Section-based Monitoring of Breeding Birds in Western Kansas

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EXECUTIVE SUMMARY

In 2003, Rocky Mountain Bird Observatory (RMBO), under contract with the Kansas Department of Wildlife and Parks (KDWP), implemented a grassland bird monitoring strategy in western Kansas as a pilot project. The objective is to monitor population trends and distribution of grasslands birds in the shortgrass prairie region of Kansas. Monitoring at this scale provides local and habitat specific data to natural resources managers resulting in more effective land management decisions regarding conservation of grassland birds and their habitat western Kansas.

INTRODUCTION

The shortgrass prairie is a unique ecosystem that is increasingly a topic of conservation discussion. Grassland birds have experienced steeper, more consistent, and geographically more widespread declines than any other guild of North American avian species (Sampson and Knopf 1996). Several species found in this ecosystem are endemic (found nowhere else) or are closely associated with the Great Plains grasslands (Mengel 1970). According to the Partners in Flight Species Assessment and Prioritization Database, 11% of upland species breeding in the Shortgrass Prairie Bird Conservation Region (BCR 18) are declining, and 85% lack sufficient data to address current population trends (Partners 2002).

Some managers have relied on data derived from the Breeding Bird Survey (BBS), currently the most extensive bird-monitoring program, to monitor bird populations (Robbins et al. 1989, Sauer 1993). The BBS, operational in the Great Plains since 1967, uses volunteers to conduct roadside surveys of birds across North America and produces indices of population abundance at the continental scale for many common bird species (Robbins et al. 1989) (Figure 1). BBS data and analyses are relatively inexpensive and have proven to be a valuable source of information on bird population trends. BBS data can be used to produce continental-scale relative abundance maps. These maps provide a reasonably good indication of the relative abundances of species that are well sampled by the BBS. However, many species and habitats are inadequately sampled by the BBS (Robbins et al. 1993, Sauer 1993), and BBS data do not reliably predict population trends at small geographic scales such as a National Grassland (Sauer 2000). For these and other reasons, BBS data are generally insufficient to guide local and regional management decisions (Leukering and Levad 2000).

In response to this need, in 2001, Rocky Mountain Bird Observatory (RMBO), in cooperation with the Colorado Division of Wildlife (CDOW), assessed field techniques to determine the most effective for monitoring shortgrass prairie birds. We evaluated 4 techniques that were randomly allocated across the shortgrass prairie of eastern Colorado: 1) road-based point counts, conducted at the section level from roads (n = 1237 sections); 2) interior line transects, conducted at the section level away from roads (n = 48 sections); 3) Monitoring Colorado's Birds (MCB) point transects, conducted irrespective of sections and roads (n = 22 point transects); and 4) 30-mile driving line transects, conducted along roads, through all habitat types in Colorado (n = 87 line transects). Program DISTANCE was used to estimate densities of birds using each of the 4

techniques. The results suggest that the road-based point count technique was the most efficient in monitoring birds in eastern Colorado (Hanni 2002).

Road-based point counts are a section-based monitoring technique that can potentially monitor 65% of the upland breeding species in the Shortgrass Prairie Bird Conservation Region (BCR 18), including 13 of the 16 species that are declining significantly in this region (Partners 2002). Section-based monitoring is currently being implemented in five Great Plains states that contain portions of the Shortgrass Prairie Bird Conservation Region (NE, CO, NM, KS, and OK) (Figure 1). Monitoring at a BCR-wide scale allows for the detection of regional trends in population and distribution of grasslands bird species while also providing local land managers with site specific data. Such knowledge can assist natural resource managers in making effective land management decisions regarding conservation of grassland birds and their habitat.

To date, the Colorado Division of Wildlife, Nebraska Game and Parks Commission, Kansas Department of Wildlife and Parks, Oklahoma Department of Wildlife Conservation, New Mexico Department of Game and Fish, and the Forest Service have implemented section-based monitoring programs using the road-based point count technique (Hanni 2002). In 2003, section-based monitoring of shortgrass prairie birds was conducted in 21 counties of western Kansas (Figure 2). This document reports our findings.

METHODS

Study area:

This study was conducted in the Kansas portion of the Shortgrass Prairie Bird Conservation Region (BCR18), including 21 counties (Figure 2). This arid region receives 300 - 500 mm of precipitation per year, and is characterized by 2 dominant grass species, buffalo grass (*Buchloe dactyloides*) and blue grama (*Bouteloua gracilis*) (Lauenroth 1992). Within the study area, the dominant habitat types were stratified into 2 categories: native prairie and dryland agriculture.

Section Selection:

Sections are defined by the Public Land Survey System (PLSS) as 1 mi^2 parcels of land and are the sampling units of section-based monitoring. Prior to field season, we used GIS to randomly select homogenous sections (600 - 700 acres) of native prairie and dryland agriculture that lie adjacent to at least 1 road (Figures 2). If, during the field season, a section was determined not to meet these criteria, it was replaced with the closest qualifying section in a randomly selected direction. In 2003, 492 sections were selected for surveying, 138 native prairie sections and 354 dryland agriculture sections.

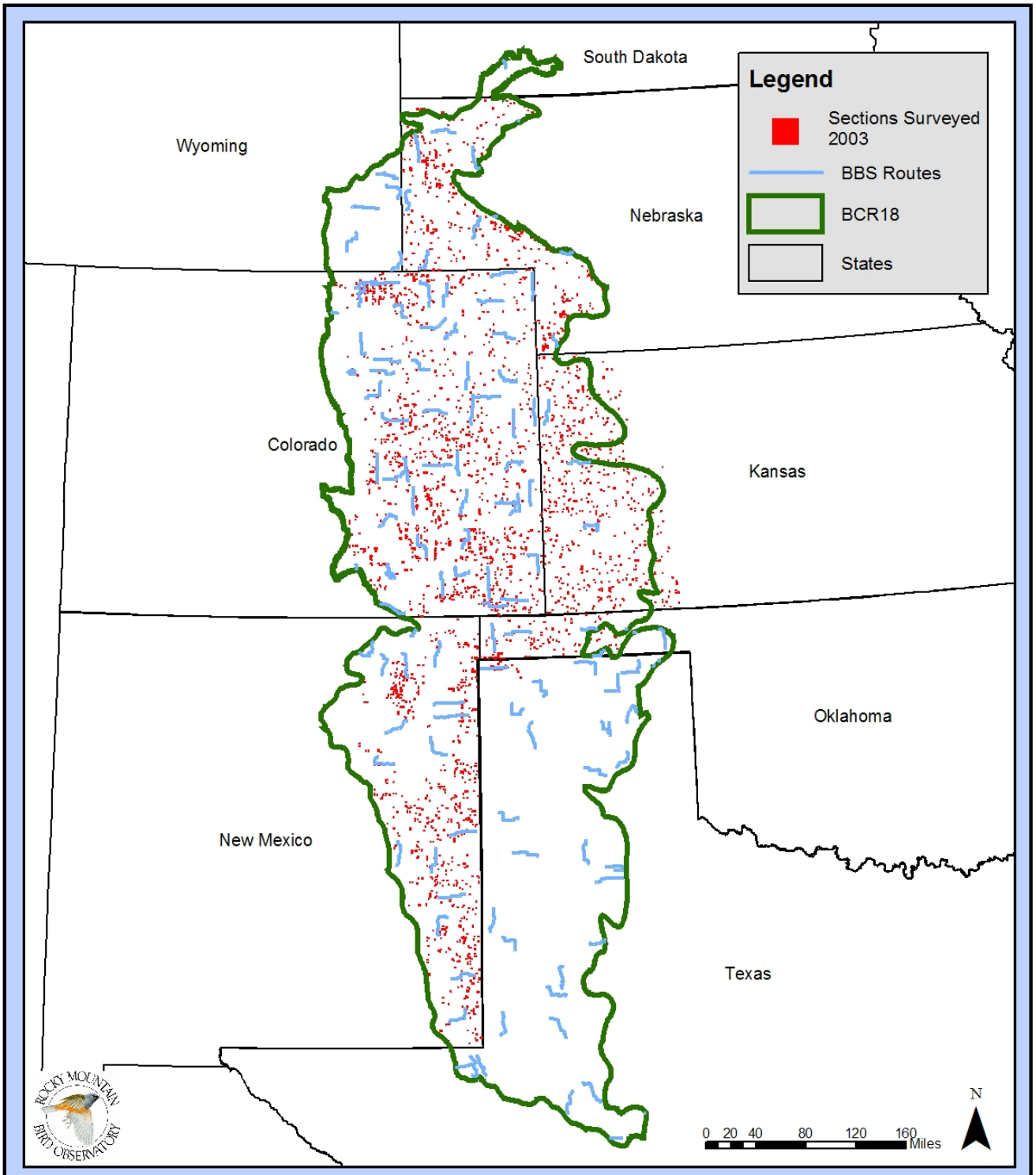

Figure 1. Sections surveyed for grassland birds, May 16 - July 3, 2003. Sections are 1 x 1 mile, contain 600 - 700 acres of contiguous habitat, are adjacent to at least 1 road, and were surveyed using road-based point counts. BBS routes are shown for comparison of surveyed methodologies.

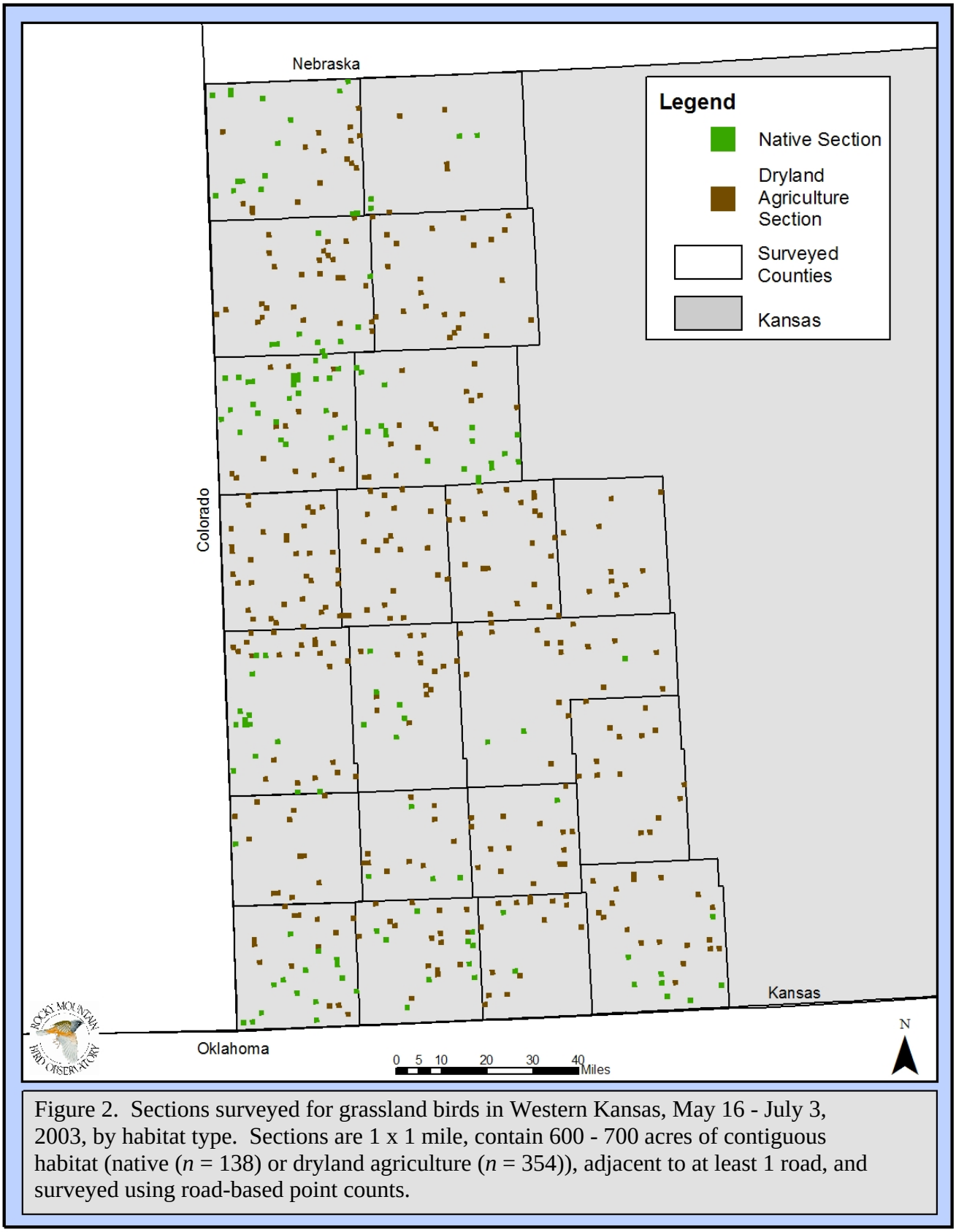

Figure 2. Sections surveyed for grassland birds in Western Kansas, May 16 - July 3, 2003, by habitat type. Sections are 1 x 1 mile, contain 600 - 700 acres of contiguous habitat (native (n = 138) or dryland agriculture (n = 354)), adjacent to at least 1 road, and surveyed using road-based point counts.

Road-based Point Counts Locations:

A point count data collection process modified from Buckland et al. (1993) was used to establish road-based point counts. Three road-based point counts, located at least 0.2 mi (322m) apart along the road, were conducted on each section. Four point counts per section does not yield a statistically significant difference in the number of species detected (Hanni 2002). Point count locations were determined using a random number table and were recorded using a Garmin *etrex* global positioning system (GPS) unit. Point count locations were distributed around a section based on the number of roads surrounding that section. For example, on sections adjacent to only 1 road, 3 counts were conducted from that road. On sections with 2 roads, 2 counts were conducted along 1 road, and 1 count was conducted along the other; the road on which 2 counts were conducted was randomly selected using a random number table. On sections bordered by 3 roads, 1 count was conducted along each road. Where 4 roads surrounded the section, 1 road was randomly selected and eliminated using a random number table, and the section was then treated as a three-road section.

Data Collection:

Data were collected May 16 – July 3, 2003. We considered arrival and productivity periods of early and late-breeding species in the assumption that the majority of the species were on their breeding territories. Observers conducted point counts from sunrise until no later than 1100 hours when detectable activity typically lessened or ceased. We recorded survey "start" and "end" times. Surveys were not conducted during periods of rain or winds in excess of 18 mph. Observers recorded weather conditions, including cloud cover, wind speed, and temperature. Township, range, and section (TRS) of the surveyed sections were also documented.

Point counts were conducted for 5 minutes looking from the road 180° into the section. All birds seen and/or heard within this section were recorded. Distance from the observer to the point of first detection was recorded for each bird observed. Distances were determined using a Bushnell Yardage Pro 500 Rangefinder. Method of detection (i.e. visually, aurally), sex (if known), and habitat association (i.e. shrub, ground, fence, etc.) were recorded. Birds flying over the section were tallied separately. From each point, we recorded vegetation characteristics, including grass height, percent shrub cover, and dominant shrub cover species, within a 150 m semicircle of the surveyed section. Grass height categories included <15 cm and >15 cm (~ankle height). When there was a combination of the 2 heights, the proportions in each category were recorded. Shrub cover data were recorded only when a shrub community was present. Technicians were provided with a reference guide to shrub percent cover that illustrated examples of shrub percent for each of the different shrub species to be encountered in the field. The categories were <1%, >1%-3%, >3%-10%, and >10%. These percentages were recorded for sagebrush, rabbit brush, four-winged salt bush, greasewood, cholla, yucca, and other species that occurred less frequently.

All black-tailed prairie dog colonies and playas visible within the section were sketched by the observer onto the data sheet. All black-tailed prairie dog colonies were

documented on maps and in notes, whether located on National Grassland, private land, or state-owned land. Black-tailed prairie dog colonies, whether occupied or abandoned by prairie dogs, and playas were searched with binoculars for both Burrowing Owls and Mountain Plovers. Nests of any raptors were documented by recording UTMs and by marking the location on a map.

Technician training was provided by RMBO at the Central Plains Experimental Range near Pawnee National Grassland. The technicians were trained for 3 consecutive days via lecture and field practice. Technicians were deemed proficient in grassland bird identification (visual and aural), distance estimation with rangefinders, GPS use, mapping skills, methodologies, vegetation identification, and ground cover estimation. Recordings of the songs and calls of grassland birds were provided to each technician for sharpening skill after the three-day training period.

Data Analysis:

Program DISTANCE (Thomas 1998-99) was used to analyze the point count data. The notation, concepts, and analysis methods of DISTANCE were developed by Buckland et al. (1993). Density estimates (D) were calculated for species that had a minimum of 25 observations or had a coefficient of variation (CV) of less than 50%, a level which indicates robust data. No flyover detections were used in the DISTANCE analysis (except for swallows). During analyses, DISTANCE assigns a unique detection function to avoid some potential problems associated with traditional analysis of point counts (e.g., varying detectability among habitats, species, and different years). Analysis using DISTANCE assumes that 1) all birds at distance 0 are detected; 2) distances of the birds close to the points or line are measured accurately; and, 3) birds do not move in response to the observer's presence. In this analysis, we adjusted the sampling effort to 0.5 because birds were recorded in only 180˚of the point count circle, instead of 360˚.

The index of relative abundance used in the distribution maps (Appendix A) was calculated from data collected using the road-based point count technique. The index of abundance, represented by graded map symbols, was defined as the total number of individuals for each species detected on the section divided by the number of point counts conducted on that section (Appendix A).

Bird taxonomy and nomenclature in this report follow that of the American Ornithological Union (1998, 2002).

RESULTS

In 2003, a total of 1,476 road-based point counts were conducted on 492 sections (138 native prairie and 354 dryland agriculture) in western Kansas (Figure 2). Seventy-six bird species were observed (Appendix B). Sixteen species had sufficient number of observations to calculate density estimates within native prairie habitat and 17 species had sufficient number of observations to calculate density estimates within dryland agriculture habitat (Tables 1 and 2). Six species designated as species of concern (SINC)

in Kansas were observed: Ferruginous Hawk (*n* = 1), Golden Eagle (*n* = 1), Lesser Prairie-chicken (*n* = 1), Long-billed Curlew (*n* = 4), Burrowing Owl (*n* = 23), and Chihuahuan Raven (*n* = 6). Species distribution maps of these and other species are located in Appendix A. Ten black-tailed prairie dog colonies were documented on surveyed sections. No playas were located on surveyed sections.

Table 1: Density estimates for species observed on native prairie sections, May 16 – July 3, 2003.

Species	D	D LCL	D UCL	D CV	n
Ring-necked Pheasant	1.11	0.73	1.69	22%	41
Northern Bobwhite	3.52	2.15	5.79	26%	38
Killdeer	11.72	6.12	22.42	34%	11
Mourning Dove	52.17	34.33	79.28	22%	150
Western Kingbird	13.83	9.08	21.07	22%	38
Horned Lark	70.02	56.51	86.76	11%	208
Cliff Swallow	38.65	19.84	75.27	35%	40
Barn Swallow	6.90	3.27	14.55	39%	27
Cassin's Sparrow	53.25	41.33	68.61	13%	185
Lark Sparrow	34.06	26.12	44.42	14%	112
Lark Bunting	34.36	25.91	45.56	14%	195
Grasshopper Sparrow	42.66	32.60	55.83	14%	120
Dickcissel	14.54	7.38	28.68	35%	24
Red-winged Blackbird	9.61	4.11	22.51	45%	23
Western Meadowlark	82.06	72.94	92.33	6%	460
Brown-headed Cowbird	7.20	3.35	15.49	40%	19

D=Density estimate expressed in birds/km^2, DLCL & DUCL = lower and upper 95% confidence limits of D, DCV = coefficient of variation of D, n = number of detections used to calculate D.

Table 2: Density estimates for species observed on dryland agriculture sections, May 16 – July 3, 2003.

Species	D	D LCL	D UCL	D CV	n
Ring-necked Pheasant	3.28	2.36	4.56	17%	230
Northern Bobwhite	0.70	0.38	1.27	31%	15
Killdeer	5.66	3.84	8.35	20%	55
Mourning Dove	49.59	38.32	64.17	13%	339
Western Kingbird	4.85	2.45	9.61	36%	46
Horned Lark	150.76	130.54	174.10	7%	1018
Cliff Swallow	6.92	4.23	11.31	25%	50
Barn Swallow	17.53	10.01	30.69	29%	37
Cassin's Sparrow	4.20	2.31	7.65	31%	26
Lark Sparrow	21.52	16.25	28.49	14%	159
Lark Bunting	59.22	49.60	70.71	9%	538
Grasshopper Sparrow	42.96	36.28	50.87	9%	220
Dickcissel	17.69	10.75	29.12	26%	97
Red-winged Blackbird	28.04	22.87	34.38	10%	360
Western Meadowlark	49.32	43.99	55.28	6%	882
Common Grackle	10.44	5.40	20.20	34%	28
House Sparrow	3.07	1.20	7.85	51%	20

D=Density estimate expressed in birds/km^2, DLCL & DUCL = lower and upper 95% confidence limits of D, DCV = coefficient of variation of D, n = number of detections used to calculate D.

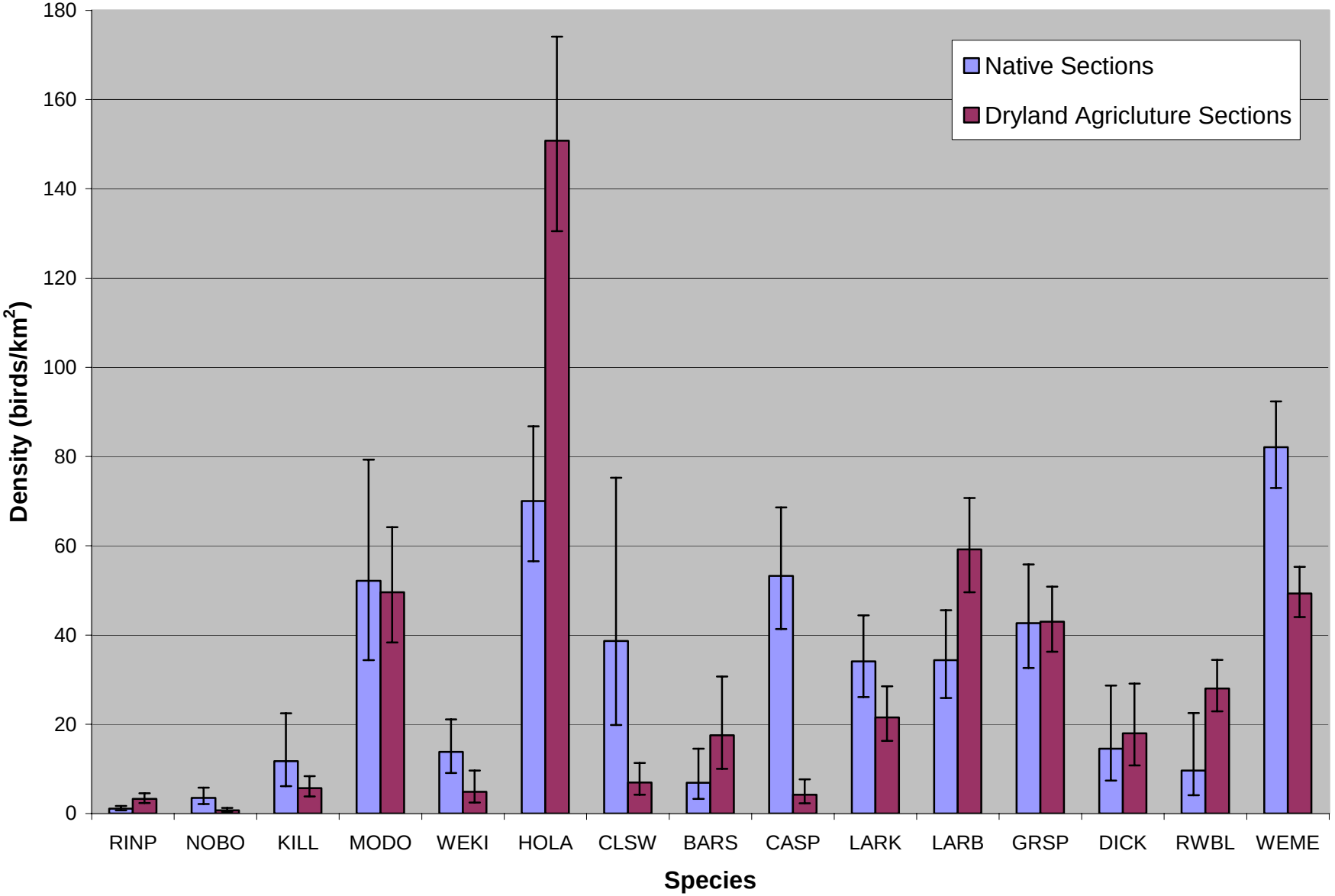

Figure 3. Density estimates with 95% confidence intervals for bird species detected on both native and dryland agriculture sections, May 16 – July 3, 2003. Density estimates are reported only for species with sufficient number of observations (n > 25 or D CV < 50 %).

DISSCUSION AND RECOMMENDATIONS

In 2003, section-based monitoring in western Kansas yielded density estimates for 19 of the 76 detected bird species. These section-based surveys provide the data necessary to detect and monitor trends in species population and distribution within the shortgrass prairie region of Kansas. Increasing the sample size in this region will potentially increase the number of species monitored under this protocol and will yield more precise data.

Monitoring by habitat type within the shortgrass prairie landscape provides habitat-specific data to natural resource managers, resulting in more effective land management decisions regarding conservation of grassland birds and their habitat. Data collected through section-based monitoring can be used to link habitat types to bird counts. For example, 2003 data suggests that Horned Larks show preference for dryland agriculture over native prairie habitat (Figure 3) in western Kansas. Dryland agriculture may provide more bare ground than native prairie. The data also suggests Cassin's Sparrows and Western Meadowlarks prefer native prairie over dryland agriculture habitat in western Kansas, due to non-overlapping 95% confidence limits (Figure 3). Native prairie may provide more structure and more cover for these species. In the future, characteristics of vegetation structure collected at permanently marked point count locations can be related to bird data. Correlations can then be drawn among avian trends, densities, species richness, habitat types and characteristics. Evaluating habitat types and characteristics based on population trends and distributions will enable us to focus conservation efforts and help land managers to make decisions that conserve shortgrass prairie birds.

Furthermore, data collected in western Kansas contributes to the detection and monitoring of large scale regional trends in species population and distribution. Section-based monitoring is currently being conducted across the shortgrass prairie bird conservation regions (BCR 18) of 5 Great Plains states -- Nebraska, Colorado, Kansas, New Mexico, and Oklahoma. We anticipate expanding section-based monitoring into Texas in the 2004 field season, and would then be surveying approximately 95% of the shortgrass prairie bird conservation region (BCR 18). Monitoring across BCR 18 allows for landscape scale bird conservation and facilitates cooperative working relationships between federal, state, and local agencies and organizations. A report will be provided documenting Kansas's contribution to a larger scale effort.

A disadvantage of our section-based monitoring program, which is also shared by BBS, is the potential road bias resulting from the road-based surveying technique. This would not affect our ability to monitor bird populations if there is no variation in the roadside bias among years. We are currently working toward identifying a correction factor that would allow us to calculate more accurate density estimates. The road-based point counts are being compared to un-biased point transects to determine a variable for each species for which there are density estimates from both techniques. The correction factor will compensate for the density estimate generated from road-based point counts and should offer a more accurate population estimate for individual species.

Section-based monitoring is statistically rigorous, inexpensive, site-specific, and habitat-specific. It fills an important management need at a modest cost. However, there should be no expectation that this technique will detect and develop trends for all grassland bird species. No single technique can accomplish such an assessment of all grassland birds. Section-based monitoring provides an overview of the avian community and can be used to identify areas in need of particular management attention and lead to more effective conservation of shortgrass prairie birds and their habitat.

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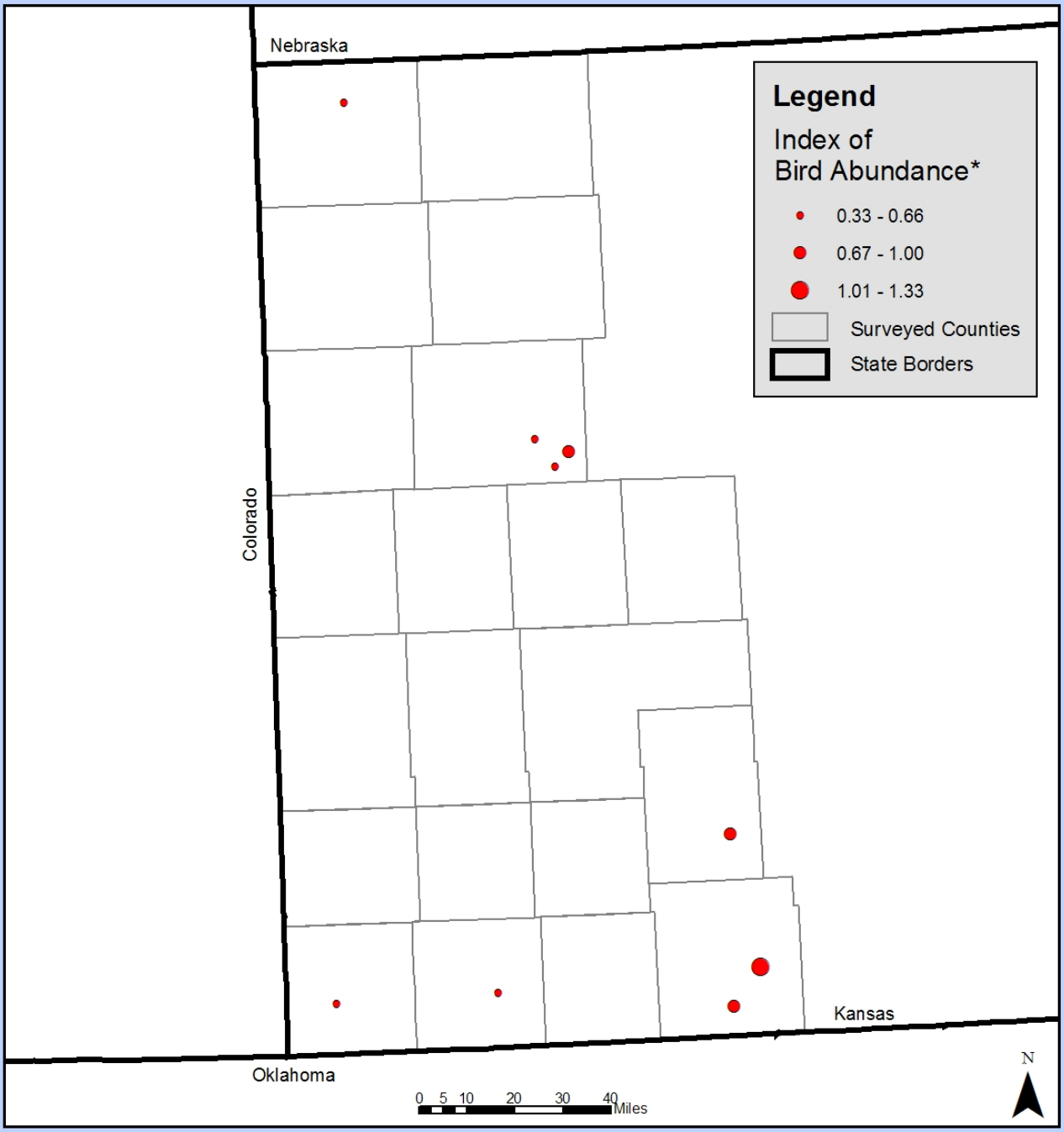
APPENDIX A.

Species Distribution Maps:

The following are species distribution maps that show observation locations and index of abundance at the section level. Index of abundance, represented by graded dots, was defined as the total number of a species detected on the section divided by the number of point counts conducted on that section. The index of abundance was created to adjust for the amount of effort on each of the sections among years (2001 - 2003) and states. In 2001, during section-based monitoring in Colorado and Nebraska, 1 to 4 point counts per section were conducted compared to 2002 and 2003 when 3 point counts were conducted on all sections.

Turkey Vulture

(Cathartes aura)

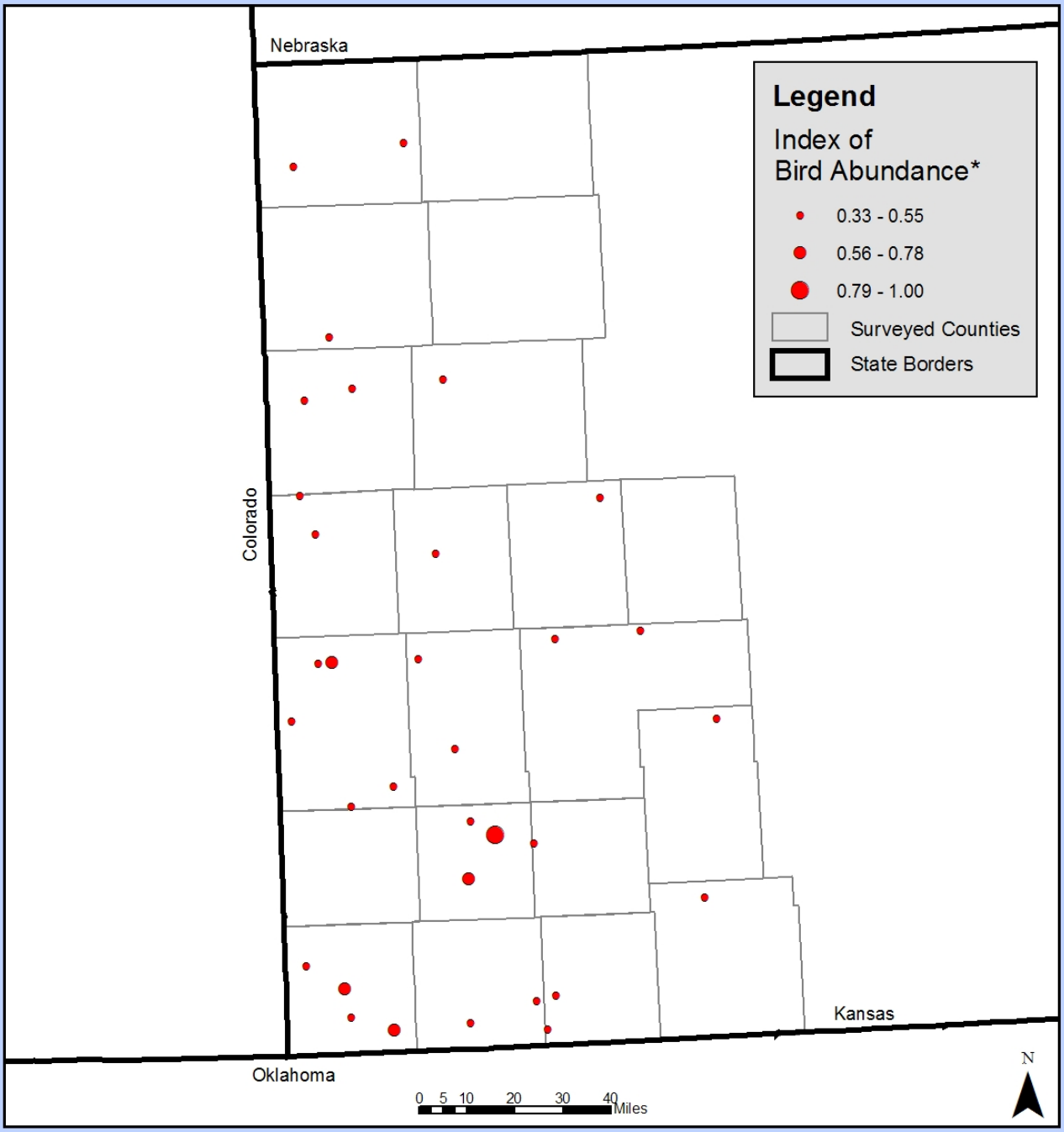


Distribution and index of abundance of indicated species across western Kansas. Surveys were conducted May 16 – July 3, 2003 using road-based point counts at the section level.

* *Index of abundance is the number of individual birds observed on a 1 x 1 mile section of land divided by the number of point counts conducted on that section.*

Swainson's Hawk

(Buteo swainsoni)



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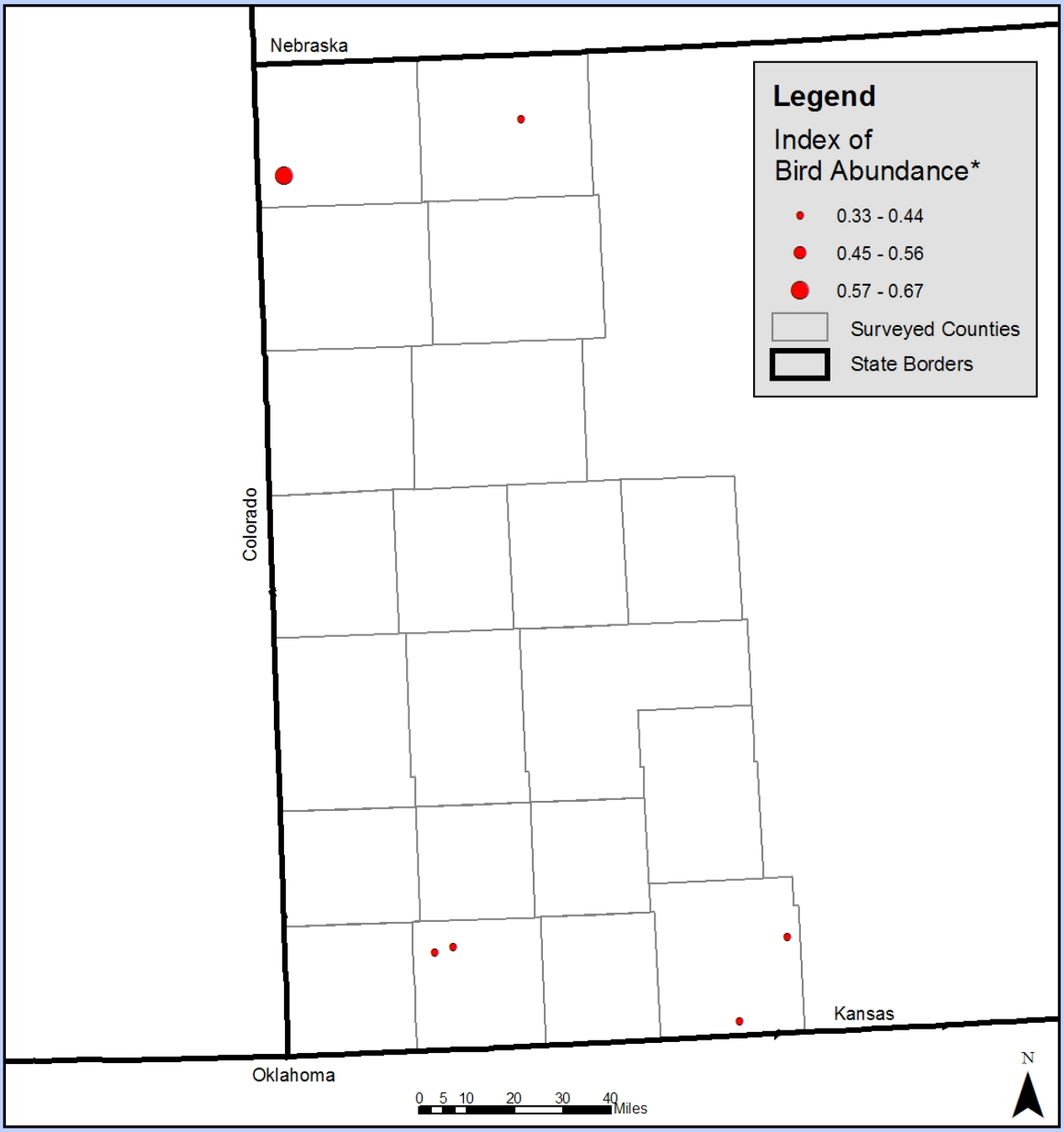
Red-tailed Hawk

(Buteo jamaicensis)



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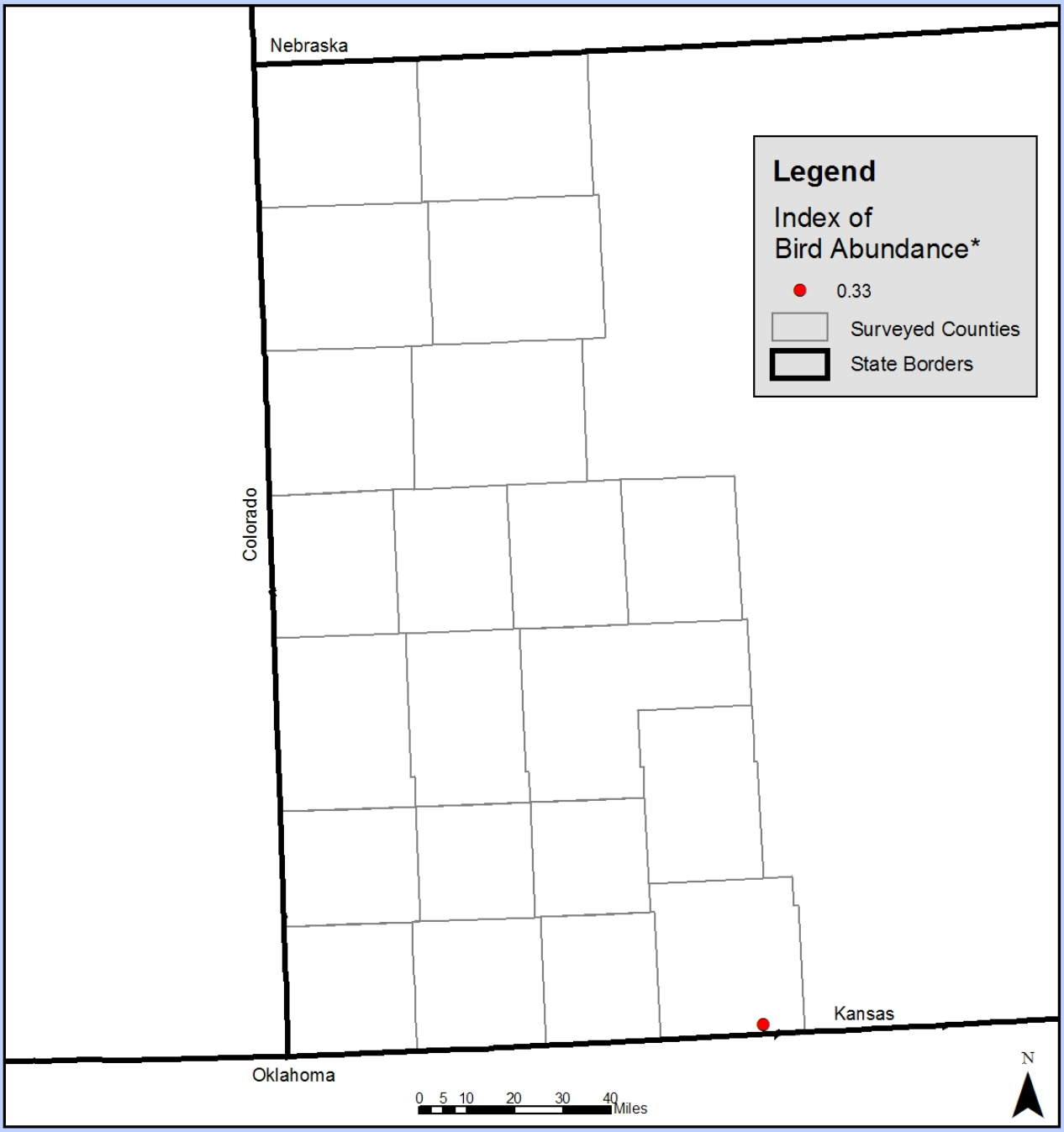
Ferruginous Hawk

(Buteo regalis)



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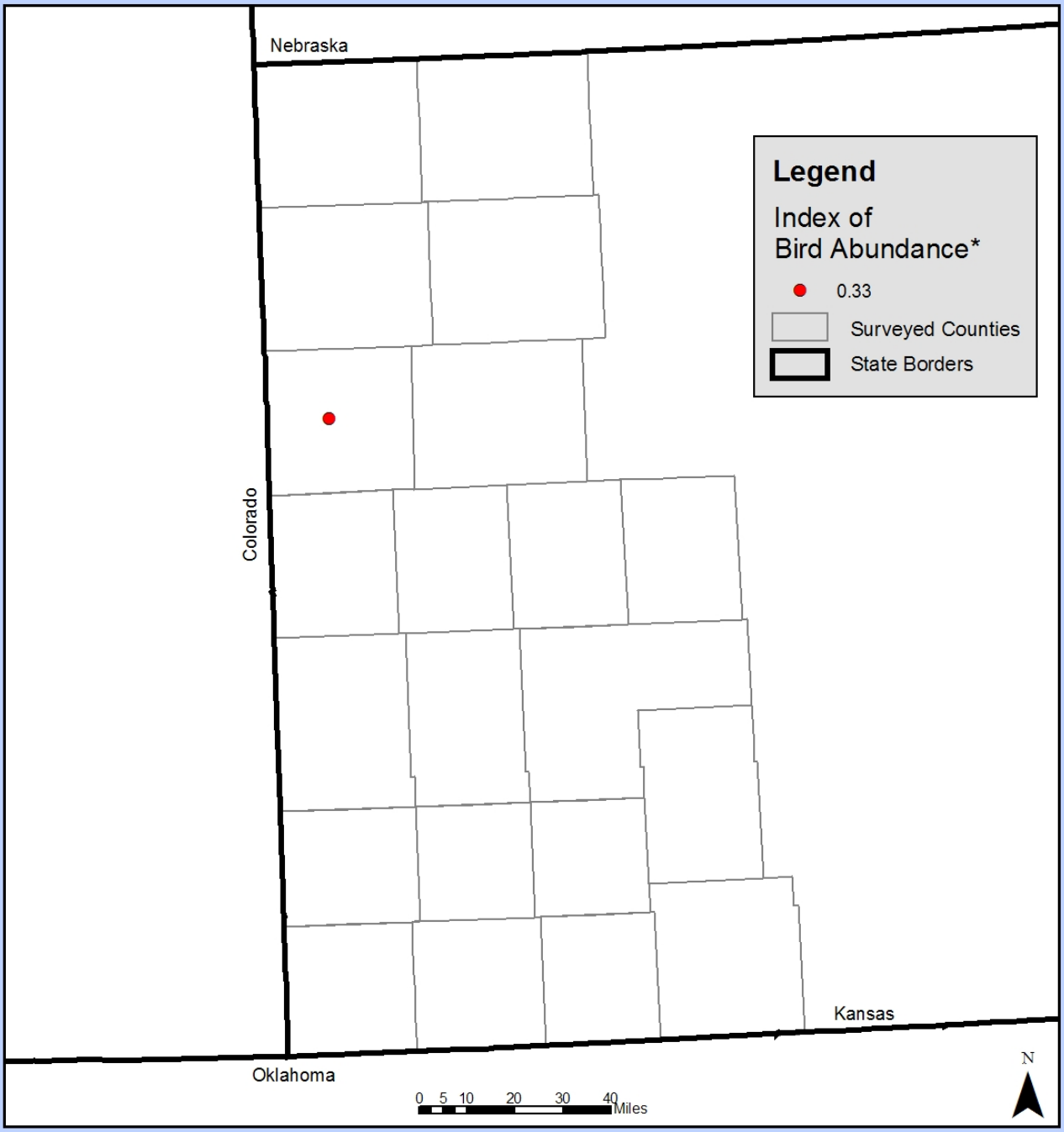
Golden Eagle

(Aquila chrysatos)



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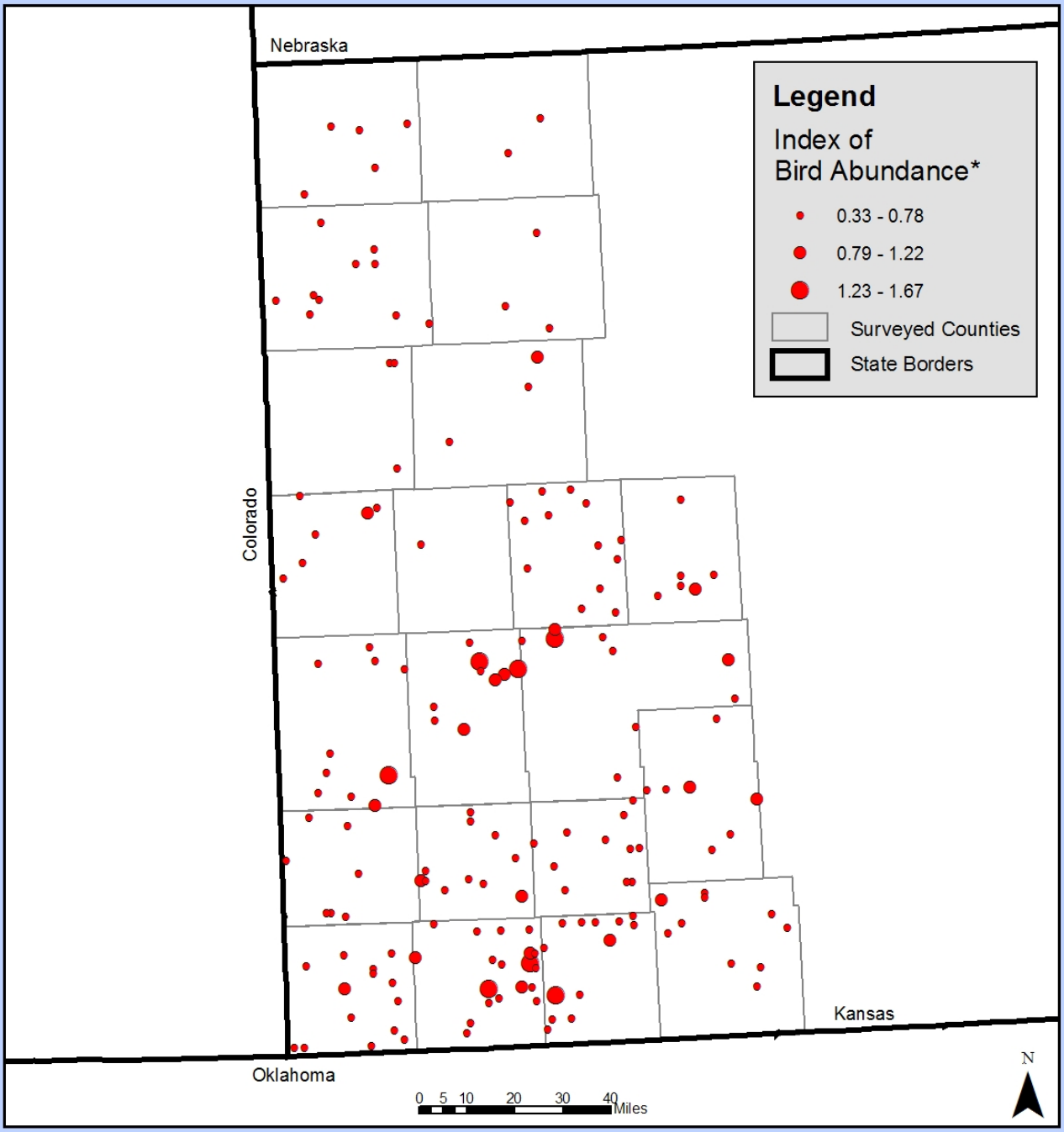
Ring-necked Pheasant

(Phasianus colchicus)



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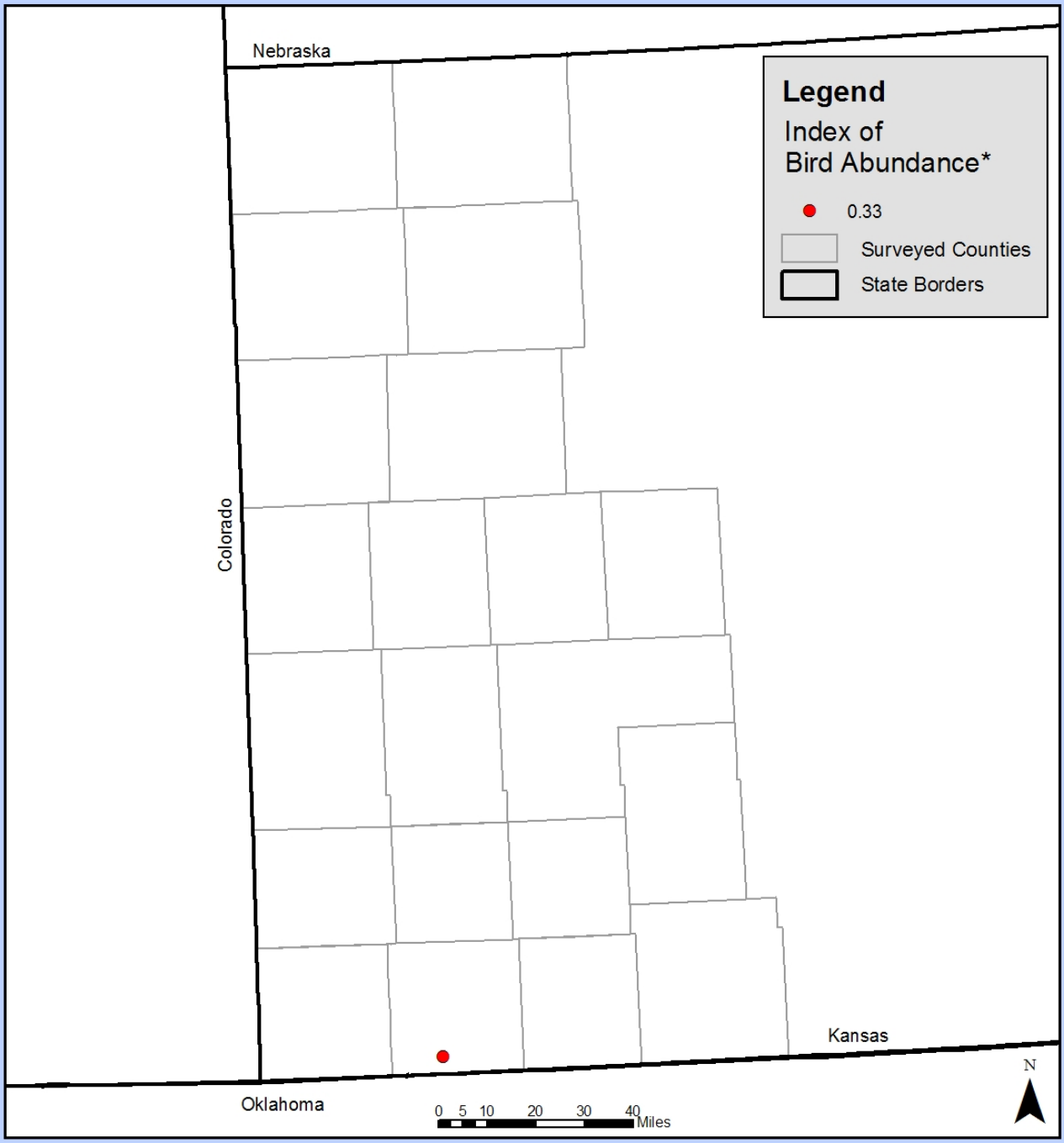
Lesser Prairie-chicken

(Tympanuchus pallidicintus)



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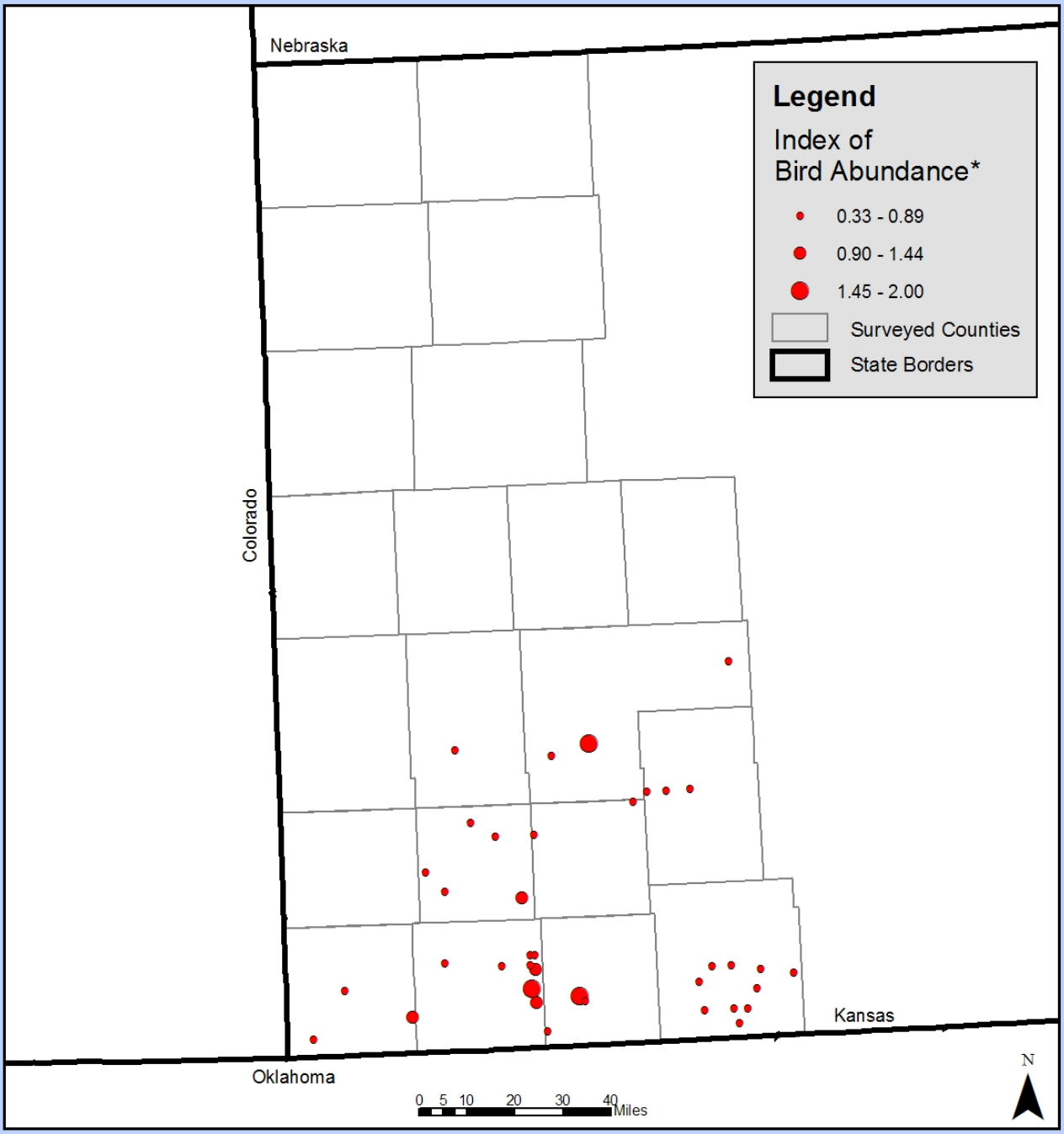
Northern Bobwhite

(Colinus virginianus)



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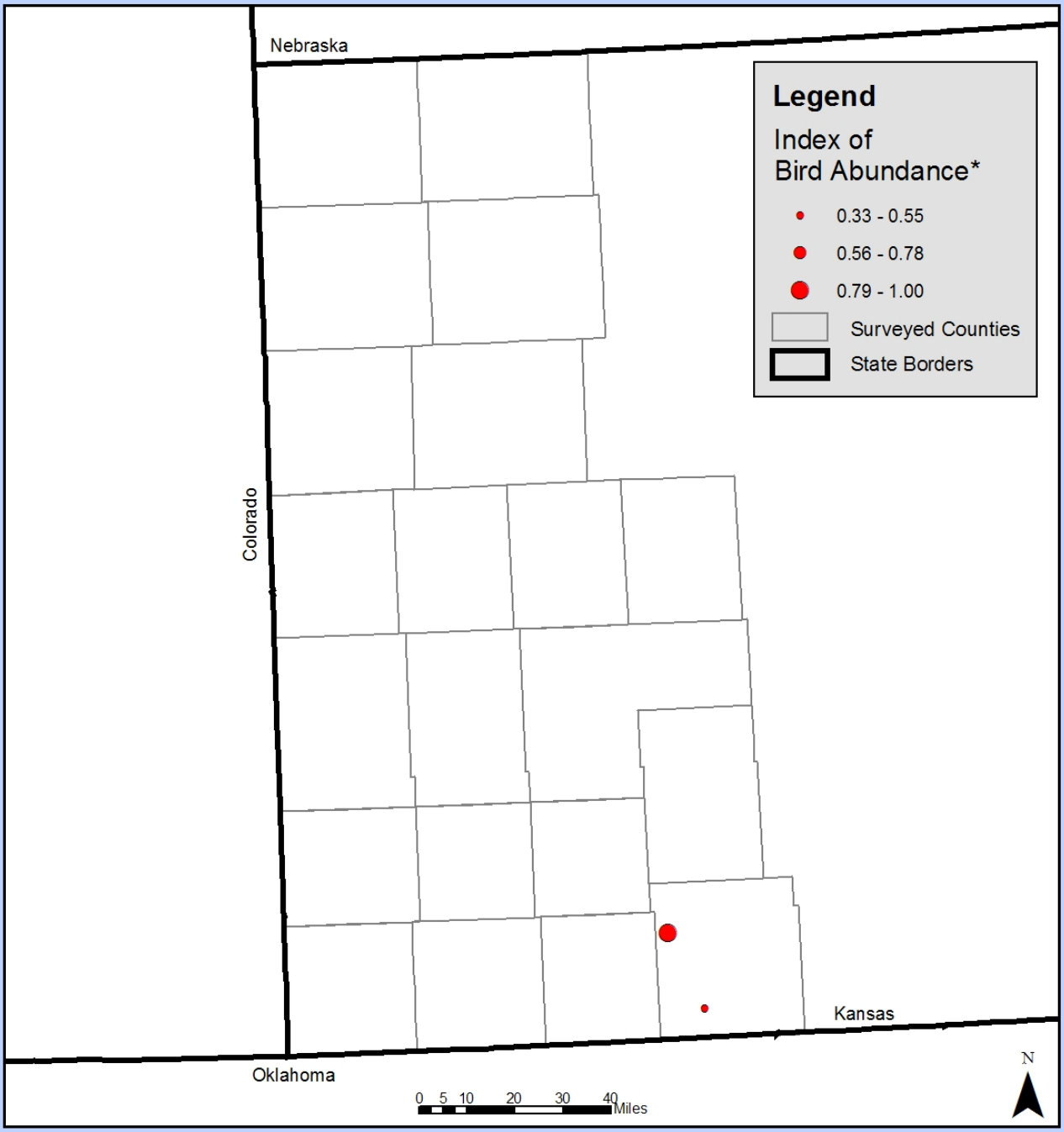
Scaled Quail

(Callipepla squamata)



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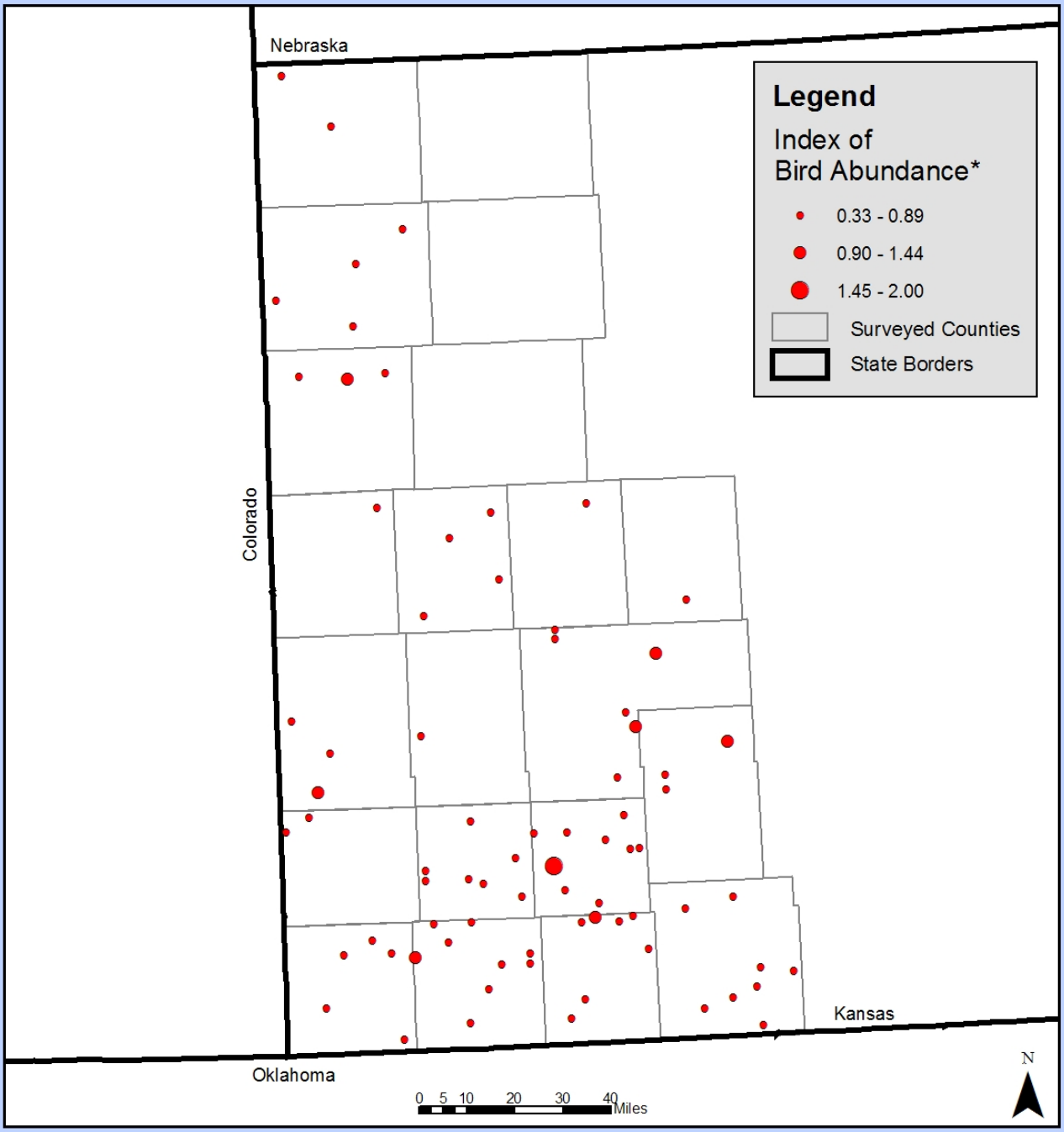
Killdeer

(Charadrius vociferous)

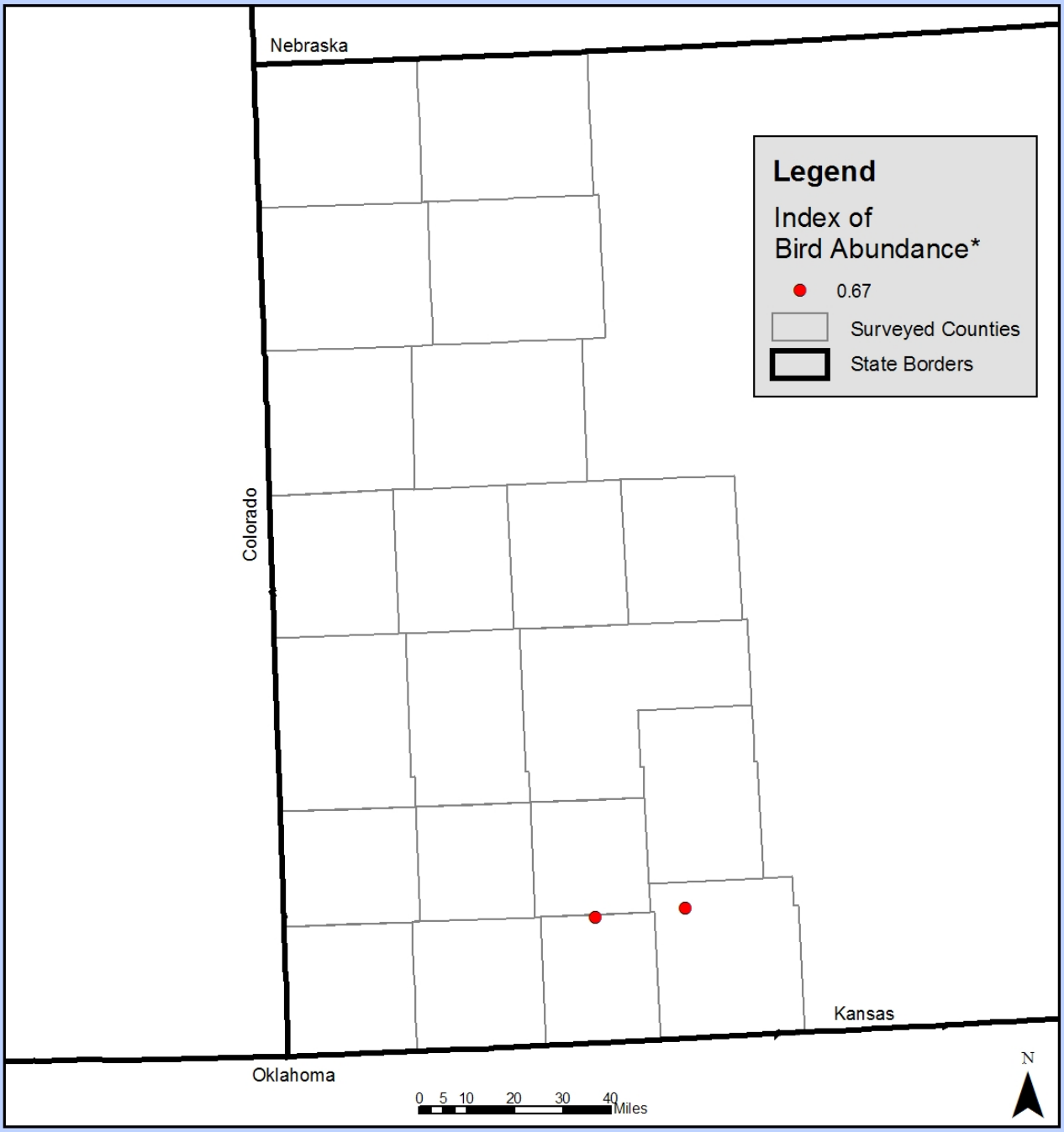


Distribution and index of abundance of indicated species across western Kansas. Surveys were conducted May 16 – July 3, 2003 using road-based point counts at the section level.

* *Index of abundance is the number of individual birds observed on a 1 x 1 mile section of land divided by the number of point counts conducted on that section.*

Long-billed Curlew

(Numenius americanus)



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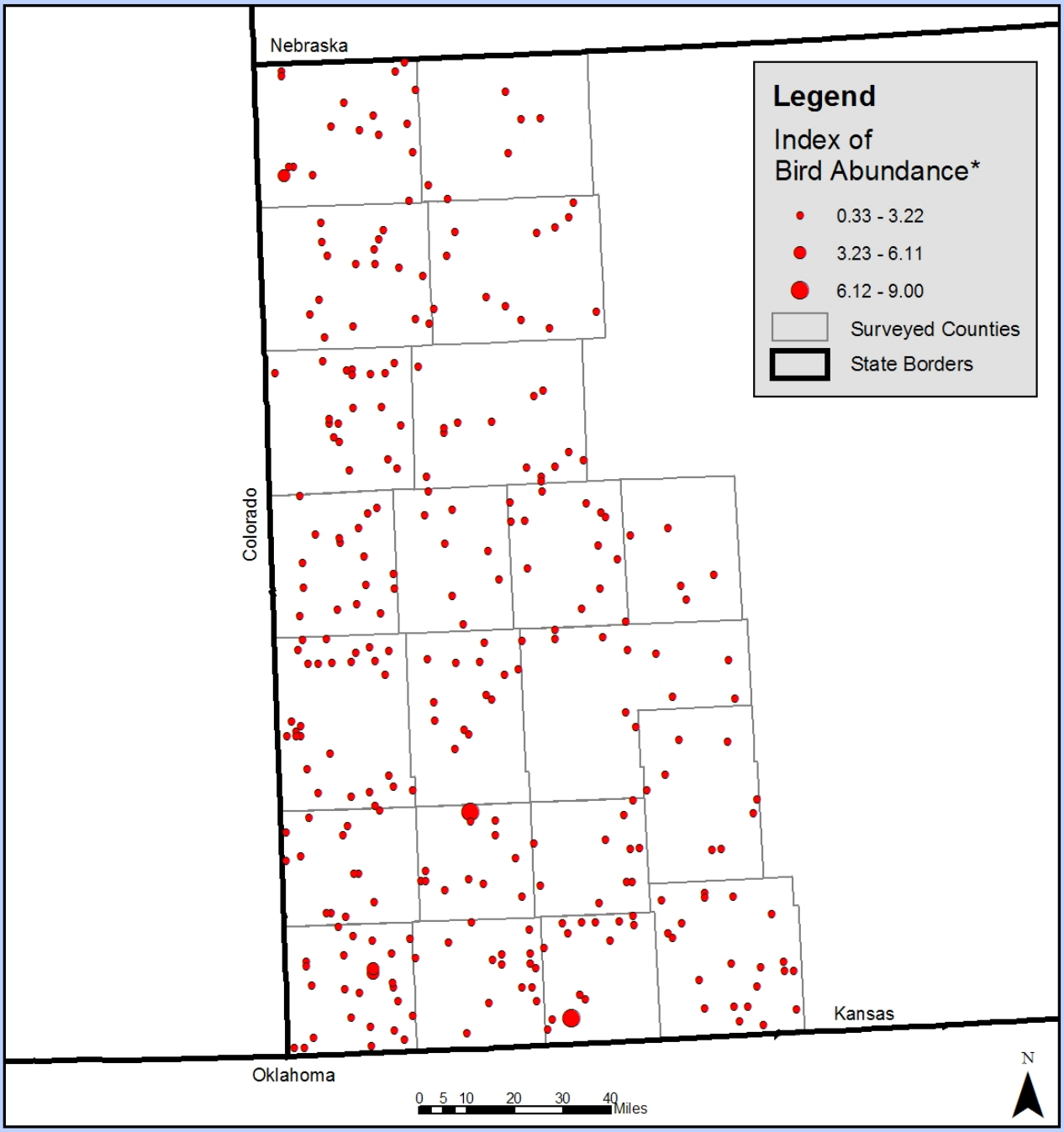
Mourning Dove

(Zenaida macroura)



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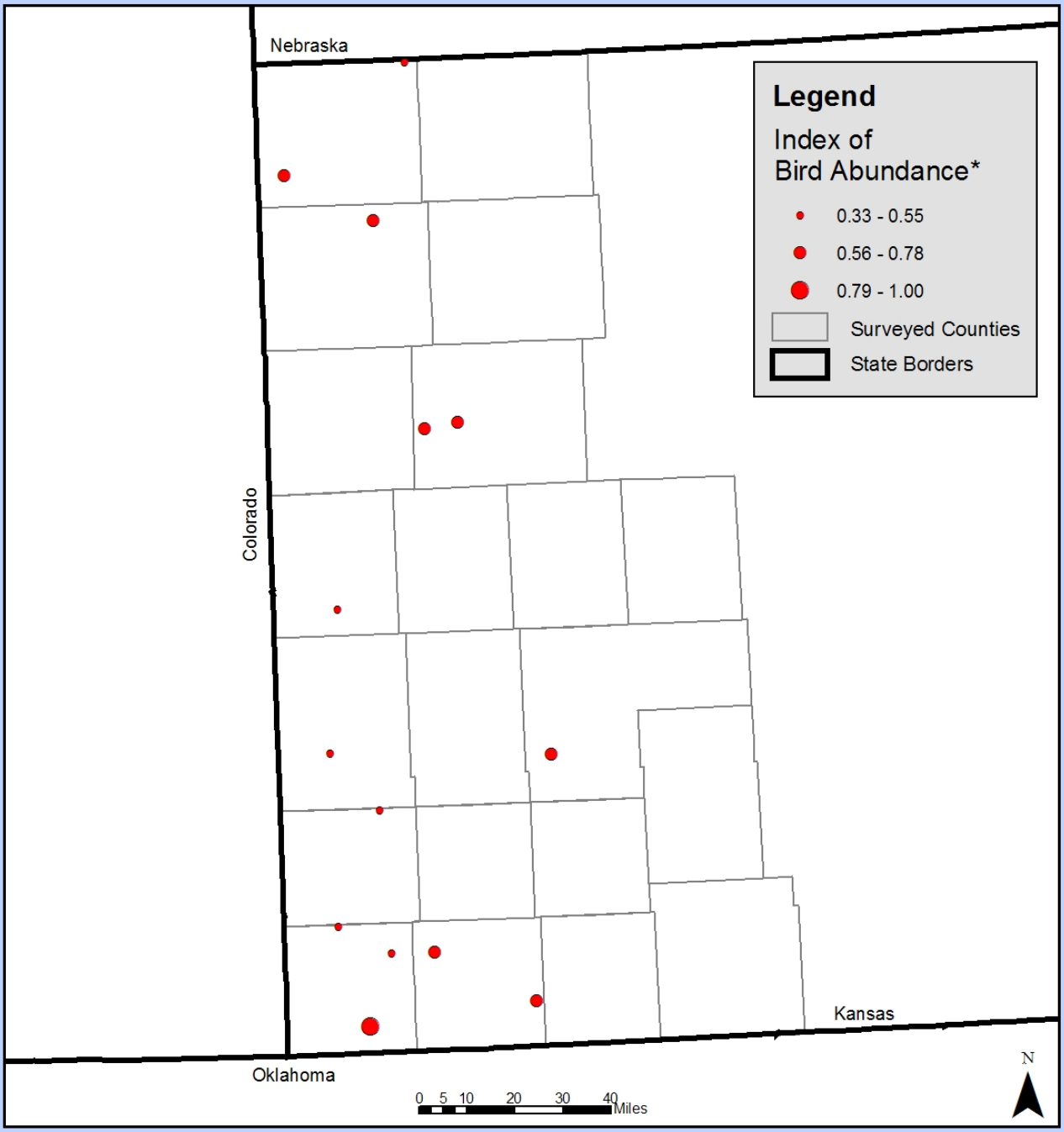
Burrowing Owl

(Athene cunicularia)



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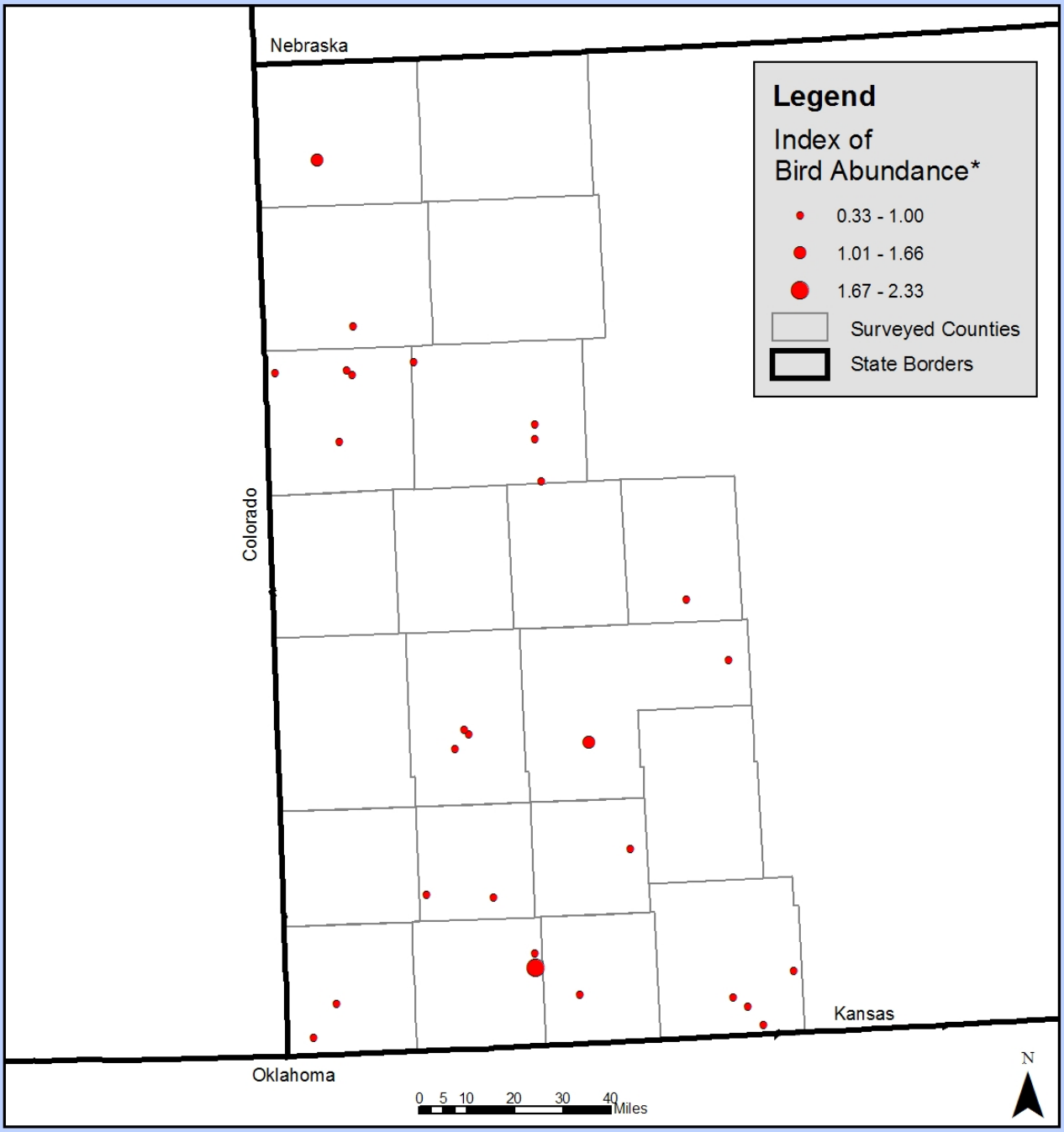
Common Nighthawk

(Chordeiles minor)



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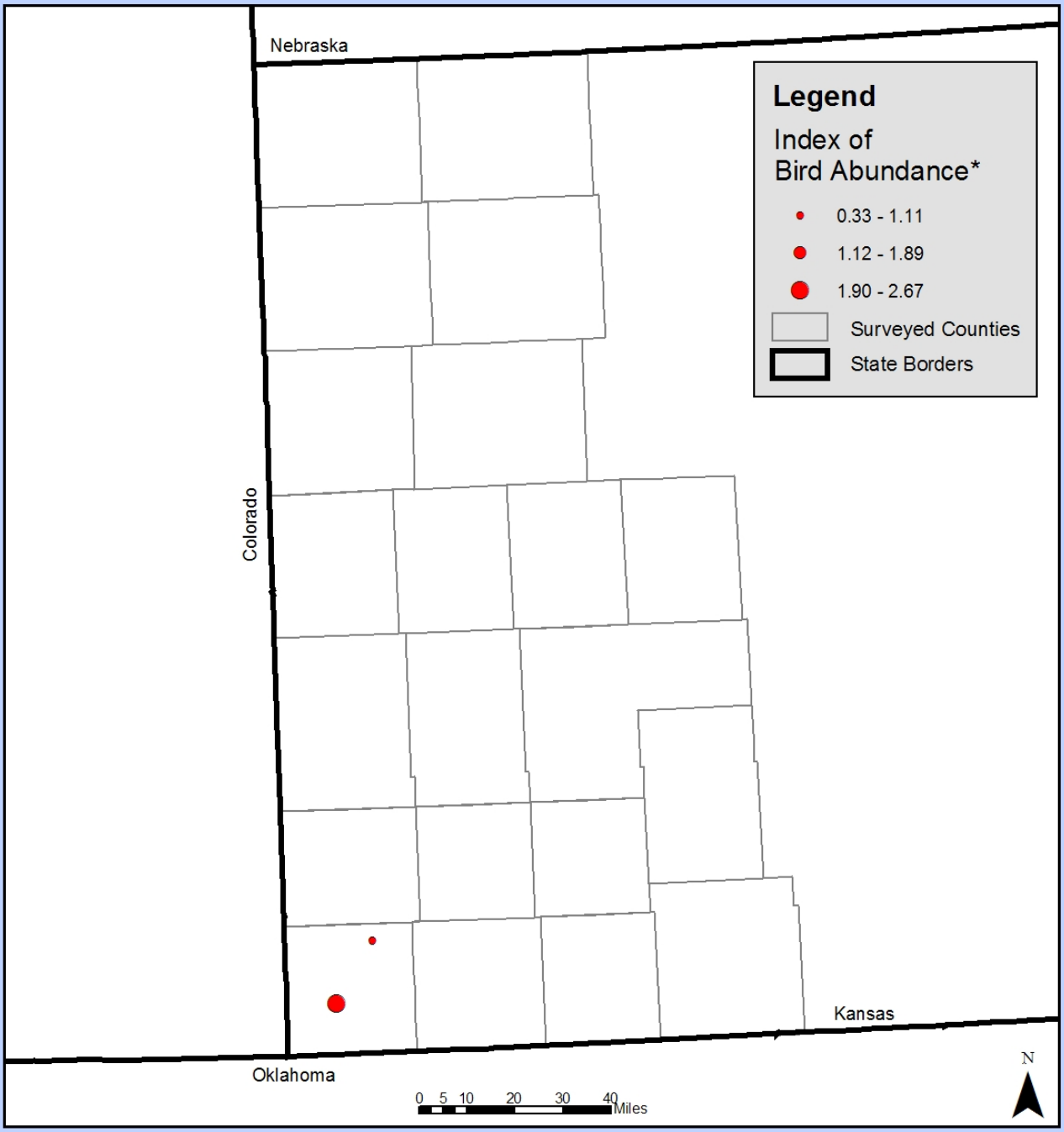
Cassin's Kingbird

(Tyrannus vociferans)



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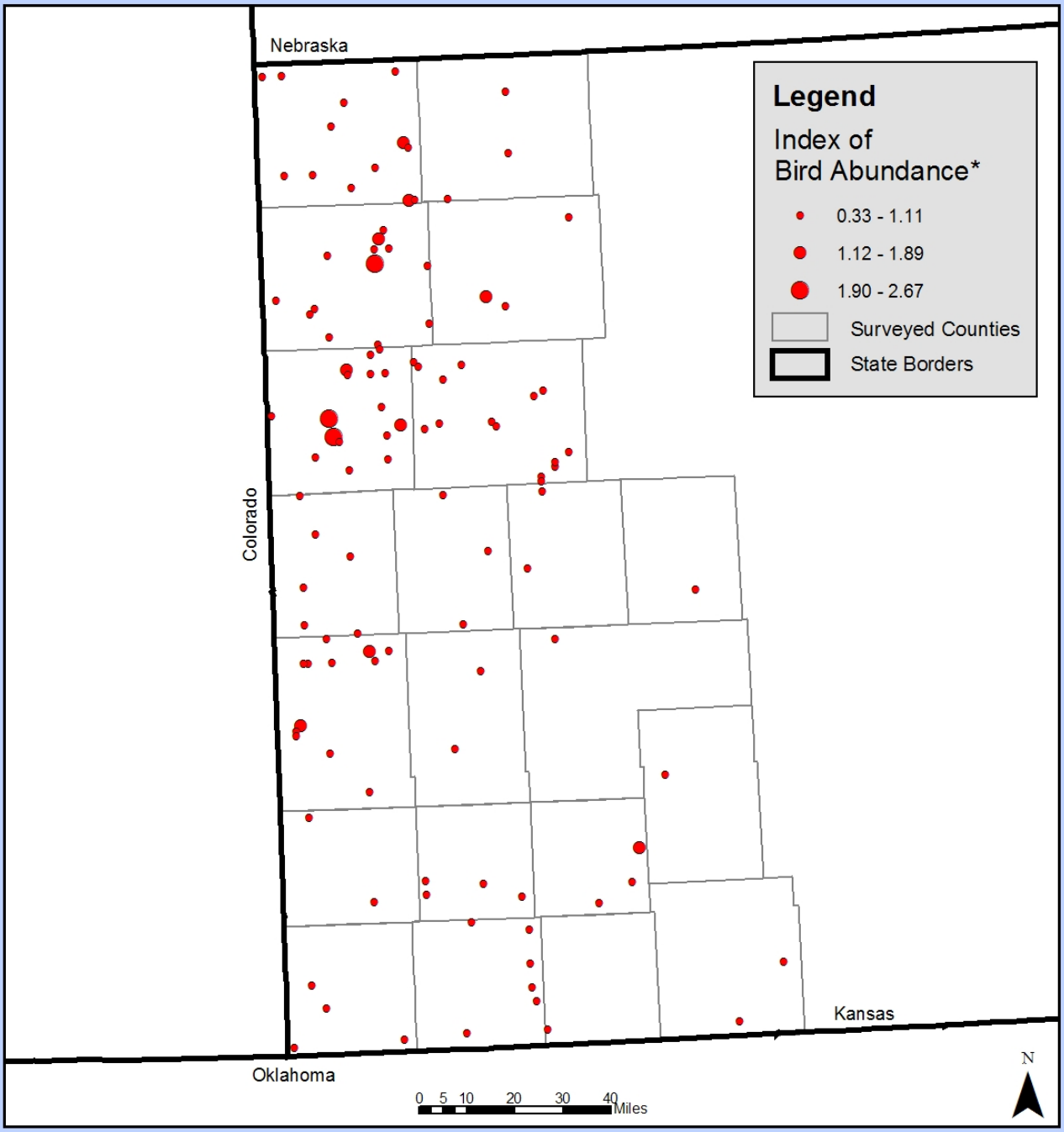
Western Kingbird

(Tyrannus verticalis)



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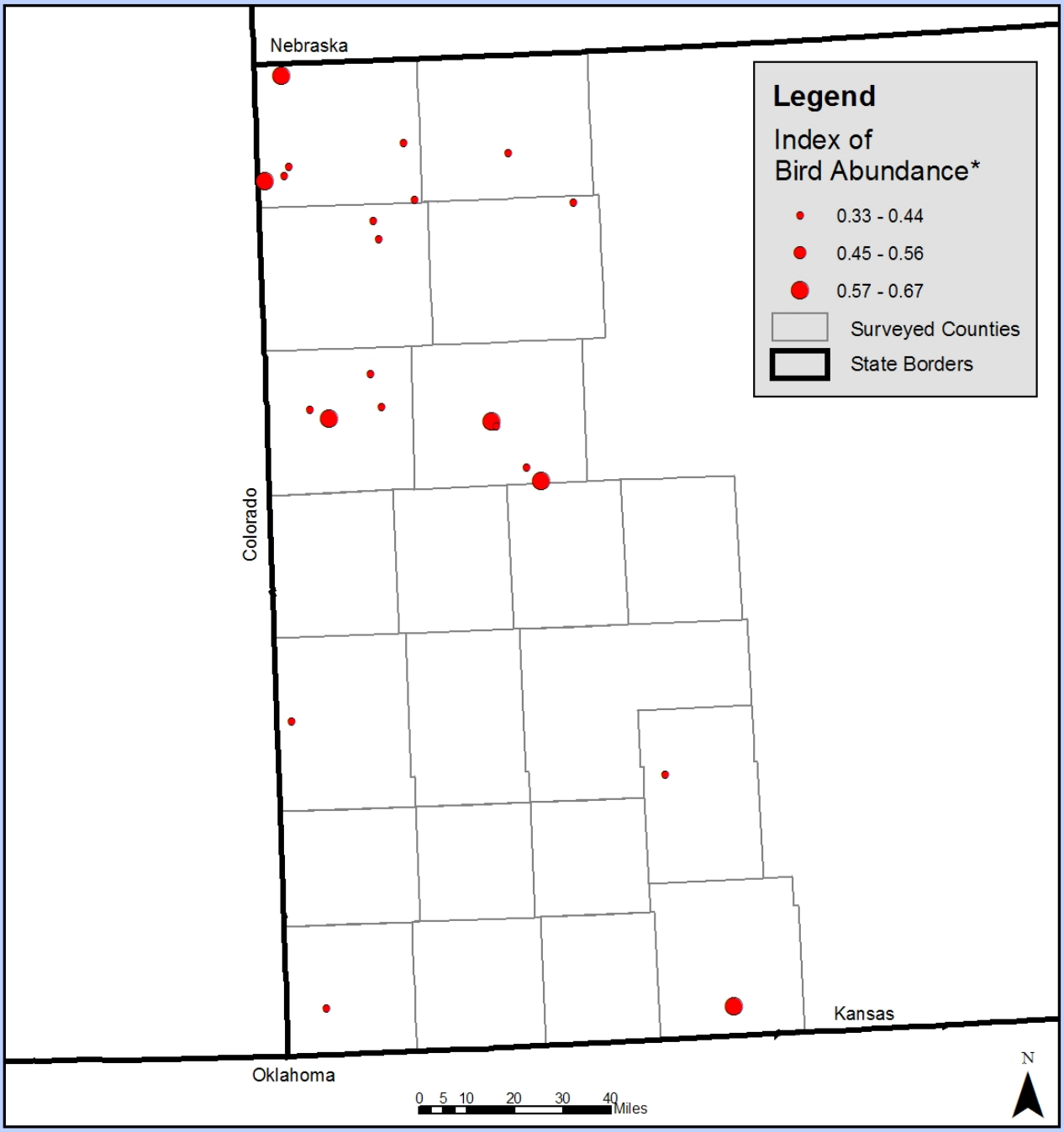
Eastern Kingbird

(Tyrannus tyrannus)



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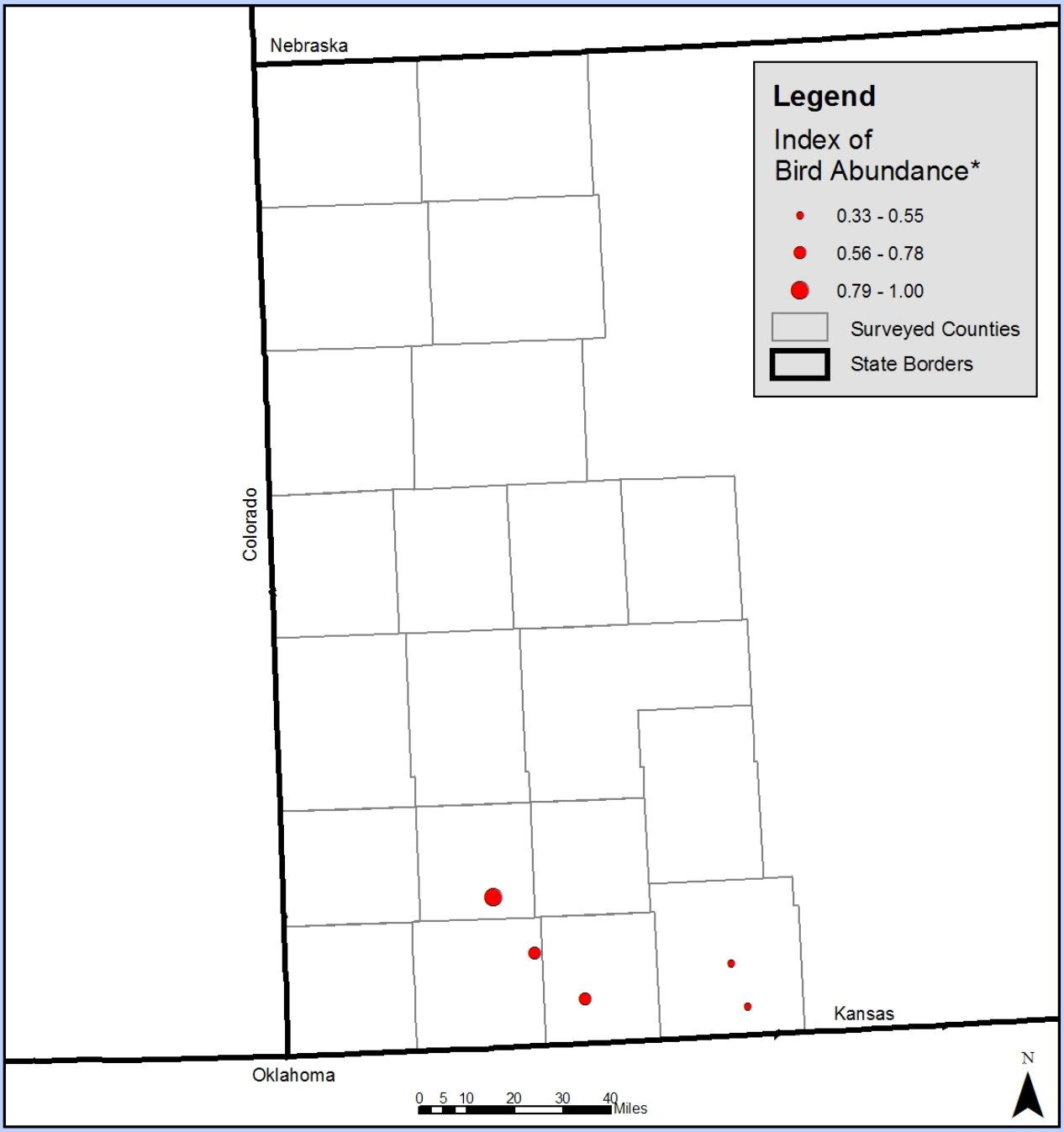
Scissor-tailed Flycatcher

(Tyranuus forficatus)



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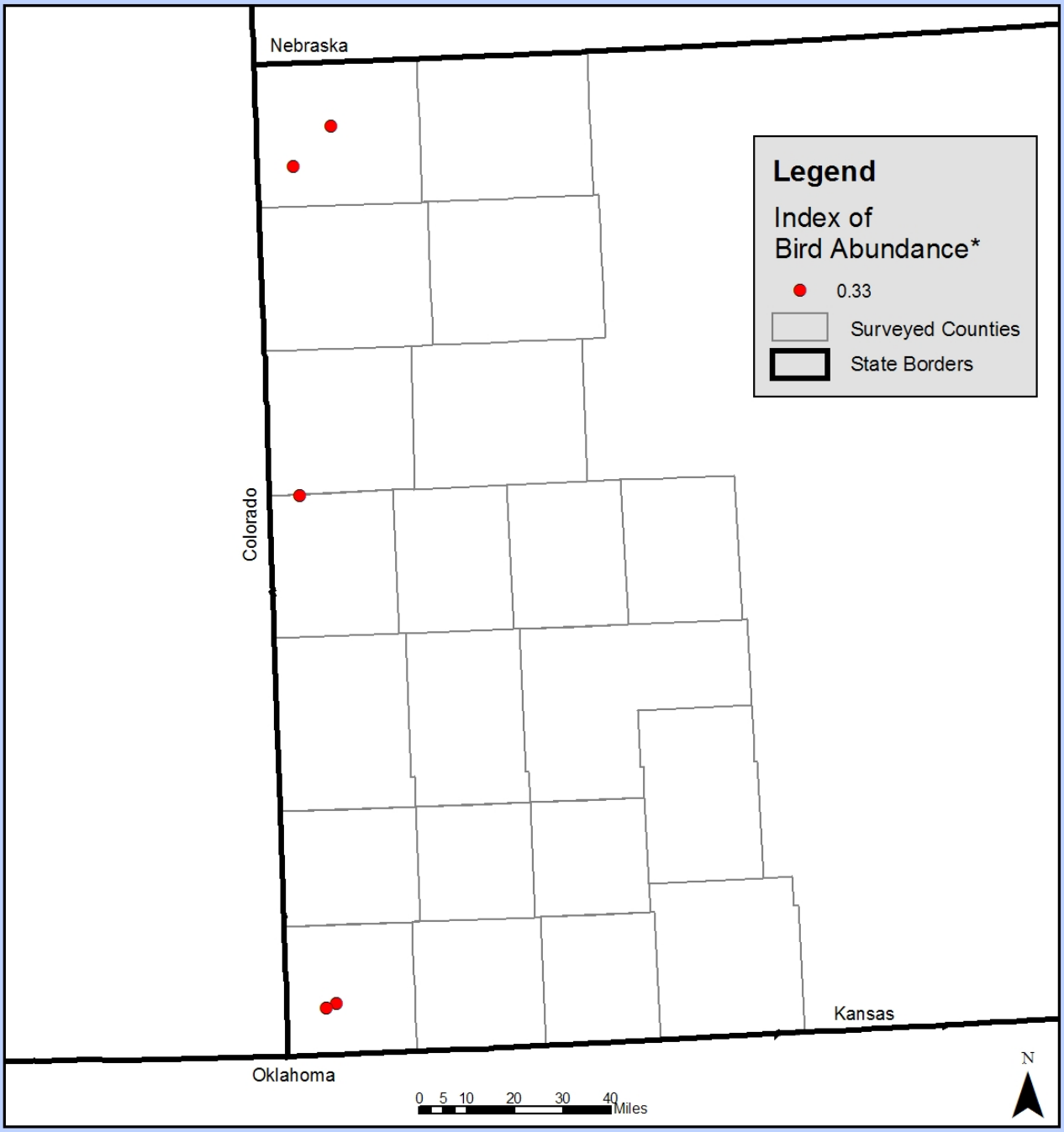
Loggerhead Shrike

(Lanius ludovicianus)



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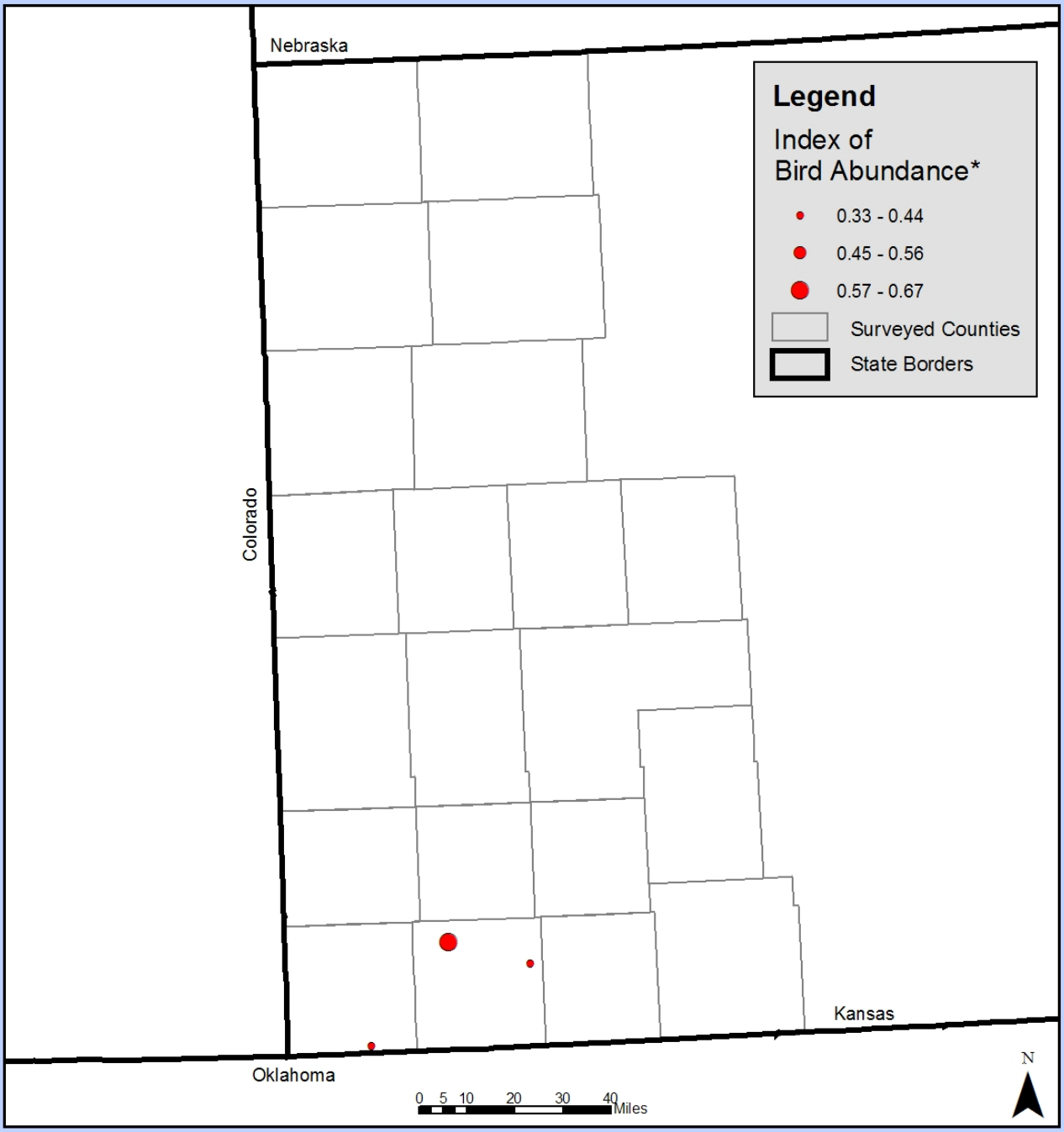
Chihuahuan Raven

(Corvus cryptoleucus)



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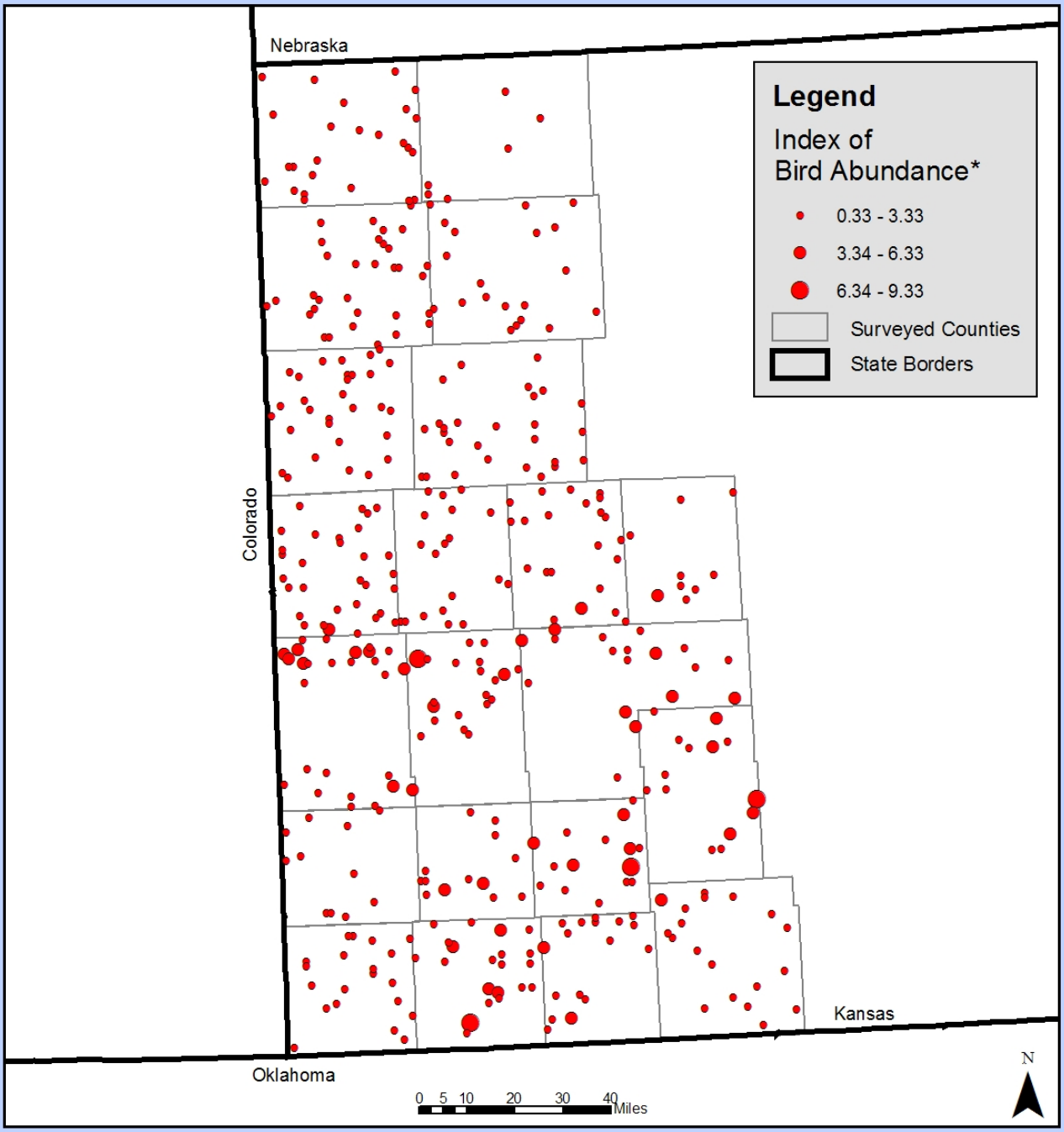
Horned Lark

(Eremophila alpestris)



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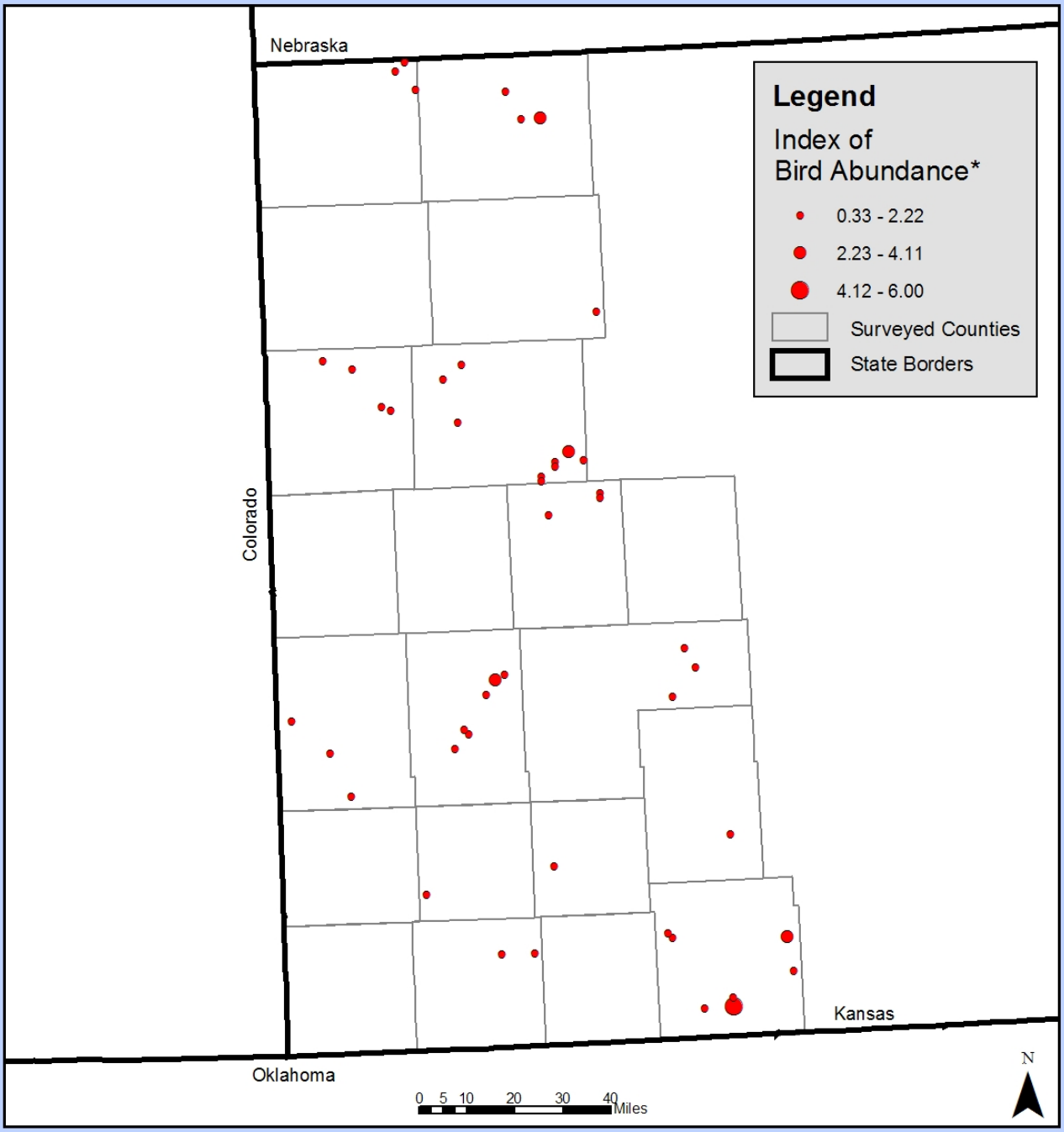
Cliff Swallow

(Petrochelidon pyrrhonota)



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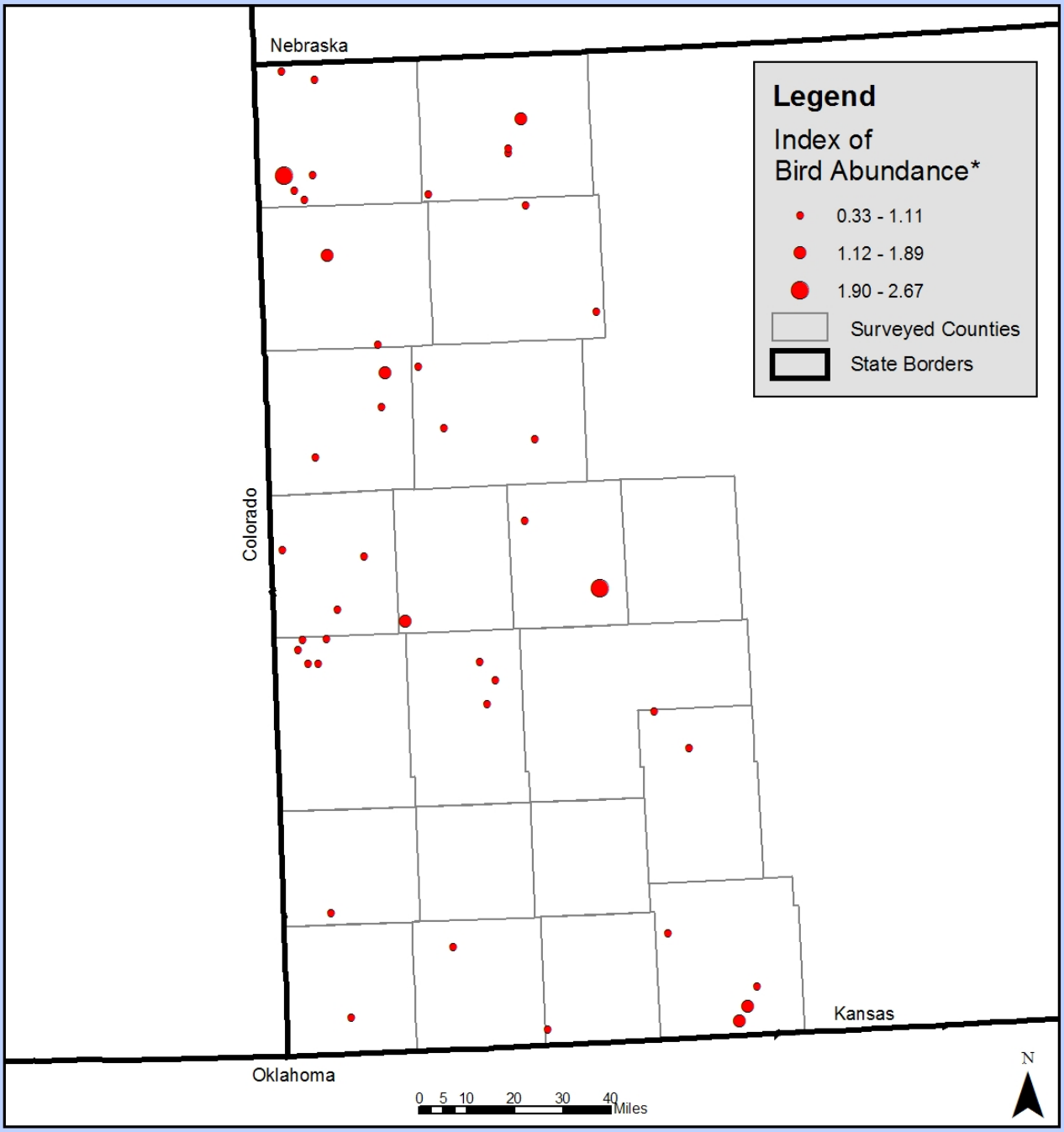
Barn Swallow

(Hirundo rusitca)



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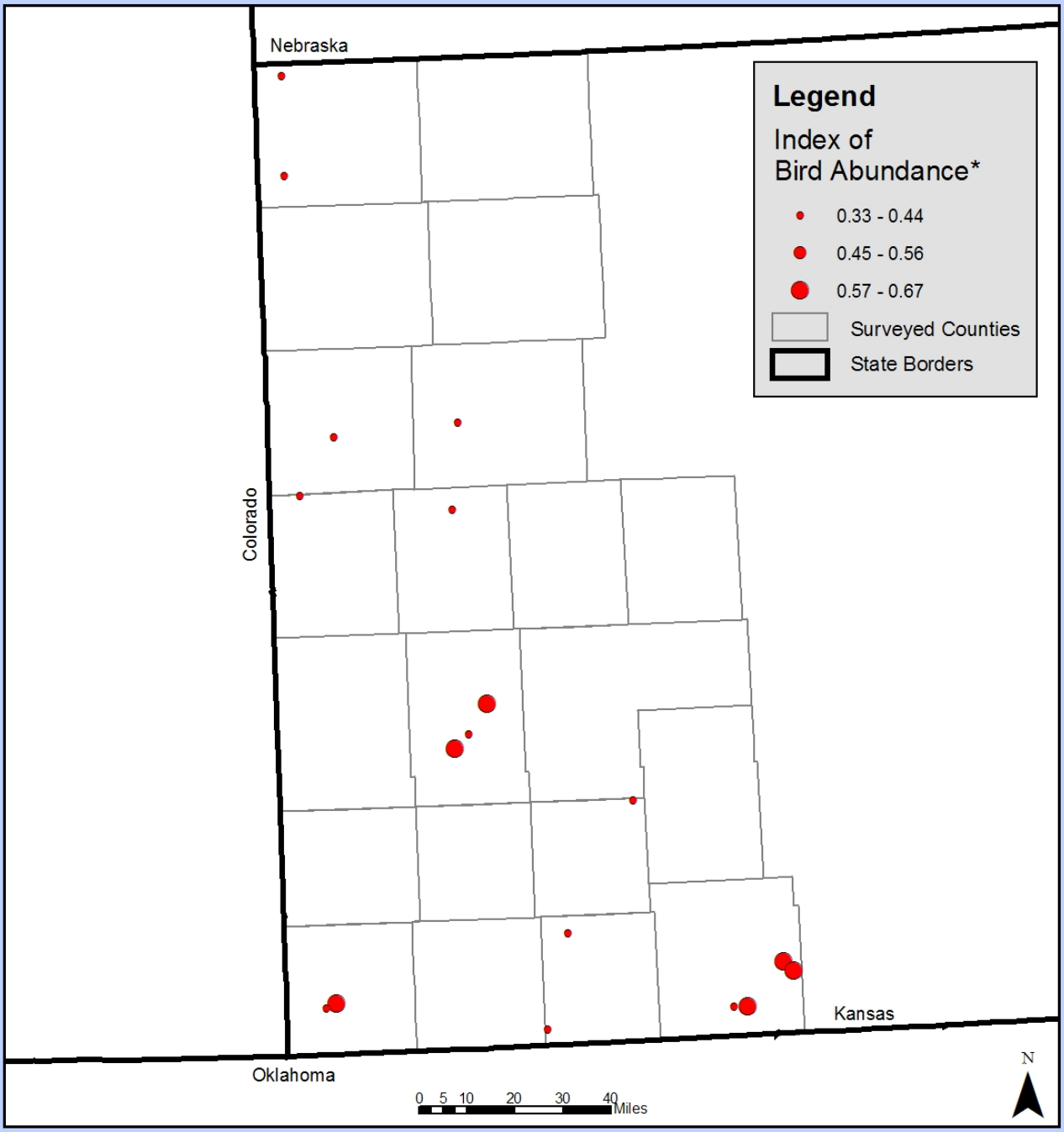
Northern Mockingbird

(Mimus polyglottos)



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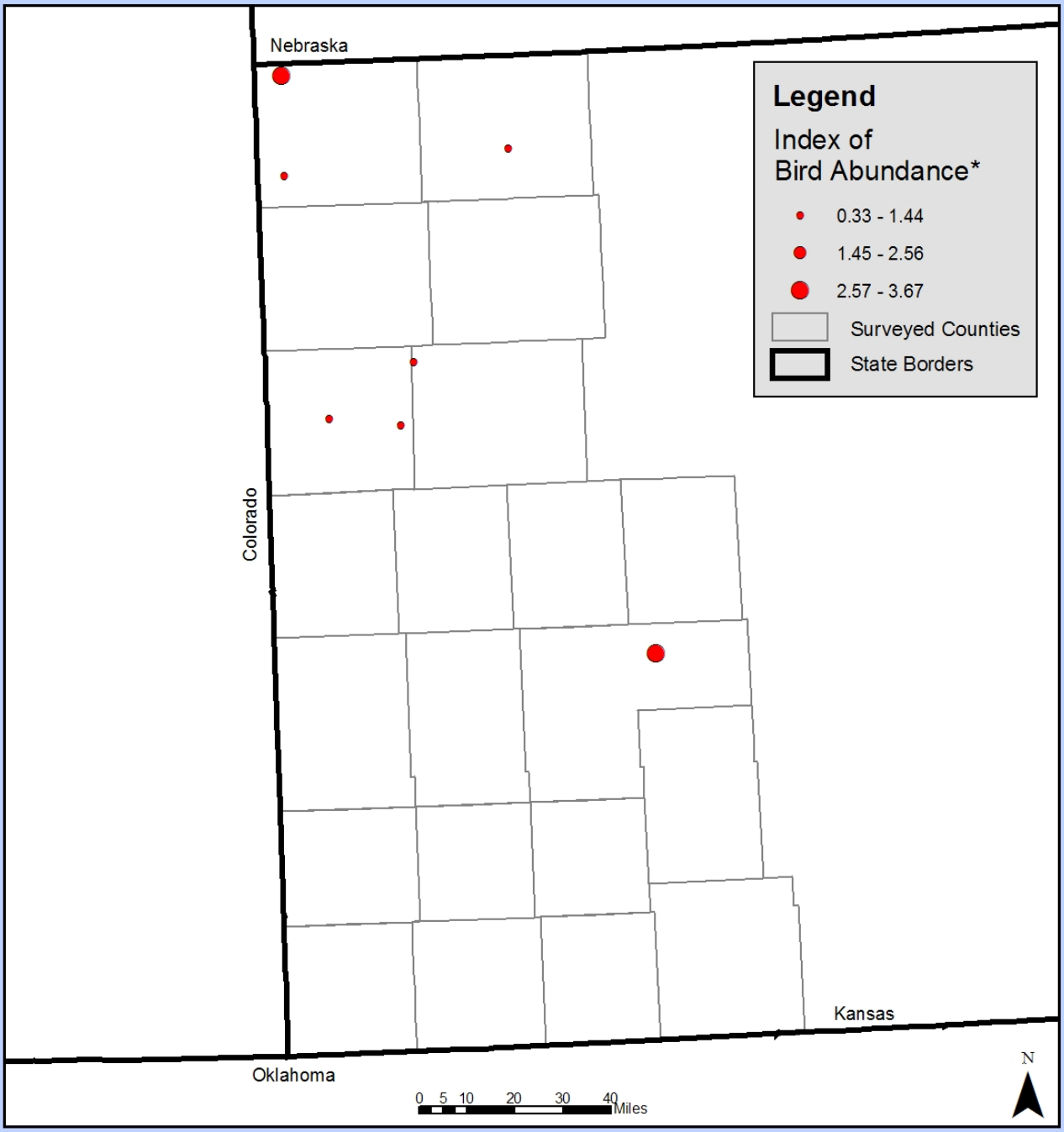
European Starling

(Sturnus vulgaris)



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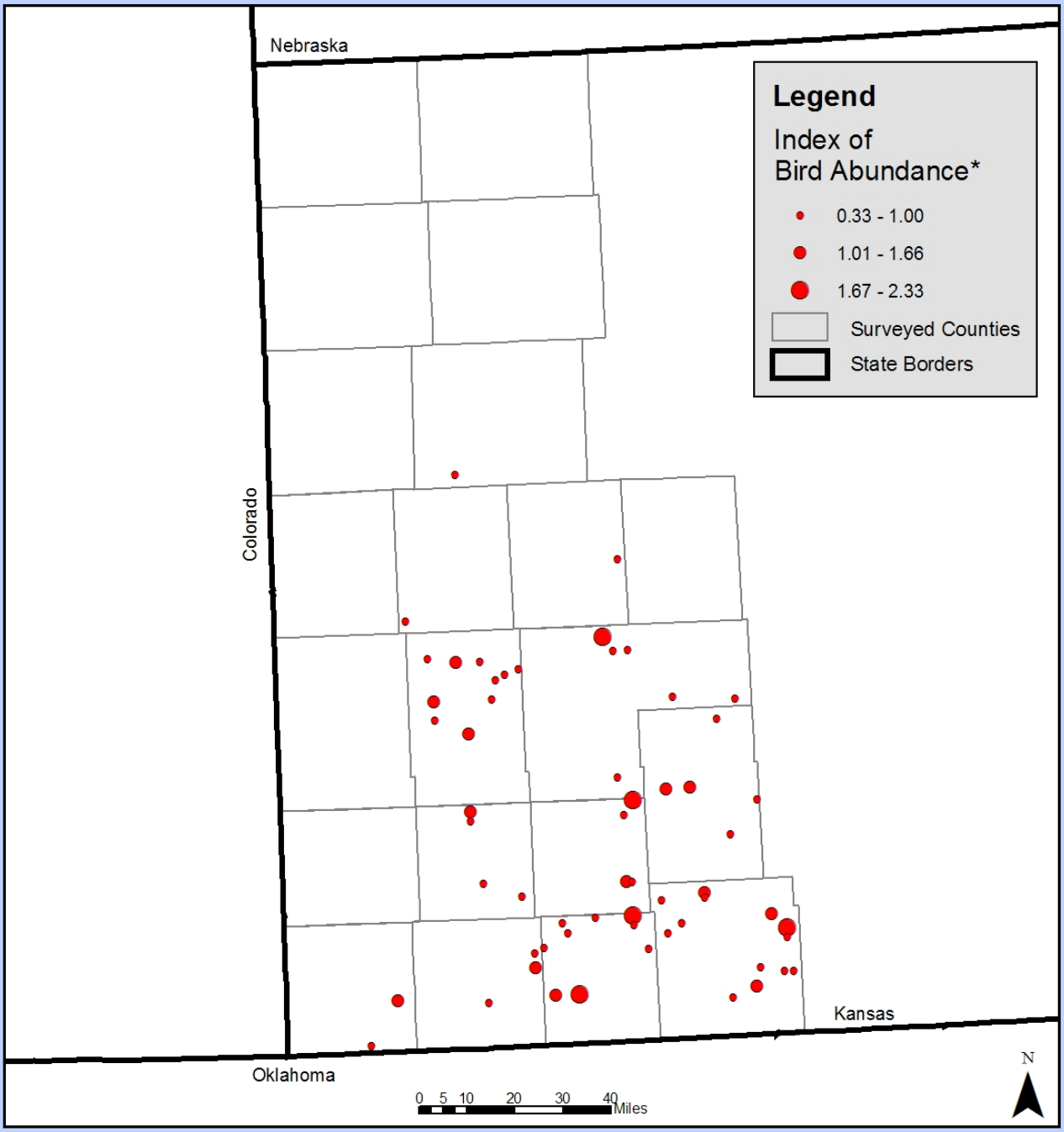
Dickcissel

(Spiza americana)



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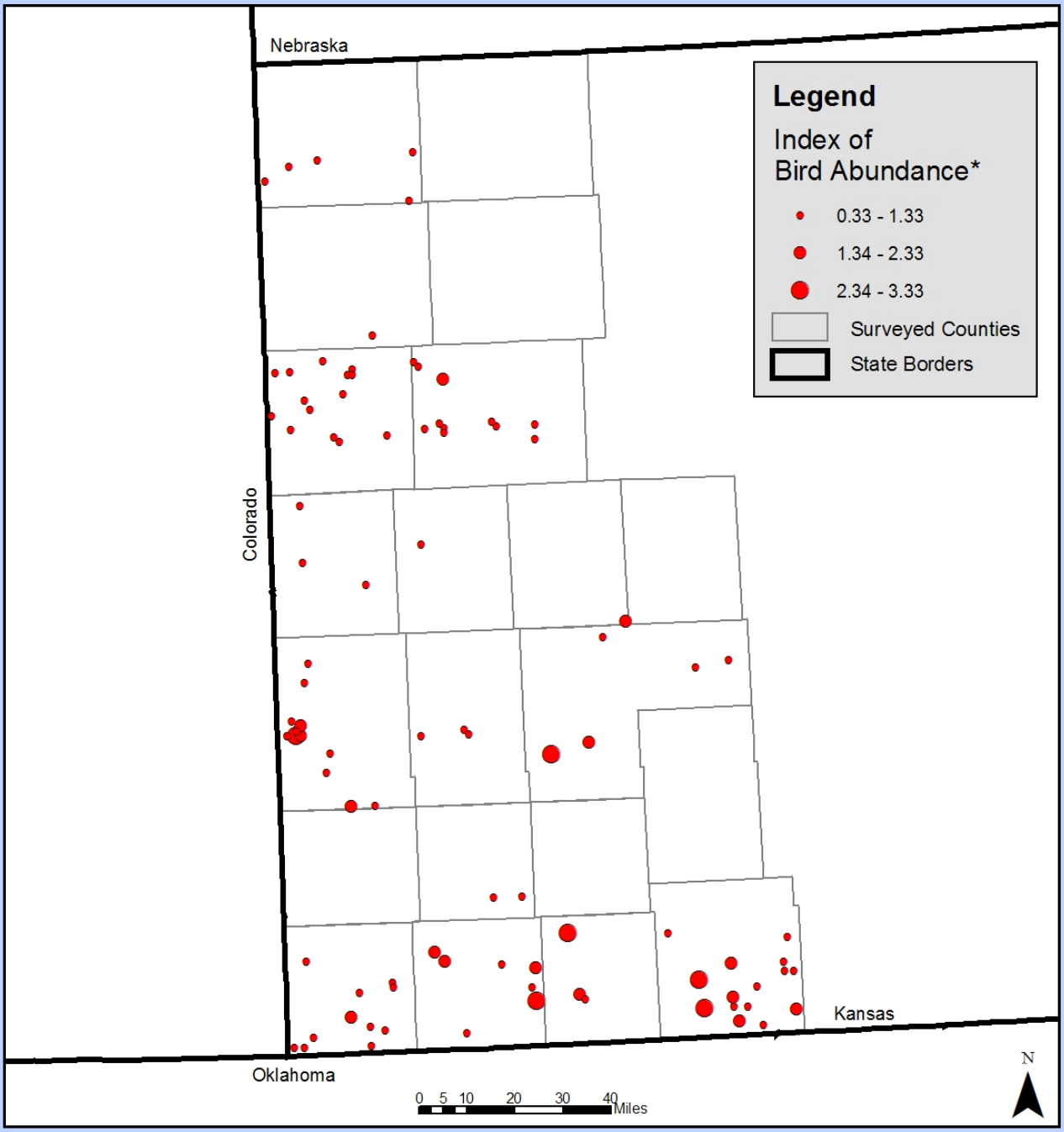
Cassin's Sparrow

(Aimophila cassinii)



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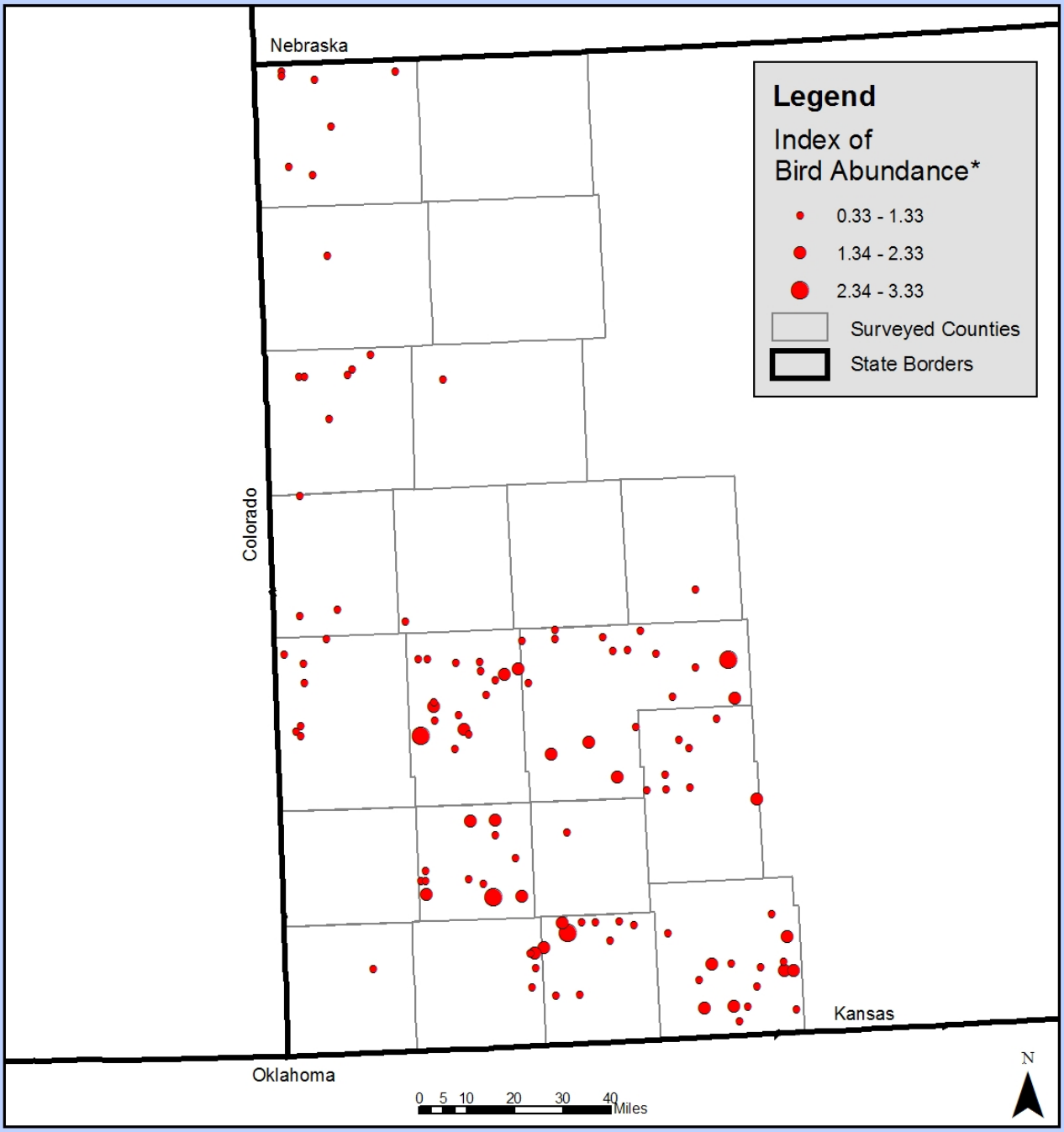
Lark Sparrow

(Chondestes grammacus)



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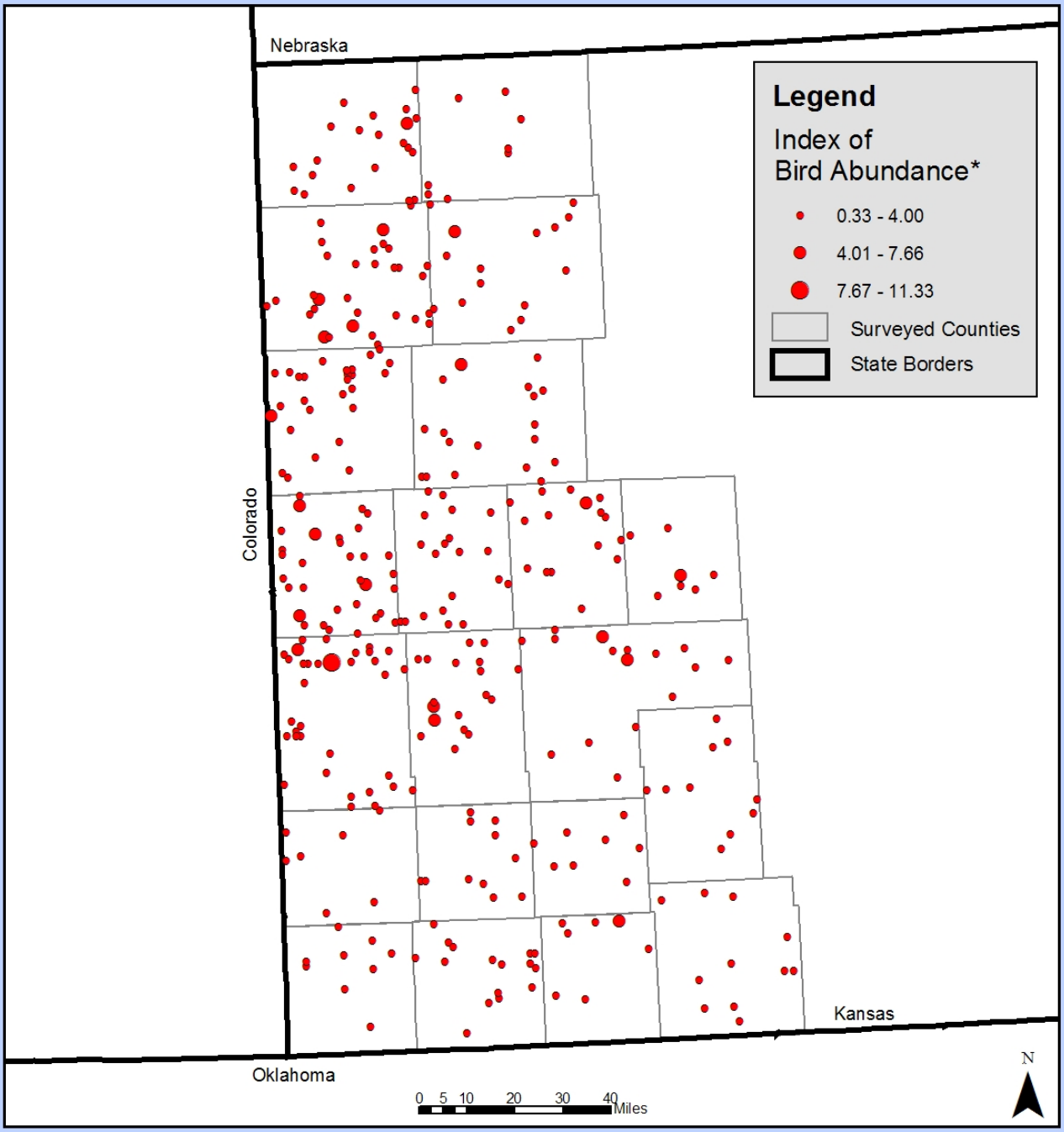
Lark Bunting

(Calamospiza melanocorys)



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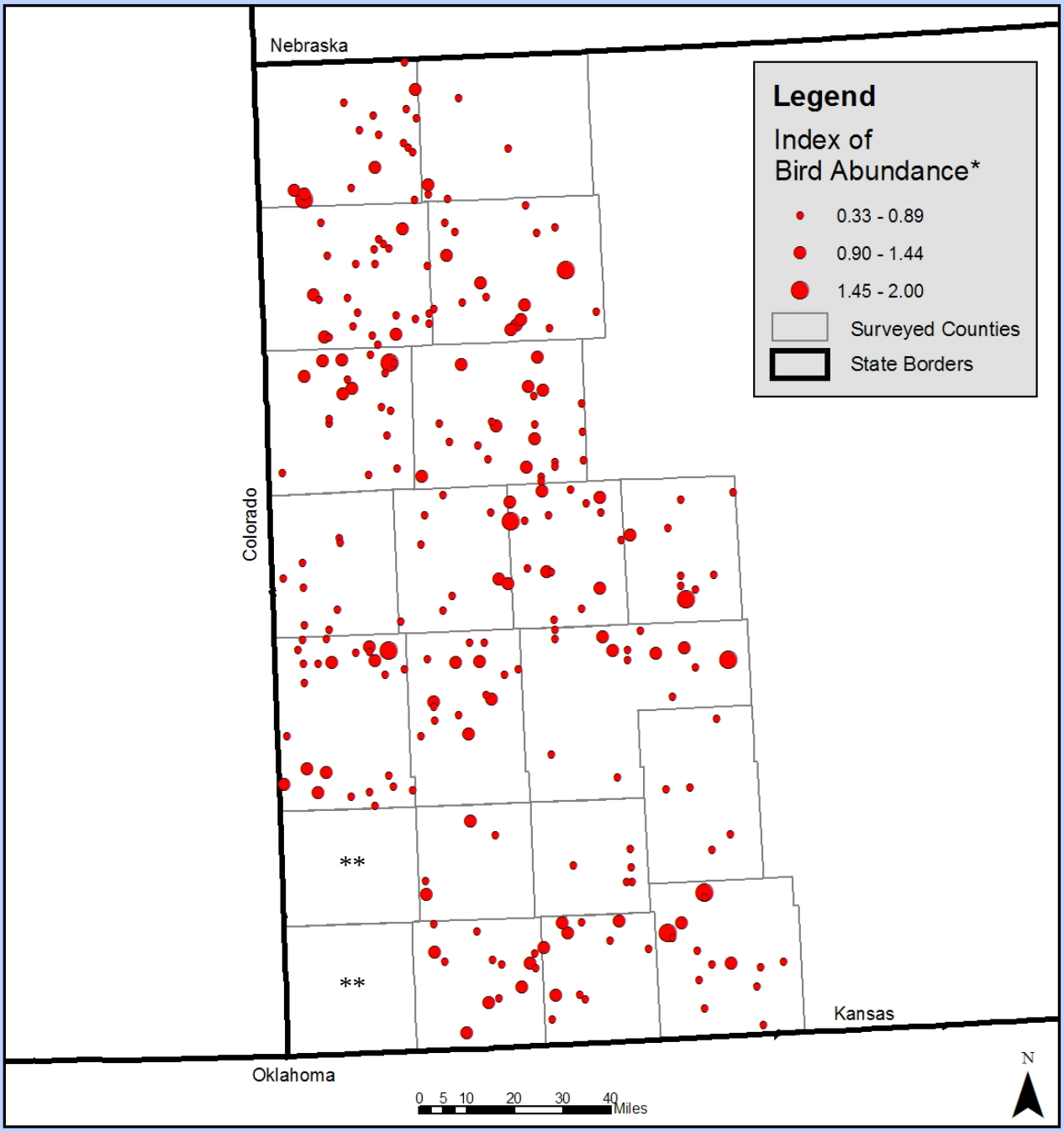
Grasshopper Sparrow

(Ammodramus savannarum)



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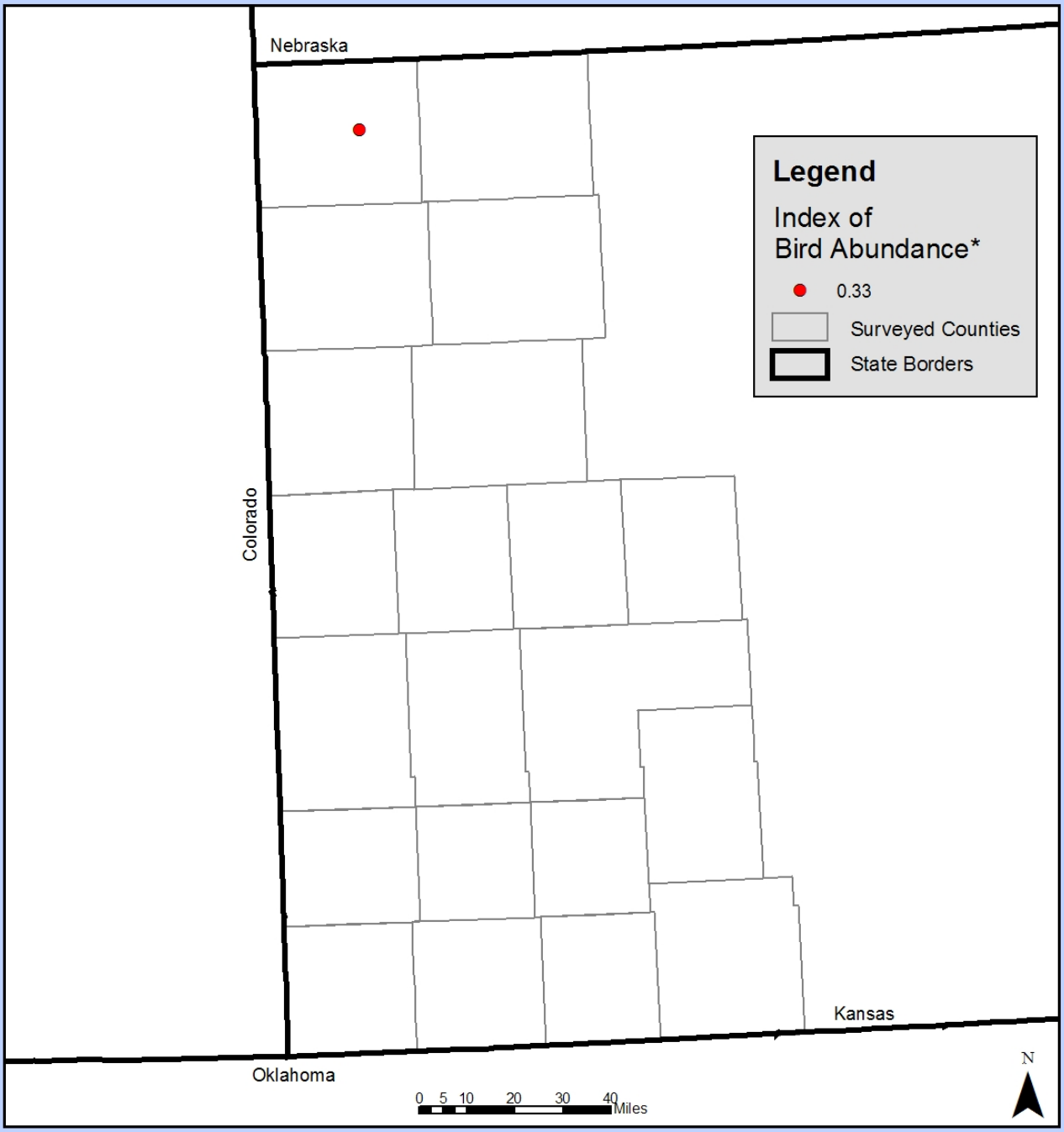
** *The technician surveying Stanton and Morton counties was unable to identify Grasshopper Sparrows.*

McCown's Longspur

(Calcarius mccownii)



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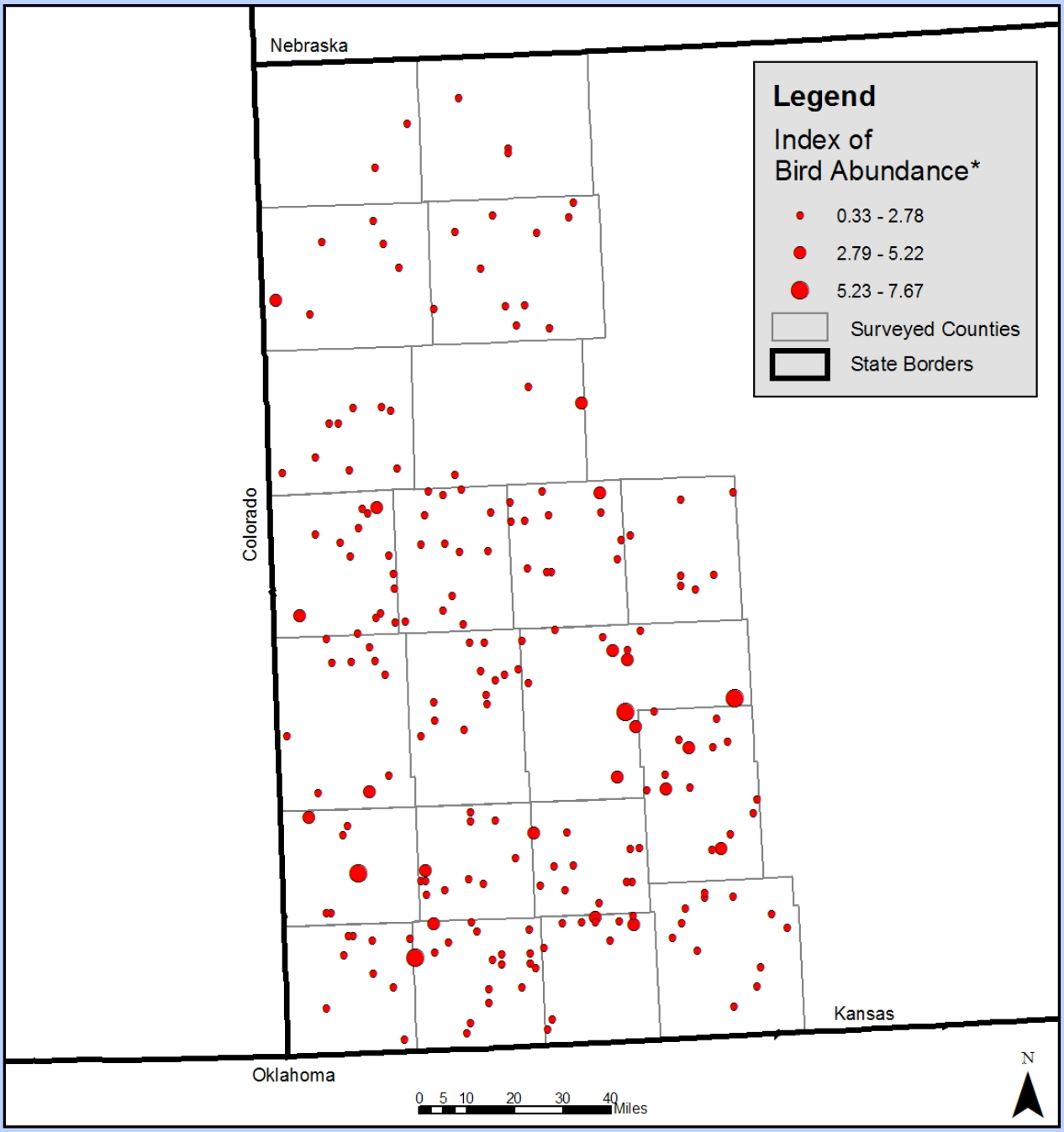
Red-winged Blackbird

(Agelaius phoeniceus)



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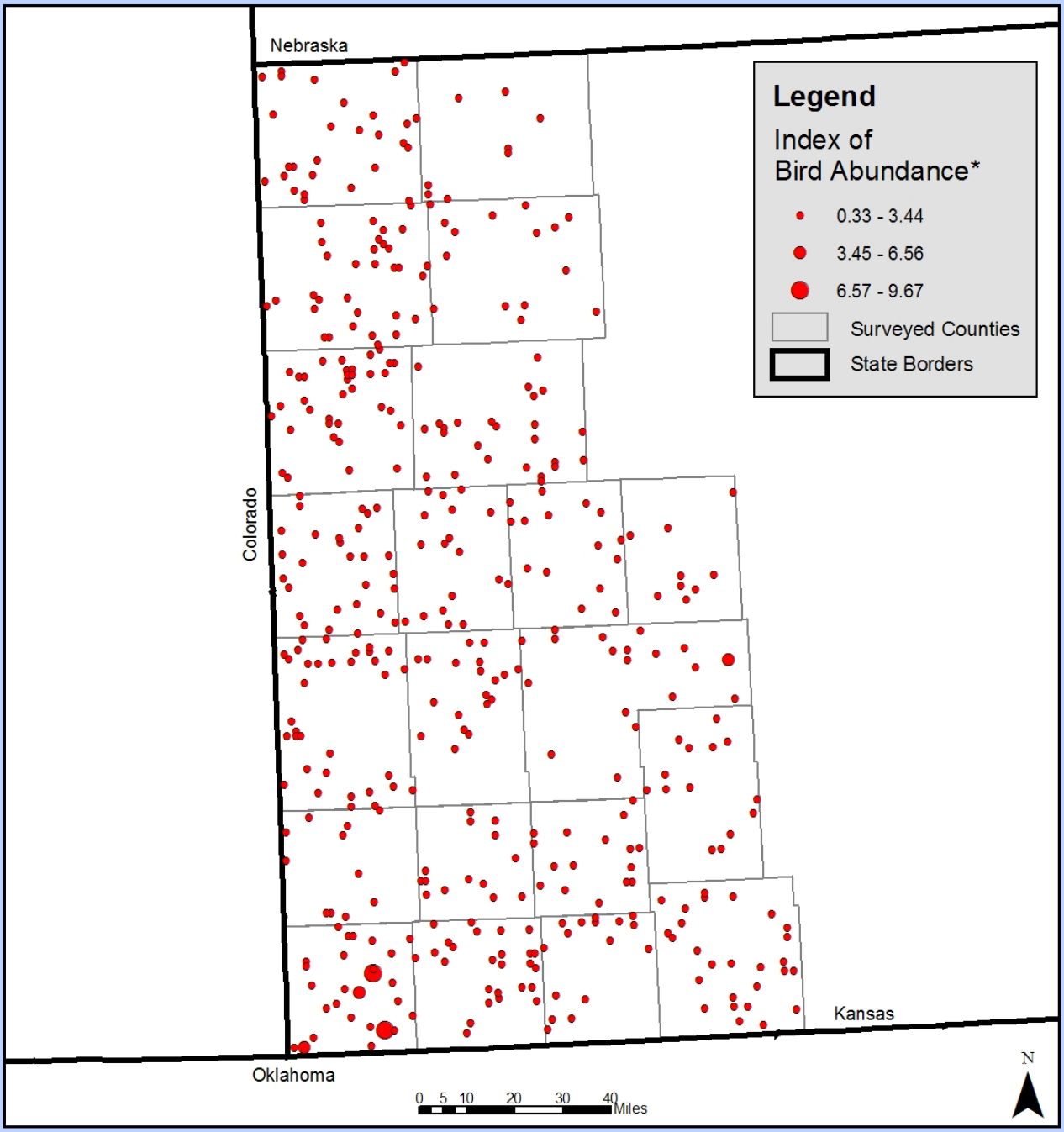
Western Meadowlark

(Sturnella neglecta)



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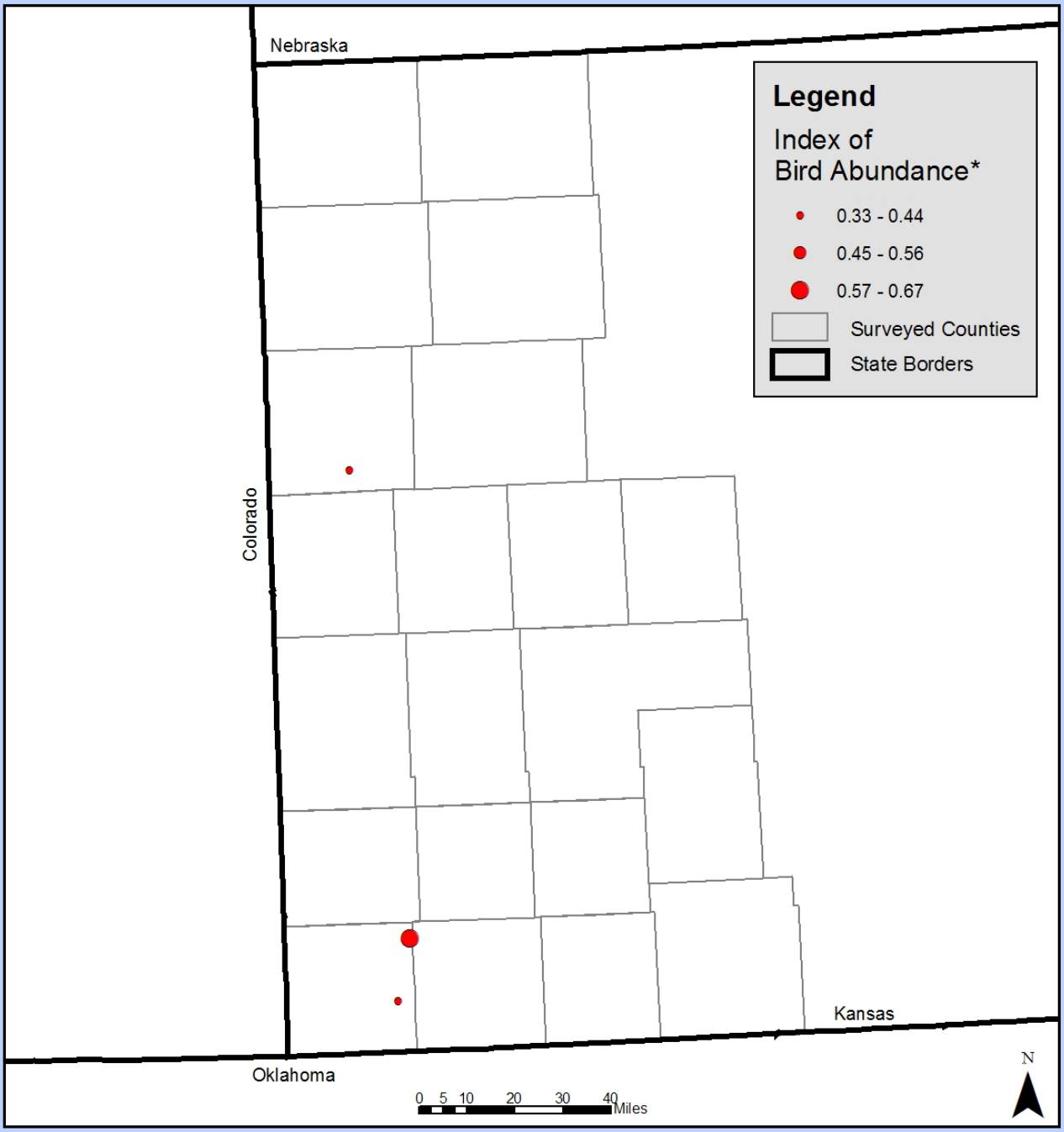
Great-tailed Grackle

(Quiscalus mexicanus)



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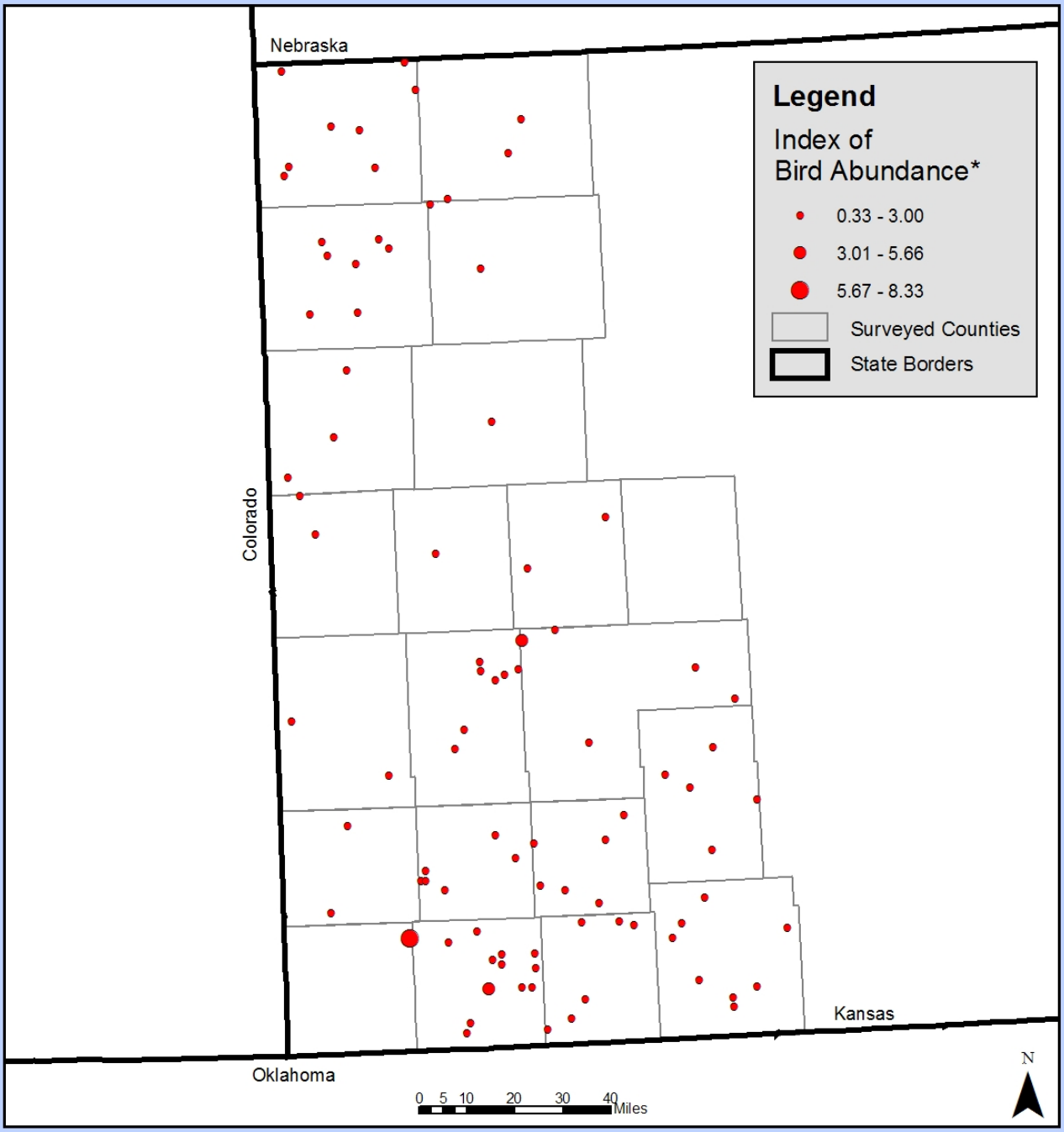
Common Grackle

(Quiscalus quiscula)



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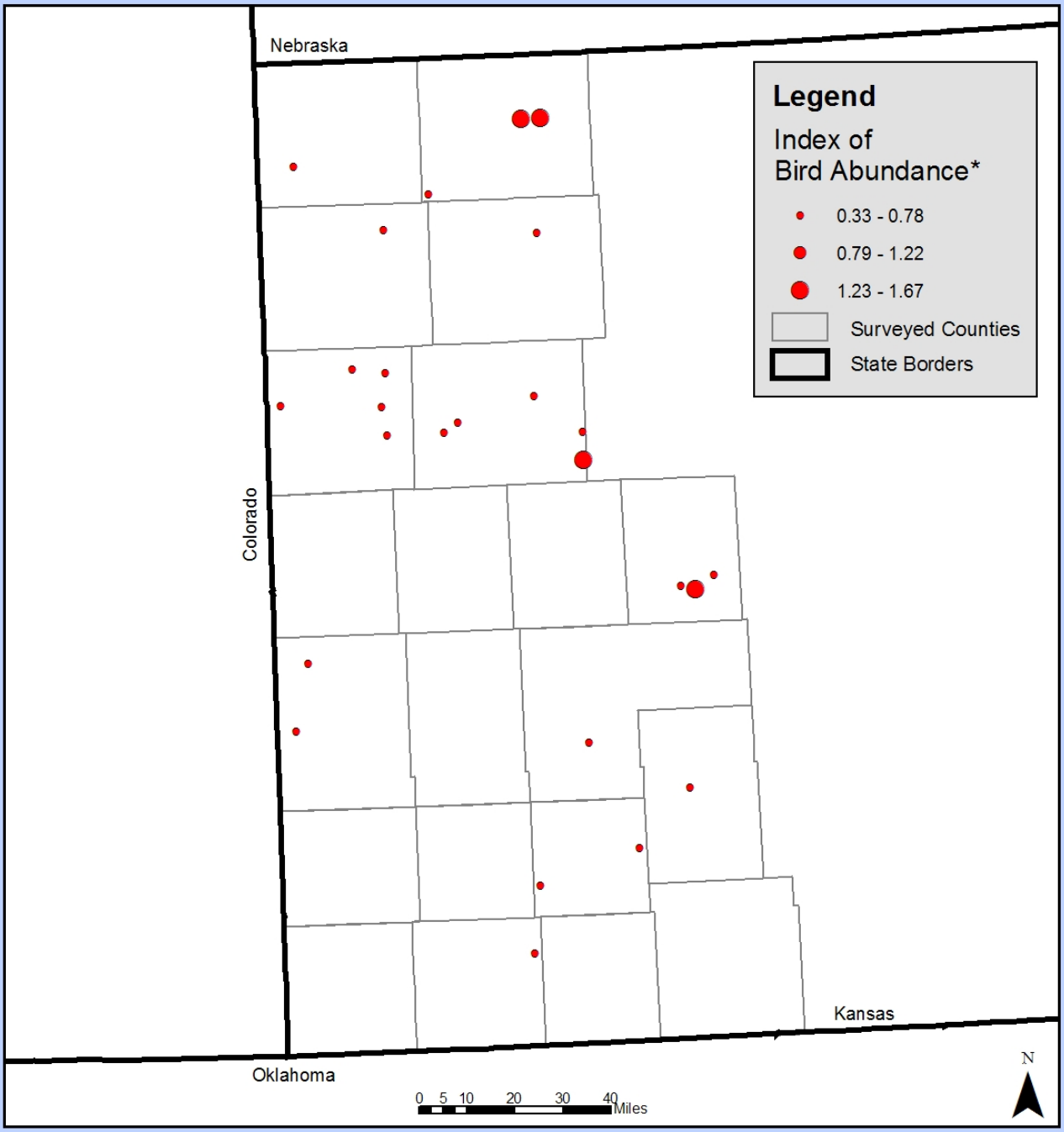
Brown-headed Cowbird

(Molothrus ater)



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APPENDIX B:

Species detected in western Kansas during road-based point counts conducted May 16 – July 3, 2003.

Common Name	Scientific Name
Mallard	*Anas platyrhynchos*
Ring-necked Pheasant	*Phasianus colchicus*
Lesser Prairie-Chicken	*Tympanuchus pallidicinctus*
Scaled Quail	*Callipepla squamata*
Northern Bobwhite	*Colinus virginianus*
Great Blue Heron	*Ardea herodias*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Turkey Vulture	*Cathartes aura*
Mississippi Kite	*Ictinia mississippiensis*
Northern Harrier	*Circus cyaneus*
Swainson's Hawk	*Buteo swainsoni*
Red-tailed Hawk	*Buteo jamaicensis*
Ferruginous Hawk	*Buteo regalis*
Golden Eagle	*Aquila chrysaetos*
American Kestrel	*Falco sparverius*
Prairie Falcon	*Falco mexicanus*
Killdeer	*Charadrius vociferus*
Long-billed Curlew	*Numenius americanus*
Least Tern	*Sterna antillarum*
Mourning Dove	*Zenaida macroura*
Yellow-billed Cuckoo	*Coccyzus americanus*
Great Horned Owl	*Bubo virginianus*
Burrowing Owl	*Athene cunicularia*
Common Nighthawk	*Chordeiles minor*
Chimney Swift	*Chaetura pelagica*
Belted Kingfisher	*Ceryle alcyon*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Northern Flicker	*Colaptes auratus*
Eastern Phoebe	*Sayornis phoebe*
Say's Phoebe	*Sayornis saya*
Cassin's Kingbird	*Tyrannus vociferans*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*
Scissor-tailed Flycatcher	*Tyrannus forficatus*
Loggerhead Shrike	*Lanius ludovicianus*
Black-billed Magpie	*Pica hudsonia*
American Crow	*Corvus brachyrhynchos*
Chihuahuan Raven	*Corvus cryptoleucus*
Horned Lark	*Eremophila alpestris*

Common Name (cont.)	Scientific Name (cont.)
Bank Swallow	*Riparia riparia*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*
Bewick's Wren	*Thryomanes bewickii*
House Wren	*Troglodytes aedon*
Eastern Bluebird	*Sialia sialis*
American Robin	*Turdus migratorius*
Northern Mockingbird	*Mimus polyglottos*
Sage Thrasher	*Oreoscoptes montanus*
Brown Thrasher	*Toxostoma rufum*
European Starling	*Sturnus vulgaris*
Yellow Warbler	*Dendroica petechia*
Black-throated Green Warbler	*Dendroica virens*
Cerulean Warbler	*Dendroica cerulea*
Cassin's Sparrow	*Aimophila cassinii*
Brewer's Sparrow	*Spizella breweri*
Field Sparrow	*Spizella pusilla*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Lark Bunting	*Calamospiza melanocorys*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow	*Ammodramus savannarum*
White-throated Sparrow	*Zonotrichia albicollis*
McCown's Longspur	*Calcarius mccownii*
Blue Grosbeak	*Passerina caerulea*
Dickcissel	*Spiza americana*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Common Grackle	*Quiscalus quiscula*
Great-tailed Grackle	*Quiscalus mexicanus*
Brown-headed Cowbird	*Molothrus ater*
Orchard Oriole	*Icterus spurius*
Bullock's Oriole	*Icterus bullockii*
American Goldfinch	*Carduelis tristis*
House Sparrow	*Passer domesticus*