17 (1808)	0.13 (1085)	0.44 (1356)	0.28 (1302)	0.17 (1085)	0.28 (1519)	0.28 (868)	0.44 (1085)	0.11 (1627)	0.39 (1085)	0.17 (723)	0.39 (1085)	0.56 (1085)
BLJA	0.11 (133)	0.11 (–)	0.13 (199)	0.33 (133)	0.18 (133)	0.11 (133)	0.11 (–)	0.17 (265)	0.06 (–)	0.22 (100)	0.33 (212)	0.22 (133)	0.06 (–)	0.17 (133)	0.11 (133)	0.33 (133)	0.17 (310)	0.17 (133)	0.28 (133)	0.22 (133)	0.00 (0)	0.28 (155)
CARW	0.18 (234)	0.00 (0)	0.00 (0)	0.11 (234)	0.11 (234)	0.11 (234)	0.06 (234)	0.00 (0)	0.06 (234)	0.28 (234)	0.20 (234)	0.28 (234)	0.06 (234)	0.22 (312)	0.22 (234)	0.11 (234)	0.11 (117)	0.28 (234)	0.39 (234)	0.00 (0)	0.33 (195)	0.28 (281)
DICK [A]	**0.00 (0)**	**0.17 (167)**	**0.17 (126)**	**0.11 (251)**	**0.11 (126)**	**0.17 (126)**	**0.06 (126)**	**0.33 (188)**	**0.22 (157)**	**0.22 (188)**	**0.47 (197)**	**0.22 (201)**	**0.11 (126)**	**0.17 (84)**	**0.11 (251)**	**0.33 (209)**	**0.22 (220)**	**0.17 (167)**	**0.28 (151)**	**0.28 (226)**	**0.22 (314)**	**0.22 (63)**
EAWP	0.33 (131)	0.56 (157)	0.44 (112)	0.72 (144)	0.78 (143)	0.72 (153)	0.22 (197)	0.72 (161)	0.56 (144)	0.67 (153)	0.47 (150)	0.61 (153)	0.50 (146)	0.44 (131)	0.50 (117)	0.33 (109)	0.78 (141)	0.17 (131)	0.22 (98)	0.56 (157)	0.67 (131)	0.83 (157)
GCFL	0.22 (265)	0.22 (265)	0.75 (206)	0.56 (176)	0.61 (199)	0.44 (227)	0.17 (176)	0.22 (176)	0.28 (176)	0.11 (176)	0.33 (247)	0.33 (118)	0.50 (235)	0.44 (154)	0.39 (151)	0.33 (118)	0.72 (217)	0.17 (176)	0.17 (176)	0.39 (202)	0.72 (176)	0.67 (221)
INBU	0.06 (563)	0.11 (845)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (563)	0.39 (751)	0.11 (845)	0.06 (563)	0.22 (986)	0.13 (845)	0.22 (704)	0.39 (1046)	0.06 (1127)	0.17 (751)	0.06 (1127)	0.06 (1127)	0.17 (563)	0.33 (751)	0.11 (188)	0.39 (483)	0.56 (732)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 6 (continued). Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using Distance software) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance using Distance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but distance measures from observers could not be determined.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=18**	**2002 n=18**	**2004 n=16**	**2005 n=18**	**2006 n=18**	**2007 n=18**	**2008 n=18**	**2009 n=18**	**2010 n=18**	**2011 n=18**	**2012 n=15**	**2013 n=18**	**2014 n=18**	**2015 n=18**	**2016 n=18**	**2017 n=18**	**2018 n=18**	**2019 n=18**	**2020 n=18**	**2021 n=18**	**2022 n=18**	**2023 n=18**
NOCA	0.17 (214)	0.28 (427)	0.13 (427)	0.28 (214)	0.17 (214)	0.28 (267)	0.17 (285)	0.39 (275)	0.17 (285)	0.44 (214)	0.33 (299)	0.50 (294)	0.44 (240)	0.44 (160)	0.33 (214)	0.50 (261)	0.67 (285)	0.28 (171)	0.44 (214)	0.56 (256)	0.67 (249)	0.44 (240)
NOPA	0.00 (0)	0.11 (315)	0.19 (210)	0.06 (210)	0.11 (210)	0.11 (210)	0.17 (280)	0.11 (210)	0.17 (210)	0.28 (252)	0.07 (420)	0.28 (210)	0.22 (315)	0.22 (157)	0.22 (210)	0.06 (210)	0.28 (252)	0.11 (210)	0.44 (184)	0.33 (180)	0.22 (262)	0.56 (210)
RBWO	0.17 (263)	0.39 (263)	0.19 (351)	0.22 (263)	0.33 (316)	0.17 (263)	0.28 (263)	0.11 (395)	0.17 (263)	0.44 (263)	0.47 (296)	0.50 (263)	0.39 (263)	0.39 (301)	0.50 (296)	0.33 (263)	0.56 (316)	0.22 (263)	0.11 (263)	0.56 (263)	0.28 (316)	0.44 (234)
REVI	0.00 (0)	0.22 (288)	0.19 (230)	0.17 (230)	0.28 (277)	0.22 (230)	0.11 (230)	0.06 (230)	0.17 (230)	0.56 (205)	0.27 (230)	0.44 (256)	0.22 (173)	0.28 (230)	0.28 (230)	0.44 (173)	0.17 (307)	0.44 (230)	0.50 (230)	0.39 (263)	0.44 (230)	0.61 (356)
TUTI	0.06 (425)	0.44 (319)	0.44 (255)	0.17 (213)	0.39 (213)	0.39 (213)	0.11 (213)	0.00 (0)	0.33 (248)	0.39 (243)	0.27 (372)	0.44 (266)	0.28 (298)	0.44 (189)	0.39 (213)	0.72 (262)	0.33 (213)	0.67 (407)	0.56 (276)	0.44 (186)	0.56 (213)	0.33 (243)
WBNU	0.00 (0)	0.39 (412)	0.06 (824)	0.17 (412)	0.28 (412)	0.17 (550)	0.11 (412)	0.11 (618)	0.11 (412)	0.22 (412)	0.53 (464)	0.17 (412)	0.11 (412)	0.06 (412)	0.06 (412)	0.33 (412)	0.11 (618)	0.33 (481)	0.39 (353)	0.22 (412)	0.06 (–)	0.28 (495)
YBCU	0.11 (88)	0.28 (–)	0.50 (139	0.00 (0)	0.00 (0)	0.00 (0)	0.22 (88)	0.17 (88)	0.00 (0)	0.11 (88)	0.13 (88)	0.11 (88)	0.00 (0)	0.17 (88)	0.11 (88)	0.22 (88)	0.28 (106)	0.33 (88)	0.22 (88)	0.22 (88)	0.39 (126)	0.00 (0)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Appendix E. Proportion of Riparian Plots Occupied and Abundance (Not Corrected for Undetected Individuals)

Table 7 presents the proportion of riparian plots occupied and abundance of breeding bird species (not corrected for undetected individuals.

Table 7. Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using birds within 125 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 125 m from the plot center.

AOU Code	Proportion of Plots Occupied (Abundance)																					
	2001 n=18	2002 n=18	2004 n=16	2005 n=18	2006 n=18	2007 n=18	2008 n=18	2009 n=18	2010 n=18	2011 n=18	2012 n=15	2013 n=18	2014 n=18	2015 n=18	2016 n=18	2017 n=18	2018 n=18	2019 n=18	2020 n=18	2021 n=18	2022 n=18	2023 n=18
AMGO	0.06 (11)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (3)	0.06 (5)	0.13 (6)	0.11 (8)	0.28 (18)	0.11 (5)	0.11 (5)	0.11 (3)	0.00 (0)	0.11 (5)	0.22 (11)	0.22 (11)	0.22 (8)	0.33 (16)
AMRO	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.17 (5)	0.11 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)
BADO	0.06 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (3)	0.13 (6)	0.00 (0)	0.06 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (3)	0.00 (0)	0.00 (0)	0.00 (0)
BANS	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (8)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
BAOR	0.00 (0)	0.00 (0)	0.00 (0)	0.17 (13)	0.28 (13)	0.00 (0)	0.06 (3)	0.22 (11)	0.00 (0)	0.22 (11)	0.07 (3)	0.17 (5)	0.00 (0)	0.06 (–)	0.11 (5)	0.11 (5)	0.11 (5)	0.06 (3)	0.11 (5)	0.00 (0)	0.00 (0)	0.22 (11)
BARS	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.13 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)
BBCU [A]	**0.06 (–)**	**0.06 (3)**	**0.00 (0)**	**0.33 (5)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
BEKI	0.06 (–)	0.00 (0)	0.06 (3)	0.06 (–)	0.00 (0)	0.06 (–)	0.06 (3)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.06 (3)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)
BEVI [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.07 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
BEWR [A]	**0.11 (5)**	**0.11 (3)**	**0.06 (3)**	**0.06 (3)**	**0.00 (0)**	**0.11 (5)**	**0.06 (8)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (5)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 7 (continued). Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using birds within 125 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 125 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=18**	**2002 n=18**	**2004 n=16**	**2005 n=18**	**2006 n=18**	**2007 n=18**	**2008 n=18**	**2009 n=18**	**2010 n=18**	**2011 n=18**	**2012 n=15**	**2013 n=18**	**2014 n=18**	**2015 n=18**	**2016 n=18**	**2017 n=18**	**2018 n=18**	**2019 n=18**	**2020 n=18**	**2021 n=18**	**2022 n=18**	**2023 n=18**
BHCO	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.06 (3)	0.11 (3)	0.00 (0)	0.11 (8)	0.07 (3)	0.33 (8)	0.11 (5)	0.28 (–)	0.33 (8)	0.17 (3)	0.00 (0)	0.28 (5)	0.11 (–)	0.22 (8)	0.06 (3)	0.28 (11)
BLGR	0.00 (0)	0.00 (0)	0.13 (9)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.07 (3)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
BRTH	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
CANG	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (–)
CEDW	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (53)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
CHSP	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.22 (18)	0.00 (0)	0.11 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
CLSW	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
COHA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)
CONI	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (5)	0.06 (3)	0.00 (0)
COYE	0.00 (0)	0.17 (11)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.17 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.06 (3)
DOWO	0.11 (5)	0.22 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (3)	0.11 (8)	0.20 (9)	0.28 (13)	0.06 (3)	0.17 (11)	0.06 (3)	0.17 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 7 (continued). Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using birds within 125 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 125 m from the plot center.

	Proportion of Plots Occupied (Abundance)																					
AOU Code	**2001 n=18**	**2002 n=18**	**2004 n=16**	**2005 n=18**	**2006 n=18**	**2007 n=18**	**2008 n=18**	**2009 n=18**	**2010 n=18**	**2011 n=18**	**2012 n=15**	**2013 n=18**	**2014 n=18**	**2015 n=18**	**2016 n=18**	**2017 n=18**	**2018 n=18**	**2019 n=18**	**2020 n=18**	**2021 n=18**	**2022 n=18**	**2023 n=18**
EABL	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.11 (11)	0.06 (5)	0.00 (0)	0.11 (5)	0.00 (0)	0.00 (0)	0.07 (3)	0.06 (8)	0.17 (11)	0.11 (5)	0.07 (3)	0.17 (8)	0.00 (0)	0.00 (0)	0.07 (3)	0.11 (3)	0.17 (3)	0.06 (3)
EAKI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.17 (11)
EAME	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (5)	0.06 (3)	0.11 (3)	0.00 (0)	0.06 (3)	0.00 (0)	0.22 (11)	0.28 (5)	0.00 (0)	0.06 (3)	0.00 (0)	0.22 (8)	0.17 (13)	0.11 (3)	0.28 (3)
EAPH	0.00 (0)	0.11 (3)	0.19 (9)	0.06 (–)	0.06 (–)	0.06 (3)	0.06 (3)	0.11 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.22 (16)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (5)	0.00 (0)	0.11 (3)	0.11 (8)	0.11 (5)	0.17 (11)
EATO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)
EUCD	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)
FISP [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.17 (8)**	**0.00 (0)**	**0.00 (0)**	**0.06 (3)**	**0.00 (0)**	**0.00 (0)**	**0.06 (3)**
GBHE	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.17 (5)	0.06 (3)	0.11 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)
GHOW	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
GRCA	0.06 (3)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)
GRHE	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 7 (continued). Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using birds within 125 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 125 m from the plot center.

AOU Code	Proportion of Plots Occupied (Abundance)																				
	2001 n=18	2002 n=18	2004 n=16	2005 n=18	2006 n=18	2007 n=18	2008 n=18	2009 n=18	2010 n=18	2011 n=18	2012 n=15	2013 n=18	2014 n=18	2015 n=18	2016 n=18	2017 n=18	2018 n=18	2019 n=18	2020 n=18	2021 n=18	2022 n=18	2023 n=18
GRSP [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (–)**	**0.11 (5)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.07 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.07 (5)**
HAWO	0.00 (0)	0.00 (0)	0.19 (9)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
HOFI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.07 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
HOWR	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.07 (3)	0.11 (5)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
KEWA [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
KILL	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
LASP	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
LOWA	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (3)	0.00 (0)
MODO	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (–)	0.17 (11)	0.11 (5)	0.00 (0)	0.06 (–)	0.13 (3)	0.06 (–)	0.00 (0)	0.00 (0)	0.33 (13)	0.17 (5)	0.06 (3)	0.11 (–)	0.06 (–)	0.11 (–)	0.11 (5)	0.11 (5)
NOBO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.06 (5)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)
NOFL [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.39 (18)**	**0.00 (0)**	**0.11 (–)**	**0.27 (13)**	**0.06 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 7 (continued). Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using birds within 125 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 125 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=18**	**2002 n=18**	**2004 n=16**	**2005 n=18**	**2006 n=18**	**2007 n=18**	**2008 n=18**	**2009 n=18**	**2010 n=18**	**2011 n=18**	**2012 n=15**	**2013 n=18**	**2014 n=18**	**2015 n=18**	**2016 n=18**	**2017 n=18**	**2018 n=18**	**2019 n=18**	**2020 n=18**	**2021 n=18**	**2022 n=18**	**2023 n=18**
NOMO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
NRWS	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (5)	0.00 (0)	0.00 (0)	0.00 (0)
OROR	0.06 (3)	0.06 (5)	0.06 (3)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.06 (5)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)
PIWO	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (3)	0.06 (3)	0.06 (3)
PROW [A]	**0.11 (5)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (3)**	**0.06 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**
RBGR	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)
RHWO [A]	**0.00 (0)**	**0.06 (–)**	**0.13 (9)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.11 (5)**	**0.00 (0)**	**0.06 (3)**	**0.00 (0)**	**0.06 (3)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.11 (5)**	**0.00 (0)**	**0.00 (0)**	**0.17 (8)**	**0.06 (3)**	**0.00 (0)**	**0.06 (3)**
RTHA	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.07 (3)	0.06 (–)	0.00 (0)	0.06 (–)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)
RTHU	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.07 (3)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)
RWBL	0.00 (0)	0.06 (5)	0.06 (–)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
SCTA	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 7 (continued). Annual proportion of riparian plots occupied by each breeding bird species and estimated abundance (determined using birds within 125 m of plot center) of each species at Tallgrass Prairie National Preserve, Kansas, during the 2001 to 2023 (excluding 2003) spring bird surveys (n = number of plots sampled). Note that the proportion of plots occupied includes flyovers, whereas estimated abundance does not. "–" denotes when an annual abundance value could not be calculated because the species was present, but outside of 125 m from the plot center.

	Proportion of Plots Occupied (Abundance)																				
AOU Code	**2001 n=18**	**2002 n=18**	**2004 n=16**	**2005 n=18**	**2006 n=18**	**2007 n=18**	**2008 n=18**	**2009 n=18**	**2010 n=18**	**2011 n=18**	**2012 n=15**	**2013 n=18**	**2014 n=18**	**2015 n=18**	**2016 n=18**	**2017 n=18**	**2018 n=18**	**2019 n=18**	**2020 n=18**	**2021 n=18**	**2022 n=18**	**2023 n=18**
SUTA	0.00 (0)	0.06 (3)	0.13 (6)	0.06 (3)	0.11 (5)	0.28 (13)	0.06 (3)	0.06 (3)	0.06 (5)	0.17 (11)	0.07 (3)	0.11 (5)	0.22 (11)	0.00 (0)	0.11 (5)	0.22 (13)	0.22 (11)	0.11 (3)	0.06 (5)	0.00 (0)	0.11 (5)	0.33 (18)
TUVU	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.11 (5)	0.06 (–)	0.07 (6)	0.06 (–)	0.06 (–)	0.06 (3)	0.00 (0)	0.06 (–)	0.00 (0)	0.06 (–)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (–)
UPSA [A]	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (–)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.00 (0)**	**0.06 (–)**
WAVI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.17 (5)	0.13 (6)	0.17 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (5)
WEKI	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.07 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (8)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
WEME	0.00 (0)	0.11 (–)	0.19 (9)	0.00 (0)	0.06 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)
WITU	0.00 (0)	0.00 (0)	0.06 (–)	0.06 (3)	0.00 (0)	0.11 (3)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.20 (16)	0.06 (–)	0.17 (31)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.06 (–)
WODU	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (5)	0.00 (0)	0.06 (3)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (13)	0.11 (11)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)
YBCH	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.06 (–)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)
YEWA	0.17 (11)	0.00 (0)	0.25 (9)	0.11 (5)	0.22 (16)	0.00 (0)	0.06 (3)	0.00 (0)	0.06 (3)	0.06 (3)	0.13 (6)	0.11 (5)	0.06 (5)	0.11 (5)	0.28 (16)	0.11 (5)	0.33 (16)	0.11 (8)	0.00 (0)	0.06 (3)	0.06 (3)	0.11 (5)
YTVI	0.06 (3)	0.06 (–)	0.13 (3)	0.17 (8)	0.00 (0)	0.06 (3)	0.17 (8)	0.11 (5)	0.11 (5)	0.06 (3)	0.00 (0)	0.00 (0)	0.11 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.11 (5)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Appendix F. Tallgrass Prairie National Preserve Trends

Table 8 presents trends in breeding birds at Tallgrass Prairie National Preserve.

Table 8. Trends, annual change in abundance (individuals), of breeding birds (listed by the American Ornithologists' Union Code (AOU code) recorded on Tallgrass Prairie National Preserve, Kansas, from 2001 through 2023.

Habitat	AOU Code	Trend [A]	SE of Slope	Trend Classification [B]
Upland	AMCR	1.07	0.04	Uncertain
	BHCO	1.02	0.01	Stable
	BRTH	1.01	0.02	Uncertain
	DICK [C]	**1.06**	**0.01**	**Moderate Increase**
	EAKI	0.95	0.09	Uncertain
	EAME	1.22	0.13	Uncertain
	GCFL	1.07	0.07	Uncertain
	GRPC	1.03	0.08	Uncertain
	GRSP [C]	**1.00**	**>0.01**	**Stable**
	HESP [C]	**1.23**	**0.34**	**Uncertain**
	HOLA	0.96	0.07	Uncertain
	KILL	0.93	0.02	Moderate Decrease
	LASP	0.96	0.03	Uncertain
	MODO	1.12	0.04	Moderate Increase
	NOBO	1.10	0.03	Moderate Increase
	NOCA	1.12	0.06	Uncertain
	OROR	1.02	0.03	Uncertain
	RWBL	0.94	0.01	Moderate Decrease

[A] Trends were determined using the statistical software package 'rtrim' built under R version 3.6.3.

[B] Trend classification types depending on statistical significance and magnitude (Pannekoek and van Strien 2005; van Strien et al. 2001) and following Gregory et al. (2007). The multiplicative overall slope estimate in TRIM was converted into one of the following categories depending on the overall slope as well as its 95% confidence interval (= slope ±1.96 times the standard error of the slope): Strong increase: increase significantly more than 5% per year; criterion is lower limit of confidence interval > 1.05. Moderate increase: significant increase, but not significantly more than 5% per year; criterion is 1.00 < lower limit of confidence interval < 1.05. Stable: no significant increase or decline, and it is certain that trends are less than 5% per year; criterion is confidence interval encloses 1.00 but lower limit > 0.95 and upper limit < 1.05. Uncertain: no significant increase or decline but not certain if trends are less than 5% per year; criterion is confidence interval encloses 1.00 but lower limit < 0.95 or upper limit > 1.05. Moderate decline: significant decline but not significantly more than 5% per year; criterion is 0.95 < upper limit of confidence interval < 1.00. Steep decline: decline significantly more than 5% per year; criterion is upper limit of confidence interval < 0.95.

[C] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Table 8 (continued). Trends, annual change in abundance (individuals), of breeding birds (listed by the American Ornithologists' Union Code (AOU code) recorded on Tallgrass Prairie National Preserve, Kansas, from 2001 through 2023.

Habitat	AOU code	Trend [A]	SE of Slope	Trend Classification [B]
Upland (continued)	TUTI	1.17	0.18	Uncertain
	UPSA [C]	**0.88**	**0.02**	**Strong Decrease**
	WEME	0.77	0.12	Uncertain
Riparian	AMCR	1.13	0.11	Uncertain
	BCCH	1.02	0.03	Uncertain
	BGGN	1.07	0.03	Moderate Increase
	BLJA	1.01	0.03	Uncertain
	CARW	1.08	0.09	Uncertain
	DICK [C]	**1.08**	**0.09**	**Uncertain**
	EAWP	0.99	0.01	Stable
	GCFL	1.00	0.02	Stable
	INBU	1.11	0.57	Uncertain
	NOCA	1.05	0.02	Moderate Increase
	NOPA	1.10	0.82	Uncertain
	RBWO	1.02	0.02	Uncertain
	REVI	1.10	0.18	Uncertain
	TUTI	1.05	0.02	Moderate Increase
	WBNU	1.02	0.09	Uncertain
	YBCU	1.03	0.11	Uncertain

[A] Trends were determined using the statistical software package 'rtrim' built under R version 3.6.3.

[B] Trend classification types depending on statistical significance and magnitude (Pannekoek and van Strien 2005; van Strien et al. 2001) and following Gregory et al. (2007). The multiplicative overall slope estimate in TRIM was converted into one of the following categories depending on the overall slope as well as its 95% confidence interval (= slope ±1.96 times the standard error of the slope): Strong increase: increase significantly more than 5% per year; criterion is lower limit of confidence interval > 1.05. Moderate increase: significant increase, but not significantly more than 5% per year; criterion is 1.00 < lower limit of confidence interval < 1.05. Stable: no significant increase or decline, and it is certain that trends are less than 5% per year; criterion is confidence interval encloses 1.00 but lower limit > 0.95 and upper limit < 1.05. Uncertain: no significant increase or decline but not certain if trends are less than 5% per year; criterion is confidence interval encloses 1.00 but lower limit < 0.95 or upper limit > 1.05. Moderate decline: significant decline but not significantly more than 5% per year; criterion is 0.95 < upper limit of confidence interval < 1.00. Steep decline: decline significantly more than 5% per year; criterion is upper limit of confidence interval < 0.95.

[C] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

Appendix G. Regional Trends

Table 9 presents the Eastern Tallgrass Prairie Bird Conservation Region trends for breeding birds recorded at Tallgrass Prairie National Preserve.

Table 9. Regional trends in breeding birds recorded on Tallgrass Prairie National Preserve, Kansas, from 2001 to 2019. Regional trend data was obtained from BBS surveys (Sauer et al. 2020). Trend is defined as an interval-specific geometric mean of proportional changes in population size (Link and Sauer 1998), expressed as a percentage.

Common Name	Annual Percent Change in Population Size	95% Confidence Interval	
		Lower	Upper
American Coot	−1.54	−11.16	8.72
American Crow	−2.57	−3.04	−2.09
American Goldfinch	−2.10	−2.74	−1.46
American Robin	−0.03	−0.33	0.27
Baltimore Oriole	−2.39	−3.03	−1.73
Bank Swallow	−3.50	−7.80	0.93
Barn Swallow	−0.82	−1.34	−0.30
Barred Owl	3.40	1.63	5.23
Bell's Vireo [A]	**4.26**	**2.56**	**5.99**
Belted Kingfisher	−2.05	−3.37	−0.78
Bewick's Wren [A]	**−6.25**	**−10.03**	**−2.38**
Black-billed Cuckoo [A]	**−3.51**	**−6.26**	**−0.53**
Black-capped Chickadee	−2.81	−3.94	−1.68
Blue-gray Gnatcatcher	−0.40	−1.84	0.93
Blue Grosbeak	4.61	3.37	5.90
Blue Jay	−1.64	−2.15	−1.15
Blue-winged Teal	3.81	−0.82	9.20
Brown-headed Cowbird	−0.61	−1.15	−0.07
Brown Thrasher	−0.69	−1.22	−0.14
Canada Goose	2.18	−1.03	5.58
Carolina Wren	8.33	7.10	9.65
Cattle Egret	−12.71	−23.54	−1.26
Cedar Waxwing	−3.27	−4.64	−1.87
Chimney Swift	−5.13	−5.86	−4.40
Chipping Sparrow	0.15	−0.42	0.73
Cliff Swallow	9.10	5.61	12.61

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[B] Species recorded between point transects or other times outside of 5-minute survey periods.

Table 9 (continued). Regional trends in breeding birds recorded on Tallgrass Prairie National Preserve, Kansas, from 2001 to 2019. Regional trend data was obtained from BBS surveys (Sauer et al. 2020). Trend is defined as an interval-specific geometric mean of proportional changes in population size (Link and Sauer 1998), expressed as a percentage.

Common Name	Annual Percent Change in Population Size	95% Confidence Interval	
		Lower	Upper
Common Grackle	−4.14	−4.65	−3.63
Common Nighthawk	−0.59	−2.32	1.20
Common Yellowthroat	−1.00	−1.49	−0.49
Cooper's Hawk	3.41	1.68	5.21
Dickcissel [A]	**1.26**	**0.65**	**1.91**
Downy Woodpecker	–	–	–
Eastern Bluebird	−1.47	−2.35	−0.61
Eastern Kingbird	−2.53	−3.20	−1.83
Eastern Meadowlark	−0.55	−1.06	−0.05
Eastern Phoebe	0.03	−0.78	0.81
Eastern Towhee	2.01	1.14	2.92
Eastern Wood-pewee	0.53	−0.07	1.16
Eurasian Collared-dove	33.53	28.80	38.47
European Starling	−3.35	−3.97	−2.78
Field Sparrow [A]	**−0.05**	**−0.65**	**0.56**
Grasshopper Sparrow [A]	**−6.60**	**−7.75**	**−5.39**
Gray Catbird	1.27	0.67	1.90
Great Blue Heron	−1.53	−2.47	−0.56
Great Crested Flycatcher	0.58	−0.09	1.22
Great Egret [B]	0.28	−3.92	5.35
Great Horned Owl	−1.88	−3.61	−0.08
Greater Prairie-chicken	−1.88	−10.55	9.49
Great-tailed Grackle	−6.98	−12.19	−1.86
Green Heron	−3.09	−4.30	−1.85
Hairy Woodpecker	0.31	−0.90	1.51
Henslow's Sparrow [A]	**1.19**	**−2.22**	**4.62**
Horned Lark	−3.39	−3.99	−2.79
House Finch	−2.30	−3.57	−0.97
House Wren	1.03	0.46	1.68
Indigo Bunting	−0.91	−1.29	−0.55
Kentucky Warbler [A]	**−0.18**	**−2.21**	**1.81**

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[B] Species recorded between point transects or other times outside of 5-minute survey periods.

Table 9 (continued). Regional trends in breeding birds recorded on Tallgrass Prairie National Preserve, Kansas, from 2001 to 2019. Regional trend data was obtained from BBS surveys (Sauer et al. 2020). Trend is defined as an interval-specific geometric mean of proportional changes in population size (Link and Sauer 1998), expressed as a percentage.

Common Name	Annual Percent Change in Population Size	95% Confidence Interval	
		Lower	Upper
Killdeer	−0.20	−0.73	0.32
Lark Sparrow	1.60	0.19	3.09
Loggerhead Shrike [A]	**−4.28**	**−6.66**	**−1.59**
Louisiana Waterthrush	2.72	0.66	4.99
Mallard	−2.24	−3.94	−0.53
Mourning Dove	0.09	−0.30	0.47
Northern Bobwhite	−1.78	−2.57	−0.98
Northern Cardinal	0.92	0.59	1.26
Northern Flicker [A]	**–**	**–**	**–**
Northern Harrier	−1.93	−4.18	0.28
Northern Mockingbird	−0.20	−0.91	0.50
Northern Parula	2.82	1.21	4.50
Northern Rough-winged Swallow	−2.12	−3.48	−0.73
Orchard Oriole	1.06	0.05	2.09
Painted Bunting	−1.33	−4.51	1.26
Pied-billed grebe [A]	**0.11**	**−3.21**	**4.63**
Pileated Woodpecker	4.60	2.87	6.34
Prothonotary Warbler [A]	**0.34**	**−2.05**	**2.94**
Purple Martin	−0.15	−2.30	1.87
Red-bellied Woodpecker	1.75	1.15	2.38
Red-eyed Vireo	2.00	1.11	2.89
Red-headed Woodpecker [A]	**0.10**	**−0.88**	**1.08**
Red-tailed Hawk	−0.58	−1.39	0.22
Red-winged Blackbird	−1.41	−1.78	−1.04
Ring-necked Pheasant	−1.01	−2.55	0.58
Rock Pigeon	−3.19	−4.53	−1.83
Rose-breasted Grosbeak	0.27	−0.68	1.27
Ruby-throated Hummingbird	1.64	0.43	2.85
Scarlet Tanager	0.29	−1.16	1.79
Scissor-tailed Flycatcher	−1.19	−2.59	0.05

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[B] Species recorded between point transects or other times outside of 5-minute survey periods.

Table 9 (continued). Regional trends in breeding birds recorded on Tallgrass Prairie National Preserve, Kansas, from 2001 to 2019. Regional trend data was obtained from BBS surveys (Sauer et al. 2020). Trend is defined as an interval-specific geometric mean of proportional changes in population size (Link and Sauer 1998), expressed as a percentage.

Common Name	Annual Percent Change in Population Size	95% Confidence Interval	
		Lower	Upper
Spotted Sandpiper	0.90	−0.80	2.53
Summer Tanager	5.80	4.24	7.58
Swainson's Hawk	−0.27	−4.62	3.85
Tree Swallow	1.44	−0.32	3.28
Tufted Titmouse	–	–	–
Turkey Vulture	5.20	3.75	6.61
Upland Sandpiper [A]	**−3.33**	**−4.62**	**−1.56**
Warbling Vireo	0.04	−0.63	0.72
Western Kingbird	1.42	−0.62	3.66
Western Meadowlark	−6.03	−7.25	−4.81
White-breasted Nuthatch	−0.47	−1.59	0.65
Wild Turkey	3.76	1.35	6.25
Wood Duck	0.60	−1.08	2.35
Yellow-billed Cuckoo	0.74	−0.33	1.84
Yellow-breasted Chat	1.88	0.53	3.24
Yellow-throated Vireo	3.76	2.30	5.37
Yellow Warbler	−0.52	−1.47	0.46

[A] Species of conservation concern for the Eastern Tallgrass Prairie Bird Conservation Region (USFWS 2008; also in bold).

[B] Species recorded between point transects or other times outside of 5-minute survey periods.

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