

Rural Mail Carrier Survey Report

2006

**A Contribution of Pittman-Robertson Funds
Federal Aid in Wildlife Restoration**

Grant W-39-R

Kansas Department of Wildlife and Parks

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January 2007



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INTRODUCTION AND METHODS

The rural mail carrier survey (RMCS) was initiated in Kansas in 1962. In that first year, mail carriers were asked to record their observations of wildlife along their normal daily routes for 5 consecutive days during the third week of July (Summer). The following year the mail carriers were also asked to record observations during the 3rd weeks of January (Winter) and April (Spring). In 1966, a fourth survey period was added during the 2nd week of October (Fall). Since 1966, volunteer mail carriers from across the state have made observations during each of those 4 survey periods. In addition to recording wildlife observations the mail carriers also report their total mileage for each week surveyed and the primary county they traveled. The list of recorded wildlife species differs during each survey period. The species recorded during the summer RMCS included ring-necked pheasants (cocks, hens, young, and uncertain), northern bobwhites (adults, young, and uncertain), wild turkeys (adult and young), prairie chickens, and eastern cottontails. The species recorded during the spring and winter surveys were identical and included: ring-necked pheasants (cocks, hens, and uncertain), northern bobwhites, prairie chickens, eastern cottontails, jack rabbits, and wild turkeys. During the fall survey period, mail carriers recorded the total number of ring-necked pheasants, northern bobwhites, prairie chickens, eastern cottontails, jack rabbits, wild turkeys, and tree squirrels (fox and gray squirrels).

The collected information was used to develop standardized statewide and regional indices for each species. The index for each species was calculated as the average number of individuals observed for each 100 miles traveled. Data from the spring, summer, and winter surveys were used to develop sex ratios (Male:Female) for ring-necked pheasants. Additionally, the information collected during the summer survey period was used to develop production indices for ring-necked pheasants (Young:Hen), northern bobwhites (Young:Adult), and wild turkeys (Young:Adult). Regional calculations were made for each of these indices using species-specific regions (Figure 1). A t-test was used to draw annual comparisons between indices. A linear regression was used to model the previous 10-year trends in abundance.

RESULTS AND DISCUSSION

Generally, spring indices increased from the previous year on a statewide scale indicating that most small game species made it through the mild winter of 2005-2006 in good shape (Table 1). Only the statewide spring index to wild turkey abundance had declined from the previous year. The decline in spring turkey abundance could be attributed to the poor production turkeys experienced during 2005 on a statewide scale (Figures 6). The hot dry conditions experienced during the summer of 2006 had a negative impact on statewide ring-necked pheasant productivity (Figure 2). Unlike pheasants, productivity of northern bobwhites and wild turkeys was not negatively affected by the abnormally hot and dry conditions (Figures 3-6). Differences in nesting chronology and nesting habitat between turkeys, bobwhites, and pheasants are the reasons productivity was not similarly affected amongst the 3 species.

Woodland-dependant species like turkeys and squirrels have increased significantly over the last 10 year period on a statewide scale (Table 1). This is undoubtedly due to the fact that the amount of woodland habitat across the state has also increased over the same time period. Statistically significant 10-year trends are not detectable on a statewide scale for most early successional grassland species such as pheasants, bobwhites, prairie chickens, cottontails, and jackrabbits (Table 1). However, not all season-specific indices are stable for each of these species. These conflicting trends make interpretation somewhat difficult and results from other departmental surveys are also needed to fully understand changes in abundance of these species over time.

Ring-necked pheasants – The RMCS spring index indicated that pheasants made it through the winter of 2005-2006 in good shape in their primary range (Table 2). However, none of the annual changes was statistically different from the previous year. The mail carriers also reported seeing more cocks than hens during each of the winter, spring, and summer survey periods (Figure 7). Thus, there were plenty of roosters still available for breeding following the fall 2005-2006 hunting season. Unfortunately, hot and dry conditions prevailed across much of Kansas during the summer 2006 nesting season. Those hot and dry conditions resulted in poor cover for nesting. The weather conditions also lead to an early wheat harvest which is detrimental to pheasants because many of them nest in green wheat fields. As a result, production was well below average in every region except the northeast which wasn't hit as hard by the drought (Figure 2). The pheasant population appears to be fairly stable in most regions of the state over the last 10-year period (Table 2).

Northern bobwhites – None of the annual changes to the spring index was statistically significant but the apparent changes generally indicated that Kansas bobwhites came through last winter in great shape in every region except the southeast (Table 3). The drought didn't effect bobwhite production as much as pheasants because of differences in nesting chronology and habitat. Bobwhites nest a little later than pheasants and they don't use green wheat as extensively for nesting. Thus, they were not severely hurt by the early wheat harvest in 2006. In fact, production was substantially better than the previous year on a statewide scale and well above average in the Southeast and Northcentral regions (Figures 3 & 5). Only in those regions most severely stricken with drought (West and Southcentral) did bobwhite production decrease from the previous year (Figure 3). The 10-year trends show either stable or declining bobwhite populations in each of the state's 6 bobwhite management regions (Table 3).

Prairie chickens – The mail carriers generally see few prairie chickens during the 4 observation periods. Thus, the reliability of this survey for detecting annual or long-term changes in prairie chicken abundance on a regional scale is probably poor. However, the 10-year RMCS trends indicate that prairie chicken abundance is generally stable within each of the prairie chicken management regions (Table 4). To better understand changes in prairie chicken abundance it is necessary to use results from this survey along with results from other annual departmental surveys (e.g. annual prairie chicken lek survey).

Wild turkeys – Wild turkey spring breeding numbers were statistically unchanged from the previous year in every region of the state (Table 5). However, apparent declines were observed in the northeast, southeast, and southcentral regions. These declines are likely due to the extremely poor production that was observed in these regions during the 2005 breeding season (Figure 4). Production during 2006 was up substantially from the previous year on a statewide scale (Figure 6) and within 4 of 6 management regions (Figure 4). Wild turkey production was worse than in 2005 only in the 2 westernmost regions most affected by the drought. Over the last 10-year period the RMCS generally shows an increase in turkey abundance in most regions of the state (Table 5). However, in recent years the turkey population in the eastern half of the state has started to stabilize.

Rabbits – Both eastern cottontail and black-tailed jackrabbit populations appear to be fairly stable over the last 10-year period on a statewide scale and within each of their management regions (Tables 1, 6, & 7). Apparent annual declines in the fall indices in the central and western management regions suggest that rabbit production was also hurt by the ongoing drought.

Squirrels – The mail carriers only count squirrels during the fall survey period. The only annual change in squirrel abundance that was statistically significant occurred in the southeast region where abundance increased substantially from 2005 (Table 8). Over the last 10-year period squirrel abundance has increased significantly in every part of the state except far western Kansas. This is undoubtedly due to the increase in woody habitat that has occurred over the same time period in eastern Kansas.

Table 1. Statewide seasonal indices (birds/100 mi. traveled) to small game and wild turkey abundance in Kansas from the rural mail carrier survey, 2005-2006.

Species-Season ^a	n ^b	2005	n	2006	Annual Change (%)	10-year trend ^c
Ring-necked pheasant						
Winter	97	2.07	100	1.24	-40.1%	Stable
Spring	103	1.92	99	2.44	+27.1%	Stable
Summer	99	2.56	100	2.00	-21.9%	Stable
Fall	102	1.88	97	1.54	-18.1%	Stable
Northern bobwhite						
Winter	97	0.85	100	0.52	-38.8%*	Stable
Spring	104	0.21	99	0.40	+90.5%	Stable
Summer	99	1.37	100	1.17	-14.6%	Stable
Fall	102	0.50	97	0.62	+24.0%	Declining
Prairie chicken^d						
Winter	97	0.94	100	0.22	-76.6%*	Stable
Spring	104	0.11	99	0.11	0.0%	Stable
Summer	99	0.06	100	0.03	-50.0%	Stable
Fall	102	0.05	97	0.08	+60.0%	Stable
Wild turkey						
Winter	97	10.09	100	4.67	-53.7%*	Increasing
Spring	103	4.16	99	3.41	-18.0%*	Increasing
Summer	99	2.28	100	2.07	-9.2%	Increasing
Fall	102	4.59	97	5.38	+17.2%	Increasing
Eastern cottontail						
Winter	97	0.62	100	0.61	-1.6%	Stable
Spring	104	0.35	99	0.83	+137.1%*	Stable
Summer	99	1.62	100	1.29	-20.4%*	Stable
Fall	102	0.65	97	0.62	-4.6%	Stable
Black-tailed jackrabbit						
Winter	97	0.08	100	0.06	-25.0%	Stable
Spring	104	0.06	99	0.13	+116.7%	Increasing
Fall	102	0.08	97	0.07	-12.5%	Stable
Tree squirrels^e						
Fall	102	1.75	97	2.32	+32.6%	Increasing

^a Not all species are counted during all 4 seasons.

^b The number of counties from which data were collected.

^c Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

^d Includes both greater and lesser prairie chickens.

^e Includes both gray and fox squirrels.

* Index is significantly different than previous year; $P < 0.05$.

Table 2. Regional and seasonal indices (birds/100 mi. traveled) to ring-necked pheasant abundance in Kansas derived from the rural mail carrier survey, 2005-2006.

Region-Season	n^a	2005	n	2006	Annual Change (%)	10-year trend^b
Northcentral						
Winter	14	5.51	14	1.47	-73.3%*	Stable
Spring	14	3.32	14	3.26	-1.8%	Stable
Summer	14	3.92	14	3.65	-6.9%	Stable
Fall	14	2.30	14	3.15	+37.0%	Stable
Northeast						
Winter	19	2.52	18	0.75	-70.2%	Stable
Spring	19	1.06	18	0.80	-24.5%	Declining
Summer	19	0.94	19	1.42	+51.1%	Stable
Fall	19	0.61	18	0.46	-24.6%	Declining
Northwest						
Winter	9	1.24	11	2.60	+109.7%	Stable
Spring	12	2.59	10	4.18	+61.4%	Stable
Summer	10	6.45	10	3.93	-39.1%	Stable
Fall	10	4.70	9	2.64	-43.8%	Stable
Southcentral						
Winter	12	0.89	13	1.39	+56.2%	Stable
Spring	13	2.30	13	1.67	-27.4%	Stable
Summer	12	1.18	13	1.19	+0.8%	Stable
Fall	13	1.66	12	1.22	-26.5%	Stable
Southeast						
Non-range	--	--	--	--	--	--
Southwest						
Winter	21	3.20	22	2.78	-13.1%	Stable
Spring	25	2.88	23	7.43	+158.0%	Stable
Summer	23	6.19	22	3.91	-36.8%*	Stable
Fall	24	5.11	22	3.93	-23.1%	Stable

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

* Index is significantly different than previous year; $P < 0.05$.

Table 3. Regional and seasonal indices (birds/100 mi. traveled) to northern bobwhite abundance in Kansas derived from the rural mail carrier survey, 2005-2006.

Region-Season	n^a	2005	n	2006	Annual Change (%)	10-year trend^b
Flint Hills						
Winter	11	2.15	11	0.76	-64.7%*	Stable
Spring	11	0.22	11	0.55	+150.0%	Stable
Summer	11	2.24	11	1.31	-41.5%*	Stable
Fall	11	0.71	11	0.94	+32.4%	Declining
Northcentral						
Winter	16	0.72	16	0.23	-68.1%	Stable
Spring	16	0.15	15	0.32	+113.3%	Declining
Summer	16	0.86	16	1.17	+36.0%	Stable
Fall	16	0.44	15	0.63	+43.2%	Declining
Northeast						
Winter	14	0.76	13	0.34	-123.5%	Stable
Spring	14	0.20	14	0.30	+50.0%	Stable
Summer	13	1.68	14	1.10	-34.5%	Stable
Fall	14	0.21	14	0.37	+76.2%	Declining
Southcentral						
Winter	13	1.24	14	0.53	-57.3%*	Stable
Spring	15	0.19	15	0.39	+105.3%	Stable
Summer	13	1.30	15	0.87	-33.1%	Stable
Fall	15	0.64	13	0.96	+50.0%	Stable
Southeast						
Winter	15	0.55	15	0.83	+50.9%	Stable
Spring	14	0.72	14	0.47	-34.7%	Stable
Summer	15	1.79	15	1.79	0.0%	Stable
Fall	15	0.55	15	0.78	+41.2%	Declining
Western						
Winter	28	0.22	31	0.39	+77.3%	Stable
Spring	34	0.08	30	0.38	+375.0%	Stable
Summer	31	0.84	29	0.82	-2.4%	Stable
Fall	31	0.40	29	0.22	-45.0%	Stable

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

* Index is significantly different than previous year; $P < 0.05$.

Table 4. Regional and seasonal indices (birds/100 mi. traveled) to prairie chicken abundance in Kansas derived from the rural mail carrier survey, 2005-2006.

Region-Season	n ^a	2005	n	2006	Annual Change (%)	10-year trend ^b
Blackjack (GPCH)						
Winter	10	0.000	10	0.000	NA ^c	Declining
Spring	9	0.000	9	0.000	NA	Stable
Summer	10	0.000	10	0.000	NA	Stable
Fall	10	0.000	10	0.000	NA	Stable
Eastern Cropland (GPCH)						
Winter	19	0.443	18	0.384	-13.3%	Stable
Spring	19	0.029	19	0.026	-10.3%	Stable
Summer	18	0.017	19	0.008	-52.9%	Stable
Fall	19	0.008	19	0.016	+100.0%	Declining
Flint Hills (GPCH)						
Winter	10	2.681	10	0.476	-82.2%*	Stable
Spring	10	0.414	10	0.204	-50.7%	Stable
Summer	10	0.207	10	0.034	-83.6%	Stable
Fall	10	0.103	10	0.314	+204.9%	Stable
Northwest (GPCH & LPCH)						
Winter	22	1.442	24	0.275	-80.9%*	Stable
Spring	25	0.073	23	0.263	260.3%	Stable
Summer	23	0.142	23	0.074	-47.9%	Stable
Fall	23	0.137	22	0.125	-8.8%	Stable
Southwest (LPCH)						
Winter	23	0.024	24	0.000	-100.0%	Stable
Spring	27	0.004	25	0.021	425.0%	Stable
Summer	24	0.003	24	0.008	166.7%	Stable
Fall	26	0.014	24	0.004	-71.4%	Stable
Western Cropland (GPCH)						
Winter	13	1.260	14	0.172	-86.3%	Stable
Spring	14	0.176	13	0.063	-64.2%	Stable
Summer	14	0.030	14	0.059	96.7%	Stable
Fall	14	0.019	12	0.055	+189.5%	Stable

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

^d NA = not applicable.

GPCH = greater prairie-chicken, LPCH = lesser prairie-chicken

* Index is significantly different than previous year; $P < 0.05$.

Table 5. Regional and seasonal indices (birds/100 mi. traveled) to wild turkey abundance in Kansas derived from the rural mail carrier survey, 2005-2006.

Region-Season	n^a	2005	n	2006	Annual Change (%)	10-year trend^b
Northcentral						
Winter	16	19.31	16	5.62	-70.9%*	Increasing
Spring	16	6.42	15	6.97	+8.6%	Increasing
Summer	16	2.64	16	3.72	+40.9%	Increasing
Fall	16	7.63	15	8.87	+16.3%	Increasing
Northeast						
Winter	16	20.81	15	11.23	-46.0%	Increasing
Spring	16	7.05	16	4.42	-37.3%	Increasing
Summer	15	4.57	16	2.53	-44.6%	Increasing
Fall	16	4.17	16	5.47	+31.2%	Increasing
Northwest						
Winter	15	6.14	18	4.40	-28.3%	Increasing
Spring	19	1.11	17	1.86	+67.6%	Stable
Summer	17	1.43	17	1.40	-2.1%	Stable
Fall	17	3.61	16	3.53	-2.2%	Increasing
Southcentral						
Winter	15	5.47	16	3.81	-30.3%	Increasing
Spring	16	3.49	16	2.62	-24.9%	Stable
Summer	16	1.77	16	1.85	+4.5%	Stable
Fall	16	6.37	15	6.46	+1.4%	Increasing
Southeast						
Winter	14	7.28	14	3.08	-57.7%*	Increasing
Spring	12	8.39	13	2.80	-66.6%	Increasing
Summer	14	2.54	14	2.02	-20.5%	Stable
Fall	14	3.08	14	4.91	+59.4%	Stable
Southwest						
Winter	21	3.32	21	1.02	-69.3%	Stable
Spring	24	1.33	22	1.72	+29.3%	Increasing
Summer	21	1.20	21	0.98	-18.3%	Increasing
Fall	23	2.64	21	3.16	+19.7%	Increasing

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

* Index is significantly different than previous year; $P < 0.05$.

Table 6. Regional and seasonal indices (animals/100 mi. traveled) to eastern cottontail abundance in Kansas derived from the rural mail carrier survey, 2005-2006.

Region-Season	n ^a	2005	n	2006	Annual Change (%)	10-year trend ^b
Flint Hills						
Winter	11	0.66	11	0.68	3.0%	Stable
Spring	11	0.10	11	0.73	+630.0%*	Stable
Summer	11	1.87	11	1.02	-45.5%*	Stable
Fall	11	0.70	11	0.83	+18.6%	Stable
Northcentral						
Winter	16	0.71	16	0.56	-21.1%*	Stable
Spring	16	0.38	15	0.96	+152.6%*	Stable
Summer	16	1.90	16	1.57	-17.4%	Stable
Fall	16	0.43	15	1.11	+158.1%	Stable
Northeast						
Winter	14	0.71	13	0.75	+5.6%	Stable
Spring	14	0.36	14	0.77	+113.9%*	Stable
Summer	13	1.63	14	1.55	-4.9%	Stable
Fall	14	0.88	14	0.57	-35.2%	Stable
Southcentral						
Winter	13	0.53	14	0.60	+13.2%	Stable
Spring	15	0.45	15	0.69	+53.3%	Stable
Summer	13	1.49	15	1.13	-24.2%	Stable
Fall	15	0.75	13	0.56	-25.3%	Stable
Southeast						
Winter	15	0.53	15	0.60	+13.2%	Stable
Spring	14	0.60	14	0.62	+3.3%	Stable
Summer	15	1.22	15	1.12	-8.2%	Stable
Fall	15	0.49	15	0.48	-2.0%	Stable
Western						
Winter	28	0.44	31	0.53	+20.5%*	Increasing
Spring	34	0.34	30	1.11	+226.5%*	Stable
Summer	31	1.74	29	1.37	-21.3%	Stable
Fall	31	0.70	29	0.43	-38.6%	Stable

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

* Index is significantly different than previous year; $P < 0.05$.

Table 7. Regional and seasonal indices (animals/100 mi. traveled) to black-tailed jackrabbit abundance in Kansas derived from the rural mail carrier survey, 2005-2006. Jackrabbits are not counted during the summer survey period.

Region-Season	n^a	2005	n	2006	Annual Change (%)	10-year trend^b
Flint Hills						
Winter	11	0.008	11	0.008	0.0%	Stable
Spring	11	0.000	11	0.011	NA ^c	Stable
Fall	11	0.000	11	0.005	NA	Stable
Northcentral						
Winter	16	0.008	16	0.020	+150.0%	Stable
Spring	16	0.032	15	0.047	+46.9%	Stable
Fall	16	0.057	15	0.117	+105.3%	Stable
Northeast						
Winter	14	0.114	13	0.010	-91.2%	Stable
Spring	14	0.000	14	0.000	NA	Stable
Fall	14	0.017	14	0.014	-17.6%	Stable
Southcentral						
Winter	13	0.036	14	0.080	+122.2%	Increasing
Spring	15	0.036	15	0.061	+69.4%	Stable
Fall	15	0.080	13	0.055	-31.3%	Stable
Southeast						
Winter	15	0.128	15	0.000	-100.0%	Stable
Spring	14	0.041	14	0.042	+2.4%	Increasing
Fall	15	0.000	15	0.012	NA	Stable
Western						
Winter	28	0.131	31	0.160	+22.1%*	Stable
Spring	34	0.140	30	0.457	+226.4%*	Stable
Fall	31	0.264	29	0.178	-32.6%	Stable

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

^c NA = not applicable.

* Index is significantly different than previous year; $P < 0.05$.

Table 8. Regional and seasonal indices (animals/100 mi. traveled) to tree squirrel (gray and fox squirrel) abundance in Kansas derived from the rural mail carrier survey, 2005-2006. Squirrels are only counted during the fall survey period.

Region-Season	n^a	2005	n	2006	Annual Change (%)	10-year trend^b
Flint Hills						
Fall	11	2.40	11	3.43	+42.9%	Increasing
Northcentral						
Fall	16	0.55	15	0.81	+47.3%	Increasing
Northeast						
Fall	14	3.93	14	2.82	-28.2%	Increasing
Southcentral						
Fall	15	1.74	13	1.84	+5.4%	Increasing
Southeast						
Fall	15	2.48	15	4.83	+94.6% [*]	Increasing
Western						
Fall	31	0.26	29	0.20	-23.1%	Stable

^a The number of counties from which data were collected.

^b Stable indicates that a statistically significant trend was not detectable ($P > 0.05$).

^{*} Index is significantly different than previous year; $P < 0.05$.

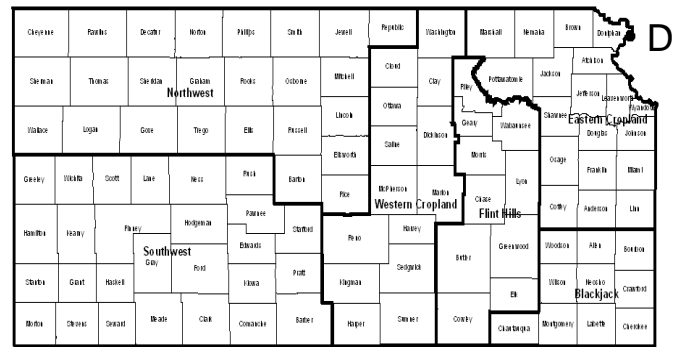
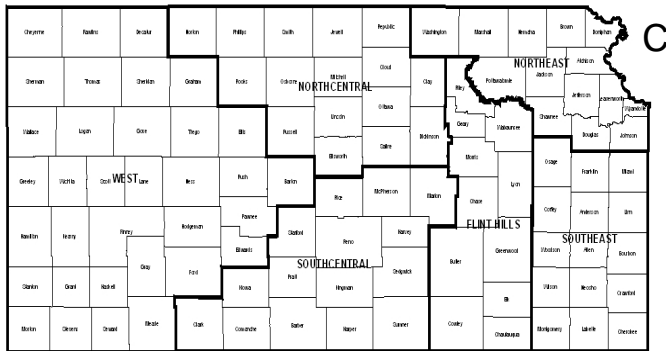
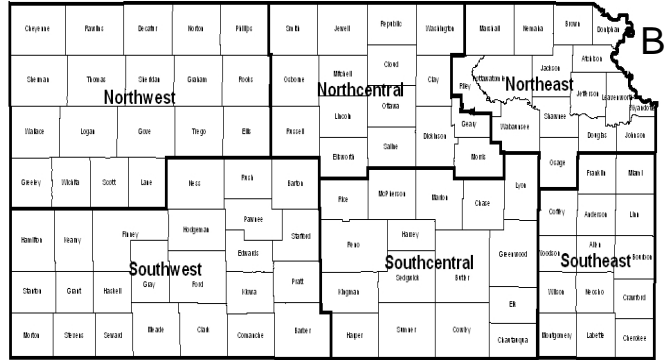
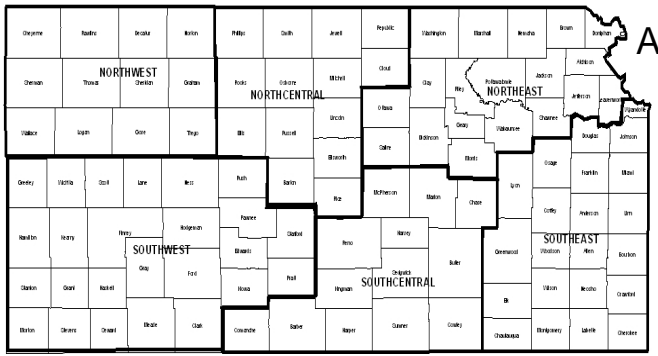


Figure 1. Kansas Department of Wildlife and Parks management regions for (A) ring-necked pheasant, (B) wild turkey, (C) northern bobwhite, eastern cottontail, black-tailed jackrabbit, and tree squirrel, and (D) prairie chickens.

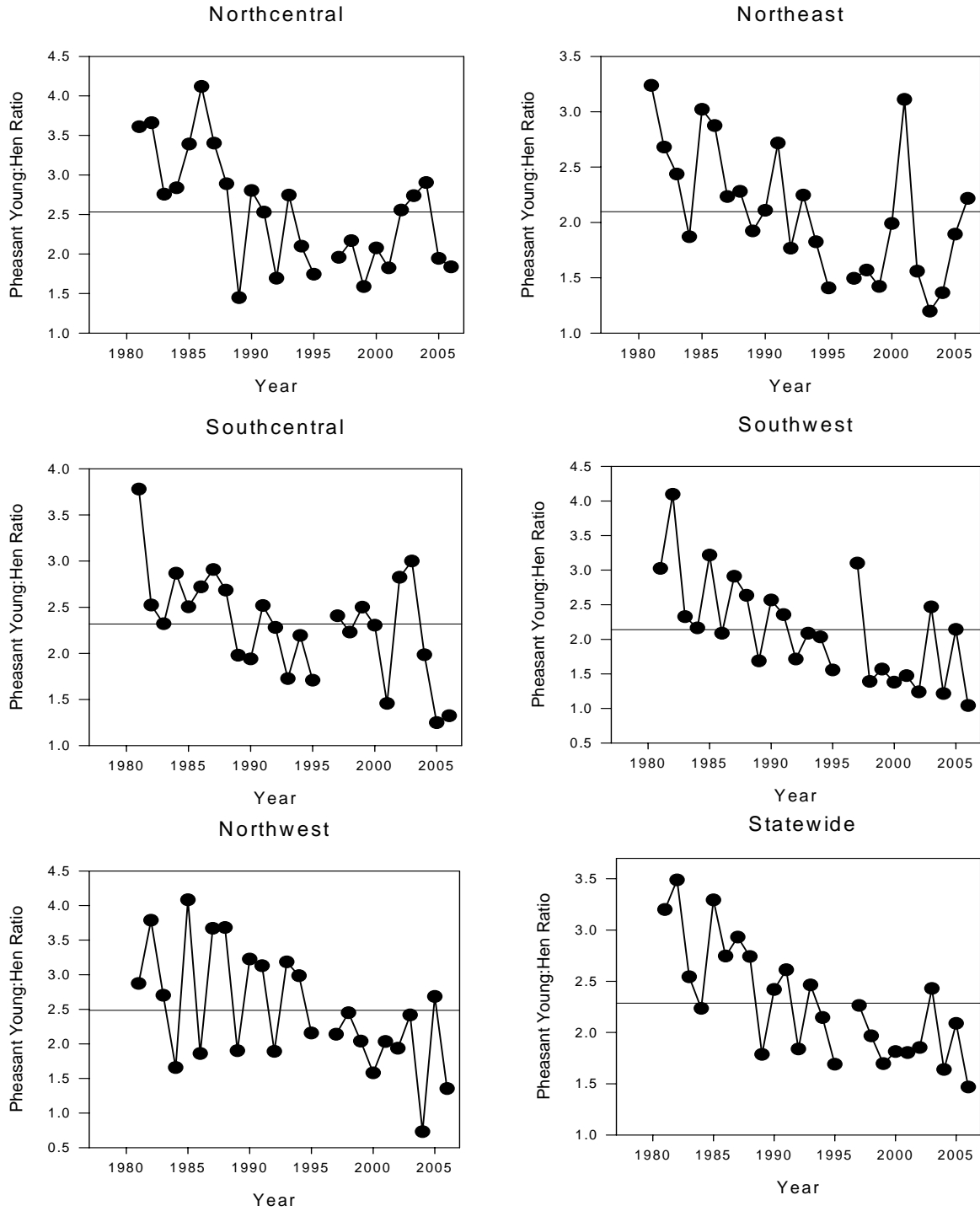


Figure 2. Regional and statewide ring-necked pheasant production indices (young:hen ratios) in Kansas derived from July rural mail carrier survey data. The horizontal line is the long-term average production index. Southeast region excluded because it is primarily non-range.

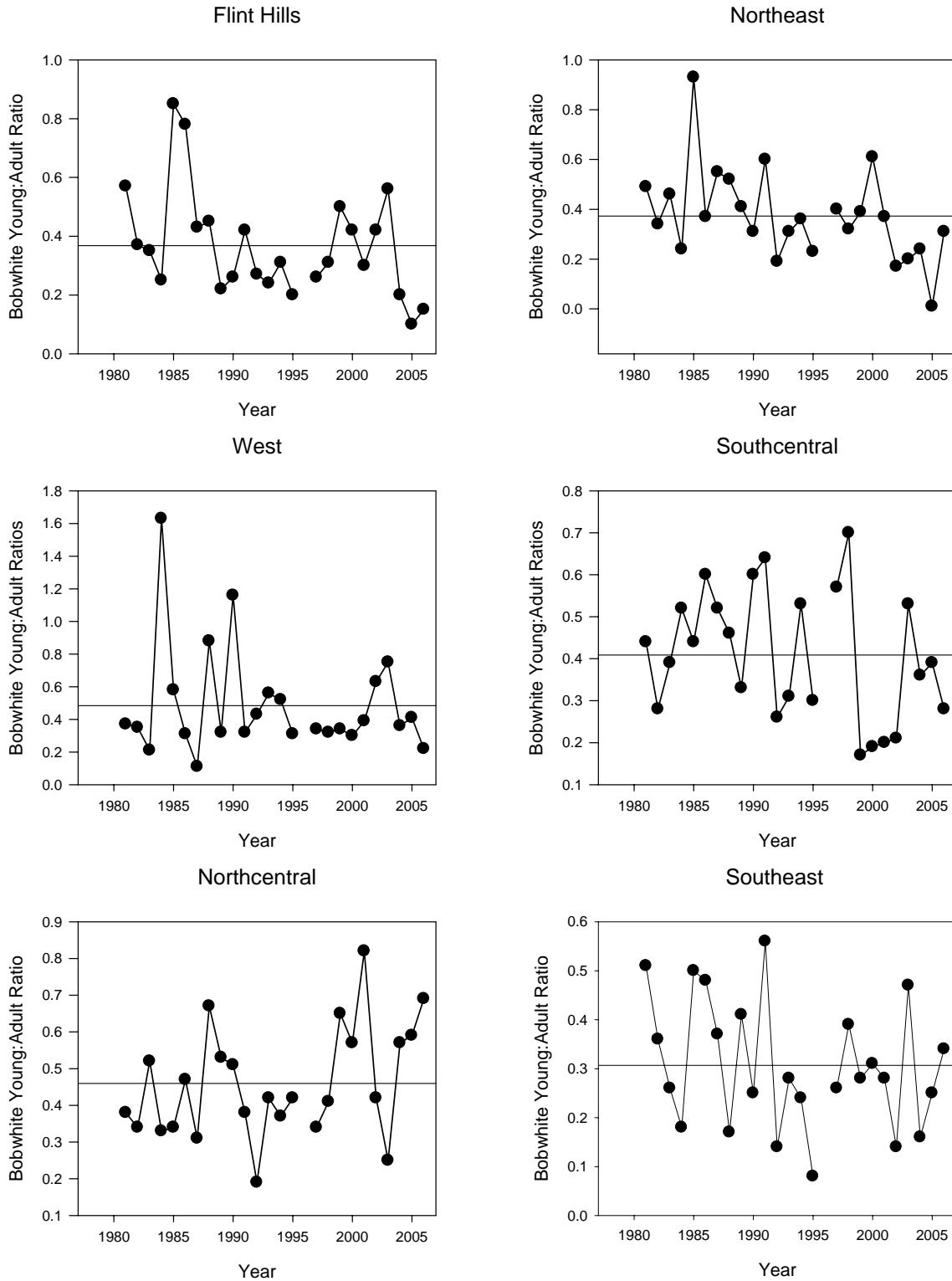


Figure 3. Regional northern bobwhite production indices (young:adult ratios) in Kansas derived from July rural mail carrier survey data. The horizontal line is the long-term average production index.

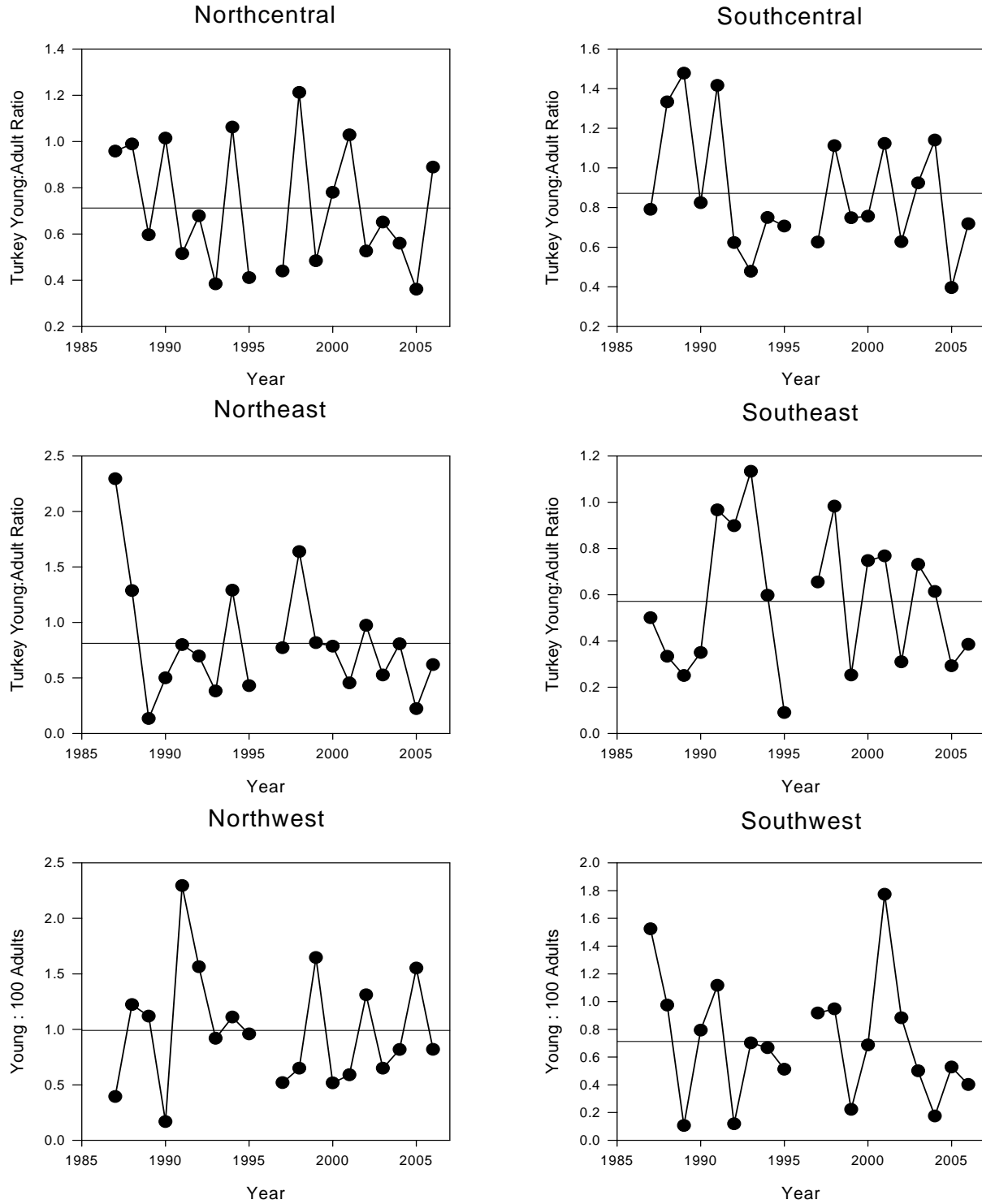


Figure 4. Regional wild turkey production indices (young:adult ratios) in Kansas derived from July rural mail carrier survey data. The horizontal line is the long-term average production index.

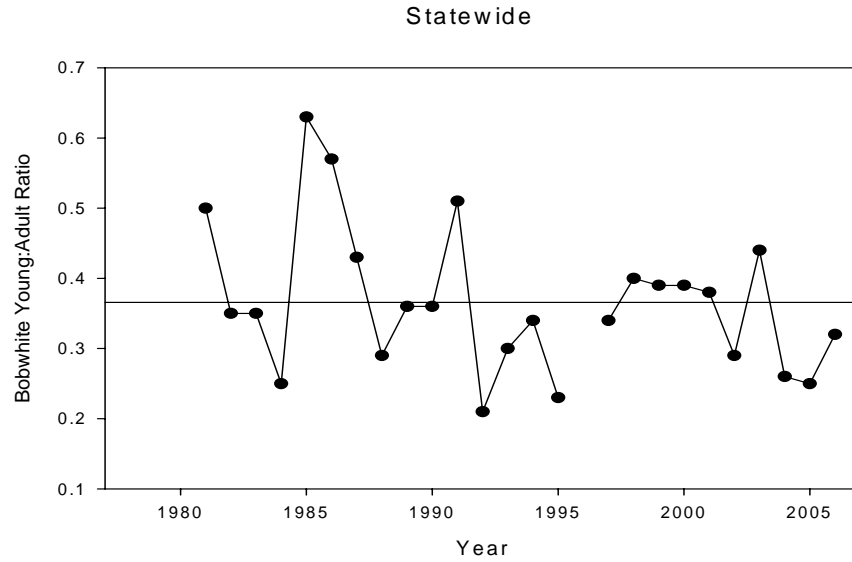


Figure 5. Statewide northern bobwhite production index (young:adult ratio) for Kansas derived from July rural mail carrier survey data. The horizontal line is the long-term average production index.

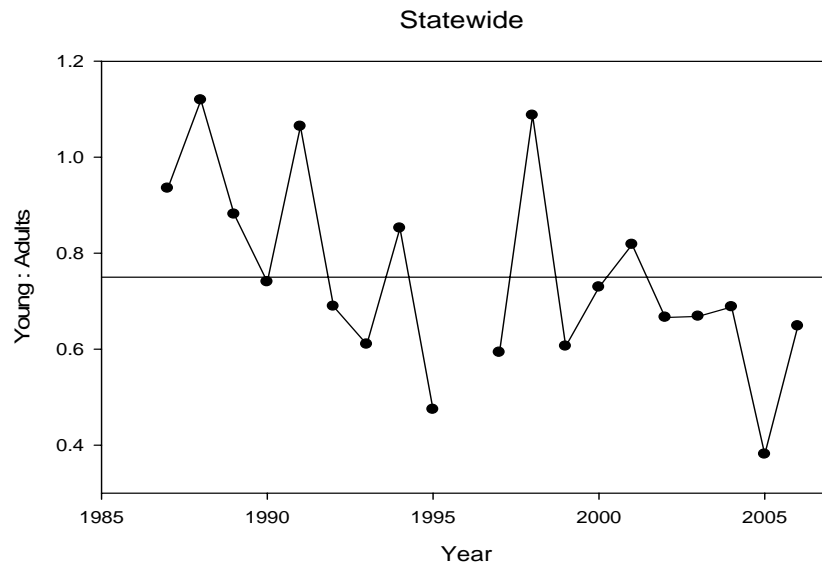


Figure 6. Statewide wild turkey production index (young:adults ratio) for Kansas derived from July rural mail carrier survey data. The horizontal line is the long-term average production index.

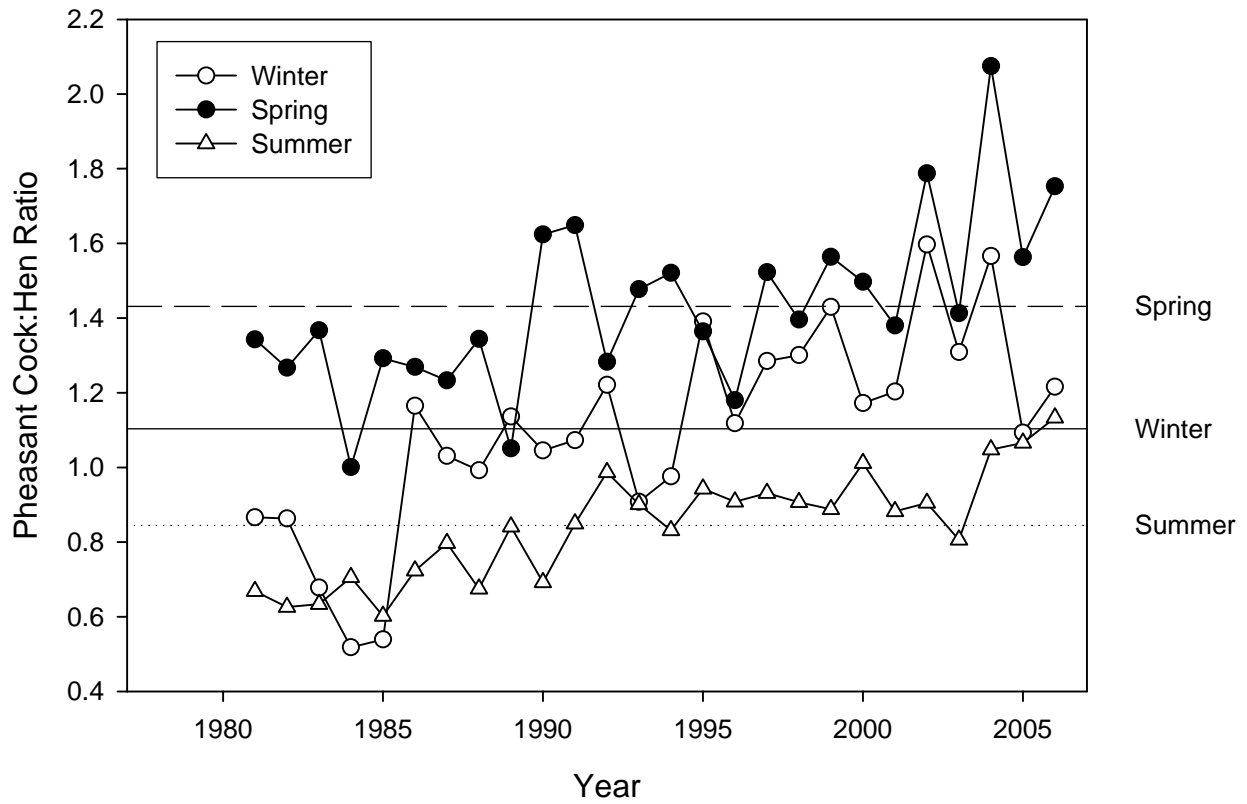


Figure 7. Statewide index to the sex ratio (Cocks:Hens) of Kansas ring-necked pheasants derived from the rural mail carrier survey data. The horizontal lines represent the long-term average cock:hen ratio for the winter, spring, and summer survey periods.