PRAIRIE CHICKEN LEK SURVEY - 2011

PERFORMANCE REPORT
STATEWIDE WILDLIFE RESEARCH AND SURVEYS

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INTRODUCTION

The spring prairie chicken lek survey was first initiated in Kansas in 1963 with the creation of 9 survey routes within the range of the greater prairie-chicken (GPCH). Lesser prairie-chickens (LPCH) were first surveyed in 1967 when 3 survey routes were created in southwestern Kansas. These initial routes were not adequately distributed across the current occupied range of either species. Over the years, the Kansas Department of Wildlife and Parks (KDWP) rectified that problem by adding several new survey routes. The KDWP now annually surveys 48 routes spread across the state including 32 within the range of the GPCH, 14 within the range of the LPCH, and 2 within the area where the two species ranges overlap (Table 1, Figure 1). The survey area associated with these routes covers 637.7 $mi.^2$ within Kansas' GPCH range, 242.3 $mi.^2$ within Kansas' LPCH range, and 38.8 $mi.^2$ within the area where occupied ranges of the two species overlap.

METHODS

Observers traverse each survey route twice between March 20 and April 20 stopping at approximately 1-mile intervals and listening for booming prairie chickens for 3 minutes (Figure 2). After all of the listening stops have been completed the observers backtrack along the route and flush all the lek sites that they identified up through 90 minutes after sunrise. Observers record the geographic coordinates of each lek they locate and the total number of birds flushed from each site (Figure 3). Observers are instructed to get two flush counts from each lek they identify within their standard survey area which includes all habitats within 1 mile of the survey route. To get all the required flush counts, it often takes additional efforts beyond the two mornings when the listening stops are completed.

Flush counts collected from within each survey area were used to develop density indices for each route. The maximum counts for all leks within each survey area were summed and multiplied by two to represent the total number of birds in the survey area. Those figures were divided by the number of square miles surveyed along each route to produce an estimate of the total number of birds per square mile. This method of estimating density assumes 1.) only males are counted, 2.) all males attend leks, 3.) the sex ratio is equal, and 4.) all leks within the survey area are detected. It is likely that some of these assumptions are being violated and as a result the density estimates are probably biased (most likely low). It is assumed that the direction and degree of bias is fairly consistent across years and that the indices correlate with real changes in population abundance. However, there is no measure of variability associated with the route-specific indices so statistical tests cannot be used to determine if annual changes are significant at that scale.

Data collected along all routes surveyed in consecutive years by the same observer were also used to estimate changes in abundance within each management region as well as species-specific changes in abundance across the entire state. Density estimates for all routes within each small game region (Figure 1) were weighted by the survey area associated with each route and averaged to produce regional indices. The KDWP is transitioning toward a unified set of management regions for all small game species and these regions differ from those that have been used in past years to summarize prairie chicken survey results. The statewide species-specific indices were developed using a similar weighted average procedure and were developed from density estimates derived for all routes located within the estimated occupied range (EOR) of each species. Two routes fall within the area where the GPCH and LPCH ranges overlap and data from those routes were incorporated into the density estimates for each species. Statistical tests can be used to identify significant annual changes at the regional level because there is cross-route variability in density indices. A paired t-test that assumes equal variance was used to identify significant annual changes within each region and across the entire range of each species (Ott 1993). Indices were considered to differ significantly when $P<0.05$.

Long-term trends were developed for each small game management region. Annual indices used to develop each trend were only calculated for years in which density indices were available for all of the selected routes. This was done to ensure that the trend was based on indices developed for identical survey areas. The time period for which a trend can be developed differs across regions due to data availability. A statewide LPCH trend can only be developed from 2004 to present due to a poor

distribution of survey effort across the EOR prior to that time. A statewide trend for GPCH cannot be developed because prior to 2011 there was no survey effort anywhere within the central and western portions of the Smoky Hills physiographic region which accounts for a large portion of the EOR of the GPCH in Kansas. Linear regression was used to determine if the slope of each fitted trend line differed from zero (Ott 1993).

The estimated density within only occupied habitats was calculated for LPCH by dividing the route-specific indices by the proportion of each survey area classified as having a probability of lek occurrence ≥0.3 (Jarnevich and Laubhan 2011). This threshold encompasses >80% of the LPCH lek sites that have been known to be active in the state since 2005. Density within occupied habitats was only estimated for LPCH because suitable GPCH habitat has not been quantified across the entire state.

RESULTS

All 48 survey routes were completed during spring 2011 but lek counts were incomplete along 2 routes. During the 2011 survey, observers flushed 234 birds from 20 leks along the 12 routes (220.8 mi.^{2}) that were completed within LPCH range, 1,458 birds from 102 leks along the 32 routes (637.8 mi.^{2}) that were completed within GPCH range, and 240 birds from 18 leks along the 2 routes (38.8 mi.^{2}) that were completed within the area where the two species ranges overlap.

Statewide LPCH Indices and Trend

The statewide LPCH index was calculated using data from 13 routes that were fairly well distributed across the EOR of the species in Kansas. The weighted density indices (birds/mi.^{2}) across the entire 239.1 mi.^{2} surveyed in both 2010 and 2011 by the same observer were 3.80 and 3.96, respectively (Table 2). The slight increase in the density index was not statistically significant (P>0.05). Thus, the statewide breeding population of LPCH probably did not change much from 2010 to 2011. There is not a significant trend in the statewide LPCH index from 2004 to present at the $\alpha = 0.05$ level (Figure 4).

Statewide GPCH Indices

The statewide GPCH index was calculated using data from 28 routes that were fairly well distributed across the EOR of the species in Kansas. The weighted density indices (birds/mi.^{2}) across the entire 537.3 mi.^{2} surveyed in both 2010 and 2011 by the same observer were 4.57 and 4.71, respectively (Table 2). These density indices did not differ significantly (P>0.05). Thus, the statewide breeding population of GPCH probably did not change much from 2010 to 2011.

Regional Indices and Estimates

The spring 2011 prairie chicken density indices did not differ significantly from the previous year in any region (Table 2). However, substantial apparent changes were observed in the Smoky Hills region (+26.0%) and the Osage Cuestas region (-72.9%). The Osage Cuestas region is solely occupied by GPCH but LPCH do occur along two routes within the Smoky Hills region. Of note, GPCH were only detected along 2 of the 7 routes within the Osage Cuestas region after disappearing from another route this spring.

Linear regression indicates that prairie chicken populations have increased significantly in the Northern High Plains (Both Species) and the South-Central Prairies (LPCH) since 2004 and 1991, respectively (Figure 5). However, both of these trends are based on data from ≤2 survey routes. There is no detectable trend in the prairie chicken population in the Smoky Hills since 1986 but the slope of the trend line is positive. Only GPCH occurred along the 7 routes that were included in the development of the Smoky Hills trend. LPCH do occur in the western portion of the Smoky Hills region but no routes were established in those habitats until 2006 (Table 1). Significant population declines have occurred for GPCH in the Flint Hills region and the Osage Cuestas region since 1978 and 1966, respectively. Additionally, the LPCH population in the Southern High Plains region has also declined significantly since 1988.

Mean lek size during spring 2011 was greatest within the Smoky Hills at 15.6 birds per lek and least in the Osage Cuestas region at 7.1 birds per lek (Table 3). Species-specific estimates were greatest in the

Smoky Hills for GPCH (16.1 birds/lek) and the South-Central Prairies for LPCH (13.6 birds/lek). However, the mean lek size for LPCH was very similar between the South-Central Prairies region and the Smoky Hills region (13.4 birds/lek).

Both species of prairie chicken occur along survey routes located in Gove and Ness Counties. Since 2006, observers in those counties have attempted to quantify the number of GPCH, LPCH, and hybrids on each lek by sight and/or vocalizations. The spring 2011 data indicates that prairie chicken populations along both routes are dominated by LPCH as 86.2% and 96.3% of the counted birds were LPCH within the Gove County and Ness County survey areas, respectively (Table 4). The pooled percentage of GPCH x LPCH hybrids across both routes was 4.2% during spring 2011. Since 2006, the percentage of hybrids pooled across both routes has been <5% each year (Rodgers 2006-2010) and no apparent trend is evident. A hybrid has never been observed along the Ness County route although a few GPCHs are documented along that route almost every year.

LPCH Density Estimates within only Potentially Suitable Habitats

Route-specific densities of LPCH calculated for only potentially suitable habitat indicate that occupied habitats at the northern and eastern portions of the EOR supported much higher densities than elsewhere in the state during 2011 (Table 5). The highest densities of LPCH were estimated for suitable habitats north of the Arkansas River where >18 birds/mi.^{2} were documented. The species was thought to have been extirpated from north of the Arkansas River since the 1960s until the KDWP began documenting lek sites in the area again in the late 1990s and early 2000s. The resurgence of LPCH in this portion of the state is most likely due to the increase in grassland habitat that has occurred in that region over the last 15 years due to increased enrollment in the conservation reserve program (CRP). Enrollment of CRP grasslands in the counties north of the Arkansas River within the current EOR has increased by >1 million acres over the last 15 years.

LITERATURE CITED

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Rodgers, R. D. 2006-2010. Prairie chicken lek survey: annual performance report. Kansas Department of Wildlife and Parks. Pittman-Robertson federal aid in wildlife restoration. Grant W39-R(12-16).

Table 1. Survey routes annually monitored by the Kansas Department of Wildlife and Parks to estimate changes in prairie chicken abundance.

Route	County or Location	Year Established	Species	Management Region	Observer
1	Allen	1963	GPCH[a]	Osage Cuestas	Ben Womelsdorf
2	Anderson	1963	GPCH	Osage Cuestas	Lance Hedges
3	Barber	2000	LPCH[b]	South Central	Ken Brunson
4	Butler	1963	GPCH	Flint Hills	Charlie Cope
5	Chase	1963	GPCH	Flint Hills	Randy Benteman
6	Chautauqua	1983	GPCH	Flint Hills	Darin Porter
7	Clark	1966	LPCH	South Central	Jeff Sutton
8	Clay	1978	GPCH	Flint Hills	Clint Thornton
9	Cloud	1984	GPCH	Smoky Hills	Todd Robinson
10	Coffee	1966	GPCH	Osage Cuestas	Bob Culbertson
11	Comanche	1991	LPCH	South Central	Charlie Swank
12	Cowley	1984	GPCH	Flint Hills	Kurt Grimm
13	Dickinson	1983	GPCH	Flint Hills	Shane Hesting[c]
14	Elk	1982	GPCH	Flint Hills	Dan Melson
15	Ellsworth	1979	GPCH	Smoky Hills	Matt Smith
16	Finney	1964	LPCH	Southern High Plains	Daryl Fisher
17	Ford	1988	LPCH	Southern High Plains	Lowell Aberson
18	Geary	1982	GPCH	Flint Hills	Jesse Gehrt
19	Gove	2004	Both	Northern High Plains	Matt Bain
20	Greenwood	1963	GPCH	Flint Hills	Rick Tush
21	Hamilton	1979	LPCH	Southern High Plains	Randy Rodgers
22	Hodgeman	2001	LPCH	Smoky Hills	Daniel Haneke
23	Kearny	1978	LPCH	Southern High Plains	Chasen Gann[c]
24	Kiowa	2001	LPCH	South Central	Chris Berens
25	Lincoln	1983	GPCH	Smoky Hills	Luke Kramer[c]
26	Lyon	1963	GPCH	Flint Hills	Jim Pitman
27	Marion	1969	GPCH	Flint Hills	Marvin Peterson
28	McPherson	2004	GPCH	Smoky Hills	Steve Adams
29	Meade	1964	LPCH	Southern High Plains	Jon Zuercher
30	Mitchell	1978	GPCH	Smoky Hills	Aaron Deters
31	Montgomery	1982	GPCH	Osage Cuestas	Ed Miller
32	Morris	1963	GPCH	Flint Hills	Lloyd Fox
33	Morton	1964	LPCH	Southern High Plains	Kraig Schultz
34	Ness	2006	Both	Smoky Hills	Aaron Baugh
35	Osage	1963	GPCH	Osage Cuestas	Matt Peek
36	Ottawa	1982	GPCH	Smoky Hills	Pat Riese
37	Phillips	2011	GPCH	Smoky Hills	Marc Gray
38	Pottawatomie	1965	GPCH	Flint Hills	Corey Alderson
39	Pratt Sandhills WA	1980	LPCH	Southern High Plains	Todd Gatton
40	Rooks	2011	GPCH	Smoky Hills	Dave Dahlgren
41	Saline	1982	GPCH	Smoky Hills	Stephanie Manes
42	Sandsage BR	1977	LPCH	Southern High Plains	Tom Norman
43	Sherman - Cheyenne	2011	GPCH	Northern High Plains	Josh Williams
44	Wabaunsee	1963	GPCH	Flint Hills	Brad Rueschhoff
45	Washington	1983	GPCH	Smoky Hills	Brent Clark
46	Wheatland	2007	LPCH	Southern High Plains	Mark Sexson
47	Wilson	1983	GPCH	Osage Cuestas	Josh DeHoux (assisted by B. Funke)
48	Woodson	1964	GPCH	Osage Cuestas	Scott Barlow

[a] GPCH = greater prairie-chicken

[b] LPCH = lesser prairie-chicken

[c] different observer from 2010

Table 2. Density estimates for greater prairie-chickens (GPCH) and lesser prairie-chickens (LPCH) within areas surveyed by the Kansas Department of Wildlife and Parks, 2011.

Region-route	Species	Total Survey Area (mi.^{2})	Unique Leks Observed within Survey Area, 2011	Sum of Max Counts, 2011	2011 Density (birds/mi.^{2})	2010 Density (birds/mi.^{2})	Apparent Change (%) from 2010[a]
Flint Hills							
4 Butler	GPCH	19.9	10	116	11.66	6.9	+69.0%
5 Chase	GPCH	20	2	24	2.40	3.9	-38.5%
6 Chautauqua	GPCH	20.1	0	0	0.00	0	NA[b]
8 Clay	GPCH	18.9	4	50	5.29	6.1	-13.3%
12 Cowley	GPCH	19.9	5	46	4.62	4.6	+0.4%
13 Dickinson	GPCH	19.8	2	25	2.53	NE[c]	NA
14 Elk	GPCH	19.9	0	0	0.00	0	NA
18 Geary	GPCH	20	3	44	4.40	4.8	-8.3%
20 Greenwood	GPCH	19.9	1	6	0.60	0.9	-33.3%
26 Lyon	GPCH	19.6	6	90	9.18	10.2	-10.0%
27 Marion	GPCH	20	4	46	4.60	7	-34.3%
32 Morris	GPCH	20.4	5	52	5.10	4.3	+18.6%
38 Pottowatomie	GPCH	19.9	4	45	4.52	4.3	+5.1%
44 Wabaunsee	GPCH	20	7	96	9.60	14.5	-33.8%
Regionwide (n = 13)[d]	GPCH	258.5	51	615	4.76	5.2	-8.1%
Northern High Plains							
19 Gove	Both	19.6	12	159	16.22	14.5	+11.8%
43 Sherman-Cheyenne	GPCH	19.8	1	11	1.11	NE	NA
Regionwide (n = 1)[d]	Both	19.6	12	159	16.22	14.5	+11.8%
Osage Cuestas							
1 Allen	GPCH	20.1	0	0	0.00	0	NA
2 Anderson	GPCH	20.2	2	17	1.68	3.1	-45.8%
10 Coffee	GPCH	20.1	0	0	0.00	0.3	-100.0%
31 Montgomery	GPCH	20	0	0	0.00	0	NA

Table 2. continued…

Region-route	Species	Total Survey Area (mi.^{2})	Unique Leks Observed within Survey Area, 2011	Sum of Max Counts, 2011	2011 Density (birds/mi.^{2})	2010 Density (birds/mi.^{2})	Apparent Change (%) from 2010[a]
35 Osage	GPCH	19.8	2	13	1.30	1.5	-13.3%
47 Wilson	GPCH	20.1	0	0	0.00	0	NA
48 Woodson	GPCH	20.1	0	0	0.00	0	NA
Regionwide (*n* = 7)[d]	GPCH	140.4	4	30	0.43	0.7	-38.6%
Smoky Hills							
9 Cloud	GPCH	20.1	6	88	8.76	3.6	+143.6%
15 Ellsworth	GPCH	20.1	2	42	4.18	NE	NA
22 Hodgeman	LPCH	20	6	53[e]	NE	NE	NA
25 Lincoln	GPCH	19.7	5	90	9.14	NE	NA
28 McPherson	GPCH	20.1	5	55	5.47	6.4	-14.5%
30 Mitchell	GPCH	19.2	3	84	8.75	6.3	+38.9%
34 Ness	Both	19.2	6	81	8.44	5.5	+53.5%
36 Ottawa	GPCH	20	5	85	8.50	7.9	+7.6%
37 Phillips	GPCH	20	4	85	8.50	NE	NA
40 Rooks	GPCH	19.8	5	121	12.22	NE	NA
41 Saline	GPCH	20.2	4	67	6.63	6.6	+0.5%
45 Washington	GPCH	20.1	5	60	5.97	5.3	+12.6%
Regionwide (*n* = 7)[d]	Both[f]	138.9	34	520	7.49	5.9	+26.0%
South Central Prairies							
3 Barber	LPCH	18.7	0	0	0.00	0	NA
7 Clark	LPCH	20	2	28	2.80	3.2	-12.5%
11 Comanche	LPCH	19.8	1	36	3.64	6.5	-44.0%
24 Kiowa	LPCH	19.8	4	36	3.64	2.6	+40.0%
Regionwide (*n* = 4)[d]	LPCH	78.3	7	100	2.55	3.12	-18.2%
Southern High Plains							
16 Finney	LPCH	18.4	2	24	2.61	1.6	+63.1%

Table 2. continued…

Region-route	Species	Total Survey Area (mi.^{2})	Unique Leks Observed within Survey Area, 2011	Sum of Max Counts, 2011	2011 Density (birds/mi.^{2})	2010 Density (birds/mi.^{2})	Apparent Change (%) from 2010[a]
17 Ford	LPCH	21.5	1	ND[g]	NE[c]	0.0	NA
21 Hamilton	LPCH	19.8	3	31	3.13	4.6	-32.0%
23 Kearny	LPCH	20.5	0	0	0.00	0	NA
29 Meade	LPCH	19.5	6	45	4.62	4.4	+5.0%
33 Morton	LPCH	19.8	1	22	2.22	3.2	-30.6%
39 Pratt Sandhills WA	LPCH	13.4	0	0	0.00	0	NA
42 Sandsage Bison Refuge	LPCH	5.5	0	0	0.00	0	NA
46 Wheatland Restoration	LPCH	25.6	1	12	0.94	0.23	+308.7%
Regionwide (n = 8)[d]	LPCH	143.5	14	134	1.87	2.06	-9.1%
All GPCH Routes (n = 27)[h]	GPCH	537.3	96	1264	4.71	4.57	+2.6%
All LPCH Routes (n = 13)[h]	LPCH	239.1	38	474	3.96	3.80	+4.2%

[a] Statistical significance can only be assessed for the region-wide and range-wide estimates because there is no measure of variance associated with the estimates for individual routes. Region-wide and range-wide indices that are significantly different (P < 0.05) are denoted with an asterisk.
[b] NA = not applicable.
[c] NE = no estimate due to incomplete lek counts or no survey effort
[d] Estimates are pooled across all routes that were surveyed in 2010 and 2011 by the same observer and weighted by survey area.
[e] Only 4 of the 6 leks were flushed.
[f] Primarily GPCH but LPCH are present along two routes.
[g] The one lek heard during the survey was not flushed so no counts were available.
[h] Data were pooled across all routes within the estimated occupied range of each species surveyed by the same observer in both 2010 and 2011. Data from the Ness County and Gove County routes were included in both the LPCH and GPCH range-wide estimates because both species are present within those survey areas.

Table 3. Mean size of leks occupied by greater prairie-chickens (GPCH), lesser prairie-chickens (LPCH), and both species (Mixed) within each of Kansas' small game management regions.

Region	n	GPCH (95% CI)	n	LPCH (95% CI)	n	Mixed (95% CI)	n	All Leks (95% CI)
Flint Hills	53	10.6 (7.9 – 13.3)	--	--	--	--	53	10. 6 (7.9 – 13.3)
Northern High Plains	3	5.7 (0.5 – 10.9)	4	10.5 (9.0 – 12.0)	6	15.8 (12. 0 – 17.3)	13	12.5 (11.4 – 13.6)
Osage Cuestas	4	7.1 (2.8 – 11.4)	--	--	--	--	4	7.1 (2.8 – 11.4)
Smoky Hills	44	16.1 (13.2 – 19.1)	10	13.4 (12.6 – 14.1)	2	11.3 (9.8 – 12.7)	56	15.6 (13.0 – 18.1)
South Central Prairies	--	--	7	13.6 (12.4 – 14.9)	--	--	7	13.6 (12.4 – 14.9)
Southern High Plains	--	--	14	9.5 (8.0 – 11.1)	--	--	14	9.5 (8.0 – 11.1)

Table 4. Estimated number of greater prairie-chickens (GPCH), lesser prairie-chickens (LPCH), and hybrids on all leks counted within the Gove and Ness County survey areas where the two species' ranges overlap, 2011. The species-specific estimates from the day when the maximum total count occurred were used for these calculations.

Species	Gove County (*n* = 12)	Ness County (*n* = 6)	Both Routes (*n* = 18)
LPCH	137 (86.2%)	78 (96.3%)	215 (89.6%)
GPCH	12 (7.6%)	3 (3.7%)	15 (6.3%)
Hybrid	10 (6.3%)	0 (0.0%)	10 (4.2%)

Table 5. Estimated density of lesser prairie-chickens in potentially suitable habitat within each survey area.

Routes within LPCH Range	Species	Route Density (birds/mi.^{2})	Proportion of Survey Area Classified as Suitable Habitat[a]	Density (birds/mi.^{2}) within Suitable Habitat
19 Gove	Both	16.22	0.89	18.22
22 Hodgeman	LPCH	NE[b]	0.35	NE
34 Ness	Both	8.44	0.45	18.76
3 Barber	LPCH	0.00	0.05	0.00
7 Clark	LPCH	2.8	0.67	4.18
11 Comanche	LPCH	3.64	0.56	6.50
24 Kiowa	LPCH	3.64	0.34	10.71
16 Finney	LPCH	2.61	0.50	5.22
17 Ford	LPCH	NE	0.09	NE
21 Hamilton	LPCH	3.13	0.76	4.12
23 Kearny	LPCH	0.0	0.16	0.00
29 Meade	LPCH	4.62	0.87	5.31
33 Morton	LPCH	2.22	0.89	2.49
39 Pratt Sandhills WA	LPCH	0.00	0.38	0.00
42 Sandsage Bison Refuge	LPCH	0.0	0.63	0.00
46 Wheatland Restoration	LPCH	0.94	0.15	6.27

[a] Identified as areas with a probability of lek occurrence ≥0.3 (Laubhan and Jarnevich 2010).
[b] NE = no estimate

Figure 1. Survey areas for greater prairie-chickens (GPCH) and lesser prairie-chickens (LPCH) monitored annually by the Kansas Department of Wildlife and Parks. The map also depicts the estimated occupied ranges of each species and Kansas' seven small game management regions.

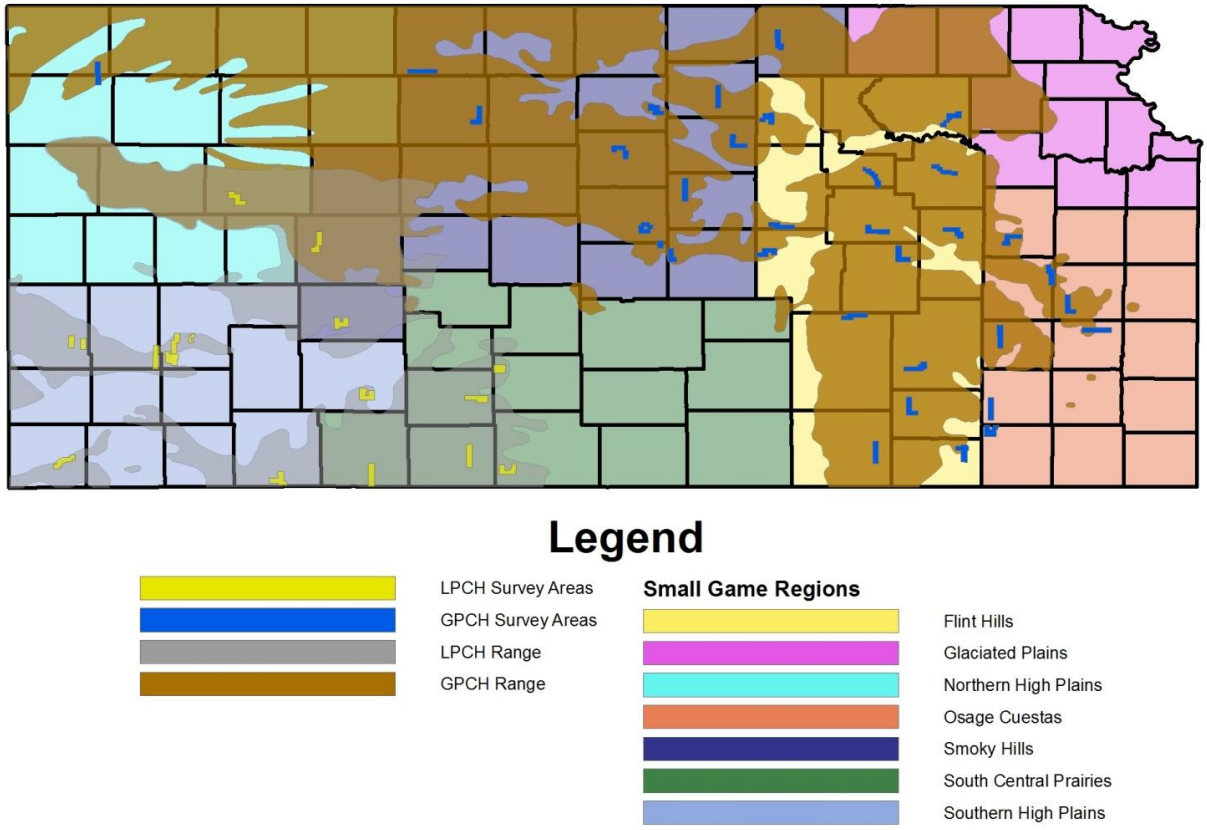

Figure 2. Instructions for conducting one of the annual prairie chicken surveys in Kansas.

1. ***The survey period is March 20th to April 20th***. *Don't put the survey off as the weather may not cooperate later. New observers should familiarize themselves with the starting point, road or trail conditions, and listening stations of their assigned route by driving the route prior to the survey.*

2. *You have been provided with a route map which indicates the location of the listening stops and the one mile buffer along the route that defines the survey area.*

3. *Record the route number and county, date, starting and ending times, time of sunrise, and weather conditions on the survey form.* ***Begin the listening segment 40 minutes before sunrise*** *at station 0 and continue through station 10.*

4. *The full listening survey should not be conducted if it's raining, foggy, or if sustained winds are >12 mph. A few brief gusts exceeding 12 mph are OK, but listening conditions must not be significantly impaired.*

5. *At each station, shut off the engine, get out of the vehicle, and move > 5 yards away.* ***Stand quietly and listen for 3 minutes***.

6. ***Assign each lek that you hear along your route with a unique identifier*** *and record the general proximity on the data sheet. Every lek that you hear should be recorded including those leks that you do not have time to physically locate on the date of the survey.*

7. *Immediately upon completing all the listening stations begin backtracking along your route and locating the leks that you heard within your survey area. When a lek is located, flush the birds from the site, get a count, and record that number onto your data sheet.* ***A lek is defined as 3 or more chickens on a display site***.

8. ***Use your GPS units to collect the location of each lek in decimal degrees using the World Geodetic System 1984 (WGS84) as the datum*** *and record the coordinates onto the data sheet.*

9. *If a lek is found to be >1 mi.from the route the observation should be removed from the primary data table and recorded with the opportunistic observations in the second data table.*

10. ***Do not conduct flush counts later than 90 minutes after sunrise***. *Depending on the number of active leks within your survey area, it may take additional mornings beyond the two required listening surveys to get all the needed flush counts.*

11. ***If possible, flush and count all leks within your survey area twice***. ***Your data can not be used to estimate population trends if you do not get at least one flush count from every lek sometime during the survey period***. *It is acceptable to obtain flush counts on known lek locations when winds are >12 mph but it is not acceptable to run the full route under those conditions (see point 4).*

12. ***Complete 2 full listening runs*** *along each route.*

Figure 3. Data sheet used to collect survey data.

KDWPT PRAIRIE CHICKEN LEK SURVEY DATA SHEET

Route Number: _____ County:_____ Observer:_____

Survey Attempt (1, 2, or 'additional effort'):_____ Date:_____

	Time	Cloud Cover (%)	Temperature (F°)	Wind Speed (mph)
Start				
End				

LEK OBSERVATIONS WITHIN 1 MILE OF ROUTE (area delineated on route maps)

1) **Record all leks that you hear within the survey area during the two complete survey runs even if those leks are not flushed.** This is not required for any additional survey efforts after the two full runs have been completed (i.e. if you are only getting flush counts).
2) Two flush counts are requested for every lek detected within the survey area. **Your data can not be used to estimate population trends unless every lek within the survey area is flushed at least once.**

Unique Identifier (A, B, etc.) Note: code each unique lek with the same identifier on every data sheet	General Location (i.e. ¼ mi. NE of stop 0)	Species (GPCH, LPCH, or Mixed)	Latitude (97.37390°) Note: use decimal degrees and datum WGS84	Longitude (-101.83489°) Note: use decimal degrees and datum WGS84	Flush Count	Comments Note: If the lek is mixed please try to provide the number of each species in the comments (or an approximation)

OPPORTUNISTIC LEK OBSERVATIONS OUTSIDE SURVEY AREA (>1 mi. from route)

Unique Identifier	General Location (proximity to intersection or PLSS)	Species	Latitude (97.37390°)	Longitude (-101.83489°)	Flush Count	Comments

Observations from table 1 should be entered online at http://www.surveymonkey.com/s/KDWPTleksurvey.
Observations from table 2 should be entered online at https://www.surveymonkey.com/s/chickenleks.

Were observation entered into the online databases? Yes ○ No ◉

Mail completed form to Jim Pitman, KDWPT, PO Box 1525, Emporia, KS 66801 or send via e-mail to jim.pitman@ksoutdoors.com.

Figure 4. The estimated trend in lesser prairie-chicken abundance (birds/mi.^{2}) within Kansas' occupied range, 2004-2009. Survey effort was not well distributed throughout the current occupied range of the species prior to 2004. The full complement of routes was not surveyed in 2010 and 2011 so comparable range-wide density indices could not be developed for those years.

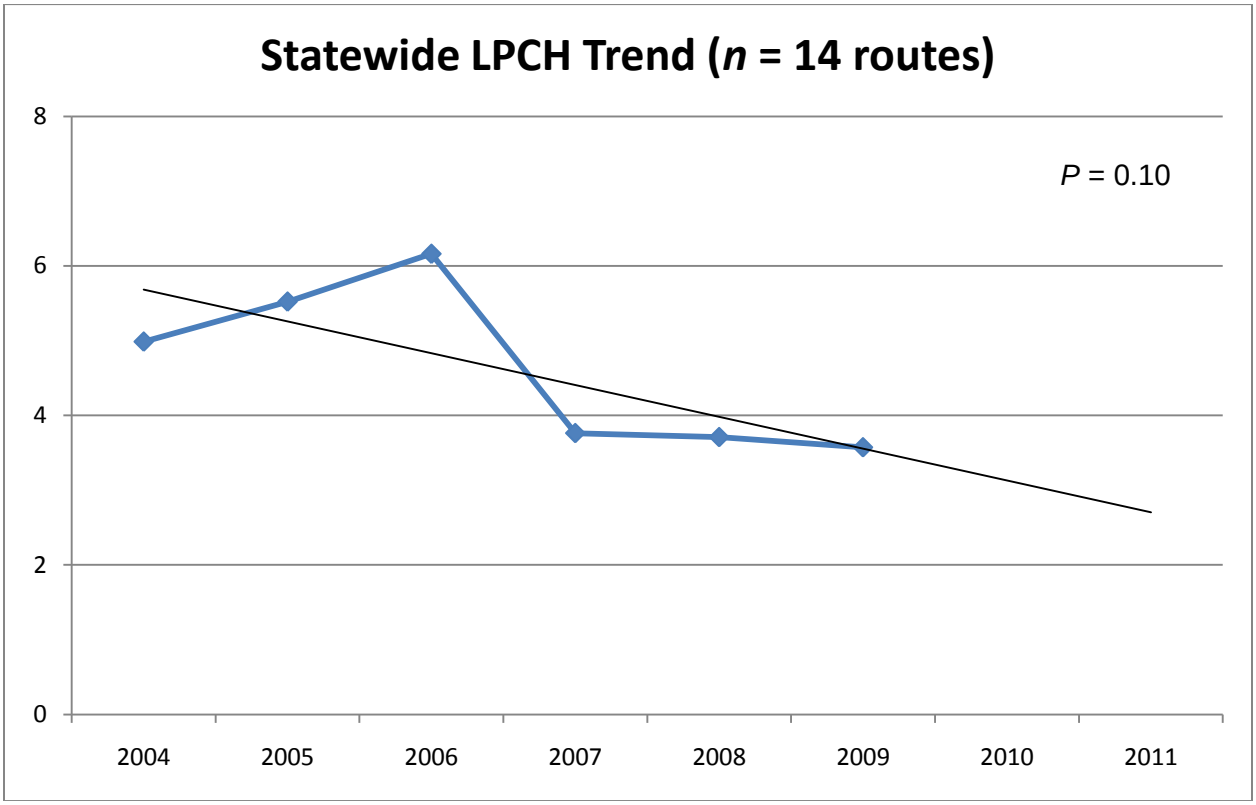

Figure 5. Estimated prairie chicken trends within each of Kansas' small game management regions. The prairie chicken specie(s) and the number of routes summarized by each trend are indicated on each graph. Annual regional indices (birds/ mi. ^{2}) were weighted by the survey area along each route and only calculated when all of the selected routes were surveyed. Note that the years differ along the x-axis of each graph.