Section-based Monitoring of Breeding Birds on Kiowa and Rita Blanca National Grasslands

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ROCKY MOUNTAIN BIRD OBSERVATORY

The mission of the Rocky Mountain Bird Observatory (RMBO) is the conservation of birds of the Rocky Mountains, Great Plains, and Intermountain West, and the habitats on which they depend. *RMBO practices a multi-faceted approach to bird conservation that integrates scientific research and monitoring studies with education and outreach programs to bring bird conservation issues to the public and other conservation partners. RMBO works closely with state and federal natural resource agencies, private landowners, schools, and other nonprofit organizations. RMBO accomplishes its mission by working in four areas:*

Research: *RMBO studies avian responses to habitat conditions, ecological processes, and management actions to provide scientific information that guides bird conservation efforts.*

Monitoring: *RMBO monitors the distribution and abundance of birds through long-term, broad-scale monitoring programs designed to track population trends for birds of the region.*

Education: *RMBO provides active, experiential, education programs for K-12 students in order to create an awareness and appreciation for birds, with a goal of their understanding of the need for bird conservation.*

Outreach: *RMBO shares the latest information in land management and bird conservation practices with private landowners, land managers, and resource professionals at natural resource agencies. RMBO develops voluntary, working partnerships with these individuals and groups for habitat conservation throughout the Great Plains and Rocky Mountains.*

Bill Schmoker

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Executive Summary

In 2007, Rocky Mountain Bird Observatory (RMBO), under contract with the United States Forest Service, implemented a grassland bird monitoring program on Kiowa and Rita Blanca National Grasslands. The objective is to monitor population trends and distribution of shortgrass prairie birds at the scale of a National Grassland. Monitoring at this scale provides Grassland-specific data, resulting in more effective land management decisions regarding conservation of shortgrass prairie birds and their habitat. There are no long term bird monitoring programs currently in place for National Grasslands which will help guide management and provide insight into bird population dynamics. Another advantage bird monitoring programs have are that they provide baseline information on bird habitat associations. These national grasslands provide valuable habitat for endemic grassland species within a deteriorating and fragmented landscape.

Monitoring birds on National Grasslands becomes even more relevant to grassland management with the advent of alternative energy and global warming. Wind farms and the development of biofuels within the Great Plains and the impacts of global warming on bird populations and their distributions will need to be understood through monitoring and research.

In 2007 forty one species were detected and eleven species had sufficient detections to estimate density within Kiowa and Rita Blanca National Grasslands. This document reports our findings.

Introduction

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). Partners in Flight found that 57% of shortgrass prairie birds have unknown or declining population trends (Partners in Flight Species Assessment Database 2005). Conversion of native prairie to cropland and urbanization are two of the factors contributing to these declines.

The Forest Service administers 3.5 million acres of National Grasslands in the Great Plains. Within the grassland bird community, some species have been designated as sensitive by the Forest Service because there is a viability concern. This concern is evidenced by either significant current or predicted downward population trends or density, or significant current or predicted downward trends in habitat capability that would reduce the species' existing distribution. Sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing. There must be no impacts to a sensitive species without an analysis of the significance of adverse effects on its population, its habitat, and on the viability of the species as a whole. Adequate monitoring information is central to environmental impact analyses and effective avian conservation and management. The Forest Service recognizes the importance of establishing a coordinated avian monitoring program (Manley 1992). However, comprehensive avian monitoring data does not exist for National Grasslands.

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, enlists 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). 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 et al. 2000), such as those of National Grassland managers. We conducted surveys on four national grasslands (figure 1.) within the Shortgrass Prairie Bird Conservation Region.

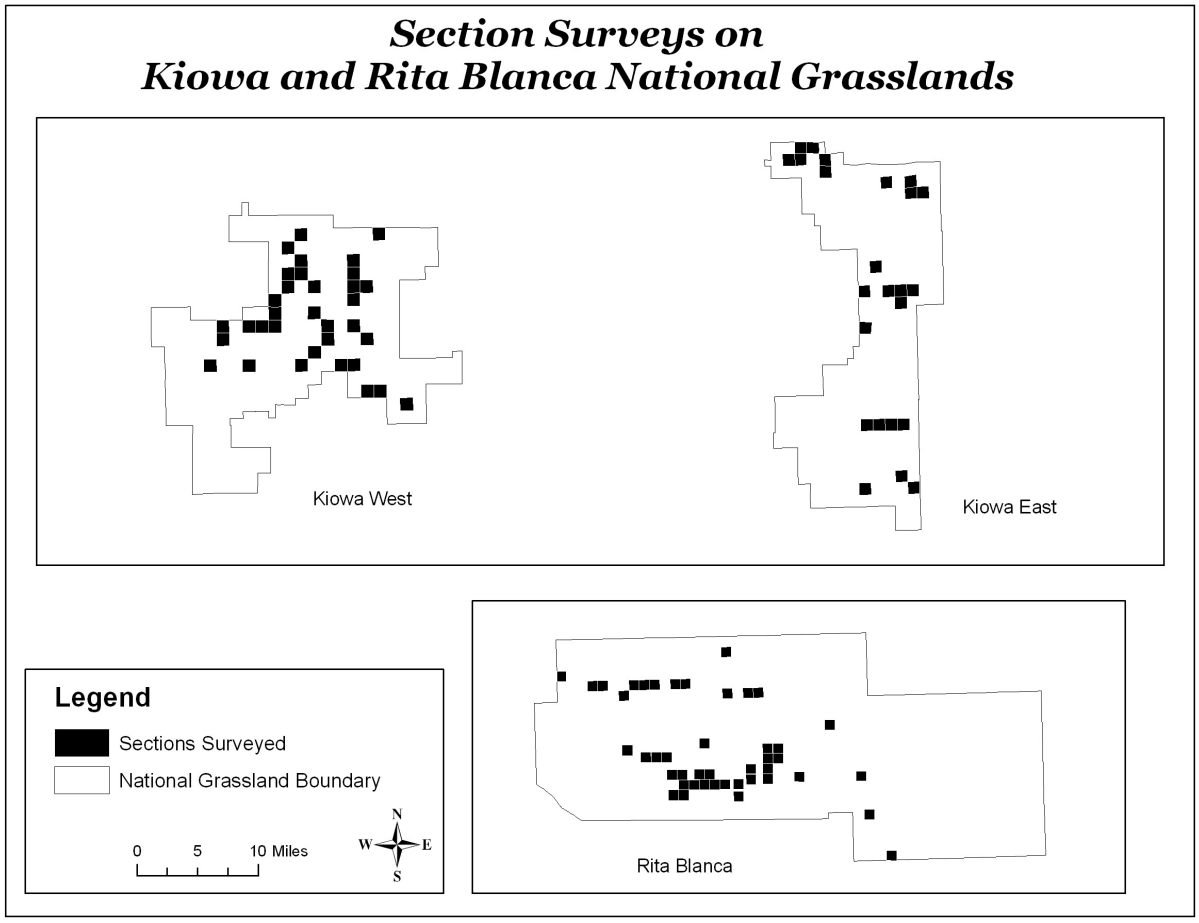

Figure 1. Locations of sections surveyed on National Grasslands in 2007.

Methodology

Study Area:

Section-based monitoring using road-based point counts was conducted on Kiowa, and Rita Blanca National Grasslands in 2007 (Figure 1). All Grasslands occur within the Shortgrass Prairie Bird Conservation Region (BCR18). This arid region receives 300-500 mm of precipitation per year and is characterized by 2 dominant grasses, buffalo grass (*Buchloe dactyloides*) and blue grama (*Bouteloua gracilis*) (Lauenroth 1992).

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 Forest Service land that lie adjacent to at least 1 road. 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 2007, a total of 101 sections were selected for surveying on National Grasslands: Fifty eight on Kiowa, and 43 on Rita Blanca (Figure 1).

Road-based Point Count Technique:

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 on Kiowa, and Rita Blanca National Grasslands from 15 May – 15 June 2007. 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. A departure in the bird data collection protocol from previous years was that starting in 2004, we now treat all dependent detections of individual birds as part of a 'cluster' together with the first independently observed bird, rather than as separate independent observations of those individuals. This practice ensures that we adhere more strictly to the assumption inherent in random sampling that all observations are independent of each other. 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. 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 5 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 skills after the five day training period.

Data Analysis:

Program DISTANCE version 5.0 (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 20 observations or had a coefficient of variation (CV) of less than 50% for the pooled density estimates. We post-stratified by grassland and pooled the detection function over both grasslands to calculate density estimates. We evaluated the fit of detection models using half-normal and hazard-rate key functions with cosine and simple polynomial parameter adjustments. 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). Species on USFS R2 Species of Concern, Partners In Flight Species of Continental Importance or on Species of Greatest Conservation Need lists are found in Appendix C.

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

Results

Results of the 2007 section surveys are presented collectively over the two National Grasslands surveyed and individually per grassland.

Section Surveys detected a total of 41 bird species in 2007(Appendix B). Number of detections of these species on each National Grassland is reported in Appendix B. Eleven of these species had sufficient detections to estimate density (Table 1).

Density estimates are presented by National Grassland as well as pooled density estimates for both grasslands (Table 1). Highest densities for Kiowa and Rita Blanca combined were for Horned Lark, Western Meadowlark and Lark Bunting.

Kiowa and Rita Blanca National Grasslands:

We surveyed 101 sections collectively on Kiowa, and Rita Blanca National Grasslands. We surveyed 58 sections on Kiowa and 43 sections on Rita Blanca.

Table 1. Density estimates for species detected on Kiowa and Rita Blanca National Grasslands in 2007.

Species	Grassland	Density	% CV	LCL	UCL	n
Swainson's Hawk	Kiowa	5.24	38	2.81	9.74	17
	Rita Blanca	4.25	46	2.05	8.82	10
	Kiowa and Rita Blanca	4.82	36	2.68	8.67	27
Long-billed Curlew	Kiowa	1.35	48	0.63	2.89	9
	Rita Blanca	4.99	39	2.65	9.39	21
	Kiowa and Rita Blanca	2.88	35	1.63	5.08	30
Mourning Dove	Kiowa	18.67	46	9.01	38.69	14
	Rita Blanca	55.26	29	34.65	88.13	30
	Kiowa and Rita Blanca	34.04	27	21.94	52.83	44
Burrowing Owl	Kiowa	0.65	55	0.27	1.54	5
	Rita Blanca	2.51	52	1.11	5.66	14
	Kiowa and Rita Blanca	1.43	43	0.72	2.83	19
Western Kingbird	Kiowa	22.31	29	14.01	35.53	20
	Rita Blanca	32.34	27	20.66	50.65	21
	Kiowa and Rita Blanca	26.52	22	18.36	38.32	41
Horned Lark	Kiowa	140.40	17	106.64	184.85	177
	Rita Blanca	62.44	21	44.00	88.60	54
	Kiowa and Rita Blanca	107.66	15	84.30	137.49	231
Cassin's Sparrow	Kiowa	52.96	26	34.56	81.16	84
	Rita Blanca	31.34	28	20.02	49.06	36
	Kiowa and Rita Blanca	43.88	24	29.90	64.40	120
Lark Sparrow	Kiowa	37.66	27	24.33	58.30	37
	Rita Blanca	32.33	29	20.01	52.24	23
	Kiowa and Rita Blanca	35.42	22	24.83	50.53	60
Lark Bunting	Kiowa	90.83	21	64.82	127.29	181
	Rita Blanca	38.81	31	23.30	64.64	56
	Kiowa and Rita Blanca	68.98	19	50.39	94.44	237

Species	Grassland	Density	% CV	LCL	UCL	n
Grasshopper Sparrow	Kiowa	18.95	68	6.66	53.90	11
	Rita Blanca	30.92	71	10.60	90.25	13
	Kiowa and Rita Blanca	23.98	65	8.76	65.66	24
Western Meadowlark	Kiowa	66.31	11	54.92	80.05	203
	Rita Blanca	76.68	12	62.71	93.77	170
	Kiowa and Rita Blanca	70.67	9	60.56	82.45	373

D = Density estimate expressed in birds/km^2, DLCL & DUCL = lower and upper 90% confidence limits of D, DCV = coefficient of variation of D, n = number of detections used to calculate D.

Discussion and Recommendations

In 2007, section-based monitoring on Kiowa, and Rita Blanca National Grasslands yielded density estimates for 11 of the 41 detected grassland bird species. Eighteen of the species detected are of concern (Appendix C). These section-based surveys provide the data necessary to detect and monitor trends in species population and distribution within these Grasslands. Increasing the sample size on the currently surveyed Grasslands or surveying additional Grasslands will potentially increase the number of species monitored under this protocol and will yield more robust data.

Kiowa and Rita Blanca National Grasslands are located in the south central portion of the Shortgrass Prairie Bird Conservation Region. These National Grasslands are particularly important for Long-billed Curlew and Cassin's Sparrow as they are found in higher abundance than the northern portion of the Shortgrass Prairie Bird Conservation Region. It would be of management interest to target these two species of concern which occupy different microhabitats within the shortgrass prairie. The benefit of managing for these two species would be in creating a diverse assemblage of microhabitats that would in turn improve breeding habitat for an array of bird species.

Monitoring at a Grassland scale provides Grassland-specific data, resulting in more effective land management decisions regarding conservation of grassland birds and their habitat. For example, data collected through section-based monitoring can be used to link habitat types or management practices to bird counts. Permanently marked point count locations can be related to base vegetation using GIS layers or to management practices using Forest Service records. Correlations can then be drawn among avian trends, densities, diversity and management practices. Evaluating management practices based on population trends and distributions will enable us to focus conservation efforts and help land managers to make decisions that conserve prairie birds on National Grasslands.

A disadvantage of our section-based monitoring program, which is also shared by BBS, is the potential road bias resulting form the road-based surveying technique. This should not affect our ability to monitor bird populations into the future assuming there is no variation in the roadside bias among years.

Overall, section-based monitoring at a Grassland scale is inexpensive, defensible, 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, resulting in more effective conservation of Great Plains birds on National Grasslands.

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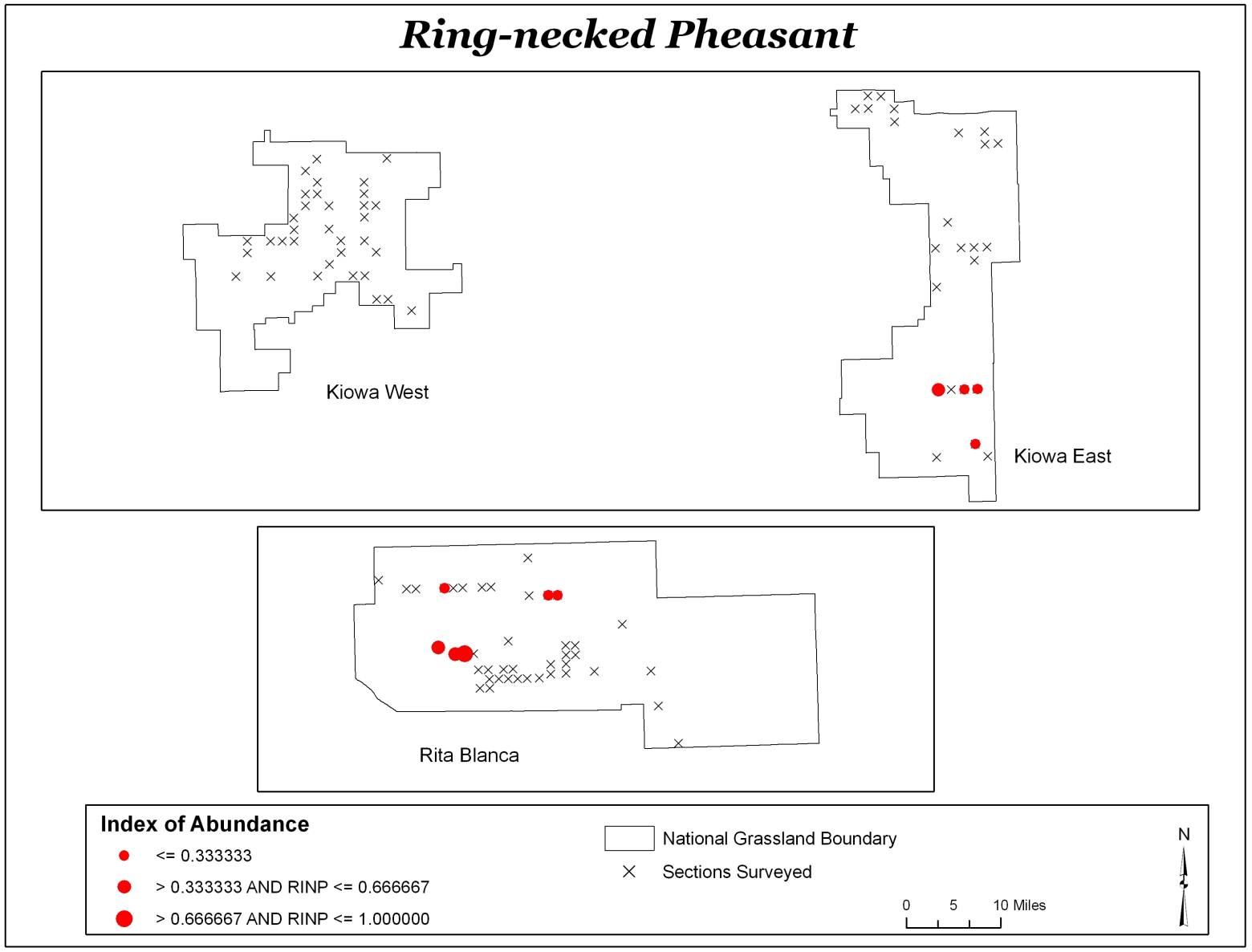
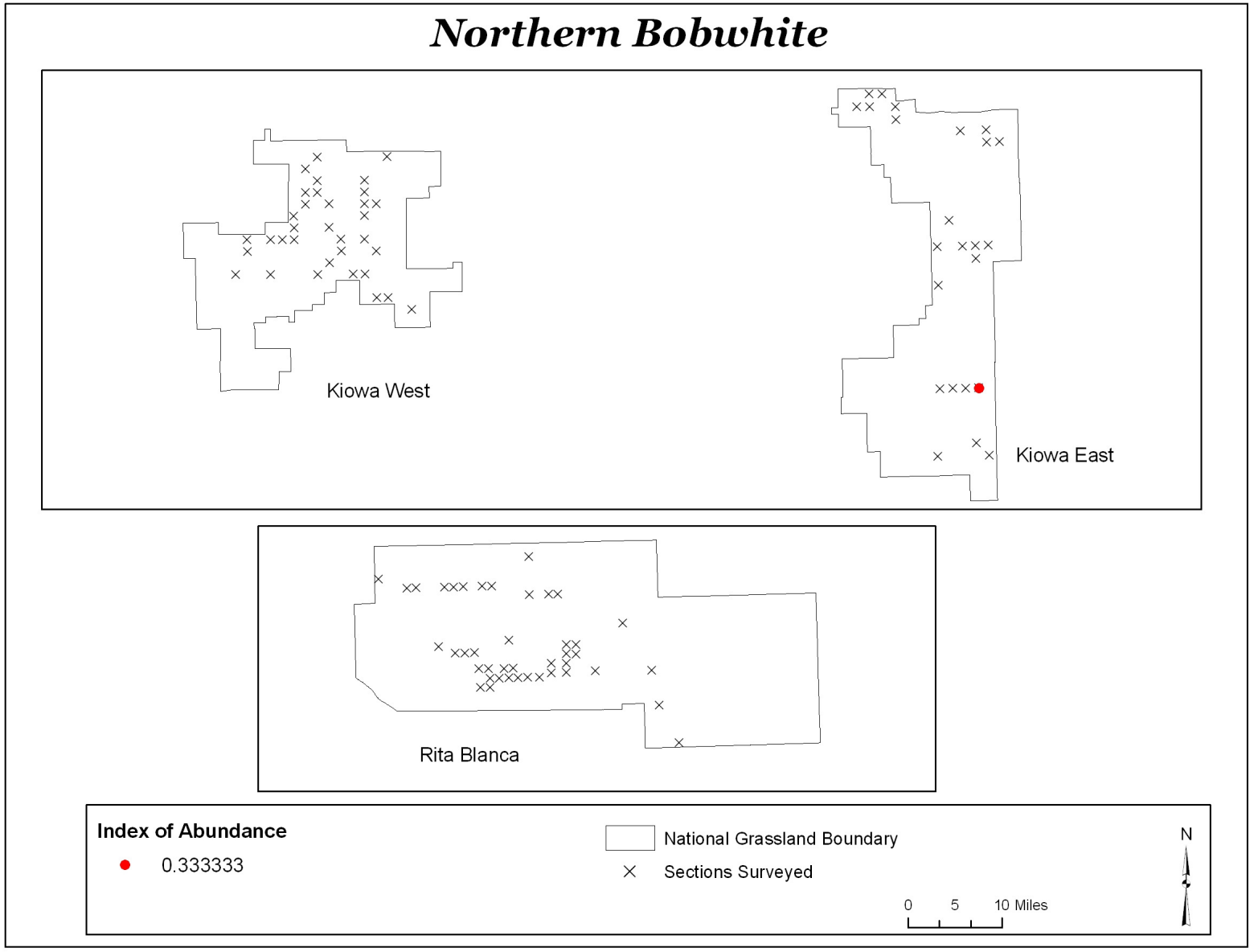
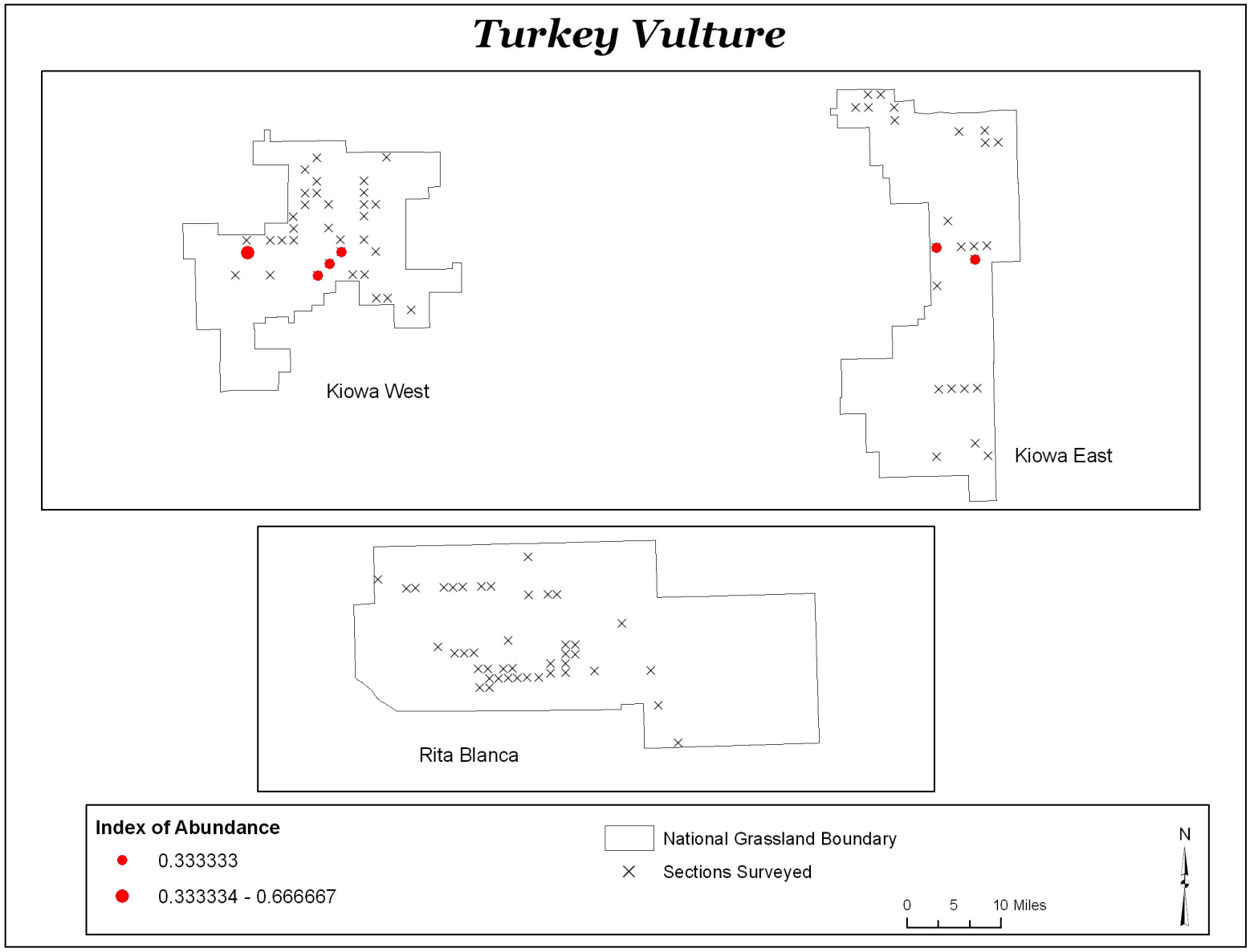
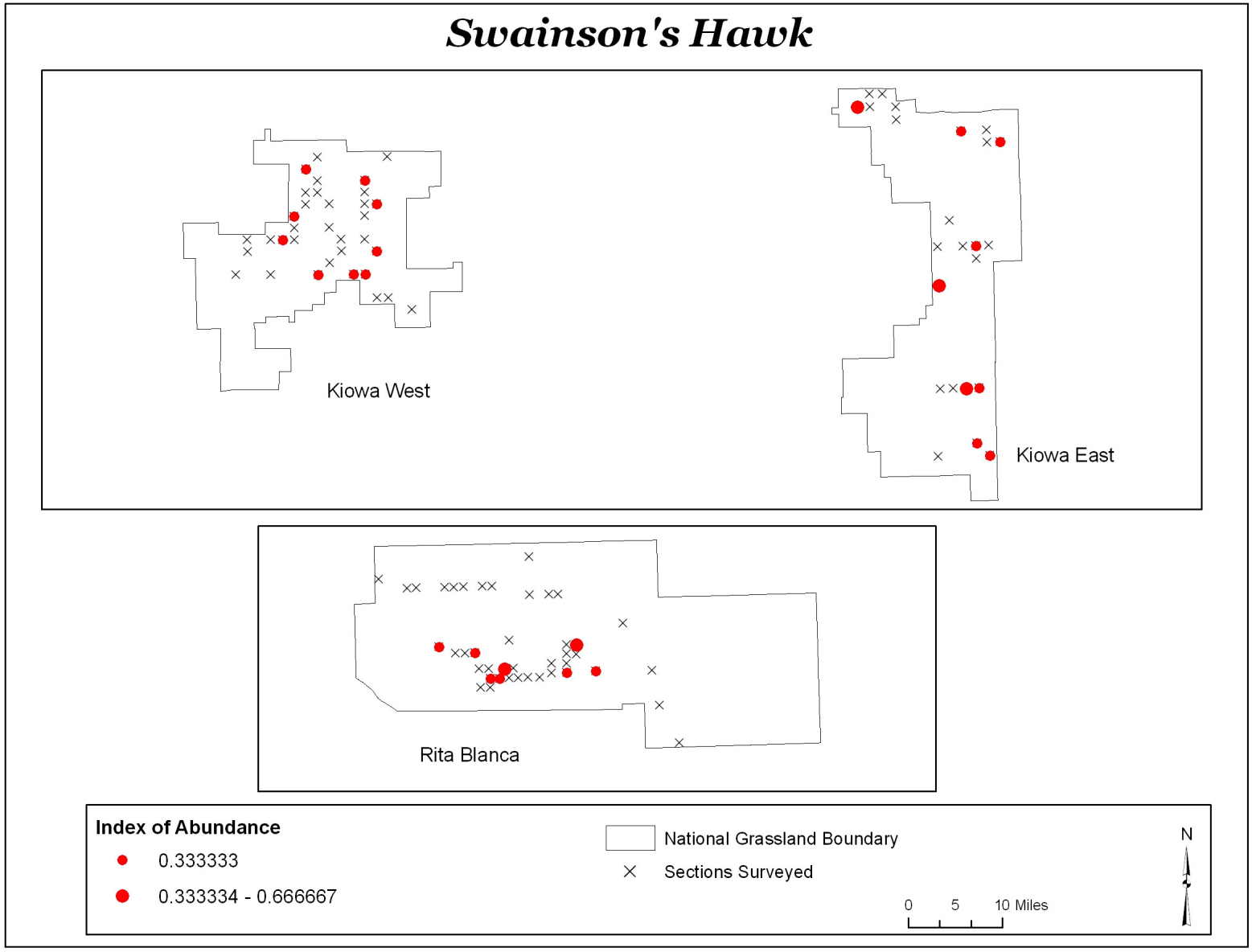
Appendix A

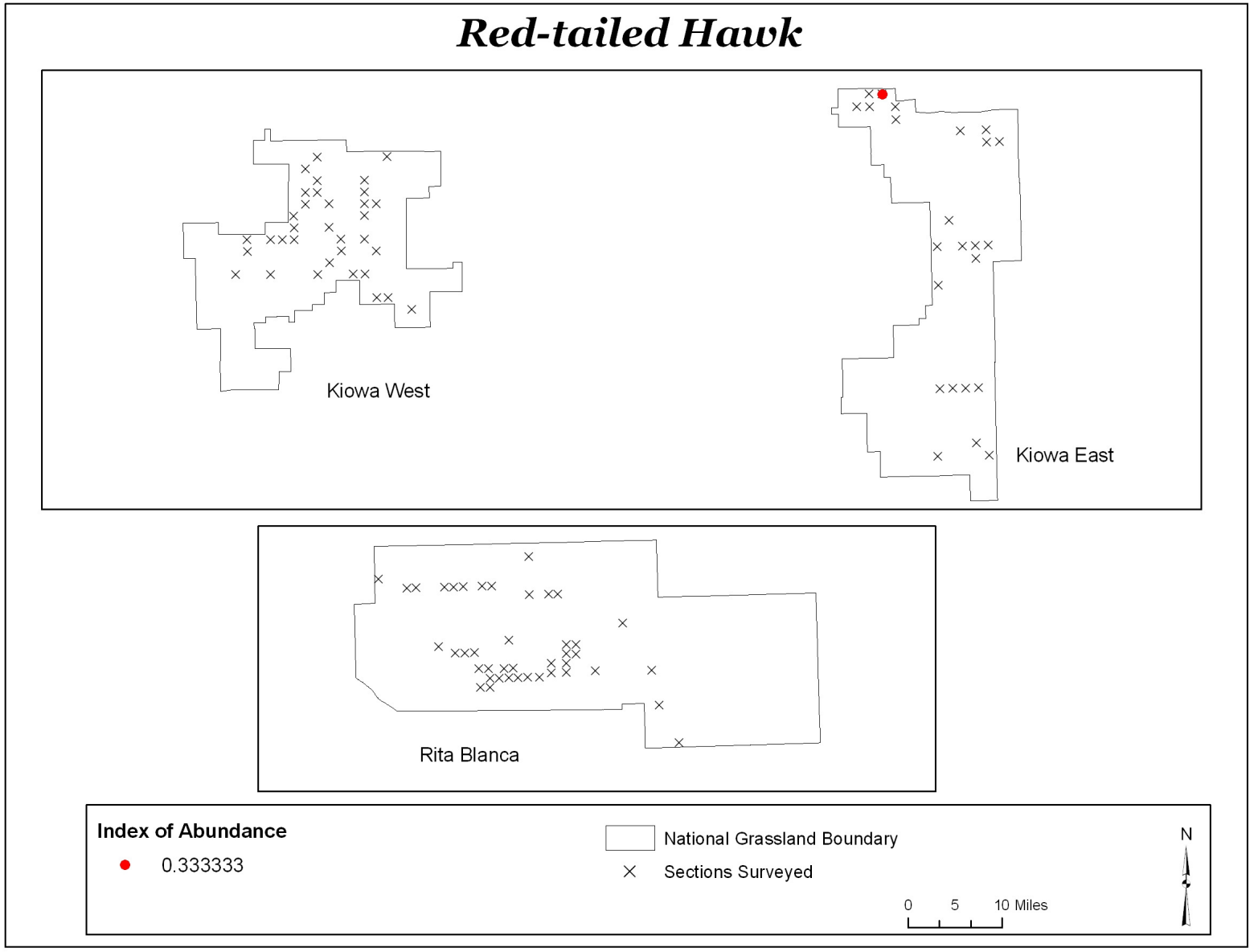
The following are species distribution maps that show observation locations and index of abundance at the section level for 2007. Index of abundance, represented by graded dots, is defined as the total number of a species detected on the section divided by the number of point counts conducted on that section.


Ring-necked Pheasant
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND RINP <= 0.666667
> 0.666667 AND RINP <= 1.000000
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

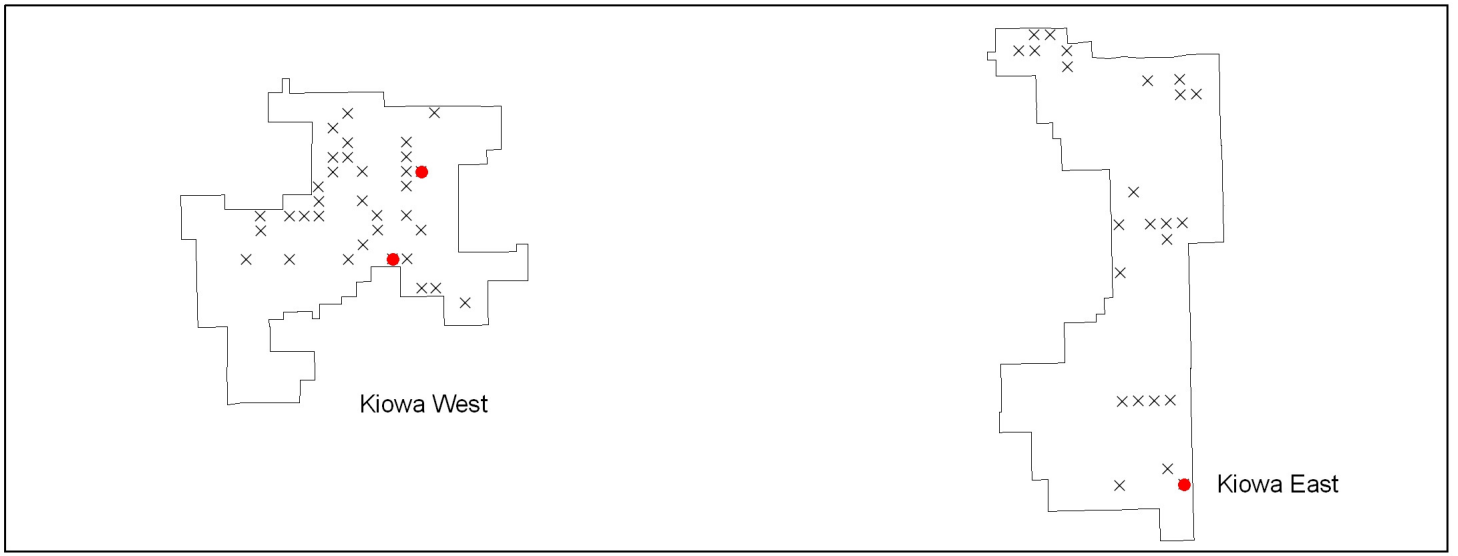

Northern Bobwhite
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

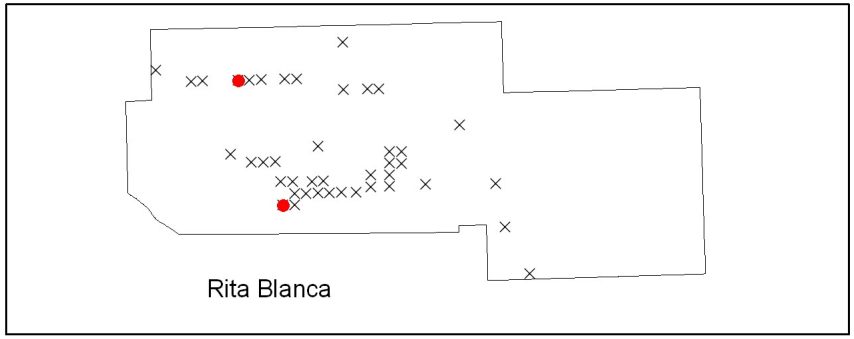

Turkey Vulture
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
0.333334 - 0.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Swainson's Hawk
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
0.333334 - 0.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Red-tailed Hawk
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

Ferruginous Hawk





Index of Abundance

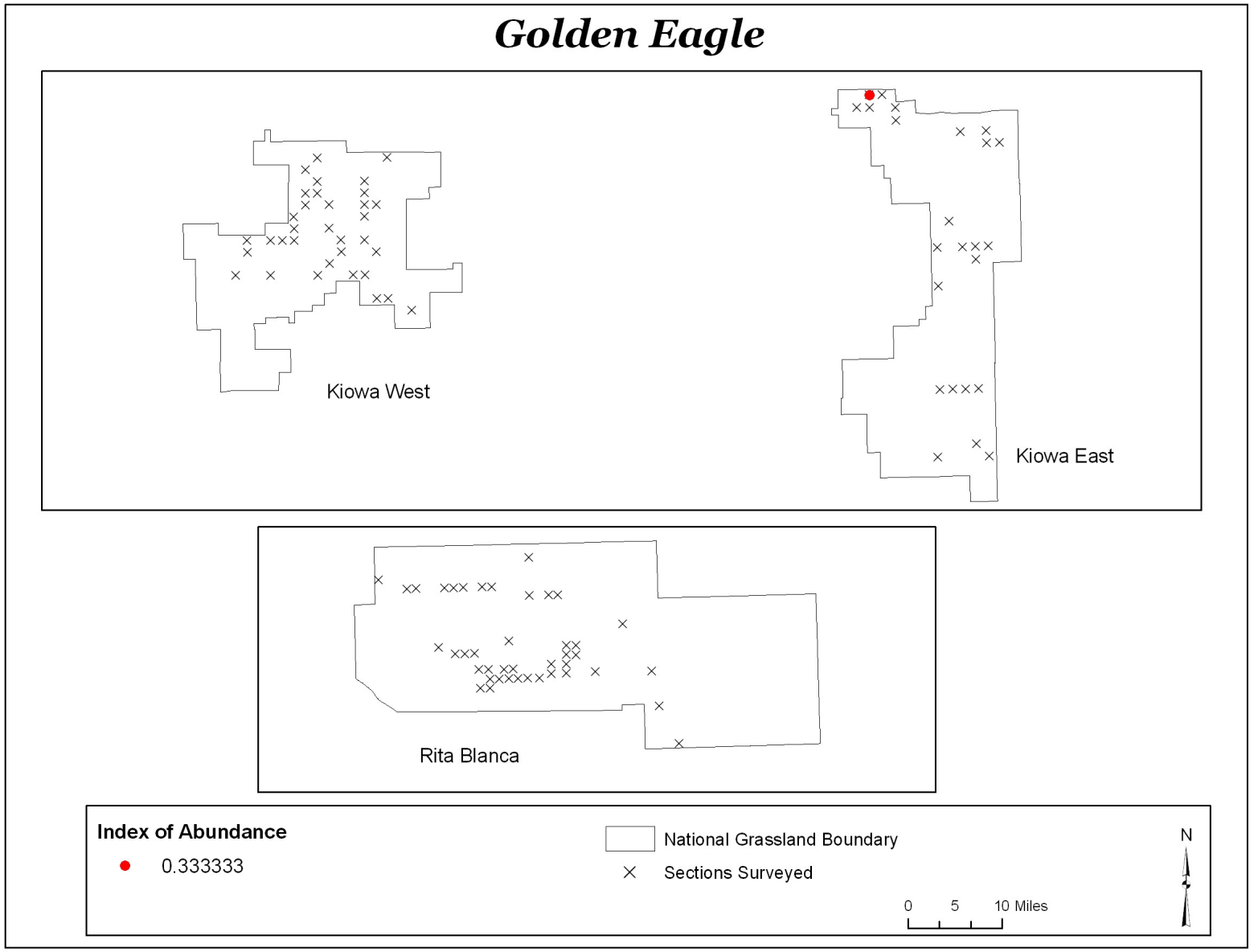
0.333333

National Grassland Boundary

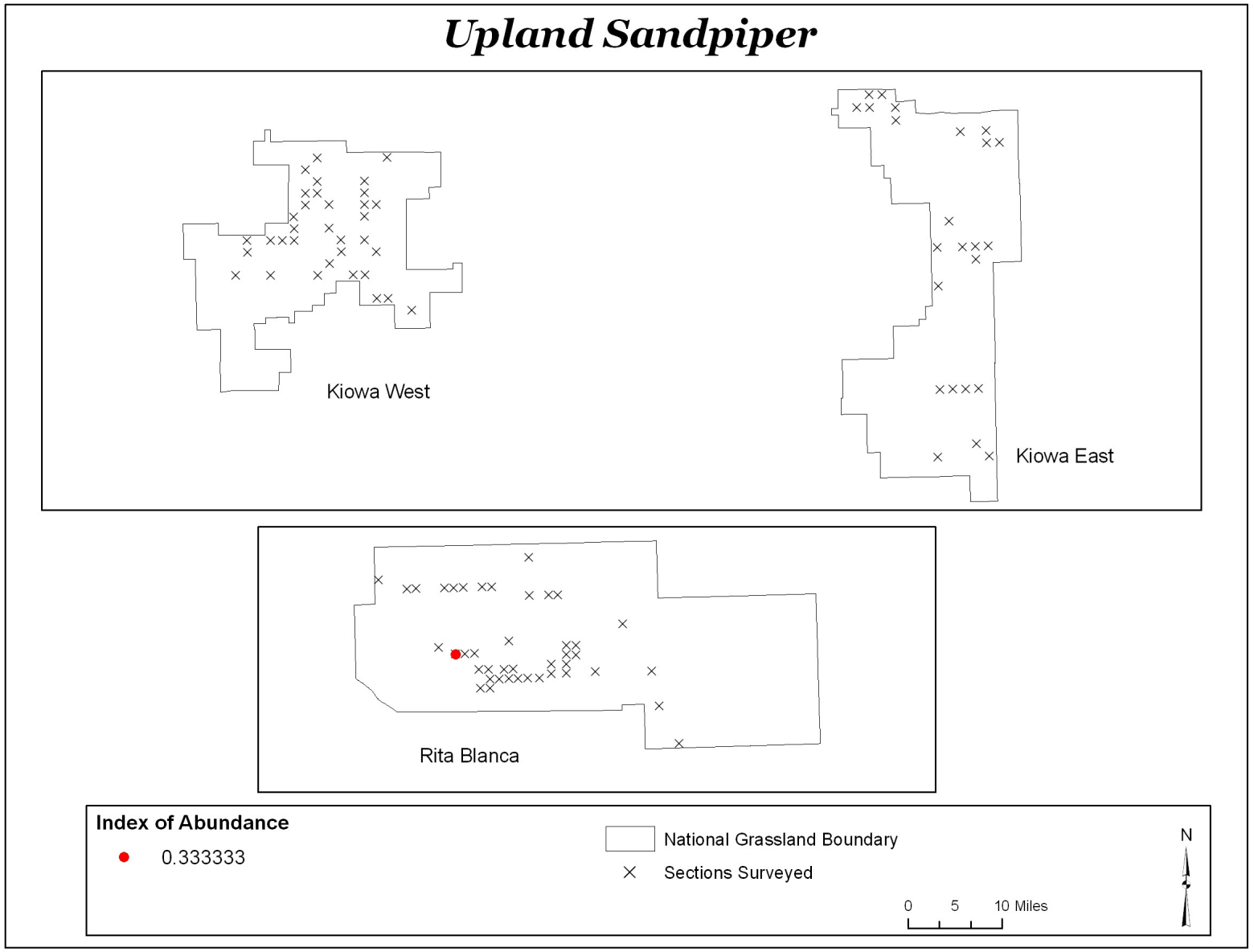
Sections Surveyed

0 5 10 Miles

N


Golden Eagle
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


American Kestrel
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Upland Sandpiper
Kiowa West
Kiowa East
Rita Blanca
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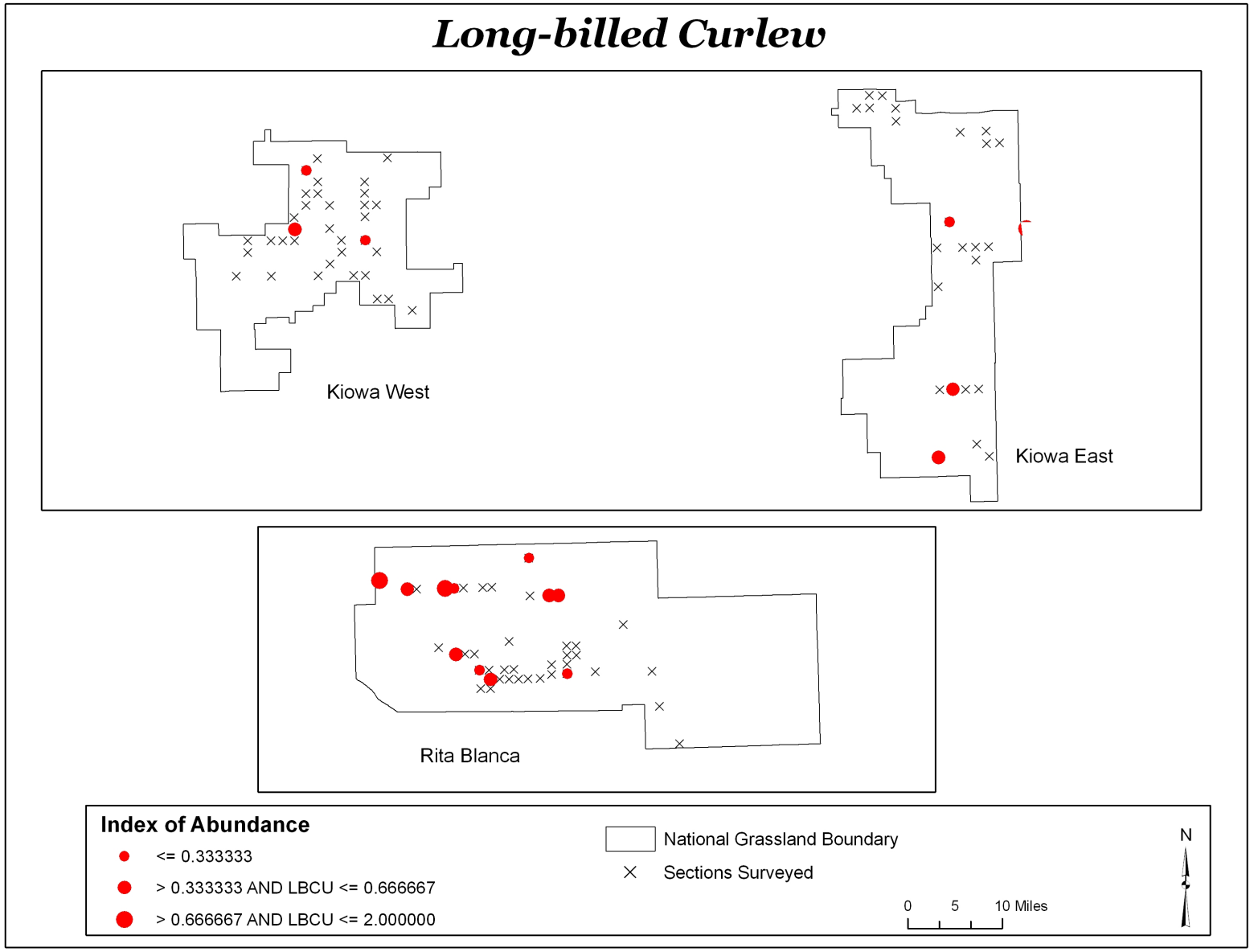
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Long-billed Curlew
Kiowa West
Kiowa East
Rita Blanca
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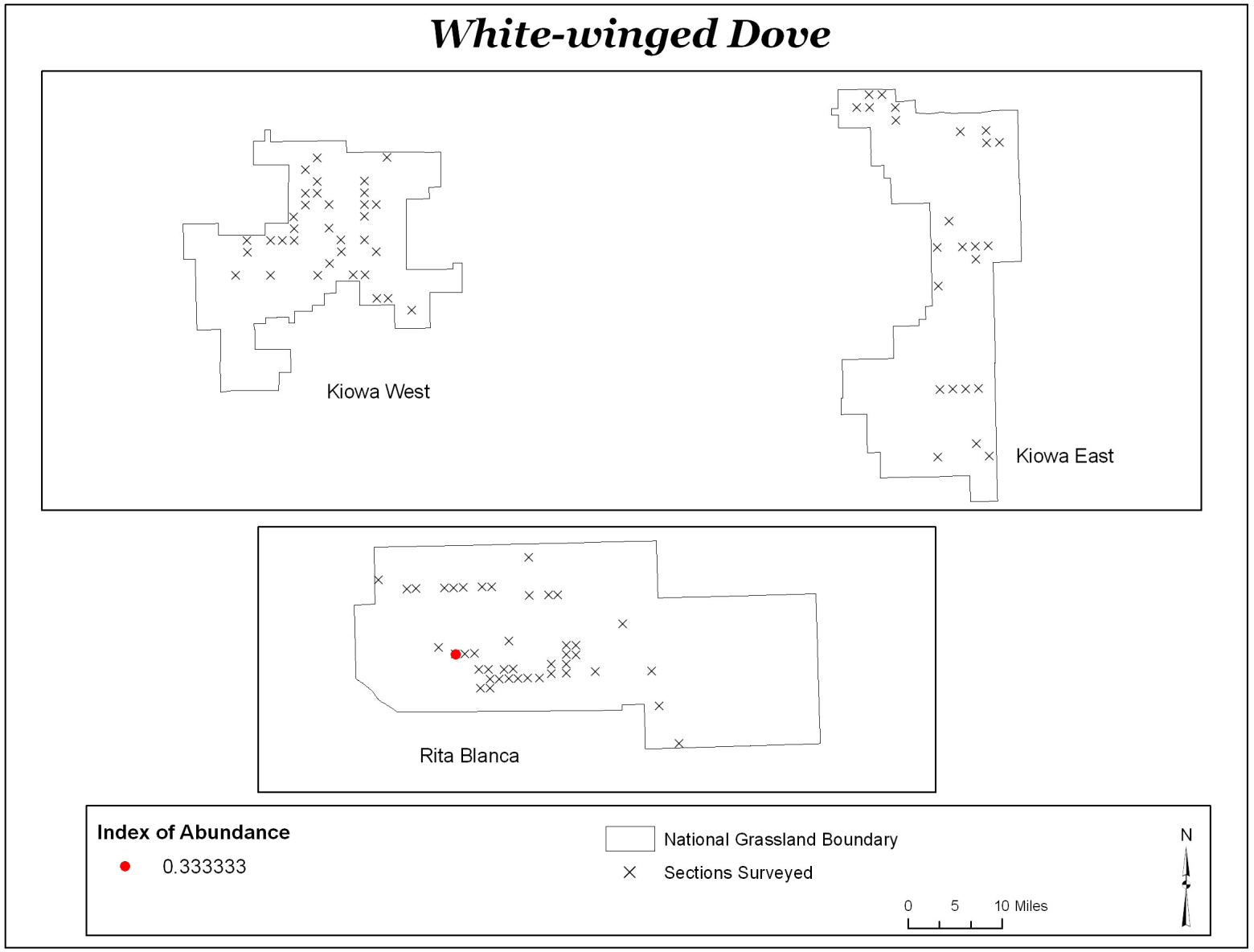
> 0.666667 AND LBCU <= 2.000000
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


White-winged Dove
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
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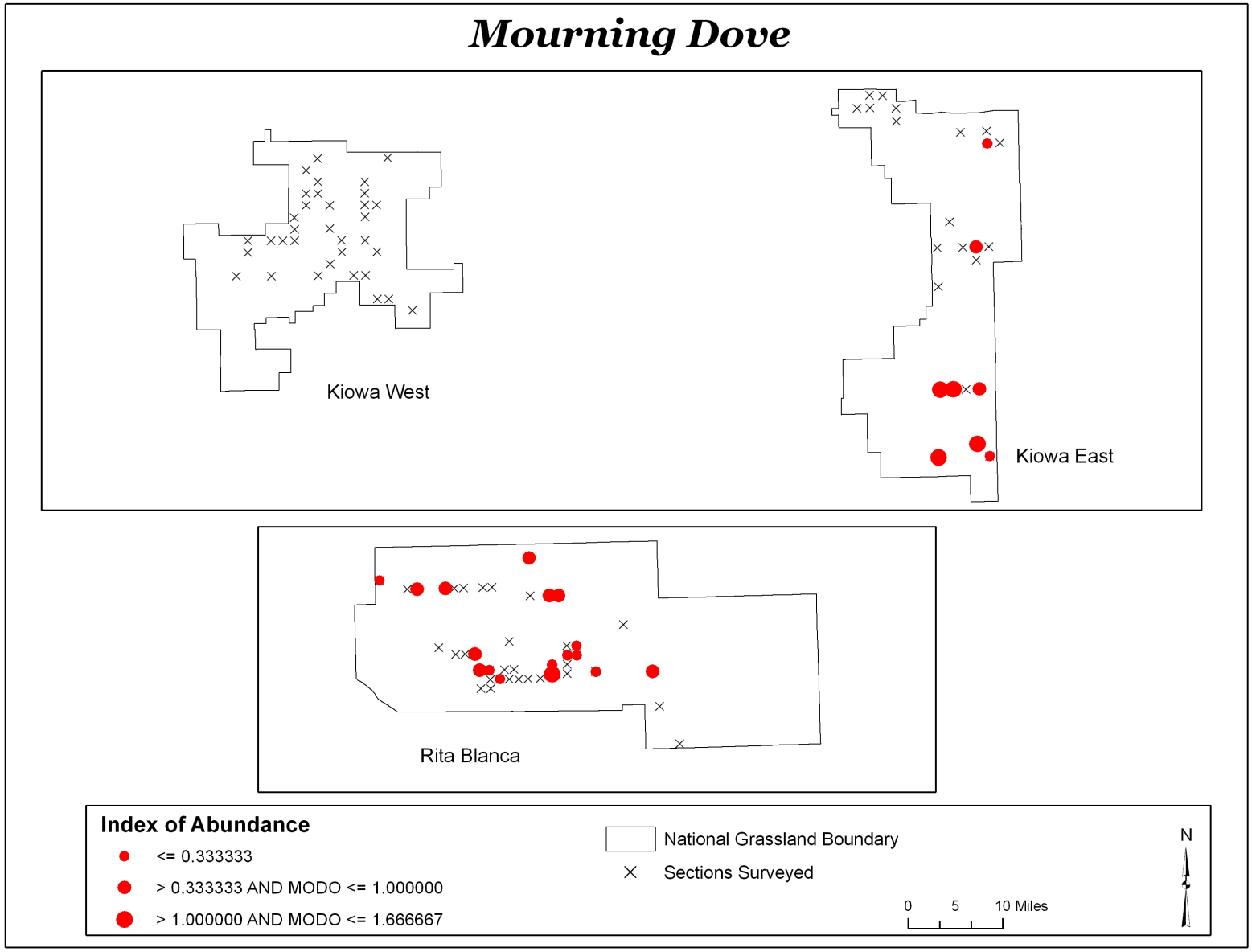
Sections Surveyed
0 5 10 Miles
N


Mourning Dove
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
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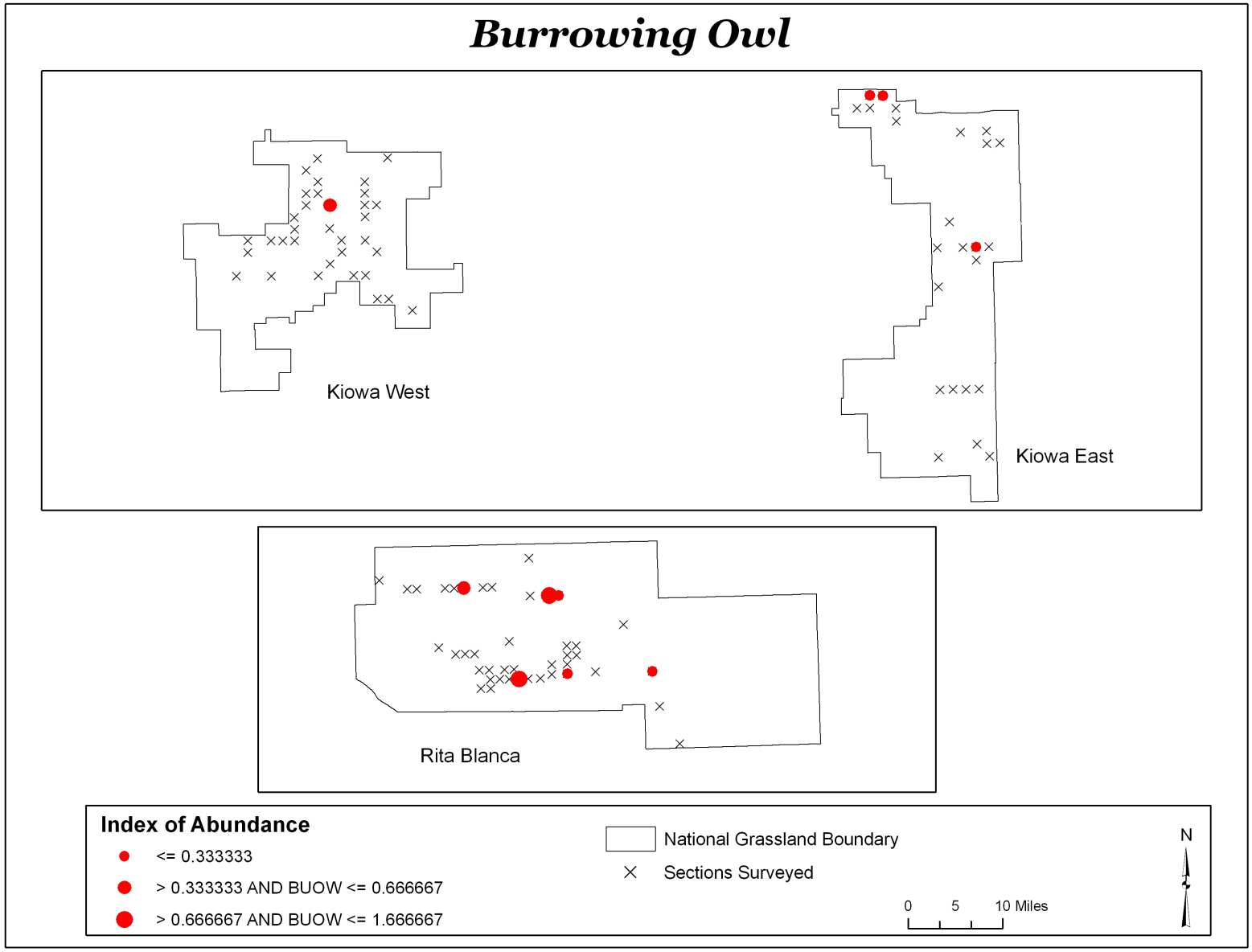
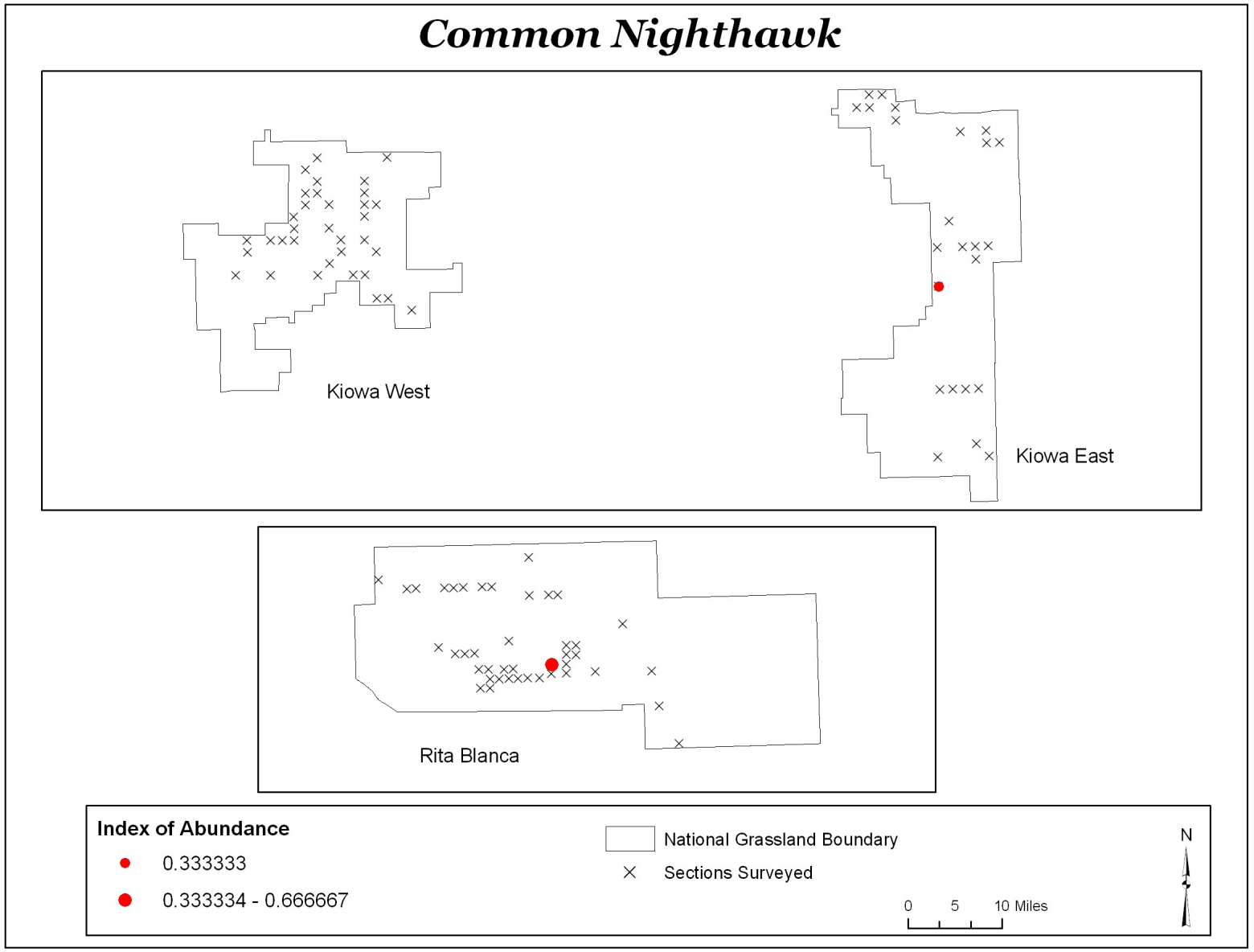
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Burrowing Owl
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND BUOW <= 0.666667
> 0.666667 AND BUOW <= 1.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Common Nighthawk
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
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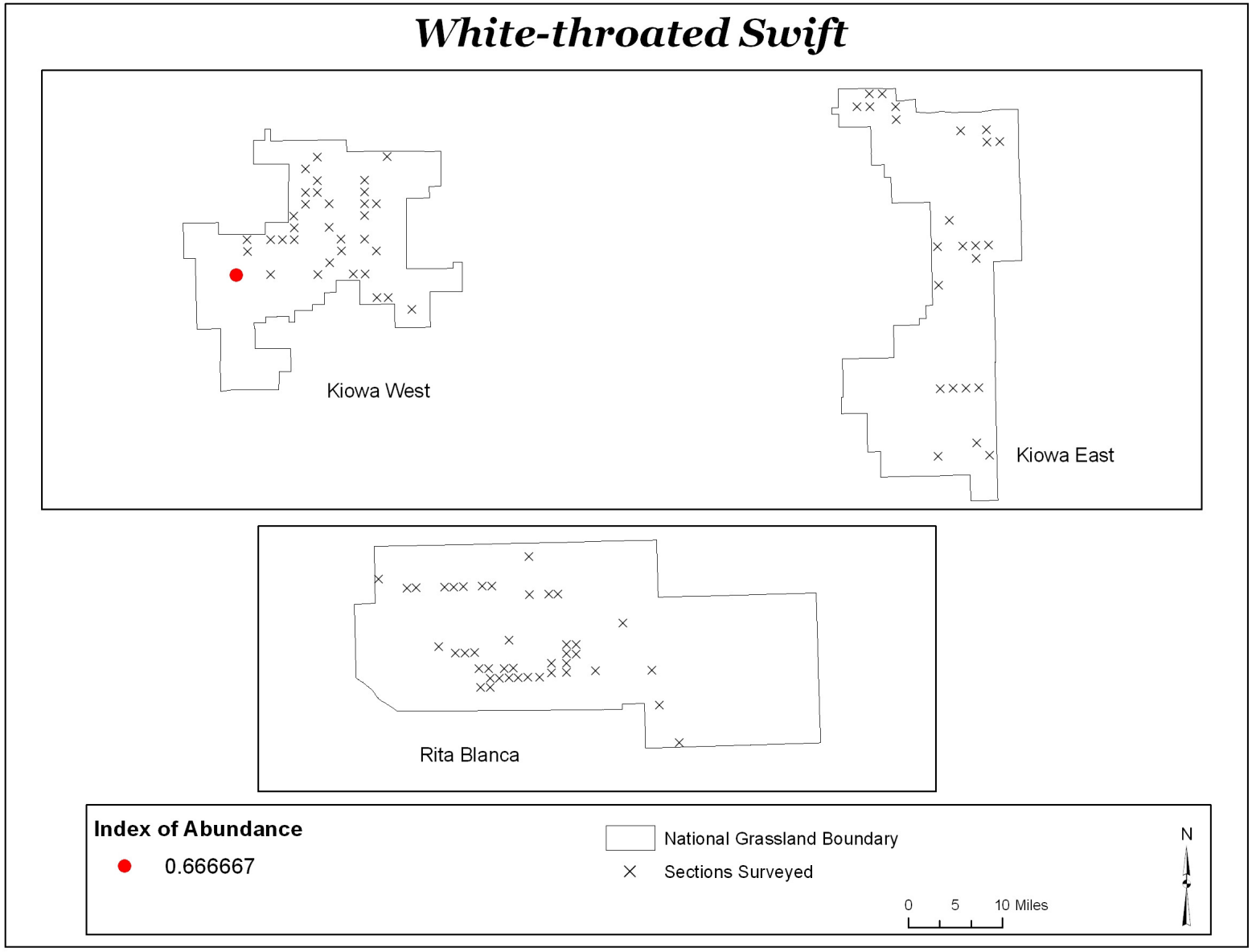
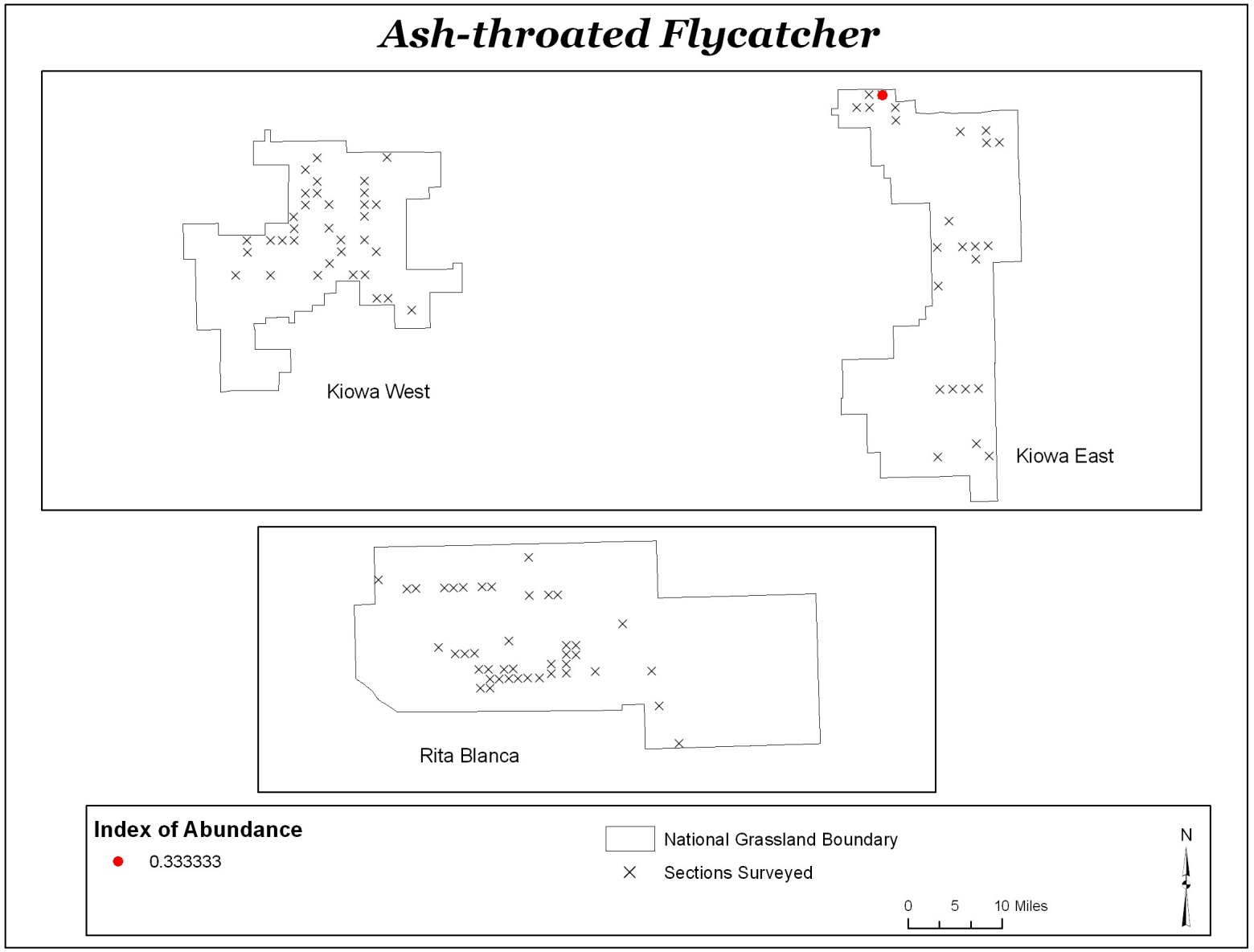
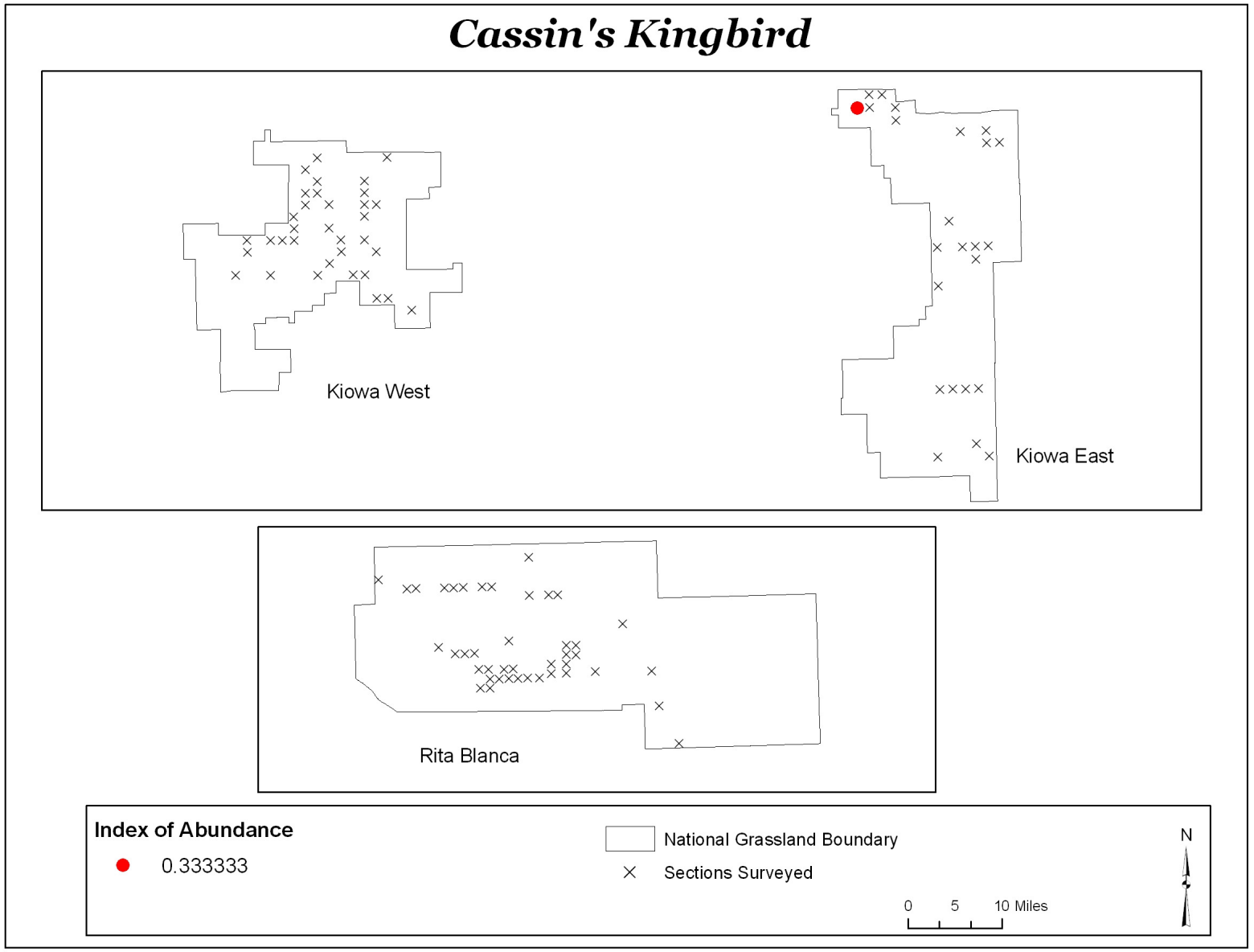
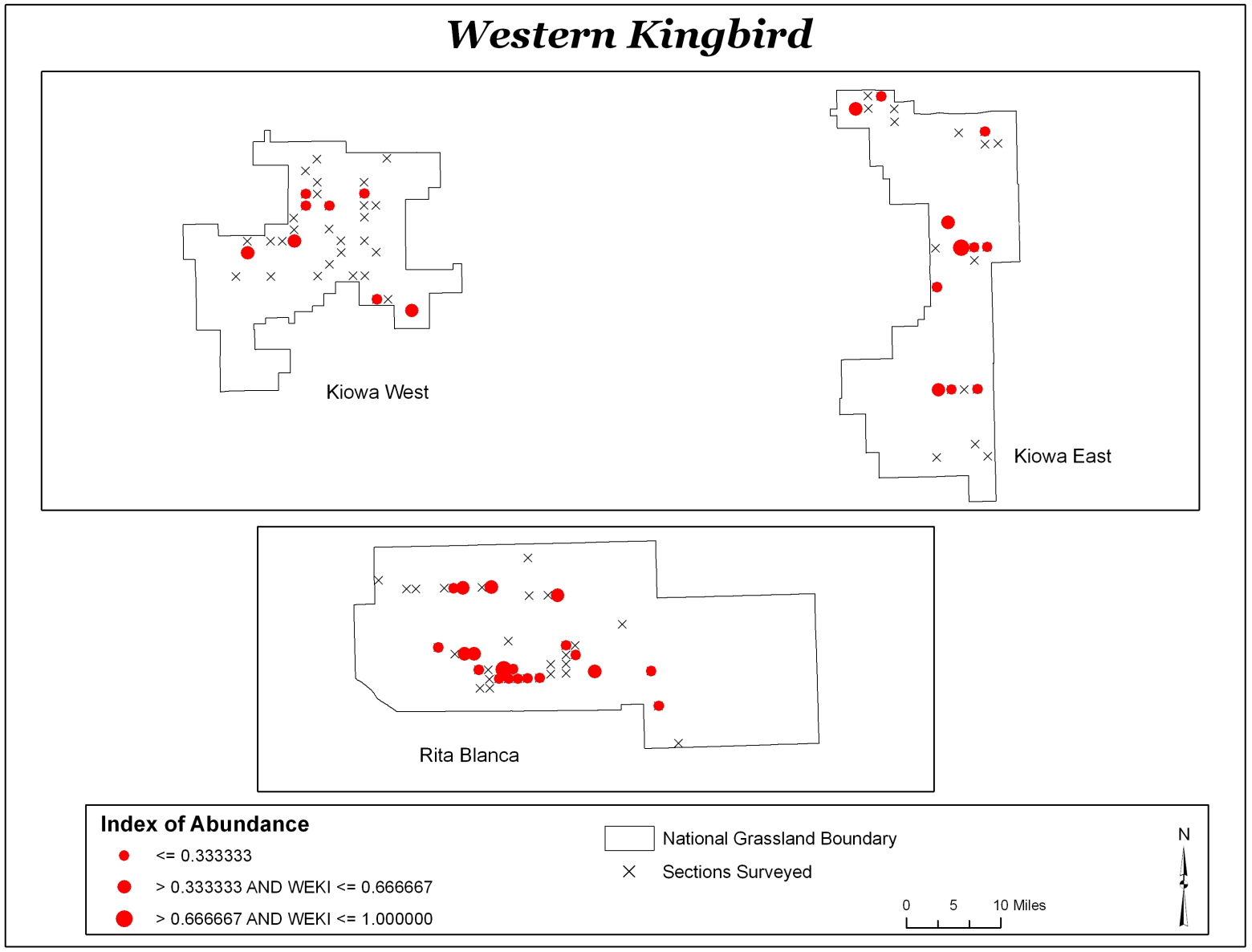
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


White-throated Swift
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Ash-throated Flycatcher
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Cassin's Kingbird
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Western Kingbird
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
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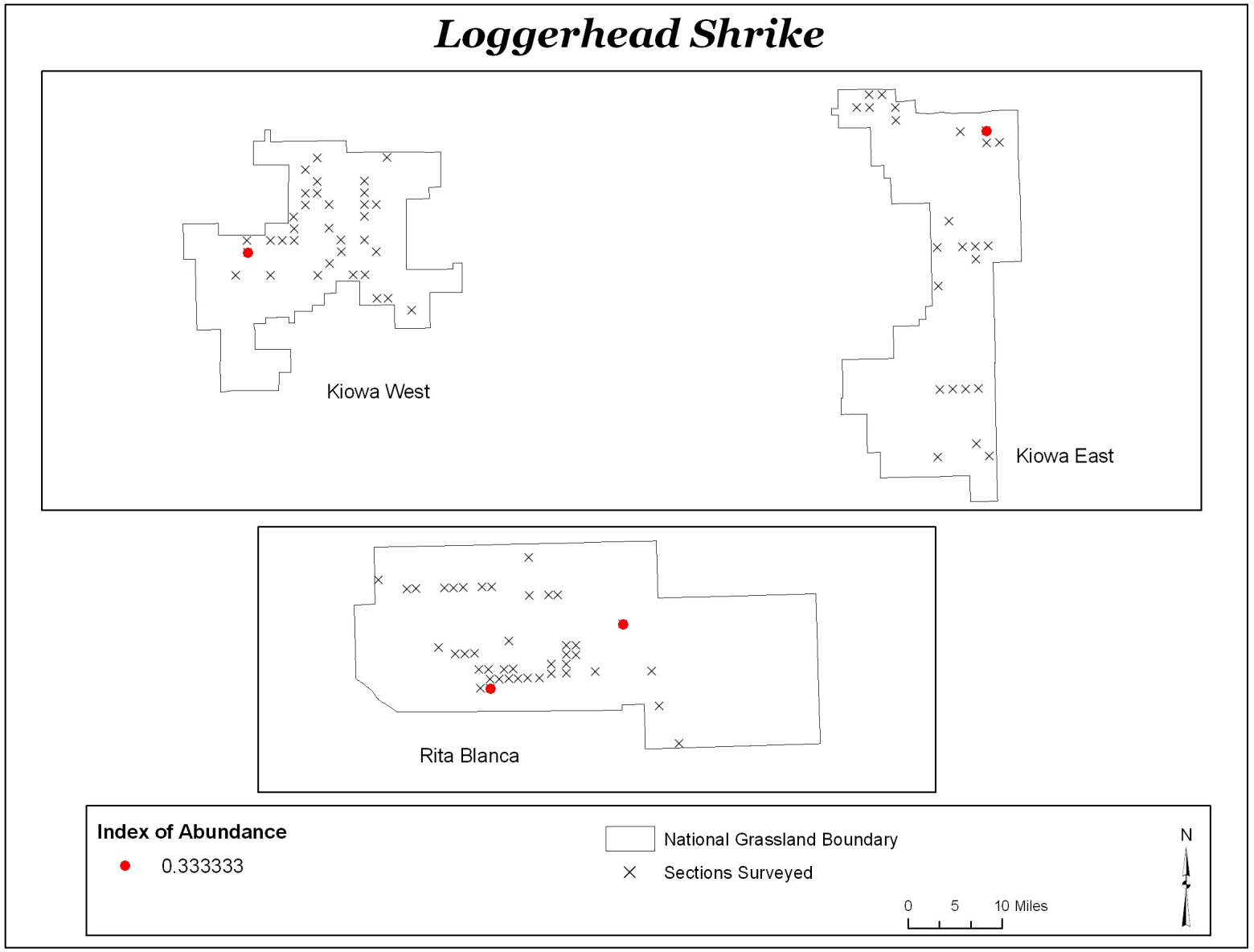
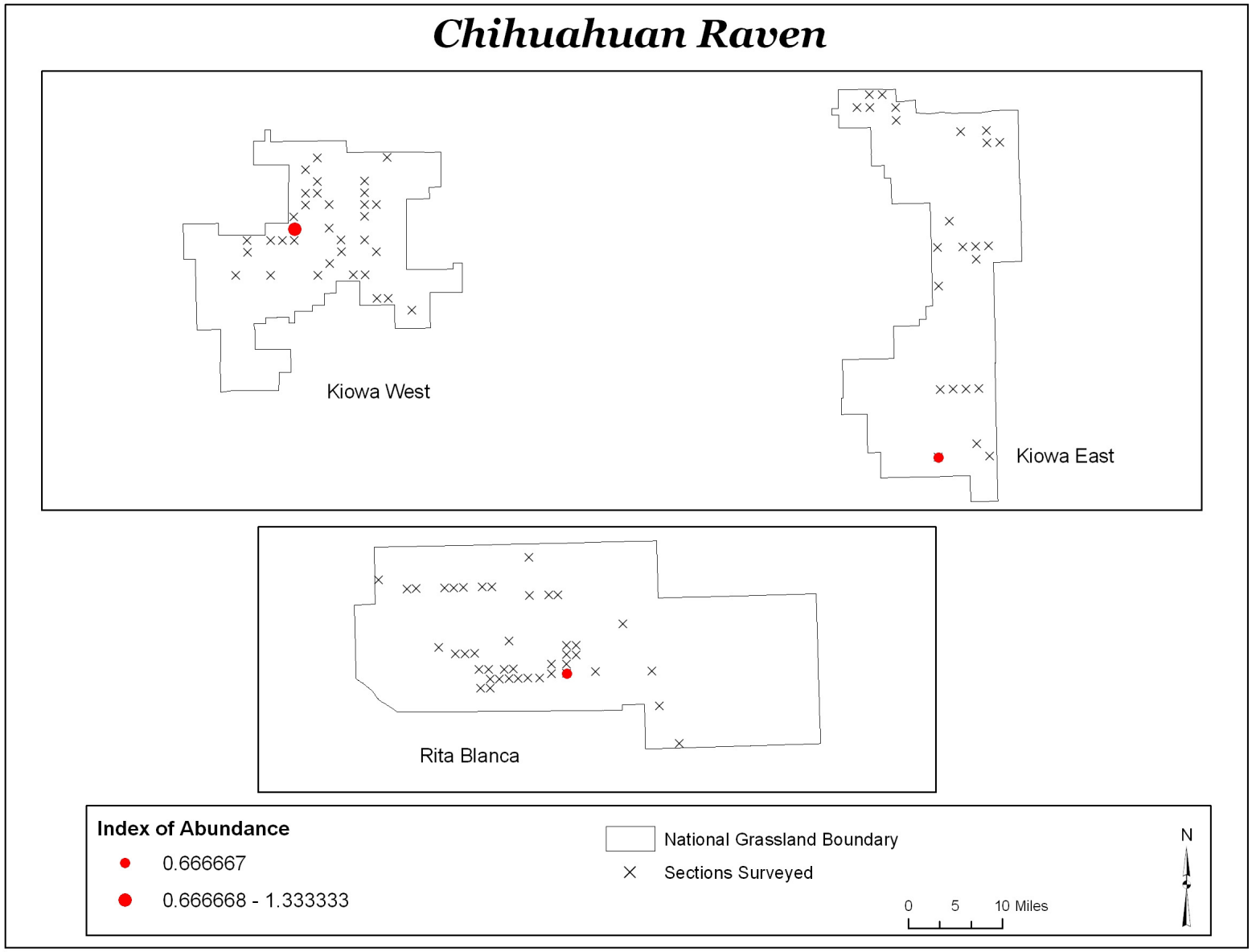
> 0.666667 AND WEKI <= 1.000000
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Loggerhead Shrike
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Chihuahuan Raven
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.666667
0.666668 - 1.333333
National Grassland Boundary
Sections Surveyed
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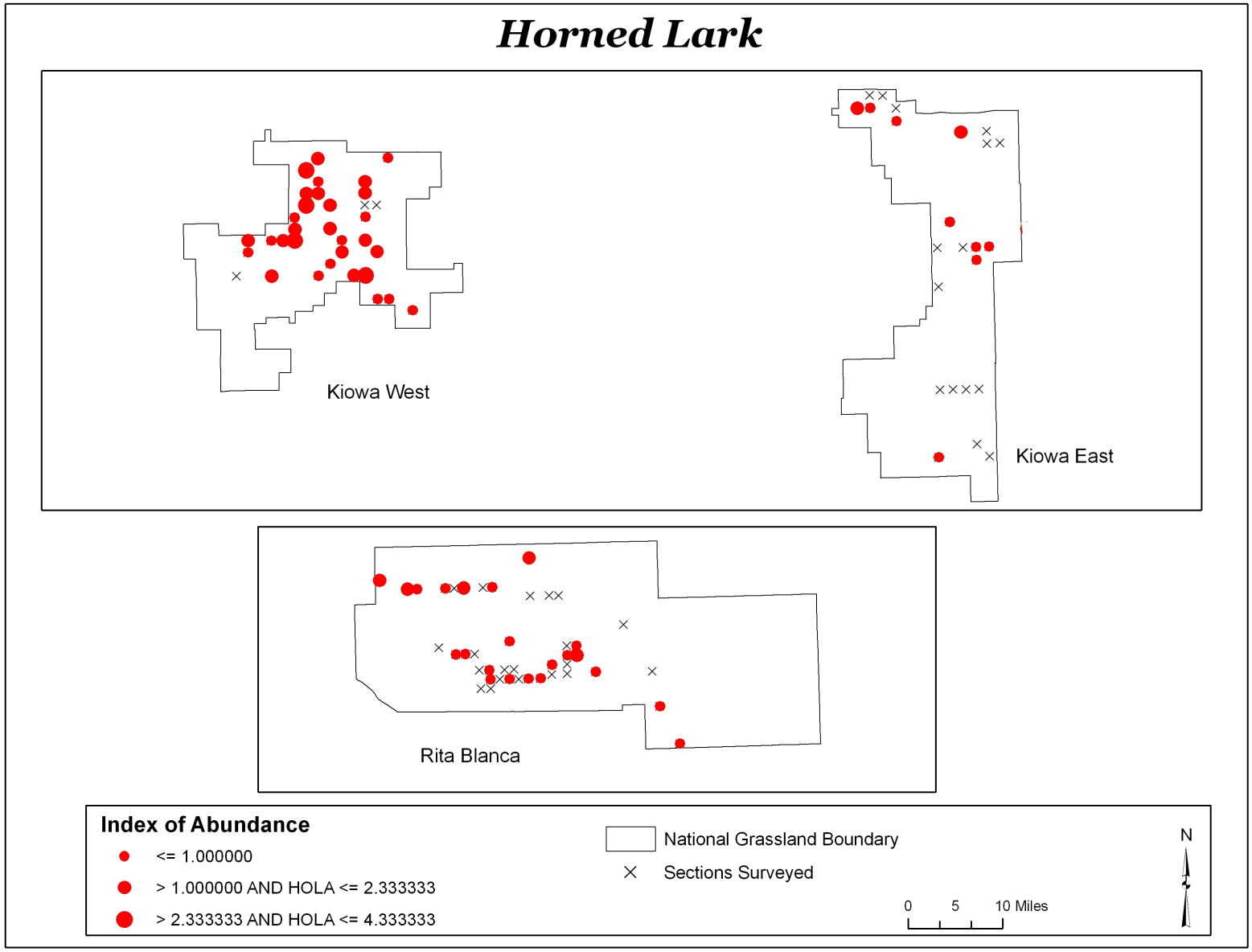
10 Miles
N


Horned Lark
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
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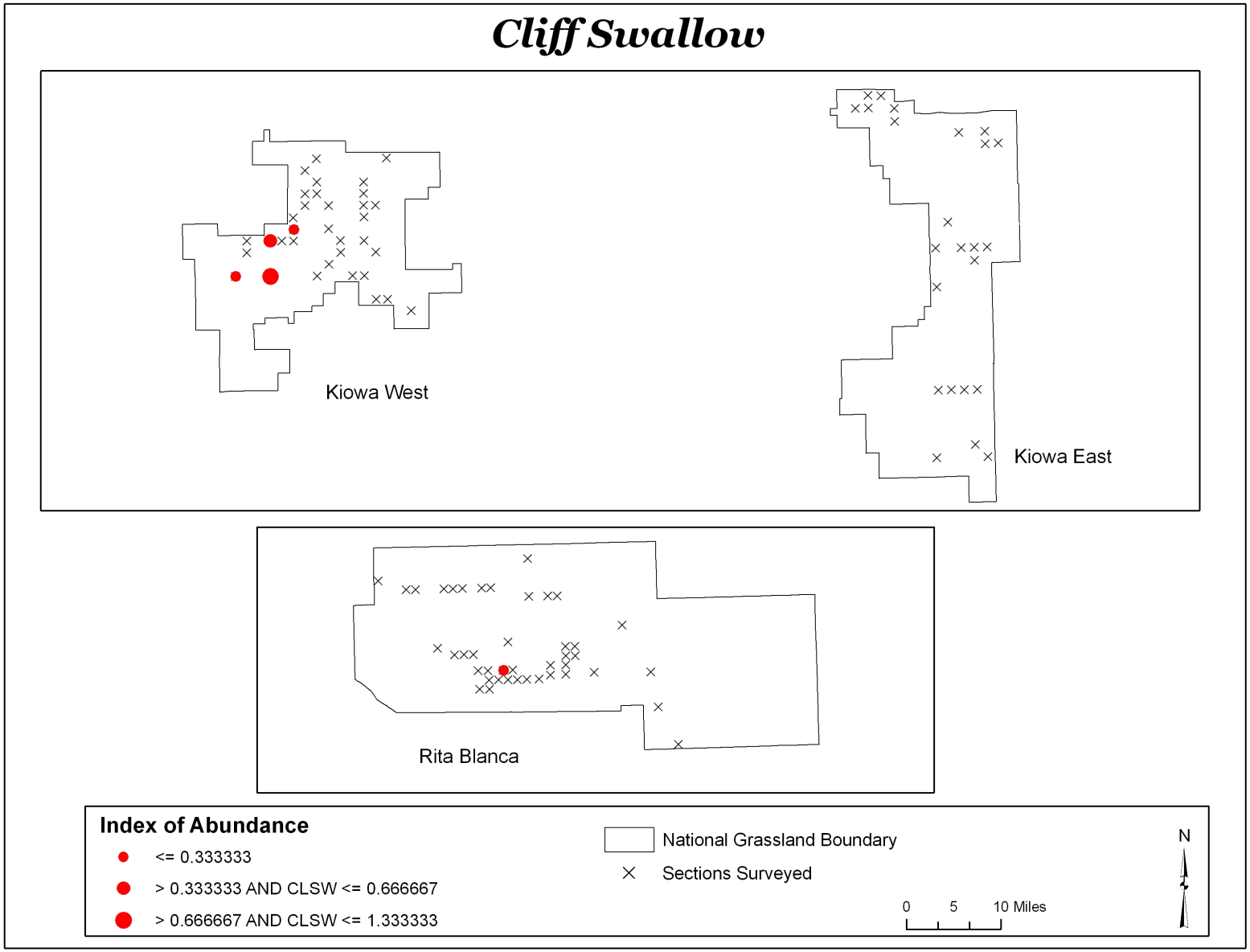
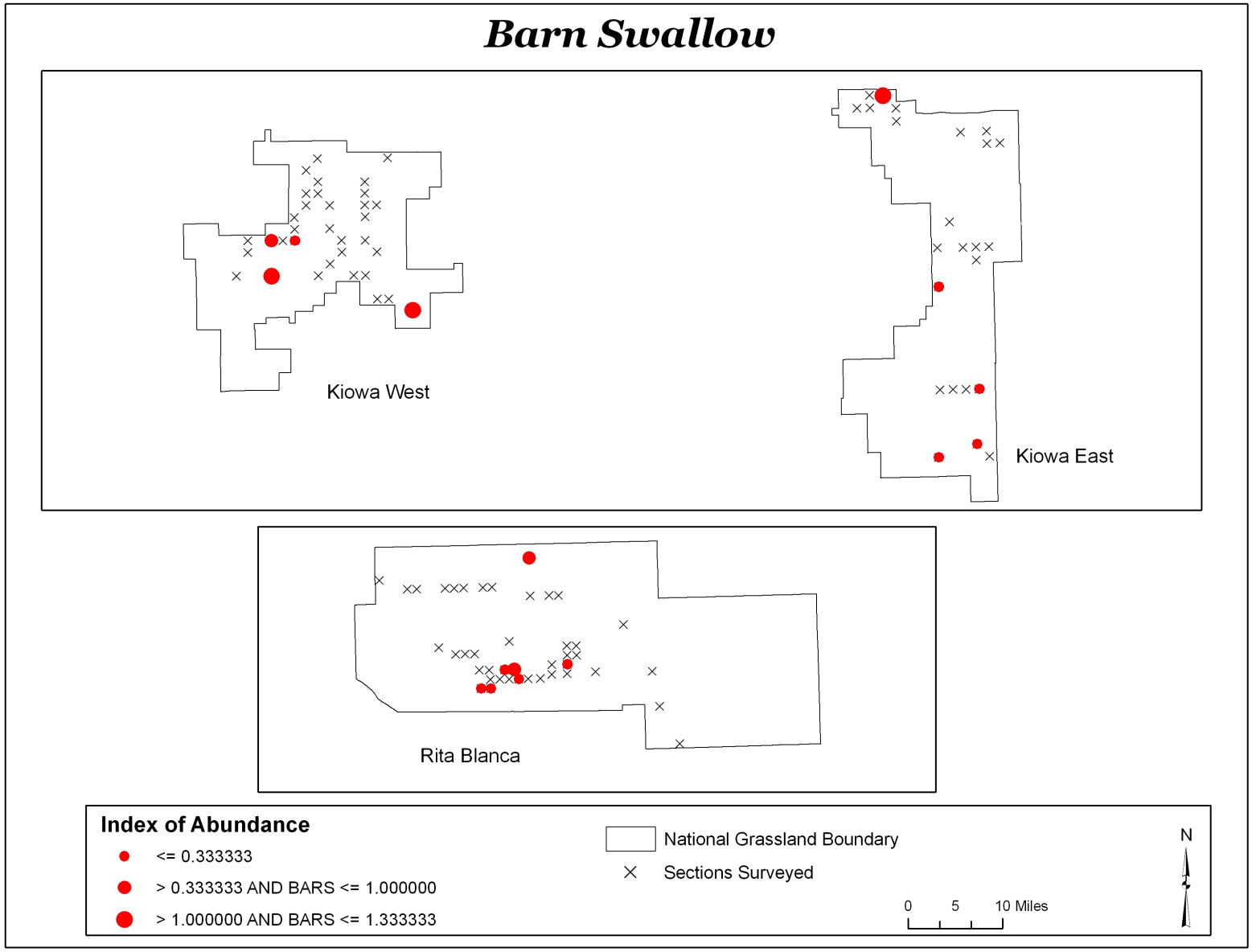
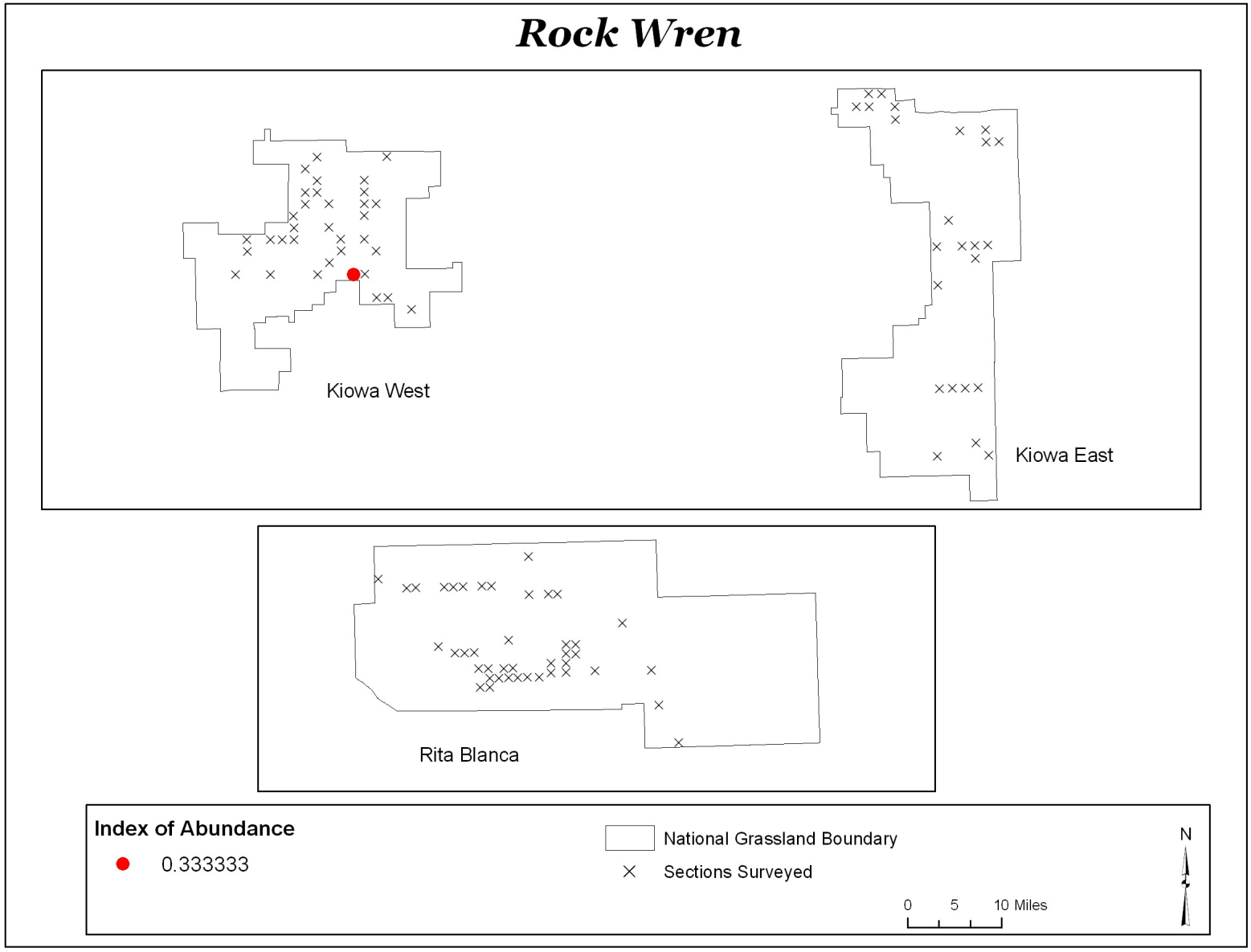
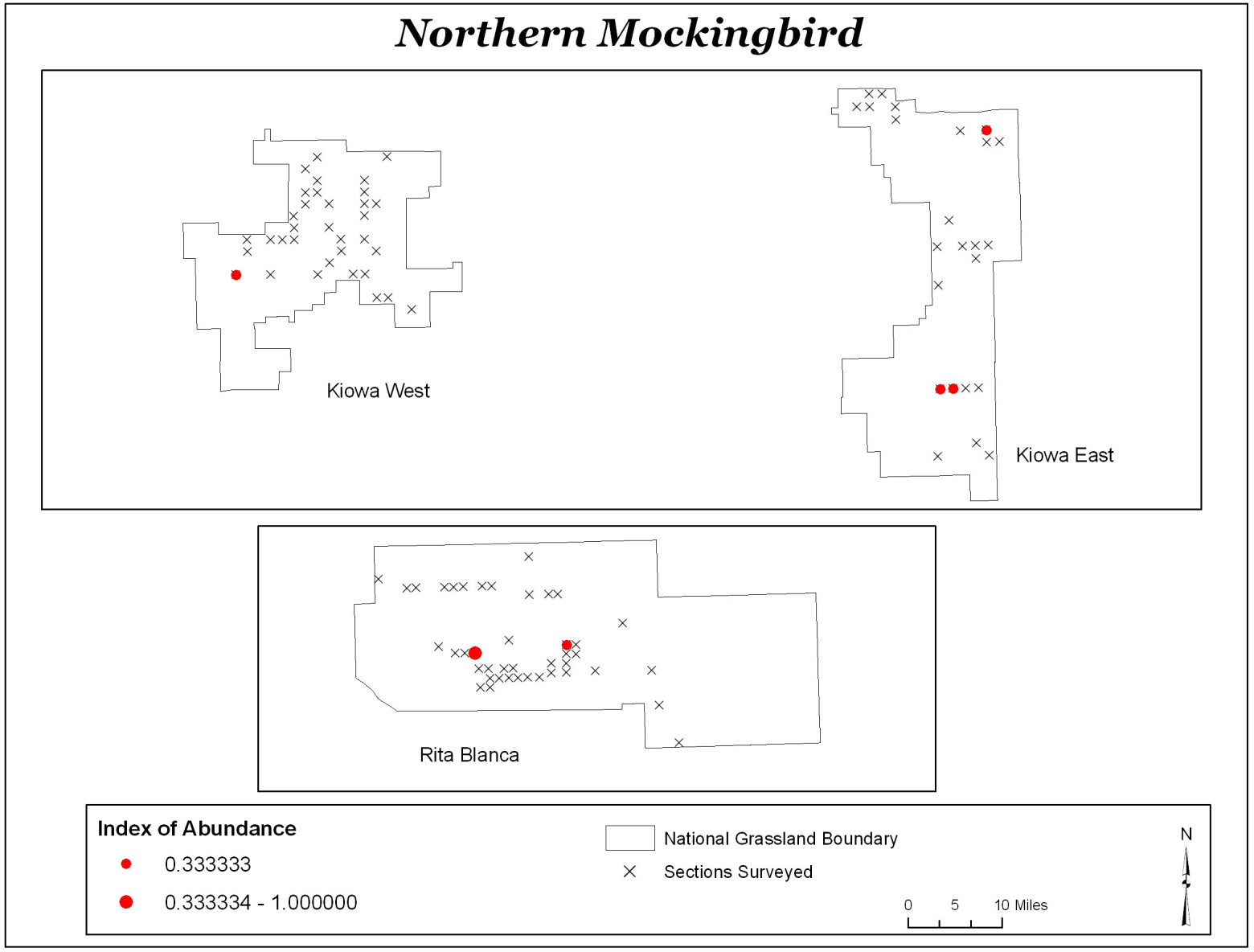
> 2.333333 AND HOLA <= 4.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

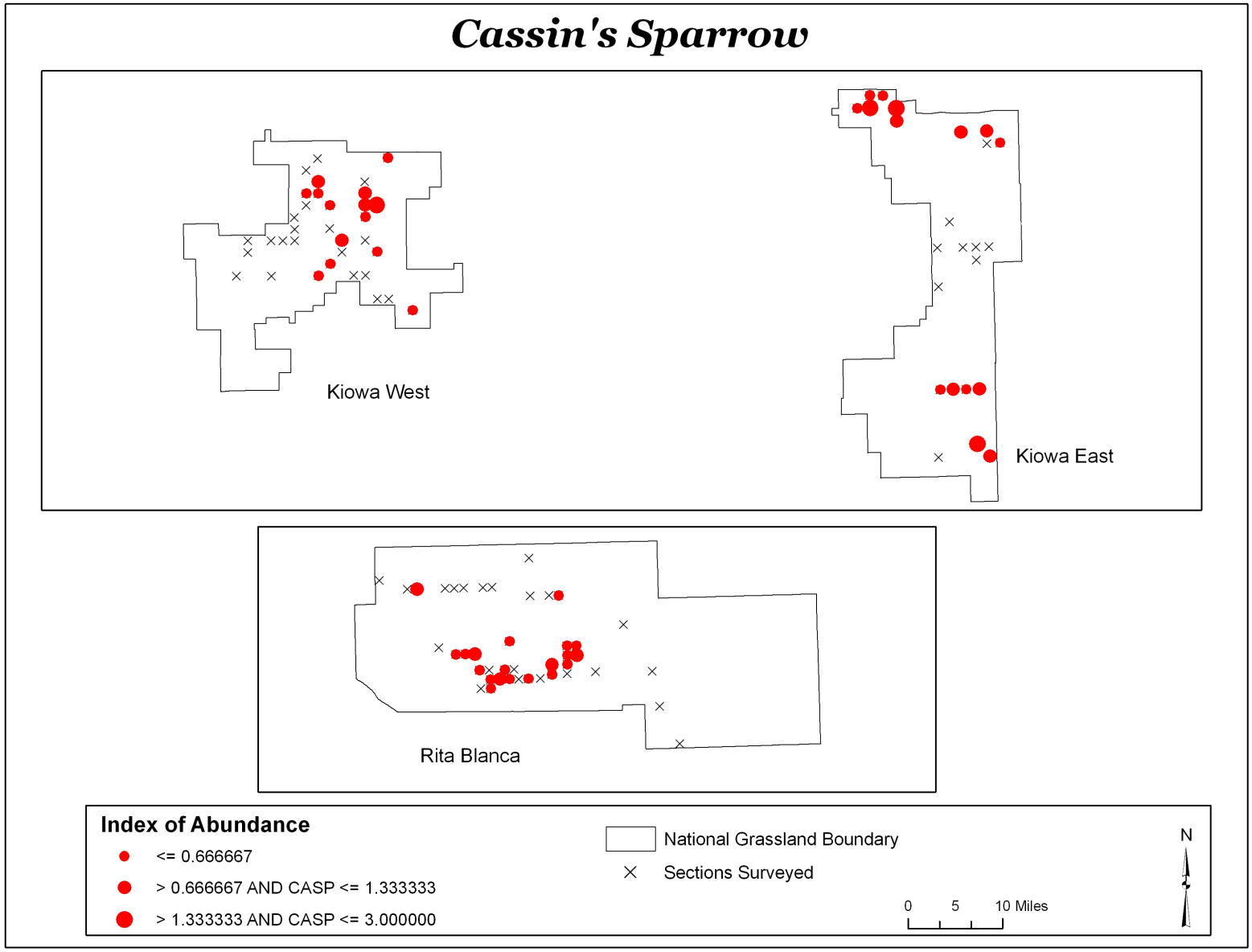

Cliff Swallow
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND CLSW <= 0.666667
> 0.666667 AND CLSW <= 1.333333
National Grassland Boundary
Sections Surveyed
0
5
10 Miles
N

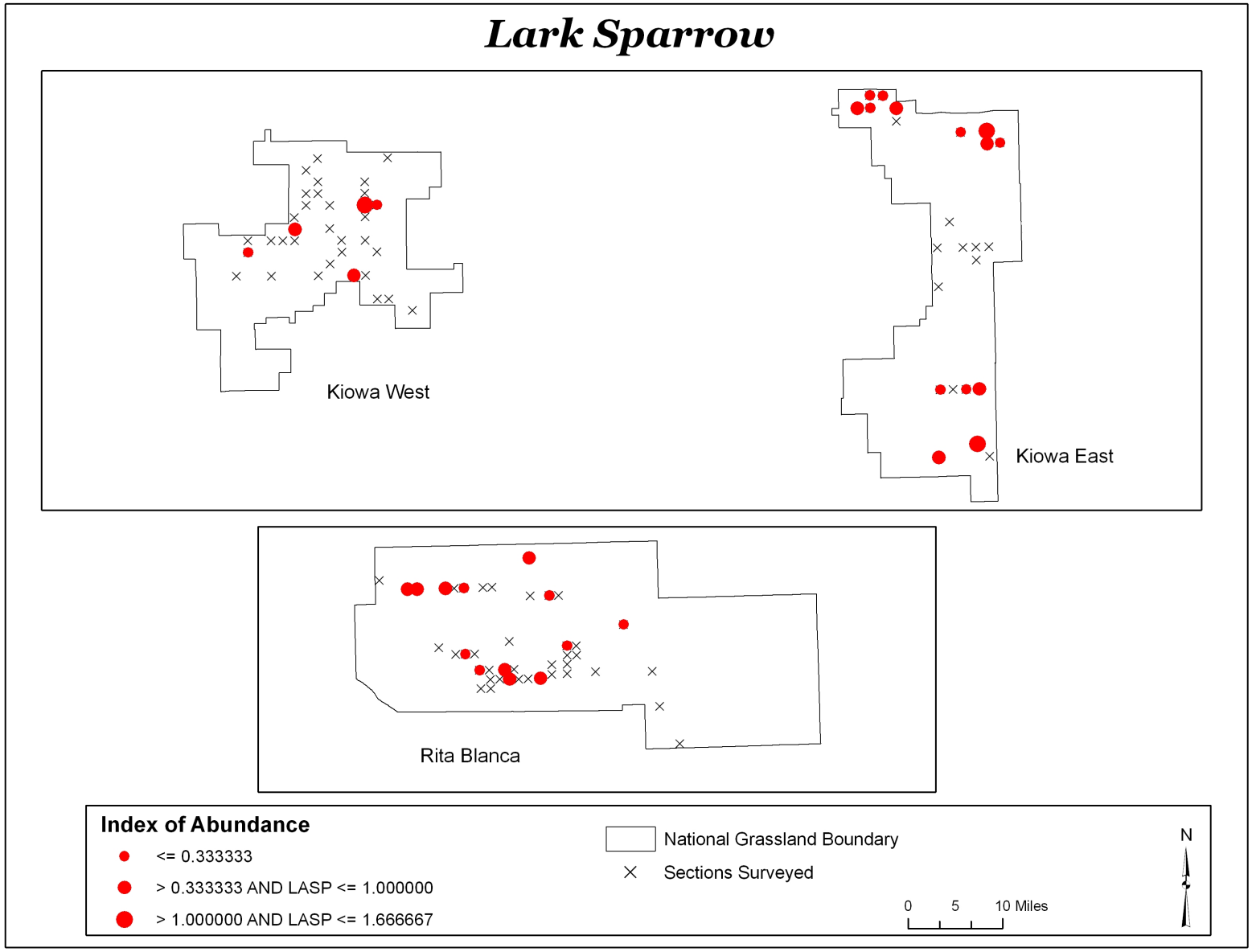

Barn Swallow
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND BARS <= 1.000000
> 1.000000 AND BARS <= 1.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

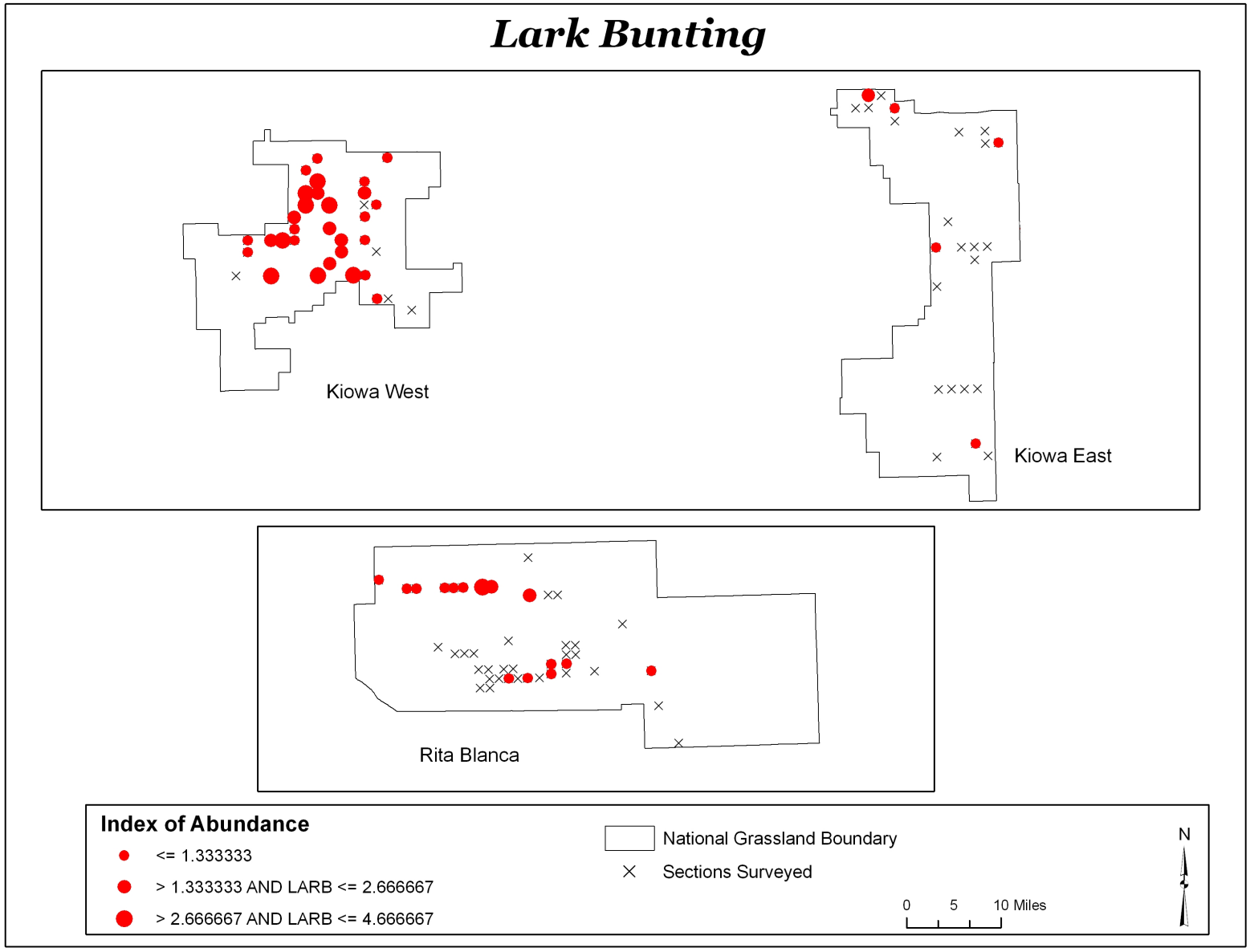
Rock Wren

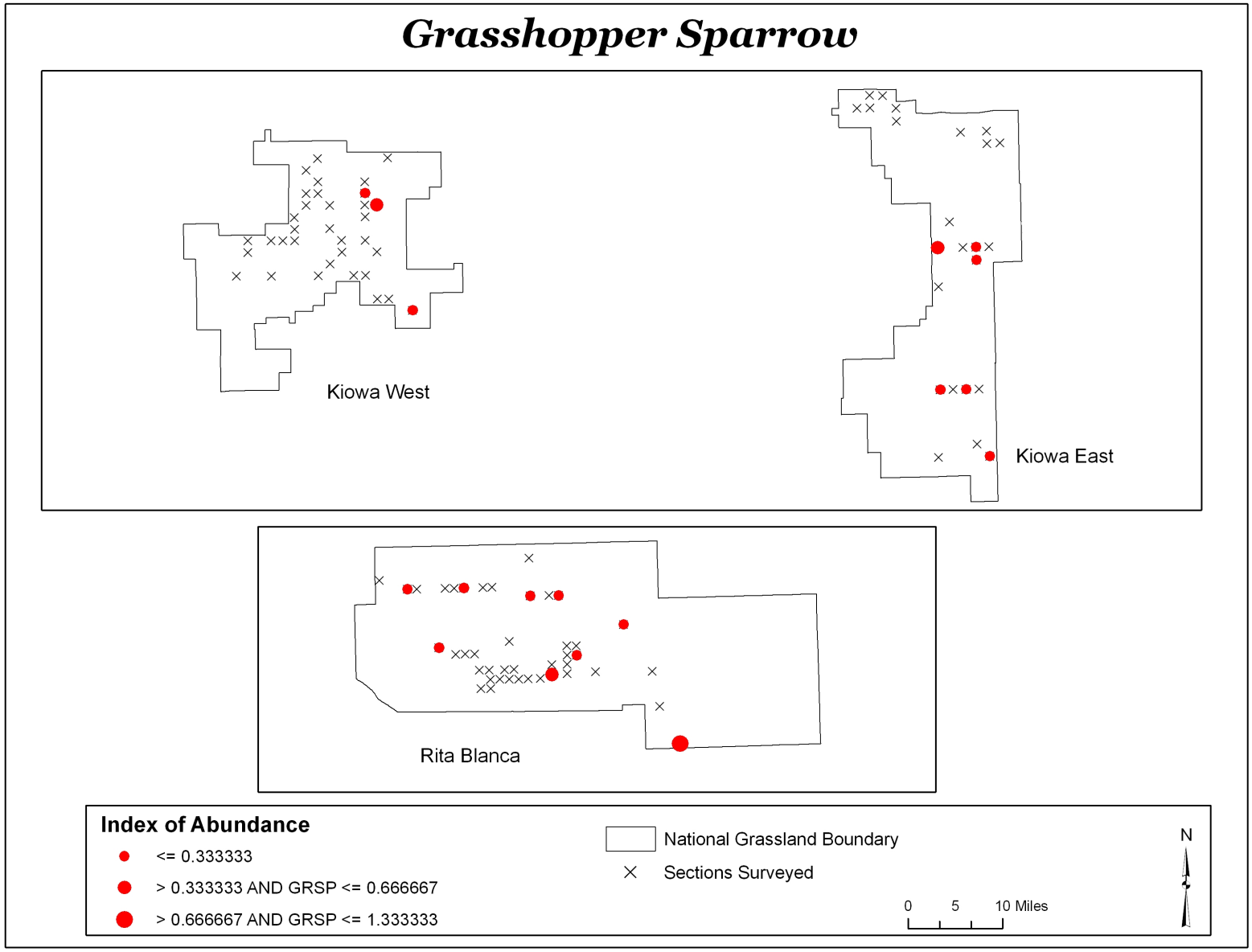

Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

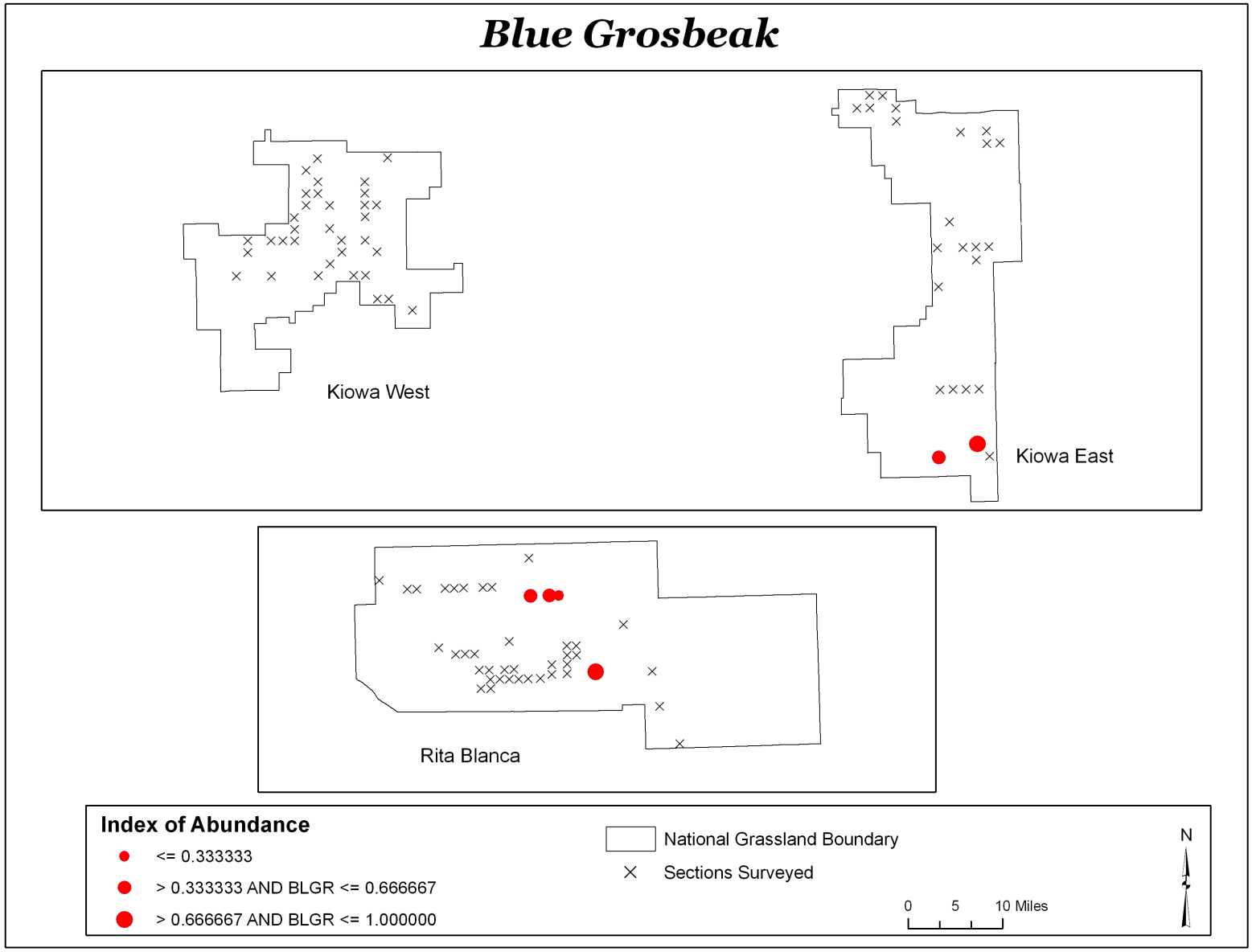

Northern Mockingbird
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
0.333334 - 1.000000
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

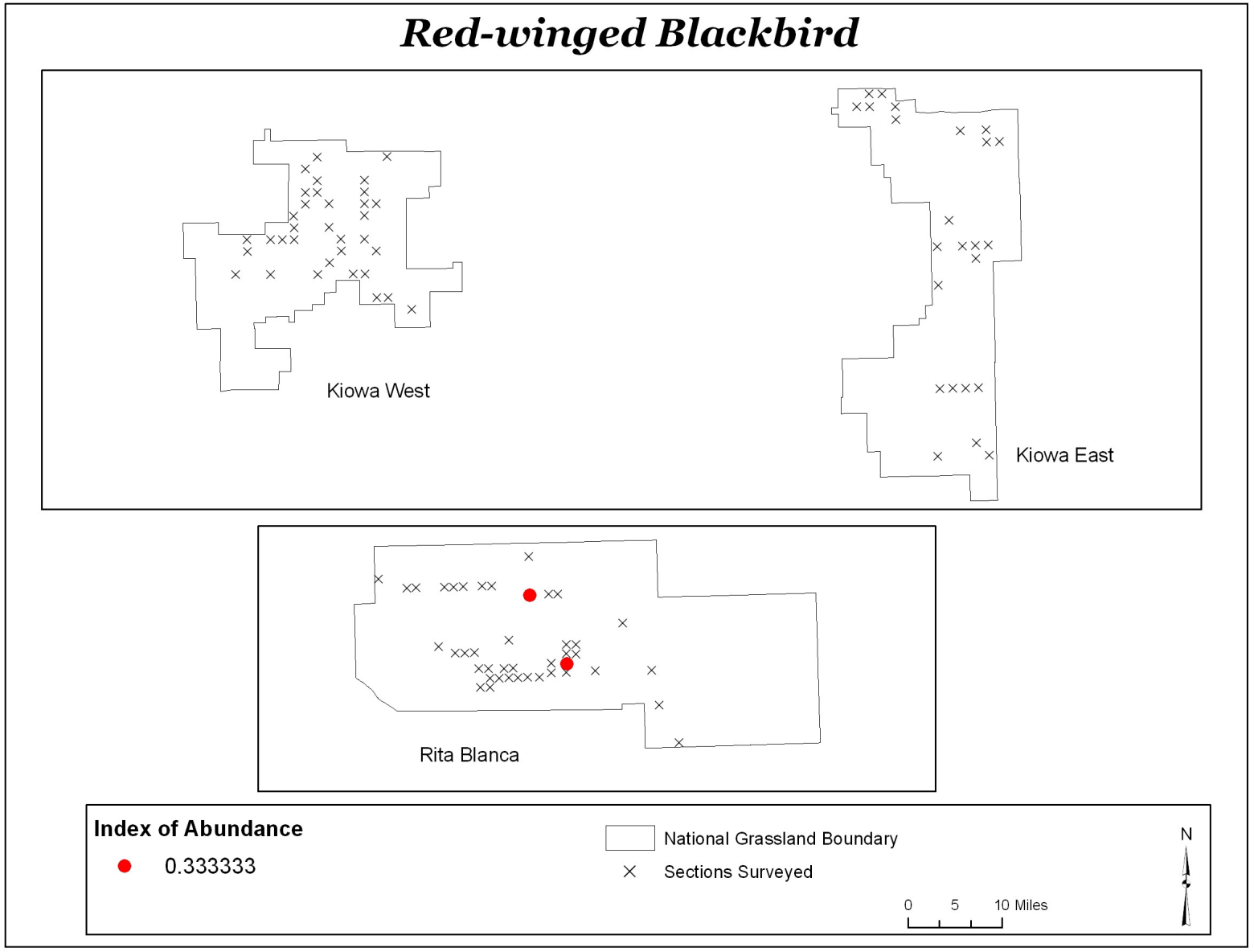

Cassin's Sparrow
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.666667
> 0.666667 AND CASP <= 1.333333
> 1.333333 AND CASP <= 3.000000
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

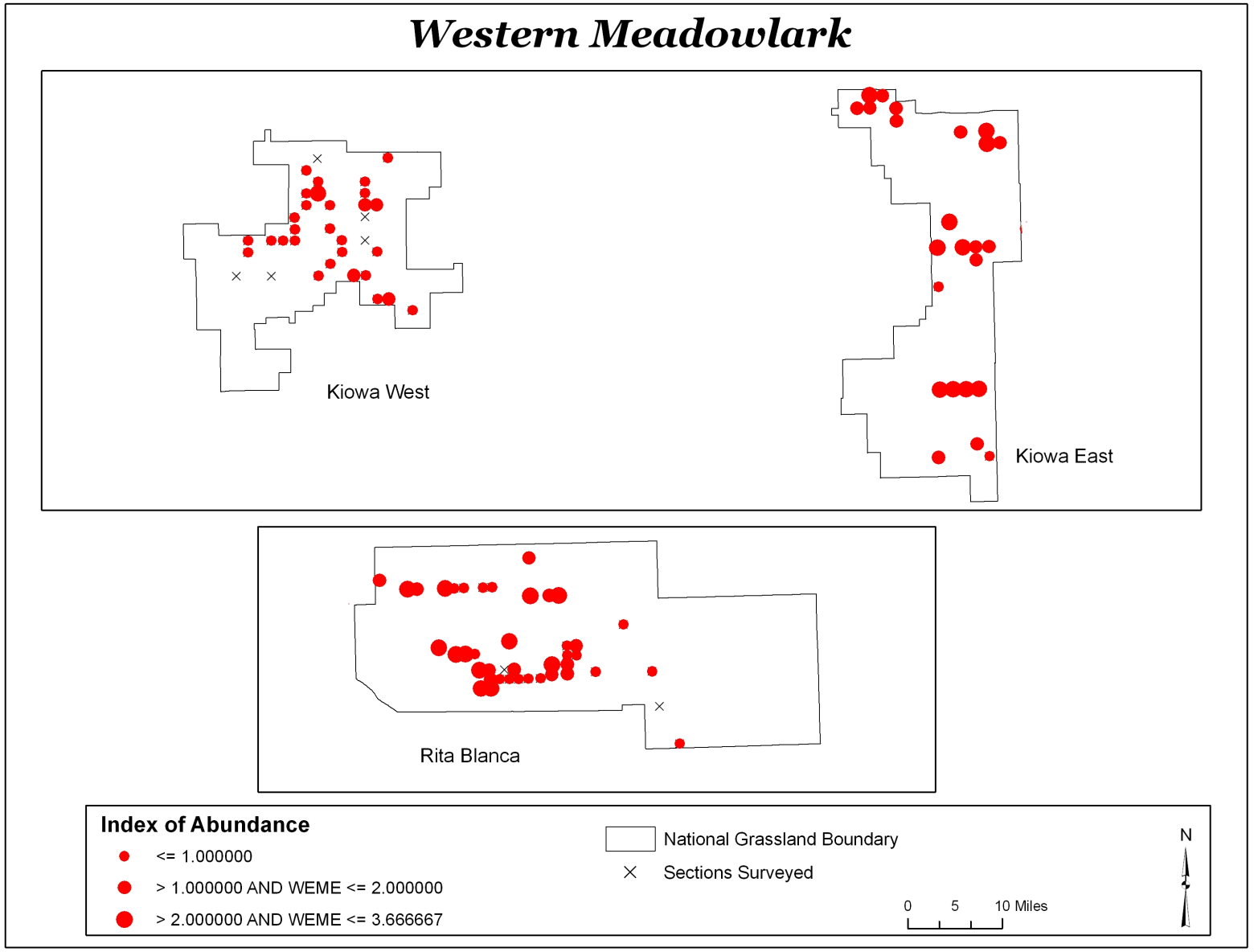

Lark Sparrow
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND LASP <= 1.000000
> 1.000000 AND LASP <= 1.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Lark Bunting
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 1.333333
> 1.333333 AND LARB <= 2.666667
> 2.666667 AND LARB <= 4.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Grasshopper Sparrow
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND GRSP <= 0.666667
> 0.666667 AND GRSP <= 1.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Blue Grosbeak
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 0.333333
> 0.333333 AND BLGR <= 0.666667
> 0.666667 AND BLGR <= 1.000000
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Red-winged Blackbird
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
0.333333
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N


Western Meadowlark
Kiowa West
Kiowa East
Rita Blanca
Index of Abundance
<= 1.000000
> 1.000000 AND WEME <= 2.000000
> 2.000000 AND WEME <= 3.666667
National Grassland Boundary
Sections Surveyed
0 5 10 Miles
N

Brown-headed Cowbird

APPENDIX B

Number of detections in taxonomic order for all species detected on Kiowa and Rita Blanca National Grasslands (15 May – 15 June 2007).

Common Name	Scientific Name	Kiowa	Rita Blanca	Total
Mallard	Anas platyrhynchos	0	1	1
Ring-necked Pheasant	Phasianus colchicus	5	10	15
Northern Bobwhite	Colinus virginianus	1	0	1
Great Blue Heron	Ardea herodias	2	0	2
Turkey Vulture	Cathartes aura	7	0	7
Swainson's Hawk	Buteo swainsoni	21	10	31
Red-tailed Hawk	Buteo jamaicensis	1	0	1
Ferruginous Hawk	Buteo regalis	3	2	5
Golden Eagle	Aquila chrysaetos	1	0	1
American Kestrel	Falco sparverius	1	0	1
Killdeer	Charadrius vociferus	2	2	4
Upland Sandpiper	Bartramia longicauda	0	1	1
Long-billed Curlew	Numenius americanus	9	24	33
White-winged Dove	Zenaida asiatica	0	1	1
Mourning Dove	Zenaida macroura	23	31	54
Burrowing Owl	Athene cunicularia	5	14	19
Common Nighthawk	Chordeiles minor	1	2	3
White-throated Swift	Aeronautes saxatalis	2	0	2
Ash-throated Flycatcher	Myiarchus cinerascens	1	0	1
Cassin's Kingbird	Tyrannus vociferans	1	0	1
Western Kingbird	Tyrannus verticalis	27	28	55
Loggerhead Shrike	Lanius ludovicianus	2	2	4
Chihuahuan Raven	Corvus cryptoleucus	6	2	8
Common Raven	Corvus corax	32	7	39
Horned Lark	Eremophila alpestris	177	57	234
Cliff Swallow	Petrochelidon pyrrhonota	8	1	9
Barn Swallow	Hirundo rustica	19	10	29
Rock Wren	Salpinctes obsoletus	1		1
Northern Mockingbird	Mimus polyglottos	4	4	8
Cassin's Sparrow	Aimophila cassinii	85	40	125
Lark Sparrow	Chondestes grammacus	37	23	60
Lark Bunting	Calamospiza melanocorys	181	56	237
Grasshopper Sparrow	Ammodramus savannarum	11	13	24
Blue Grosbeak	Passerina caerulea	5	8	13
Red-winged Blackbird	Agelaius phoeniceus	0	2	2
Western Meadowlark	Sturnella neglecta	223	190	413
Common Grackle	Quiscalus quiscula	0	2	2

Common Name	Scientific Name	Kiowa	Rita Blanca	Total
Great-tailed Grackle	Quiscalus mexicanus	0	2	2
Brown-headed Cowbird	Molothrus ater	2	5	7
Bullock's Oriole	Icterus bullockii	1	3	4
House Sparrow	Passer domesticus	1	0	1

APPENDIX C.

Species of Continental Importance for Partners In Flight (PIF), Species of Greatest Conservation Need (SGCN) for NM and OK and USFS R2 Sensitive Species.

Common Name	Scientific Name	USFS R2	SGCN	PIF
Northern Bobwhite	Colinus virginianus		X	
Swainson's Hawk	Buteo swainsoni		X	CC,RS
Red-tailed Hawk	Buteo jamaicensis			
Ferruginous Hawk	Buteo regalis	X	X	RC,RS
Golden Eagle	Aquila chrysaetos		X	
Upland Sandpiper	Bartramia longicauda		X	
Long-billed Curlew	Numenius americanus		X	
Mourning Dove	Zenaida macroura		X	
Burrowing Owl	Athene cunicularia	X		RC,RS
Common Nighthawk	Chordeiles minor			RC
White-throated Swift	Aeronautes saxatalis			CC
Loggerhead Shrike	Lanius ludovicianus		X	RC
Chihuahuan Raven	Corvus cryptoleucus			RS
Cassin's Sparrow	Aimophila cassinii	X	X	RC,RS
Lark Sparrow	Chondestes grammacus			RC
Lark Bunting	Calamospiza melanocorys			RC,RS
Grasshopper Sparrow	Ammodramus savannarum		X	RC,RS
Western Meadowlark	Sturnella neglecta			RS

CC = Continental Concern, RS = Regional Stewardship Species, RC= Regional Concern.