QUAIL, PHEASANT, & TURKEY BROOD SURVEY - 2010

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QUAIL, PHEASANT, AND TURKEY BROOD SURVEY RESULTS – 2010

Prepared by David Dahlgren, Wildlife Research Biologist

INTRODUCTION

Kansas Department of Wildlife and Parks (KDWP) collects reproductive data for quail (*Colinus virginianus and Callipepla squamata*), ring-necked pheasant (*Phasianus colchicus*), and wild turkey (*Meleagris gallopava*) statewide. Northern bobwhites provide nearly all the quail data; however, scaled quail provide < 1% of the data. Summer brood surveys were initiated in 1986 focusing on pheasant and quail. Turkey data was not collected and reported until 2006. These summer brood surveys are used to forecast upcoming hunting seasons, and to provide consistent monitoring of these important game species. Prairie chickens (greater and lesser; *Tympanuchus* spp.), though hunted within designated seasons, are not included in summer brood surveys due to their late summer habitat use patterns not coinciding with observation protocol (i.e., generally roadway use is limited).

METHODS

Dates for the 2010 Summer Brood Survey were from July 18 through August 28. This survey consisted of opportunistic monitoring during this period. Observers (KDWP biologists, law enforcement, and other personnel) were instructed to record all quail, pheasants, and turkeys observed and the number of days spent traveling non-pavement roads on a weekly basis for 6 consecutive weeks during their regular work duties. A day spent in city boundaries or on paved roads was not considered an observation day. They recorded number of males, females, females with young, young, distinct broods, distinct brood size, and approximate age of brood based on size class (used photographs of known age chicks for all species). When a brood was detected, observers attempted to flush the entire brood by walking around the brood location. These tallies are then divided by observer-days to generate an index (*variable*/observer-day) for each class. Additionally, young per adult female ratios were included. Data are summarized by species-specific survey regions within Kansas (Appendix A), and statewide.

In 2010 weather during the survey period was very hot and dry compared to previous years. Some biologists felt this may have precluded some broods using open cover for this year's brood survey, possibly underestimating some indices.

Data Analysis

For reporting purposes summary statistics were used based on variable/observer-day. Histograms were used to assess hatching chronology for each species (based on estimated age of young). For year to year comparisons a Wilcoxon Rank-Sum Test (same as Mann-Whitney U-test) was used to compare the distribution of each index for the six week survey period. A one-tailed test with an alpha level of $P \leq 0.10$ was used to assess a biologically significant relationship. One-tailed tests are only recommended to test the directional difference between two distributions. For example, are the pheasants/observer-day higher (or lower) in 2010 than 2009? However, a two-tailed test would need to be used to test the question are pheasants/observer-day different in 2010

compared to 2009? For our purposes, assessing direction was sufficient in year to year comparisons.

Young:adult female ratio data can be used to assess productivity within regions and populations. While numbers per observer-day may represent abundance, young:adult female ratios represent reproductive success. All adult females with or without young are included in the ratio data. Student t-tests (two-tailed) were used to compare ratios between regions, and a Wilconxon Rank-Sum test (one-tailed) was used to compare year to year changes in ratios within regions ($P < 0.10$).

RESULTS

Quail

In 2010 KDWP personnel provided 1,800 observer-days with an average of 101.83 observers per week within the six week survey period (Table 1). This was down compared to 2009, where 113.8 observers provided 2,269 observer-days. In 2010 a total of 1,747 quail were observed (Table 1). Indices and statistical comparisons are included in Tables 1 – 2. Quail hatch peaked between the 3rd week of June and 1st week of July (Figure 1). Long term regional trends are declining with the exception of the west region (Figure 4). The west region had the highest young:adult female ratios, while the southeast region did not have good reproduction relative to other regions (Table 3). Young:adult female ratios generally declined from 2009 to 2010, except for the west region, which increased 62% (Table 4).

Pheasant

KDWP personnel reported observing 3,924 (1180 observer days; 3.33/observer-day) pheasants in 2010 compared to 3,884 (1485 observer days; 2.62/observer-day) in 2009. Observer information is included in Table 5. Indices and statistical comparisons are included in Tables 5 – 6. The pheasant hatch peaked the 1st week of June (Figure 2). Long term trends are stable to increasing (varies by region), with the exception of northeast region (Figure 5). The pheasants/observer-day index for the northwest region is at the highest level ever recorded since the survey was initiated in 1986. Generally, young:adult female ratios were higher in the northwest region relative to others, while the northeast region had less production (Table 7). Young:adult female ratios had little change from 2009 – 2010 (Table 8).

Turkey

KDWP personnel reported observing 4,411 (1795 observer days; 2.46/observer-day) turkeys in 2010 compared to 6,048 (2275 observer days; 2.67/observer-day) in 2009 (Table 9). Indices and statistical comparisons are included in Tables 9 – 10. The turkey hatch peaked the first week of June (Figure 3). The population has been fairly stable in each region from 2006-2010 (Figure 6). Young:adult female ratios were generally consistent across regions, excepting the southeast region where productivity was considerably lower than the other regions (Table 11). Young:adult female ratios decreased in southwest region, while increasing in the northcentral region, and remained relatively constant in the other regions (Table 12).

DISCUSSION

Generally, Kansas experienced extremely hot dry conditions during the late summer survey period. This may have precluded normal movements of broods to roadways during this survey. Broods may have remained in suitable cover for the ameliorated environment it provided. However, generally, early spring precipitation conditions were extremely beneficial across the state for providing good nesting and early brooding habitat, and good protective late summer habitat.

We experienced a decline in total observer days for all species during 2010 compared to 2009. Multiple personnel were on annual leave at some point during 6-week survey period. Additionally, the position responsible for coordinating this survey was vacant at the start of the observation period.

While numbers per observer-day provide abundance data, the young:adult female ratios give a slightly different view of upland game production across Kansas. For instance, though young/observer day were similar between the west and northcentral regions for quail (Table 2), the young:adult female ratios were much greater (87%) in the west region (Table 3). Higher young:adult female ratios may result in more inexperienced birds available during the hunting season, and hunter success could increase as a result.

Quail

Statewide (combined data), quail indices declined in 2010 compared to 2009 (Table 2). Long term trends show consistent decline across regions, except the western region (slight increase; Figure 4). However, the south-central region had consistent increases compared to 2009 (Table 2). Notably, north-eastern Kansas had significant declines for most quail indices. This was likely due to a severe winter in 2009-2010, and some large storm events during the hatching and early brooding periods that brought large hail events across much of the region. The southeast region had the worst quail production (ratio data) relative to other regions, while the west region had much higher production compared to other regions (Table 3). Some discrepancies may exist for quail within our methodology. For example, quail hatch later than pheasants or turkeys (Figure 1), and thus broods may not be as mature and mobile during the survey period. This could influence the accuracy of these data. However, this discrepancy is generally consistent across years, which lends validity to long term trends.

Pheasant

Statewide (combined data), pheasant indices generally increased compared to 2009 (Table 6). This was unexpected because 2009 was thought to be an extremely good pheasant production year. This statewide increase is largely due to the consistent increases in the north-west region. Brood size increased in the north-west and north-central regions compared to 2009 as well (Table 6). Notably, the north-east region had significant declines in pheasant indices (Table 6). This decline in the north-east region was likely due to the severe winter of 2009-2010 and hail and rain storm events during hatching and early brooding periods in 2010. However, though decreases in pheasants observed per day occurred, production (ratio data) was not significantly different than most other regions, excepting the northwest (Table 7). Production was the same in 2010 as 2009 statewide (Table 8). Long term trends for pheasants in Kansas seem stable to

increasing, with large increases in recent years in the north-west region (Figure 5). Additionally, winter wheat harvest was postponed 2-3 weeks due to rain events. In western Kansas, winter wheat provides abundant nesting cover for pheasant populations. Timing of wheat harvest can be critical to population productivity, where later harvest provides time for hens to hatch and move their broods out of wheat fields.

Turkey

Statewide (combined data), turkeys remain stable compared to 2009 (Table 10). The south-central region saw significant increases across indices, while other regions remained fairly stable or with slight declines compared to 2009 (Table 10). Interestingly, brood size seemed to increase in most regions across the state (Table 10). Long term trends were relatively stable statewide, while the north-west region has declined slightly in recent years (Figure 6). For production (ratio data), the southeast region was lower, while the northwest was higher, compared to other regions (Table 11).

Table 1. Quail observation distribution by region, summer brood survey, 2010.

Region	Obs/Week	Obs Days	Unclassified	Males	Females	Females w/ Young	Young	Broods
W	20.67	298	0	53	39	24	241	29
NC	18.00	322	0	73	68	26	243	28
SC	12.50	175	0	60	57	14	119	18
FH	10.17	202	0	41	37	16	109	13
NE	16.17	284	0	52	41	16	159	18
SE	24.33	519	0	131	98	21	126	19
Statewide	101.83	1,800	0	410	340	117	997	125

Table 2. Year to year change in quail indices, 2009 - 2010.

Index	Year	Survey Regions						
		W	NC	SC	FH	NE	SE	Statewide
Quail/ Obs-day	2009	1.11	1.47	1.01	1.21	2.64	0.78	1.27
	2010	1.11	1.21	1.43	0.95	0.89	0.71	1.02
	% Change	0	-18	+42	-21	-66*	-9	-20
Male/ Obs-day	2009	0.22	0.28	0.27	0.27	0.36	0.29	0.28
	2010	0.18	0.23	0.35	0.22	0.19	0.26	0.23
	% Change	-16	-20	+28	-19	-48*	-13	-19*
Female/ Obs-day	2009	0.17	0.20	0.21	0.18	0.31	0.22	0.21
	2010	0.13	0.21	0.34	0.20	0.14	0.19	0.19
	% Change	-24	+8	+62	+11	-53*	-12	-10
Young/ Obs-day	2009	0.72	0.99	0.53	0.76	1.97	0.27	0.78
	2010	0.80	0.77	0.75	0.53	0.55	0.26	0.56
	% Change	+10	-22	+42	-30*	-72*	-3	-28
Broods/ Obs-day	2009	0.07	0.09	0.06	0.08	0.22	0.03	0.08
	2010	0.10	0.09	0.11	0.06	0.06	0.04	0.07
	% Change	+31	-4	+92*	-17	-71*	+13	-16
Brood Size	2009	9.41	10.82	8.66	9.51	8.83	7.97	9.42
	2010	8.79	8.73	6.79	8.02	9.33	7.23	7.99
	% Change	-7	-19*	-22	-16*	+6	-9	-15*

* are statistically significant relationships for one-tailed tests at $P \leq 0.10$.

Table 3. Regional comparisons for quail young:adult female ratios (production), Kansas, 2010.

	West	Northcentral	Southcentral	Flint Hills	Northeast	Southeast
West		+87*	+176*	+128*	+111*	+408*
Northcentral	0.05		+48	+22	+13	+172*
Southcentral	0.01	0.20		-18	-23	+84
Fling Hills	0.04	0.60	0.67		-7	+123
Northeast	0.05	0.73	0.54	0.88		+140
Southeast	0.01	0.02	0.15	0.19	0.13	

Numbers below the shaded boxes are P-values of 2-tailed T-tests comparing young:adult female ratios between regions. Numbers above the shaded boxes are the percent difference in ratios between regions starting with the regions listed vertically. For example, the young:adult female ratio in the West region was 87% higher than the Northcentral region.
* are statistically significant relationships at $P \leq 0.10$.

Table 4. Year to year comparison of quail Young:Adult Female ratio (production), Kansas, 2010.

Year	West	Northcentral	Southcentral	Flint Hills	Northeast	Southeast	Statewide
2009	4.23	5.15	2.49	4.39	6.82	1.12	3.65
2010	6.83	3.66	2.47	3.00	3.23	1.34	2.90
% Change	+62*	-29*	0	-32	-53*	+20	-21

* are statistically significant relationships at $P \leq 0.10$.

Table 5. Pheasant observation distribution by region, summer brood survey, 2010.

Region	Obs/Week	Obs Days	Unclassified	Males	Females	Females w/ Young	Young	Broods
NW	7.33	107	0	80	151	125	1247	191
SW	15.67	227	0	127	155	87	631	137
NC	15.50	276	0	123	160	126	930	155
SC	13.83	221	0	38	29	20	181	37
NE	20.00	349	0	13	15	5	44	9
Statewide	72.33	1180	0	381	510	363	3033	529

Table 6. Year to year change in pheasant indices, 2009 - 2010.

Index	Year	Survey Regions					
		NW	SW	NC	SC	NE	Statewide
Pheasant/ Obs-day	2009	8.54	3.63	3.99	0.97	0.52	2.59
	2010	13.81	4.02	4.39	1.12	0.21	3.33
	% Change	+62	+11	+10	+16	-60*	+29*
Male/ Obs-day	2009	0.56	0.47	0.45	0.18	0.03	0.28
	2010	0.75	0.56	0.45	0.17	0.04	0.32
	% Change	+33	+20	-1	-7	+7	+15*
Female/ Obs-day	2009	0.85	0.59	0.52	0.14	0.08	0.34
	2010	1.41	0.68	0.58	0.13	0.04	0.43
	% Change	+65	+16	+11	-5	-49*	+26*
Young/ Obs-day	2009	7.12	2.57	3.02	0.65	0.40	1.96
	2010	11.65	2.78	3.37	0.82	0.13	2.57
	% Change	+64	+8	+11	+27	-68*	+31*
Broods/ Obs-day	2009	1.32	0.51	0.60	0.12	0.08	0.38
	2010	1.79	0.60	0.56	0.17	0.03	0.45
	% Change	+35	+18	-7	+43	-67*	+18
Brood Size	2009	5.37	5.02	5.01	5.50	5.03	5.15
	2010	6.53	4.61	6.00	4.89	4.89	5.73
	% Change	+21*	-8	+20*	-11*	-3	+11*

* are statistically significant relationships for one-tailed tests at $P \leq 0.10$.

Table 7. Regional comparisons for pheasant young:adult female ratios (production), Kansas, 2010.

	Northwest	Southwest	Northcentral	Southcentral	Northeast
Northwest		+89*	+31	+10	+104*
Southwest	0.01		-31*	-42	+7
Northcentral	0.11	0.00		-17	+55
Southcentral	0.73	0.13	0.51		+86
Northeast	0.03	0.84	0.17	0.15	

Numbers below the shaded boxes are P-values of 2-tailed T-tests comparing young:adult female ratios between regions. Numbers above the shaded boxes are the percent difference in ratios between regions starting with the regions listed vertically. For example, the young:adult female ratio in the Northwest region was 89% higher than the Southwest region.
* are statistically significant relationships at $P \leq 0.10$.

Table 8. Year to year comparison of pheasant young:adult female ratio (production), Kansas, 2010.

Year	Northwest	Southwest	Northcentral	Southcentral	Northeast	Statewide
2009	8.53	4.52	5.74	4.83	5.45	5.72
2010	7.86	4.15	5.98	7.17	3.86	5.90
% Change	-8	-8	+4	+48	-29	+3

* are statistically significant relationships at $P \leq 0.10$.

Table 9. Turkey observation distribution by region, summer brood survey, 2010.

Region	Obs/Week	Obs Days	Unclassified	Males	Females	Females w/ Young	Young	Broods
NW	10.83	144	0	175	114	53	303	33
SW	17.00	266	0	30	58	37	129	16
NC	16.00	310	0	233	167	124	543	71
SC	16.83	292	0	250	226	132	616	58
NE	16.17	275	0	119	145	84	344	39
SE	24.33	508	0	207	326	120	426	54
Statewide	101.17	1795	0	1014	1036	550	2361	271

Table 10. Year to year change in Turkey indices, 2009 - 2010.

Index	Year	Survey Regions						
		NW	SW	NC	SC	NE	SE	Statewide
Turkey/ Obs-day	2009	5.81	1.02	3.62	2.47	2.51	2.00	2.64
	2010	4.11	0.82	3.04	3.74	2.21	1.89	2.47
	% Change	-29	-20	-16*	+52*	-12	-6	-7
Male/ Obs-day	2009	1.73	0.28	0.84	0.48	0.46	0.42	0.60
	2010	1.22	0.11	0.75	0.86	0.43	0.41	0.56
	% Change	-30	-59	-11	+78*	-6	-3	-6
Female/ Obs-day	2009	1.28	0.17	0.75	0.61	0.49	0.77	0.66
	2010	0.79	0.22	0.54	0.77	0.53	0.64	0.58
	% Change	-38	+30	-28*	+26	+7	-17	-13
Young/ Obs-day	2009	2.80	0.58	2.03	1.37	1.56	0.81	1.38
	2010	2.10	0.48	1.75	2.11	1.25	0.84	1.32
	% Change	-25	-16	-14	+54*	-20	+3	-5
Young/ Female	2009	2.19	3.47	2.73	2.23	3.18	1.05	2.09
	2010	2.66	2.22	3.25	2.73	2.37	1.31	2.28
	% Change	+21	-36*	+19*	+22	-25	+25	+9
Brood Size	2009	6.15	5.78	6.41	6.54	6.94	6.06	6.38
	2010	9.18	8.06	7.65	10.62	8.82	7.89	8.71
	% Change	+49*	+40	+19*	+62*	+27*	+30*	+36*

* are statistically significant relationships for one-tailed tests at $P \leq 0.10$.

Table 11. Regional comparisons for turkey young:adult female ratios (production), Kansas, 2010.

	Northwest	Southwest	Northcentral	Southcentral	Northeast	Southeast
Northwest		+56	-1	+5	+47	+146*
Southwest	0.24		-37*	-33	-6	+58
Northcentral	0.97	0.07		+6	+49*	+149*
Southcentral	0.87	0.16	0.74		+40	+135*
Northeast	0.28	0.84	0.09	0.19		+68
Southeast	0.06	0.20	0.00	0.01	0.11	

Numbers below the shaded boxes are P-values of 2-tailed T-tests comparing young:adult female ratios between regions. Numbers above the shaded boxes are the percent difference in ratios between regions starting with the regions listed vertically. For example, the young:adult female ratio in the Northwest region was 56% higher than the Southwest region.
* are statistically significant relationships at $P \leq 0.10$.

Table 12. Year to year comparison of turkey young:adult female ratio (production), Kansas, 2010.

Year	Northwest	Southwest	Northcentral	Southcentral	Northeast	Southeast	Statewide
2009	2.72	3.54	2.73	2.52	3.41	1.07	2.10
2010	3.16	2.02	3.20	3.01	2.15	1.28	2.29
% Change	+16	-43*	+17*	+20	-37	+20	+9

* are statistically significant relationships at $P \leq 0.10$.

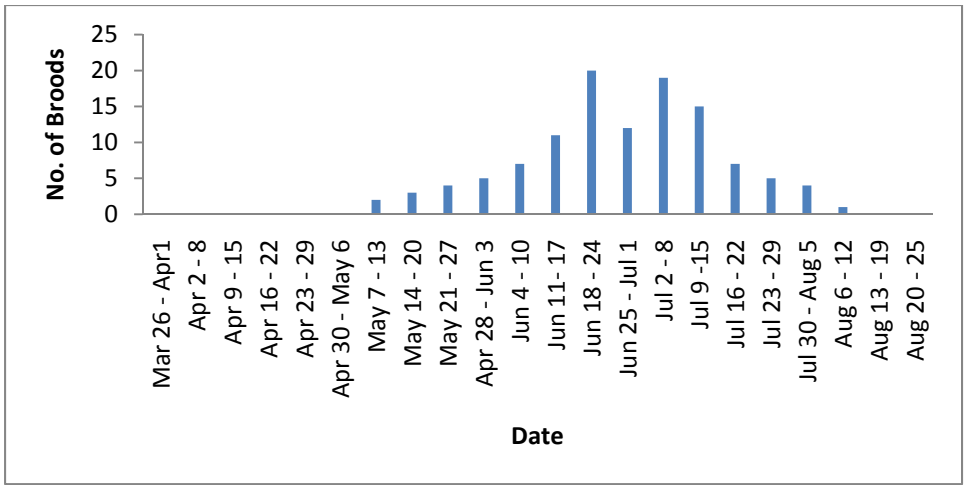


Figure 1. Quail hatch date frequency statewide, 2010.

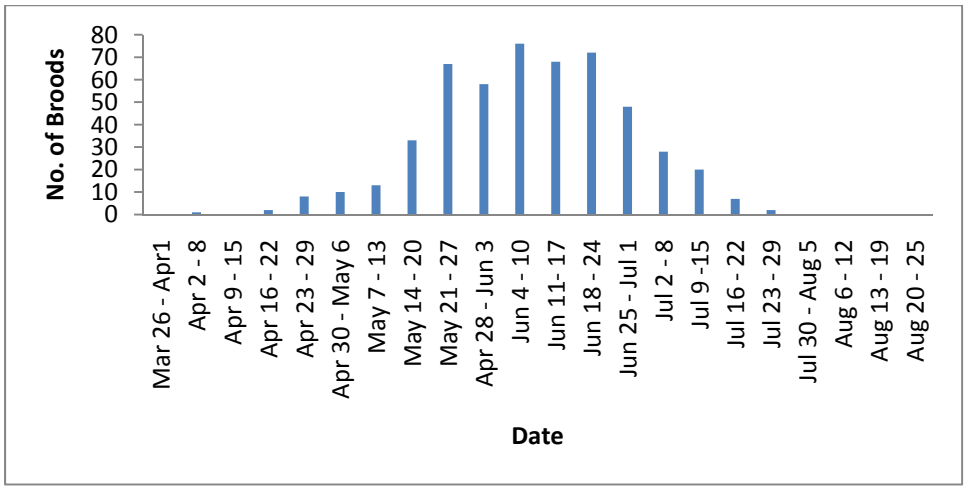


Figure 2. Pheasant hatch date frequency statewide, 2010.

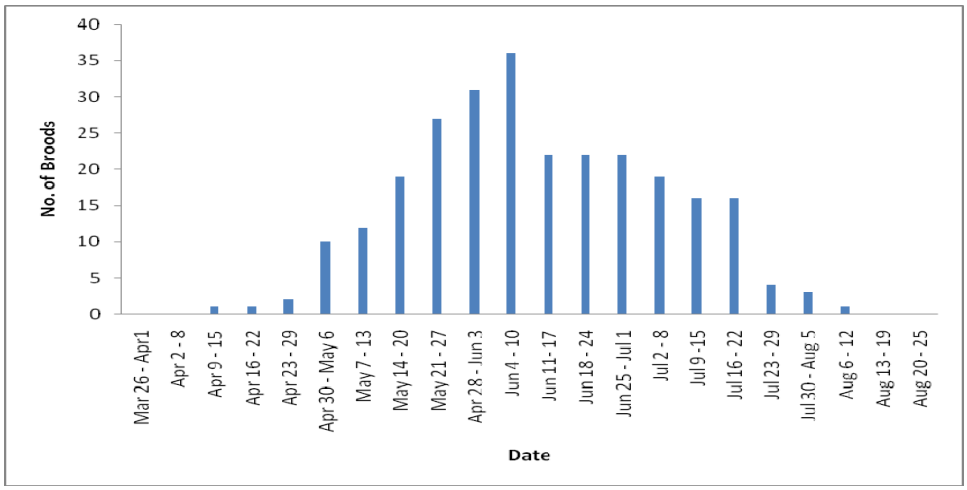


Figure 3. Turkey hatch date frequency statewide, 2010.

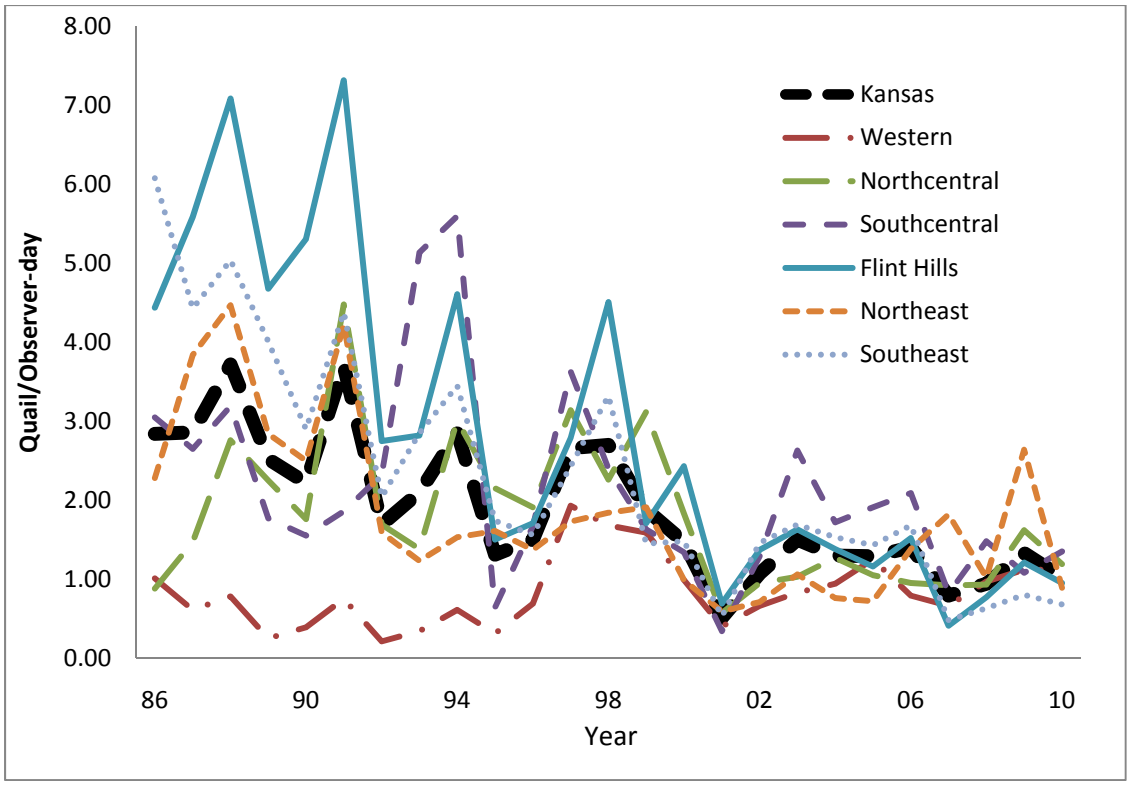


Figure 4. Quail summer (Jul – Aug) survey trends, statewide and regional, 1987 – 2010.

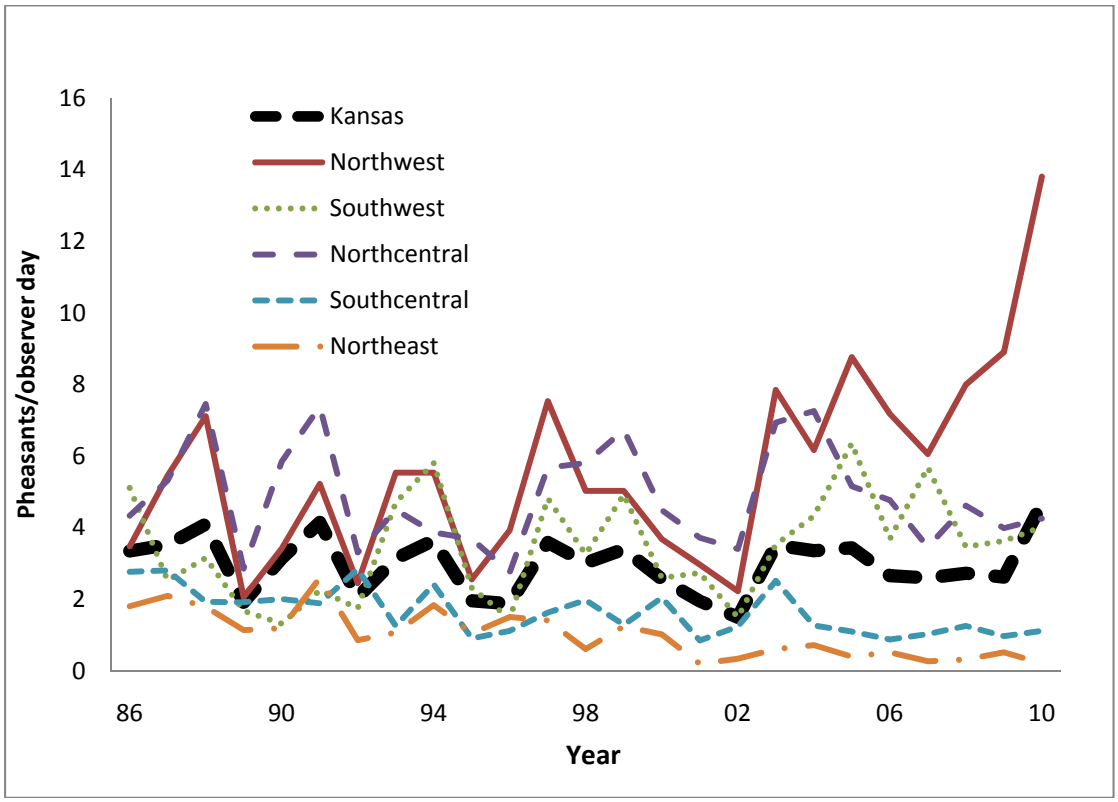


Figure 5. Pheasant summer (Jul – Aug) survey trends, statewide and regional, 1987 – 2010.

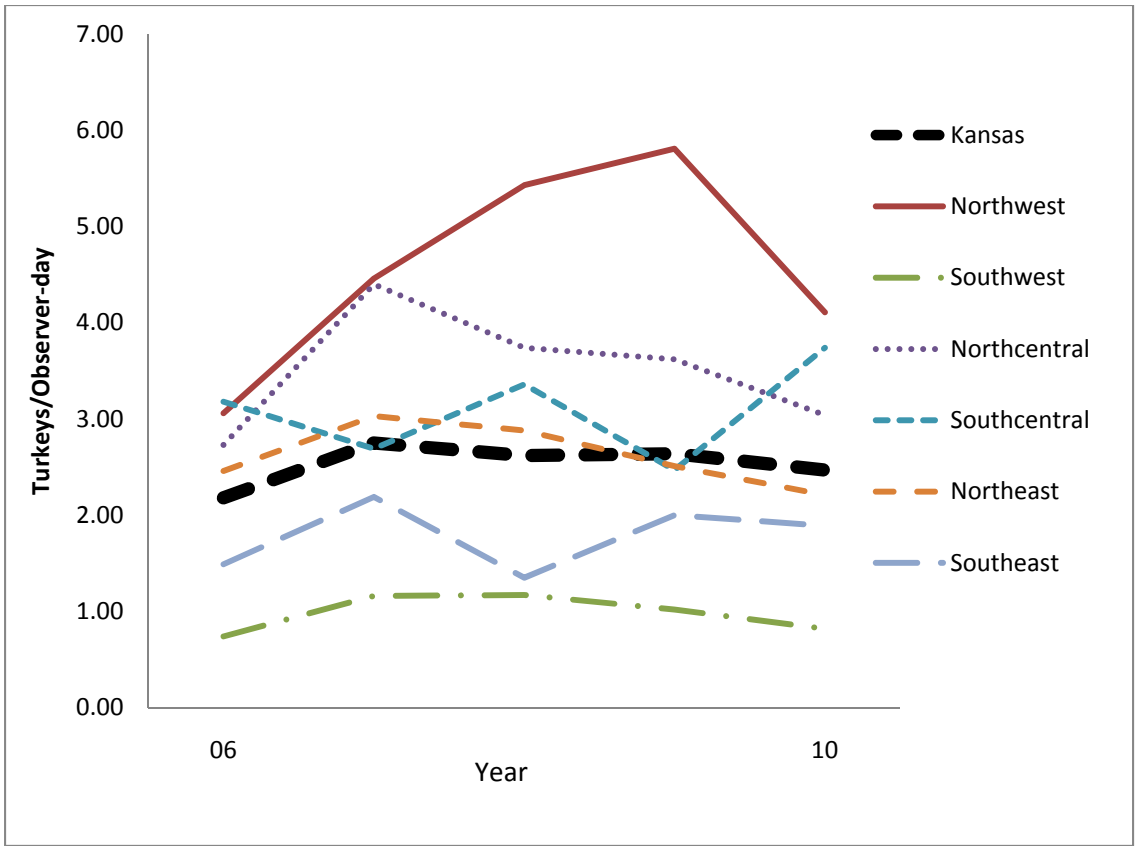
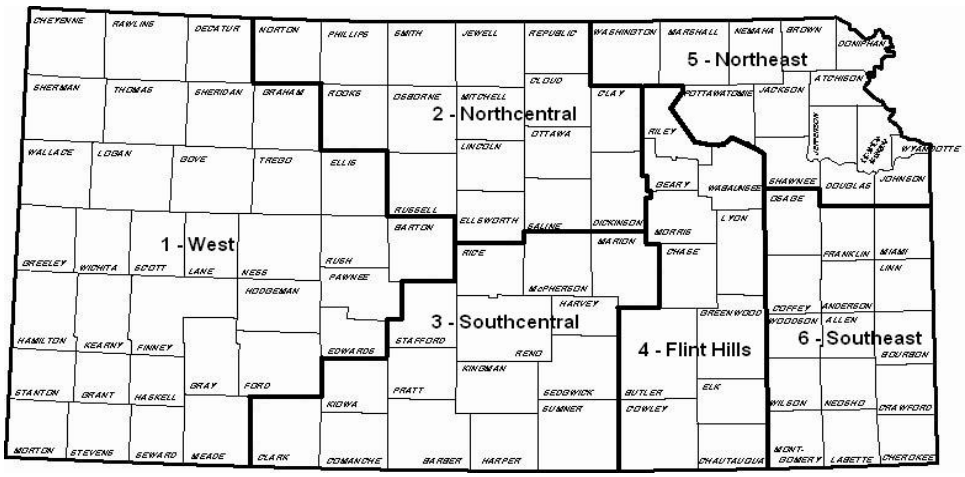
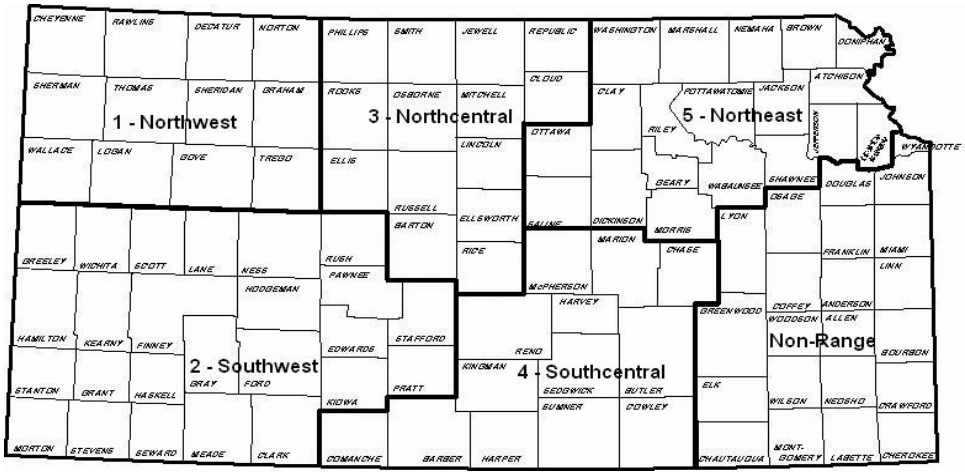


Figure 6. Turkey summer (Jul – Aug) survey trends, statewide and regional, 2006 – 2010.

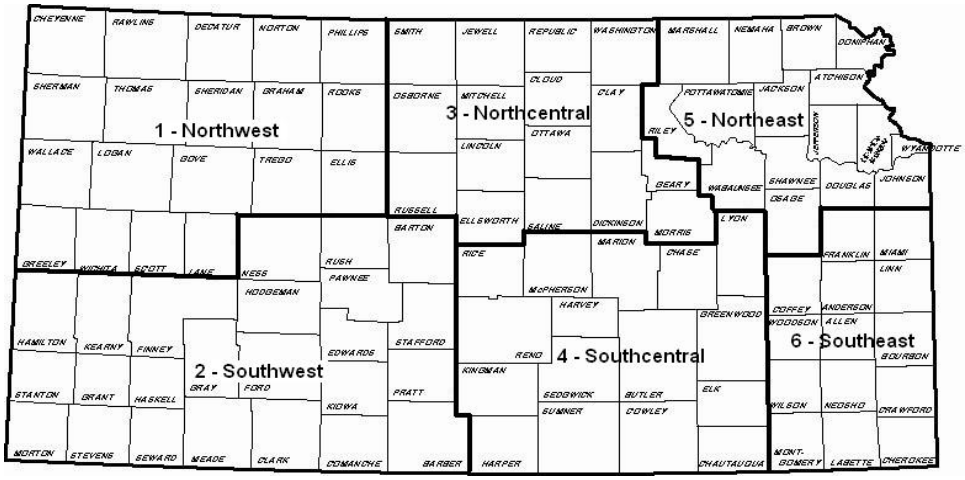
Appendix A: Kansas Species-Specific Survey Regions



Kansas QUAIL survey regions.



Kansas PHEASANT survey regions.



Kansas TURKEY survey regions.