QUAIL, PHEASANT, & TURKEY BROOD SURVEY - 2022

Performance Report

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QUAIL, PHEASANT, AND TURKEY BROOD SURVEY RESULTS – 2022

Prepared by Jeff Prendergast, Small Game Specialist

INTRODUCTION

The Kansas Department of Wildlife, Parks, and Tourism (KDWPT) collects reproductive data for quail (*Colinus virginianus and Callipepla squamata*), ring-necked pheasant (*Phasianus colchicus*), and wild turkey (*Meleagris gallopavo*) statewide. Northern bobwhites provide nearly all the quail data; however, scaled quail can be found in extreme southwestern Kansas and observations are included in quail estimates (generally < 1% data). Summer brood surveys were initiated in 1986 focusing on pheasant and quail. Turkey data were 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 recorded opportunistically, cannot be easily assessed using the same methods because they generally do not associate with roads like quail, pheasants, and turkeys.

METHODS

Dates for the 2022 summer brood survey were from July 17 – August 27 (6 weeks). Survey protocol and methodology changed in 2012 to establish permanent brood routes averaging 35 miles (29-49 miles) in 74 randomly selected counties in Kansas (urban counties were removed from the original selection pool). Since the original selection, routes have been added to fill voids where staff has allowed, bringing the current number of routes to 78. Routes were positioned within each county to be representative of the average land cover (rangeland, crop, CRP, etc.) for that county. If public land (e.g., Wildlife Areas) occurred in the county, we attempted to place the route through or adjacent to the property. Routes were sampled 4 times beginning at sunrise, driving the route at a maximum of 25 mph until the entire route was sampled. The 6-week sampling period was separated into 2, 3-week periods where at least 2 samples occurred in each 3-week period. Additionally, observers were asked to have at least one sample completed on a morning with wet vegetation (dew or after a rain the evening/night before). This sampling protocol provides a more stringent standardization of collected data. Indices are reported on a per mile basis (e.g., pheasant/mile, etc.). If a quail or pheasant brood was detected, observers attempted to flush the brood to get the most accurate count of chicks possible. Age of chicks was visually estimated based on aging criteria and recorded in weeks.

Data Analysis

The indices to upland game bird densities were calculated as the mean number of birds observed per mile for each species along routes. Given that observations are recorded on permanently established routes, samples are not independent and thus a paired-sample t-test is used to make inter-annual comparisons. A two-tailed test with an alpha level of 0.10 was used to identify significant differences between years (current vs. previous year). Data was standardized by reporting counts per mile (e.g., pheasants/mile) for routes and regions. Ratio data (chicks/hen

and chicks/brood) can help indicate population productivity, but sample sizes per route are generally limited; as such, ratio data are pooled across each Small Game Region (Figure 1). In considering the brood to hen ratios, broods that are observed without hens are removed to remove bias from the % of hens that successfully hatched broods. While many factors influence these ratios, the broods/hen index is generally an indicator of nest success, while chicks/brood is an indicator of brood survival after hatching. Quail ratio data was reported per adult (male and female) because males also will incubate nests and brood young. Turkey Management Regions (Figure 2) differ from Small Game Regions and data were reported accordingly.

Spatial comparisons were made using an ARC GIS Inverse Weighted Distance technique, which interpolates data across a landscape between known points. Inverse Distance Weighting was used per species by assigning the route-specific index to the centroid of the county sampled. This provides a unique map showing probable densities which are spatially relative. This provides a statewide estimate of upland bird densities but does not account for localized populations and habitats.

RESULTS

Participants sampled 77 of 78 established routes between July 17 and August 27. One route was unable to be completed due to staff injury. There were 3 routes that were not able to be completed the 4 runs during the survey period (Table1). Results are summarized by Kansas Small Game Regions (Figure 1) or Turkey Regions accordingly (Figure 2).

Pheasants

For 2022, there was a non-significant decrease in the statewide roadside index of pheasants (-19%) compared to 2021. While there were statistically significant declines in both the Northern High plains and Southern High Plains, a significant increase in the Flint Hills and a large apparent, yet non-significant, increase in the Smoky Hills helped offset these losses (table 2). Pheasants per mile was highest in the Smoky Hills, with the highest index in Rice County (Table 2). Similar to last year, few pheasants were detected in the Glaciated plains regions. While Flint Hills region generally has lower pheasant densities it doubled the number of routes with detections this year, with no decreases on any of the routes in the region. No pheasants were detected in the Osage Cuestas of southeastern Kansas.

Statewide chicks/ hen were decreased while other statewide production indices were all comparable to 2020 (Table 3). All production indices were decreased Northern and Southern High Plains. Particularly in the chicks/hen which saw large declines (Table 3). There were no broods observed in the Glaciated Plains region. Pheasant hatch peaked statewide in early to mid-June with almost 50% of broods estimated hatch date in the first 2 weeks of June (Figure 3). While pheasant hatch always peaks this time of year there was a greater percent of our pheasant hatched then normal during this period. This is likely an indication of poor nesting conditions later in the summer when renesting attempts would have occurred.

Quail

There was no change in the statewide roadside index of quail (-1%) compared to 2021. There were no regions that showed statistically significant changes from last year (Table 4). However

there were larger apparent changes recorded in the several regions. Large decreases in Southern High Plains regions (-53%) and south central prairies (-28%) were offset by regional increases in Glaciated Plains (41%) Smoky Hills (27%) and Flint Hills (15%). As is common with quail, many regional patterns were obscured by large offsetting changes on routes within the regions. Quail densities were greatest in the Flint Hills followed by Smoky Hills, with the highest index recorded in Cowley County (Table 4). Scaled quail were only recorded on Hamilton and Kearney County routes.

Statewide broods/adult improved but brood size was reduced by half. (Table 5). The Smoky Hills region saw consistent increases across all measures of production this year. While brood size was increased in the Southern High Plains this year there were very few broods observed, resulting in large decreases in chick/adult and brood/adult measures (Table 5). Quail hatch peaked in mid-late June. Similar to pheasants fewer then normal broods were hatched after the peak hatch (Figure 5). The highest estimated quail densities are generally in the Smoky and Flint Hills (Figure 6).

Turkey

There was a significant increase in the statewide roadside index of turkey (33%) compared to 2021. There were significant regional increases in both the Northwest region (367%) and the Northcentral (132%). The remaining regions all had small non-significant changes from 2021 (Table 6). The Northeast region had the highest regional turkey index with the Northcentral being a close second. (Table 6). Jefferson county had the highest roadside index to turkeys this year (Table 6).

The statewide turkey production saw consistent improvements across all measures this year (Table 7). Production was down across all 3 southern regions, with no broods observed in the Southwest region this year (Table 7). However production was improved across all 3 northern regions and surprisingly some great improvements in the Northwest where pheasants and quail both struggled this year (Table 7). Turkey hatch peaked between late May into early June prior to when conditions really deteriorated later in the summer, which likely favored turkey production this year (Figure 7). The highest turkey densities will generally be found in northeastern Kansas (Figure 8).

DISCUSSION

The drought that had gripped much of the Great Plains throughout 2021 settled into Kansas during fall of 2021 and into the spring of 2022. Some April and May showers gave a short reprieve from these conditions, improving nesting conditions where sufficient rainfall fell, particularly in the Smoky Hills and eastern regions. However dry and brutally hot weather plagued the state throughout the remainder of the summer. There were 86 counties in the state this year that registered D2 or greater on the Drought severity index. While some of these area in North Central Kansas have been downgraded, most of the state remains in drought status. The drought conditions led to poor nesting cover across much of the state, particularly the High Plains region of far western Kansas where the drought conditions were the most severe. As we progressed later into the summer, conditions turned off more extreme as there were an abundance of triple digit days and extended periods without rains. These conditions have the

potential to impact chick survival particularly due to lack of ample cover and invertebrates as a result of poor soil moisture, which can mitigate against these extreme conditions. Even in areas where conditions were sufficient to encourage production of young, conditions have continued to deteriorate as local farmers try to maintain cattle herds on existing grasslands and many fall crops have failed and been put toward cattle forage. These conditions are likely to limit overwinter cover for gamebirds and nesting cover going into next spring.

Pheasants are an important resource to Kansas. Within the last decade, estimated annual harvests have been at both extreme highs and lows. Despite a reduced roadside index in 2021 harvest rates for pheasants harvested rates remained unchanged, likely due to poor survey conditions underestimating birds last year. With the lack of precipitation and the extreme temperatures that were observed this year decreases were expected across the pheasant range. While there were significant losses in some areas leading to a statewide decline, the losses were not as widespread as expected. As a result the statewide estimate was greater than expected. However, based on the results of the survey overall densities are expected to be lower and harvest success will likely decrease. The Smoky Hills had the highest regional estimate of pheasants in 2022, with several routes showing improvements. The high plains regions saw steep declines resulting in estimates that are reminiscent of 2013 at the end of the last drought cycle (Figure 4).

Kansas continues to have one of the strongest quail populations in the country. Recent years have seen improved densities across many of the Great Plains states, including Kansas. This initial boom was caused by habitat changes associated with recovery from the extreme and expansive drought. While the benefits of these habitat changes have largely waned and some states have seen populations decline again, Kansas has largely maintained these higher densities thus far. Spring densities remained high based on spring whistle surveys and saw significant increases in some regions. The estimates in the roadside survey remained similar to last year. While the high plains regions decline mirrored that of pheasants the increases in much of the central and western regions offset this. These increases should provide noticeably more quail in the Smoky Hills and Flint Hills region. The Flint Hills had the highest roadside density this year, however densities did not appear to be as consistent as the Smoky Hills regions (Figure 6). Based on roadside survey estimates, we expect hunters to maintain success rates observed over the last few years.

After several years of declining trends, roadside estimates for turkeys increased this year. There were large increases in Northwest and Northcentral with turkeys being recorded on several routes where they had been absent last year. While these increases are promising they are not enough to yet offset the trend that we have seen in recent years with our turkeys struggling to recruit young into the population. The Northeast region had the highest roadside estimate this year (Figure 8).

Table 1. Upland game bird brood routes and observers in Kansas, 2022.

Route	Observer	Replicates	Route	Observer	Replicates
Allen	Justin Harbit	4	Logan	Leonard Hopper	4
Atchison	Tim Urban	4	Marion	Jeff Rue	4
Barber	Jake George	4	Marshall	Megan Smith	4
Barton	Jeff Prendergast	4	Meade	Aaron Andrews	4
Bourbon	Justin Harbit	4	Miami	Andy Friesen	5
Brown	Tyler Warner	4	Mitchell	Cale Hedges	4
Butler	Tyler Burt	4	Montgomery	Ryan Lies	4
Cherokee	David Jenkins	2	Morris	Brent Konen	4
Cheyenne	Abby Athen	4	Morton	Kraig Schultz	4
Cloud	Matt Farmer	4	Neosho	Logan Martin	4
Coffey	Matt Peek	3	Ness	Andy Nelson	4
Comanche	Matt Hanvey	4	Norton	Luke Winge	4
Cowley	Kurt Grimm	4	Osage	Alex Lyon	5
Decatur	Daniel Howard	4	Osborne	Chris Lecuyer	4
Dickinson	Clint Thornton	4	Pawnee	Kevin Wood	5
Doniphan	Jesse Morland	4	Phillips	Eric Wiens	4
Elk	Viki Cikanek	4	Pottawatomie	Corey Alderson	4
Ellis	Megan Rohweder	4	Pratt	Wes Sowards	4
Finney	Jared King	4	Rawlins	Kevin Klag	4
Ford	Jeff Sutton	4	Reno	Keith Murrow	6
Franklin	Ryan Tewllman	4	Republic	Rob Unruh	4
Geary	Clint Thornton	4	Rice	Steve Adams	4
Gove	Matt Schmidt	4	Rooks	Joe Lambert	4
Graham	Jake Brooke	4	Rush	Jason Wagner	4
Gray	Jared King	4	Russell	James Svaty	4
Greeley	Kurt Meier	4	Saline	Pat Riese	4
Greenwood	Kent Fricke	4	Scott	Brent Clark	4
Hamilton	Kurt Meier	4	Seward	Jason Vajnar	4
Harvey	Charlie Cope	4	Sheridan	Kevin Klag	4
Haskell	Kelly Lazar	5	Sherman	Abby Athen	4
Hodgeman	Dan Haneke	4	Smith	Kirk Andrews	4
Jackson	Tyler Warner	4	Stafford	Logan Shoup	4
Jefferson	Andrew Page	4	Stanton	Kraig Schultz	4
Jewell	Brandon Tritch	4	Stevens	Kraig Schultz	4
Kearney	Kurt Meier	4	Thomas	Jared Ireland	4
Kingman	Troy Smith	4	Trego	Kent Hensley	4
Kiowa	Logan Shoup	4	Wabaunsee	Darin Porter	4
Labette	Rob Roggin	4	Wallace	Abby Athen	4
Lane	Angie Reisch	3	Wilson	Jordan Wooderson	4

Table 2. Annual regional changes in mean pheasants per mile (P/M), 2022.

Route	2021 P/M	2022 P/M	% Δ
	Flint Hills		
Butler	0.00	0.00	0
Cowley	0.00	0.01	0
Dickinson	0.22	0.31	42
Elk	0.00	0.01	NE
Geary	0.00	0.00	0
Greenwood	0.00	0.00	0
Marion	0.00	0.06	NE
Morris	0.00	0.00	0
Pottawatomie	0.01	0.03	400
Wabaunsee	0.00	0.00	0
Region	**0.02**	**0.04**	**86***
	Glaciated Plains		
Atchison	0.01	0.01	-50
Brown	0.00	0.01	NE
Doniphan	0.00	0.00	0
Jackson	0.00	0.00	0
Jefferson	0.00	0.00	0
Marshall	0.04	0.00	-100
Region	**0.01**	**0.00**	**-71**
	Smoky Hills		
Barton	0.21	0.53	153
Cloud	0.08	0.01	-81
Ellis	0.03	0.39	1100
Hodgeman	0.42	0.16	-62
Jewell	0.04	0.05	17
Mitchell	0.31	0.24	-24
Ness	0.10	0.08	-15
Osborne	0.25	0.05	-78
Phillips	0.01	0.04	200
Republic	0.07	0.02	-67
Rice	0.10	0.71	607
Rooks	0.36	0.62	71
Rush	0.18	0.26	44
Russell	0.04	0.03	-17
Saline	0.05	0.01	-83
Smith	0.16	0.13	-20
Trego	0.15	0.46	208
Region	**0.15**	**0.22**	**49**

Route	2021 P/M	2022 P/M	% Δ
	Northern High Plains		
Cheyenne	0.17	0.06	-67
Decatur	0.39	0.11	-72
Gove	0.13	NA	NA
Graham	0.14	0.13	-11
Greeley	0.65	0.17	-74
Lane	0.16	0.01	-94
Logan	0.08	0.04	-50
Norton	0.06	0.03	-50
Rawlins	0.09	0.09	0
Scott	0.52	0.17	-66
Sheridan	0.28	0.05	-83
Sherman	0.39	0.17	-58
Thomas	0.08	0.00	-100
Wallace	0.12	0.10	-12
Region	**0.24**	**0.09**	**-64***
	South-Central Prairies		
Barber	0.00	0.01	NE
Comanche	0.00	0.00	0
Harvey	0.01	0.04	500
Kingman	0.09	0.00	-100
Kiowa	0.36	0.24	-33
Pawnee	0.16	0.07	-53
Pratt	0.16	0.24	55
Reno	0.00	0.01	NE
Stafford	0.09	0.03	-64
Region	**0.10**	**0.07**	**-25**
	Southern High Plains		
Finney	0.00	0.09	NE
Ford	NA	0.03	NA
Gray	0.19	0.01	-92
Hamilton	0.19	0.02	-89
Haskell	0.03	0.06	67
Kearny	0.13	0.11	-12
Meade	0.02	0.01	-67
Morton	0.21	0.09	-57
Seward	0.34	0.11	-67
Stanton	0.07	0.05	-30
Stevens	0.22	0.11	-48
Region	**0.14**	**0.07**	**-51***
Statewide	**0.13**	**0.10**	**-19**

* = Significant difference ($p < 0.1$)

**The Osage Cuestas region is outside of the pheasant range and is removed for analysis.

[a]Route was not sampled in consecutive years and wasn't included in regional or statewide comparisions

Table 3. Annual regional changes in pheasant chicks per hen (C/H), chicks per brood (C/B), and broods per hen (B/H), 2022.

Region	2021C/H	2022C/H	%Δ	2021 C/B	2022 C/B	%Δ	2021 B/H	2022 B/H	%Δ
Flint Hills	4.8	4.9	2	6.0	5.5	-8	0.8	0.8	-3
Glaciated Plains	4.0	0.0	0	4.0	0.0	NE	0.0	0.0	0
Northern High Plains	7.5	3.0	-60	4.7	3.3	-30	0.7	0.5	-27
Osage Cuestas	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
Smoky Hills	4.8	4.9	1	4.0	5.0	26	0.7	0.7	-1
South-Central Prairies	5.1	5.9	15	6.8	5.5	-20	0.4	0.8	100
Southern High Plains	9.1	1.7	-81	3.7	2.1	-43	0.8	0.6	-26
Statewide	6.3	4.2	-33	4.4	4.4	0	0.7	0.6	-1

Table 4. Annual regional changes in mean quail per mile (Q/M), 2022.

Route	2021 Q/M	2022 Q/M	% Δ	Route	2021 Q/M	2022 Q/M	% Δ
	Flint Hills				Smoky Hills		
Butler	0.04	0.15	280	Barton	0.14	0.13	-10
Cowley	0.40	0.78	93	Cloud	0.11	0.11	0
Dickinson	0.31	0.05	-84	Ellis	0.10	0.22	120
Elk	0.08	0.08	-8	Hodgeman	0.17	0.50	200
Geary	0.02	0.25	1133	Jewell	0.14	0.12	-15
Greenwood	0.29	0.26	-12	Mitchell	0.18	0.13	-28
Marion	0.02	0.22	869	Ness	0.11	0.07	-40
Morris	0.15	0.01	-95	Osborne	0.06	0.35	478
Pottawatomie	0.11	0.06	-44	Phillips	0.02	0.13	500
Wabaunsee	0.23	0.06	-72	Republic	0.07	0.15	122
Region	**0.17**	**0.19**	**15**	Rice	0.01	0.09	1200
	Glaciated Plains			Rooks	0.29	0.10	-65
Atchison	0.08	0.07	-9	Rush	0.29	0.33	12
Brown	0.28	0.13	-55	Russell	0.32	0.22	-31
Doniphan	0.12	0.19	63	Saline	0.12	0.25	107
Jackson	0.11	0.18	59	Smith	0.19	0.21	6
Jefferson	0.03	0.07	125	Trego	0.13	0.00	-100
Marshall	0.05	0.31	514	**Region**	**0.14**	**0.18**	**27**
Region	**0.11**	**0.16**	**41**		Southern High Plains		
	Northern High Plains			Finney	0.01	0.01	0
Cheyenne	0.00	0.00	0	Ford	NA	0.02	NA
Decatur	0.16	0.00	-100	Gray	0.01	0.00	-100
Gove	0.04	NA	NA	Hamilton	0.62	0.12	-80
Graham	0.20	0.02	-93	Haskell	0.01	0.00	-100
Greeley	0.01	0.00	-100	Kearny	0.00	0.01	NE
Lane	0.00	0.01	NE	Meade	0.01	0.01	0
Logan	0.00	0.00	0	Morton	0.03	0.03	25
Norton	0.50	0.24	-51	Seward	0.20	0.16	-19
Rawlins	0.01	0.11	1500	Stanton	0.00	0.00	0
Scott	0.00	0.02	NE	Stevens	0.14	0.14	-5
Sheridan	0.02	0.01	-67	**Region**	**0.10**	**0.05**	**-53**
Sherman	0.00	0.00	0		Osage Cuestas		
Thomas	0.00	0.00	0	Allen	0.00	0.06	NE
Wallace	0.00	0.00	0	Bourbon	0.01	0.01	-38
Region	**0.07**	**0.03**	**-56**	Cherokee	0.01	0.15	1250
	South-Central Prairies			Coffey	0.05	0.04	-17
Barber	0.15	0.05	-68	Franklin	0.06	0.01	-78
Comanche	0.01	0.04	200	Labette	0.00	0.05	NE
Harvey	0.00	0.00	NE	Miami	0.00	0.02	0
Kingman	0.22	0.14	-35	Montgomery	0.20	0.14	-28
Kiowa	0.36	0.11	-68	Neosho	0.05	0.05	0
Pawnee	0.17	0.14	-20	Osage	0.07	0.13	80
Pratt	0.25	0.11	-57	Wilson	0.08	0.07	-9
Reno	0.11	0.23	104	**Region**	**0.05**	**0.06**	**33**
Stafford	0.05	0.13	186				
Region	**0.15**	**0.11**	**-28**	**Statewide**	**0.11**	**0.11**	**-1**

*Values are significant at a $P < 0.10$.

NA = Data Not availiable

NE = Not estimable

Table 5. Annual regional changes in quail chick per adult (C/A), chicks per brood (C/B), and broods/adult, 2022.

Region	2021 C/A	2022 C/A	%Δ	2021 C/B	2022 C/B	%Δ	2021 B/A	2022 B/A	%Δ
Flint Hills	2.2	0.7	-68	8.8	6.2	-30	0.18	0.12	-36
Glaciated Plains	2.3	2.3	-1	6.0	8.1	35	0.31	0.23	-25
Northern High Plains	1.7	4.4	160	9.2	14.7	59	0.16	0.20	23
Osage Cuestas	0.4	0.4	-2	6.0	5.6	-7	0.05	0.06	12
Smoky Hills	1.5	2.1	41	7.4	8.8	19	0.12	0.17	46
South-Central Prairies	2.5	1.8	-28	10.5	9.9	-6	0.20	0.15	-27
Southern High Plains	4.0	0.4	-90	7.8	9.5	22	0.19	0.02	-88
Statewide	1.8	1.1	-39	8.1	4.4	-45	0.15	0.25	65

Table 6. Annual regional changes in mean turkey per mile (T/M), 2022

Route	2021 T/M	2022 T/M	[a]% Δ	Route	2021 T/M	2022 T/M	% Δ
	Northeast				Northcentral		
Atchison	0.07	0.24	267	Barton	0.00	0.00	0
Brown	0.00	0.06	NE	Cloud	0.09	0.38	342
Dickinson	0.26	0.02	-92	Ellis	0.06	0.19	222
Doniphan	0.07	0.04	-40	Jewell	0.10	0.09	-14
Franklin	0.20	0.21	4	Mitchell	0.00	0.00	0
Geary	0.38	0.13	-66	Osborne	0.20	0.08	-60
Jackson	0.47	0.24	-49	Phillips	0.00	0.01	NE
Jefferson	0.26	0.70	171	Republic	0.15	0.24	60
Marshall	0.18	0.22	24	Rooks	0.00	0.19	NE
Morris	0.10	0.15	43	Rush	0.00	0.46	NE
Osage	0.13	0.19	51	Russell	0.10	0.26	167
Pottawatomie	0.24	0.35	49	Saline	0.24	0.21	-14
Wabaunsee	0.06	0.21	275	Smith	0.18	0.49	169
Region	**0.19**	**0.21**	**15**	**Region**	**0.09**	**0.20**	**132***
	Northwest				Southcentral		
Cheyenne	0.11	0.44	294	Barber	0.11	0.04	-63
Decatur	0.01	0.17	2775	Comanche	0.00	0.00	0
Graham	0.00	0.00	0	Harvey	0.06	0.13	111
Norton	0.00	0.04	NE	Kingman	0.10	0.14	36
Rawlins	0.04	0.22	520	Kiowa	0.06	0.03	-56
Sheridan	0.00	0.02	NE	Meade	0.00	0.00	0
Sherman	0.02	0.00	-100	Pawnee	0.09	0.41	380
Thomas	0.02	0.00	-100	Pratt	0.00	0.00	0
Region	**0.02**	**0.11**	**367***	Reno	0.43	0.23	-47
	Southwest			Rice	0.19	0.00	-100
Finney	0.00	0.04	NE	Stafford	0.05	0.25	375
Ford	NA	0.00	NA	**Region**	**0.10**	**0.11**	**12**
Gove	0.00	NA	NA		Southeast		
Gray	0.00	0.00	0	Allen	0.15	0.05	-68
Greeley	0.00	0.00	0	Bourbon	0.08	0.05	-42
Hamilton	0.00	0.00	0	Butler	0.28	0.17	-40
Haskell	0.00	0.00	0	Cherokee	0.38	0.00	-100
Hodgeman	0.00	0.00	0	Coffey	0.06	0.10	71
Kearny	0.00	0.00	0	Cowley	0.02	0.26	1100
Lane	0.00	0.00	0	Elk	0.01	0.13	2000
Logan	0.00	0.00	0	Greenwood	0.22	0.07	-70
Morton	0.00	0.00	0	Labette	0.20	0.12	NE
Ness	0.00	0.02	NE	Marion	0.06	0.10	59
Scott	0.00	0.00	0	Miami	0.21	0.44	114
Seward	0.00	0.00	0	Montgomery	0.05	0.02	-56
Stanton	0.11	0.00	-100	Neosho	0.15	0.31	107
Stevens	0.02	0.00	629	Wilson	0.16	0.00	-100
Trego	0.14	0.16	-6	**Region**	**0.15**	**0.13**	**-11**
Wallace	0.10	0.13	-80				
Region	**0.02**	**0.02**	**-7**	**Statewide**	**0.10**	**0.13**	**33***

*Values are significant at a $P < 0.10$.

NA = Data Not Available

NE = Not estimable

Table 7. Annual regional changes in turkey poults per hen (P/H), poults per brood (P/B), and broods per hen (B/H), 2022.

Region	2021 P/H	2022 P/H	%Δ	2021 P/B	2022 P/B	%Δ	2021 B/H	2022 B/H	%Δ
Northcentral	1.2	1.8	49	5.8	5.4	-6	0.21	0.33	58
Northeast	0.8	1.4	78	3.8	5.1	35	0.19	0.28	45
Northwest	1.0	3.4	236	3.3	4.3	28	0.20	0.64	221
Southcentral	1.6	1.1	-31	5.9	6.2	5	0.26	0.15	-41
Southeast	1.5	0.7	-54	5.5	4.3	-21	0.27	0.16	-42
Southwest	0.5	0.0	-100	2.2	0.0	-100	0.14	0.00	-100
Statewide	1.2	1.4	17	4.8	5.1	6	0.22	0.25	13

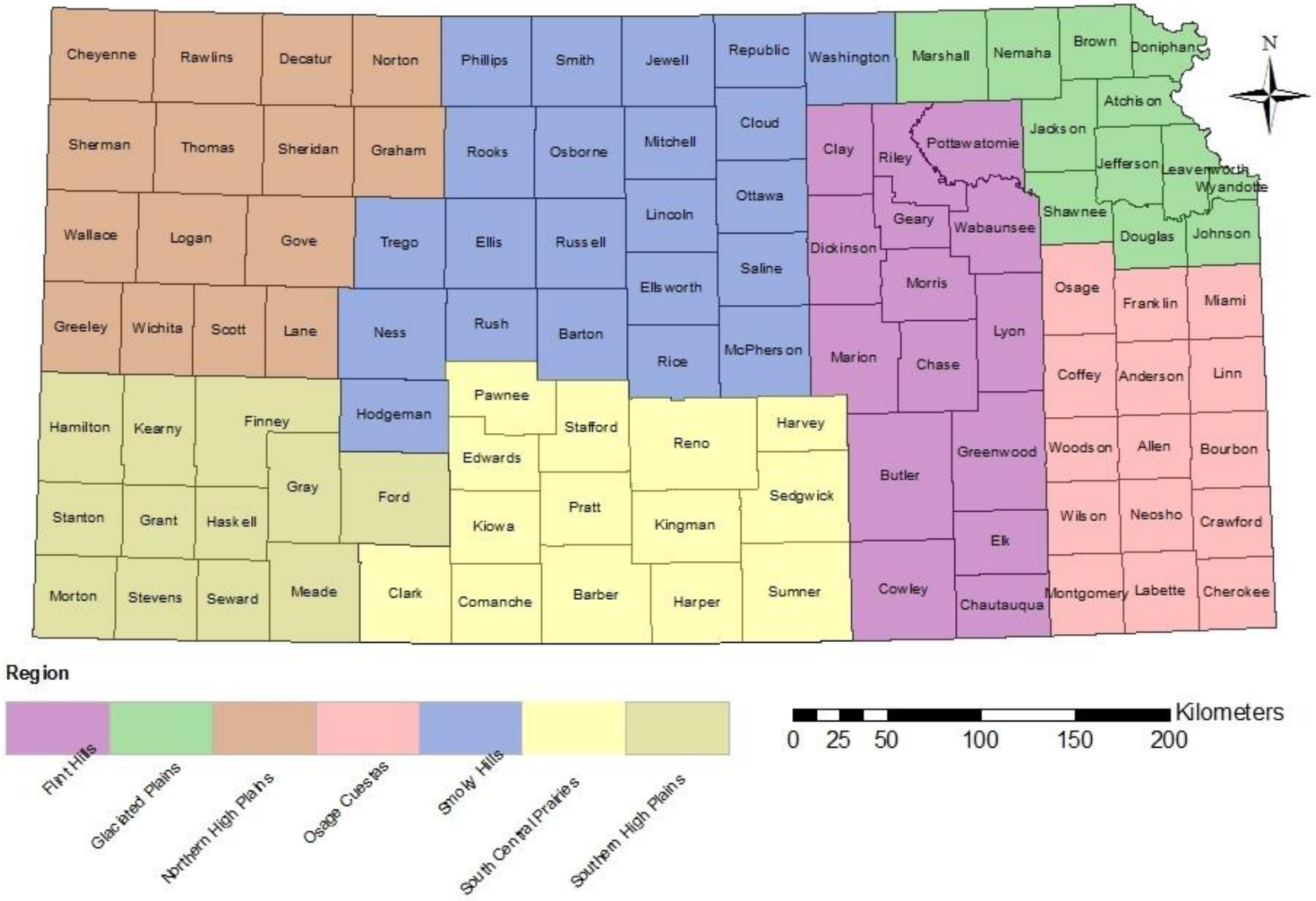

Figure 1. Kansas Small Game Regions.

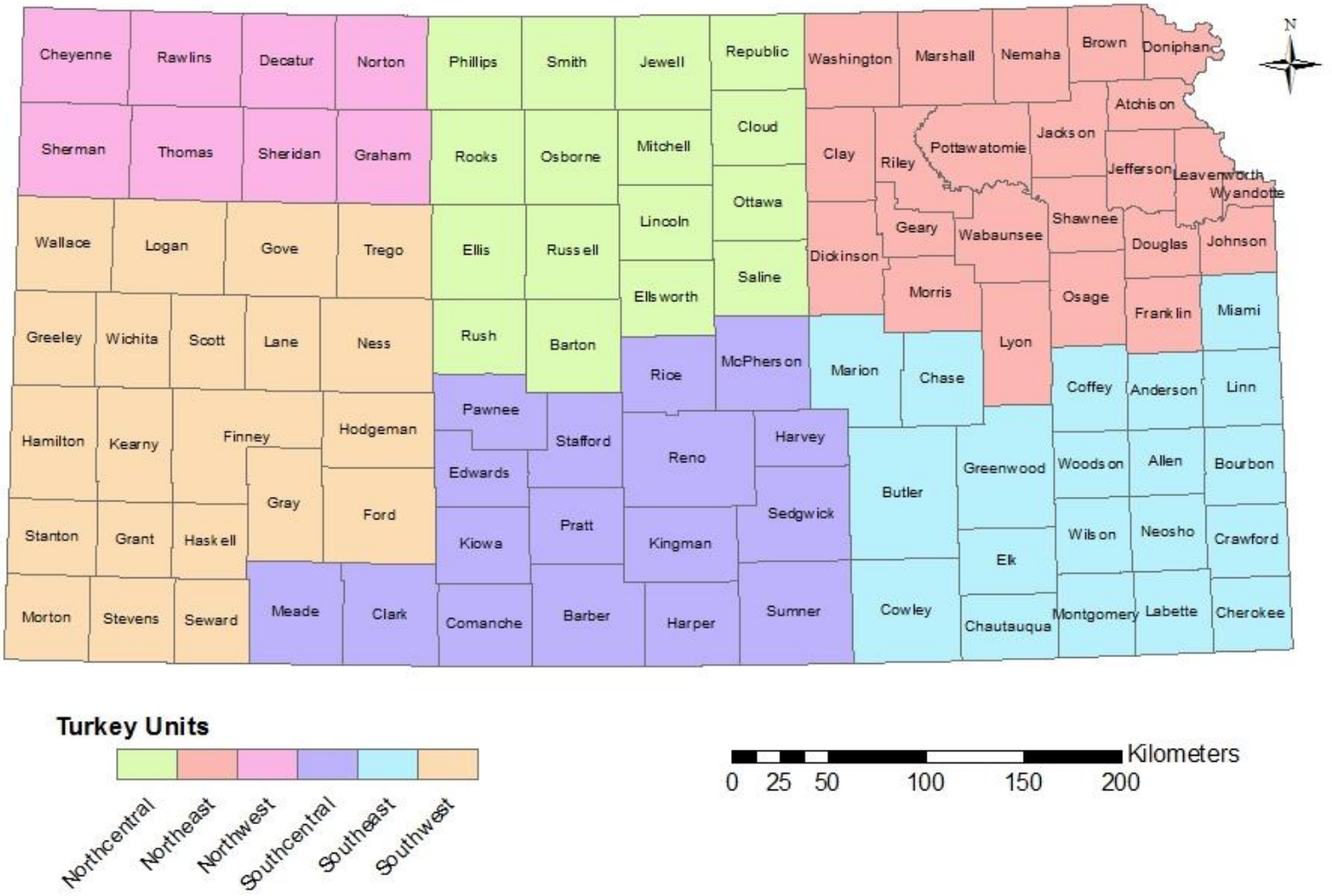

Figure 2. Kansas Turkey Management Regions.

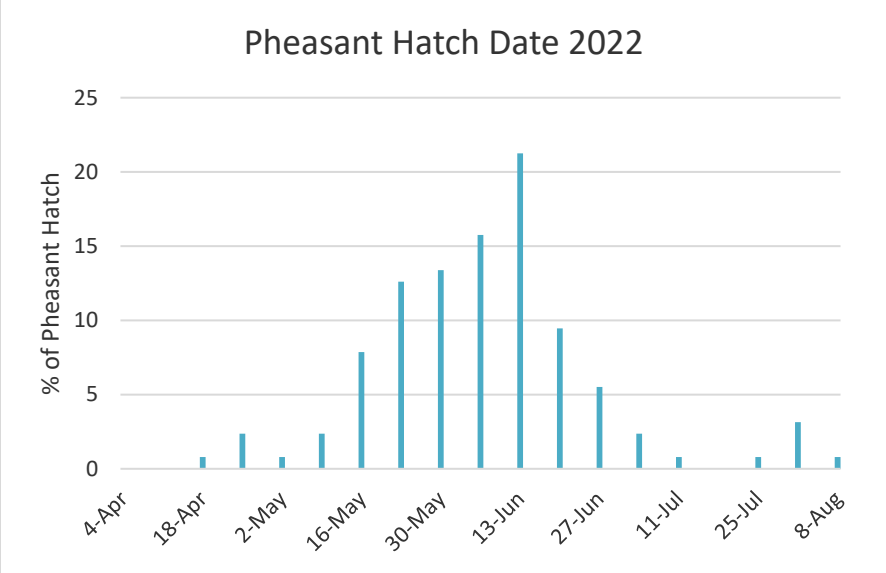

Figure 3. Weekly hatch dates of pheasant broods estimated from age at detection.

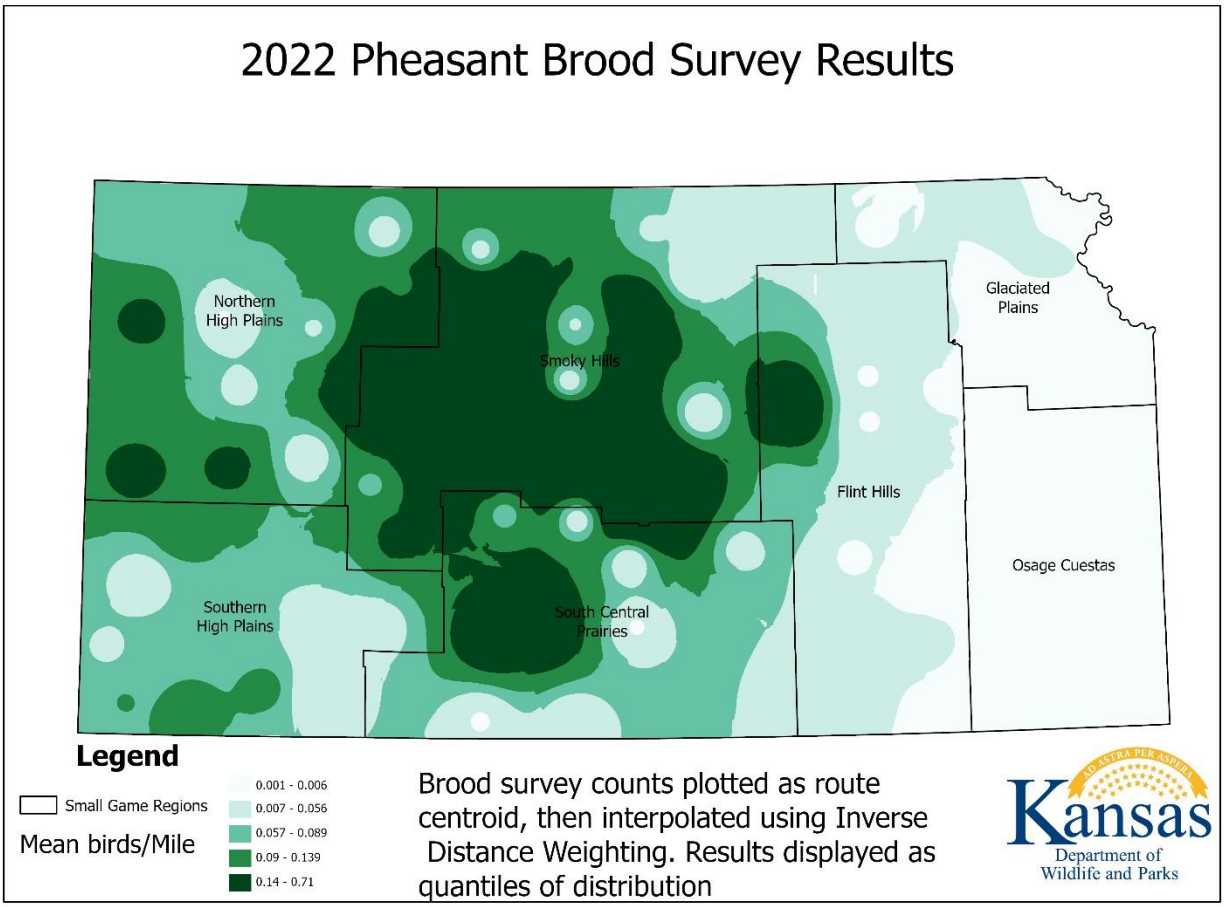

Figure 4. Relative pheasant densities estimated from brood survey routes in Kansas, 2022.

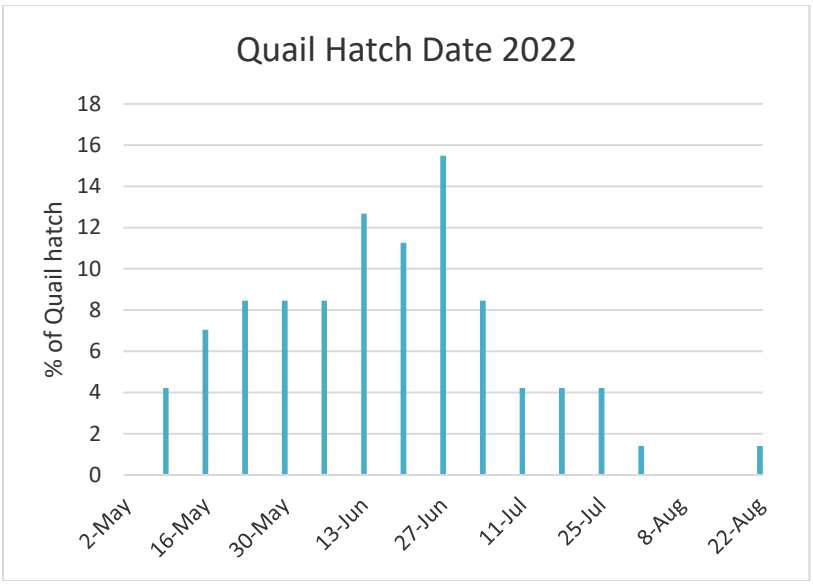

Figure 5. Weekly hatch dates of quail broods estimated from age at detection.

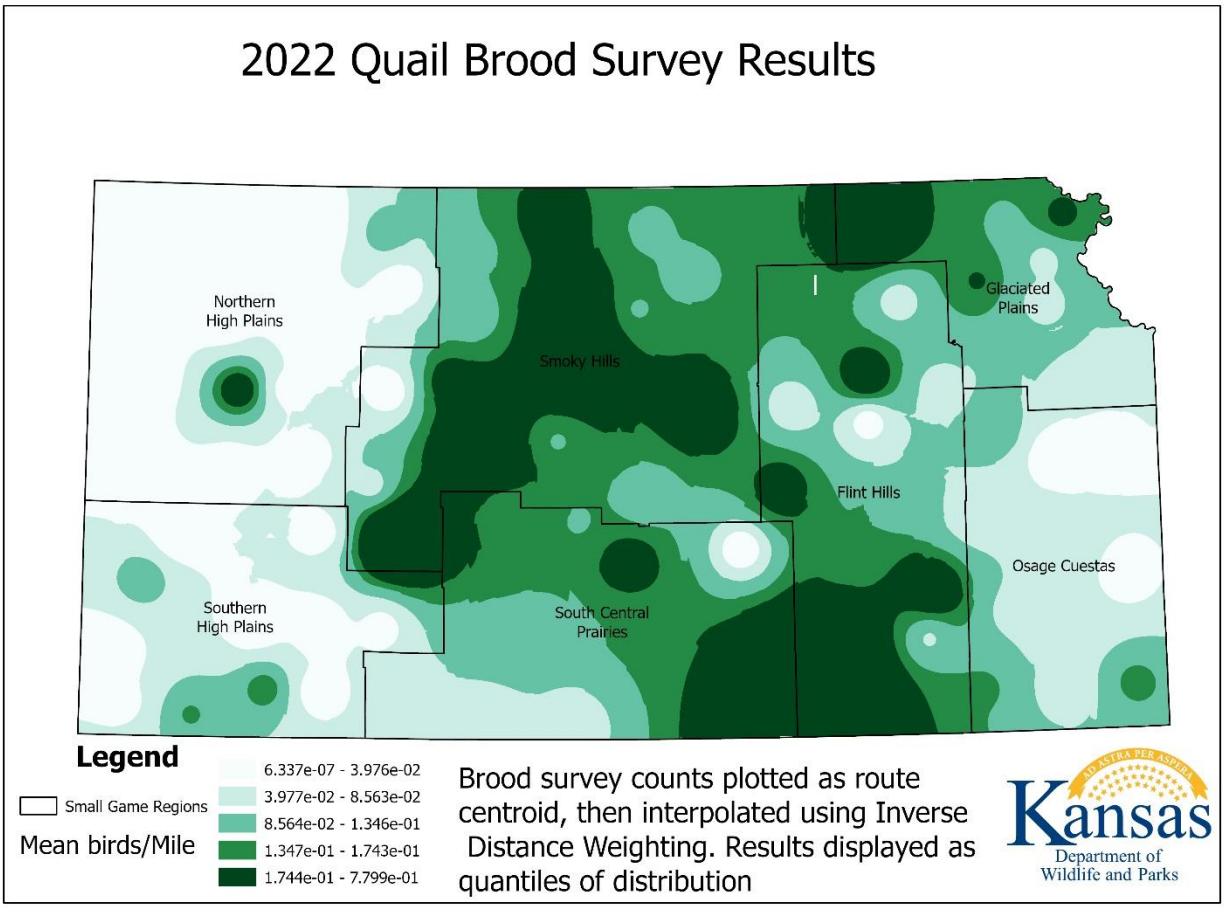

Figure 6. Relative quail densities estimated from brood survey routes in Kansas, 2022.

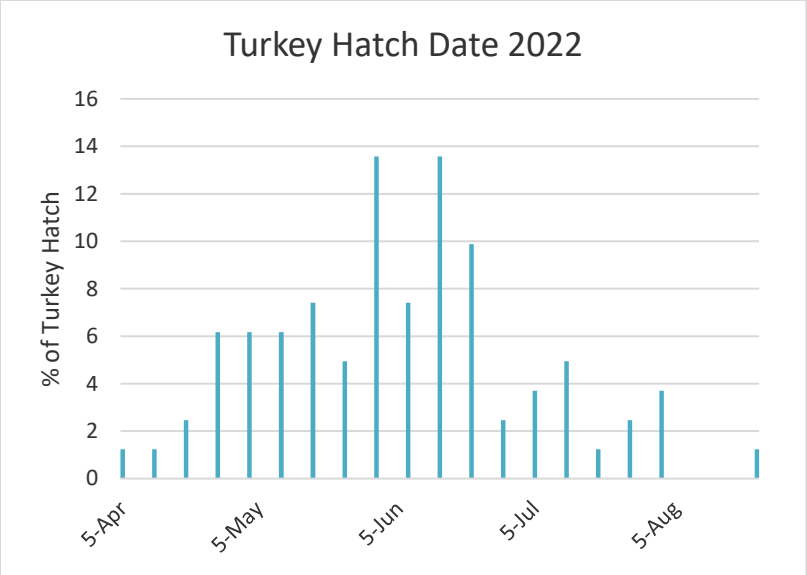

Figure 7. Weekly hatch dates of turkey broods estimated from age at detection.

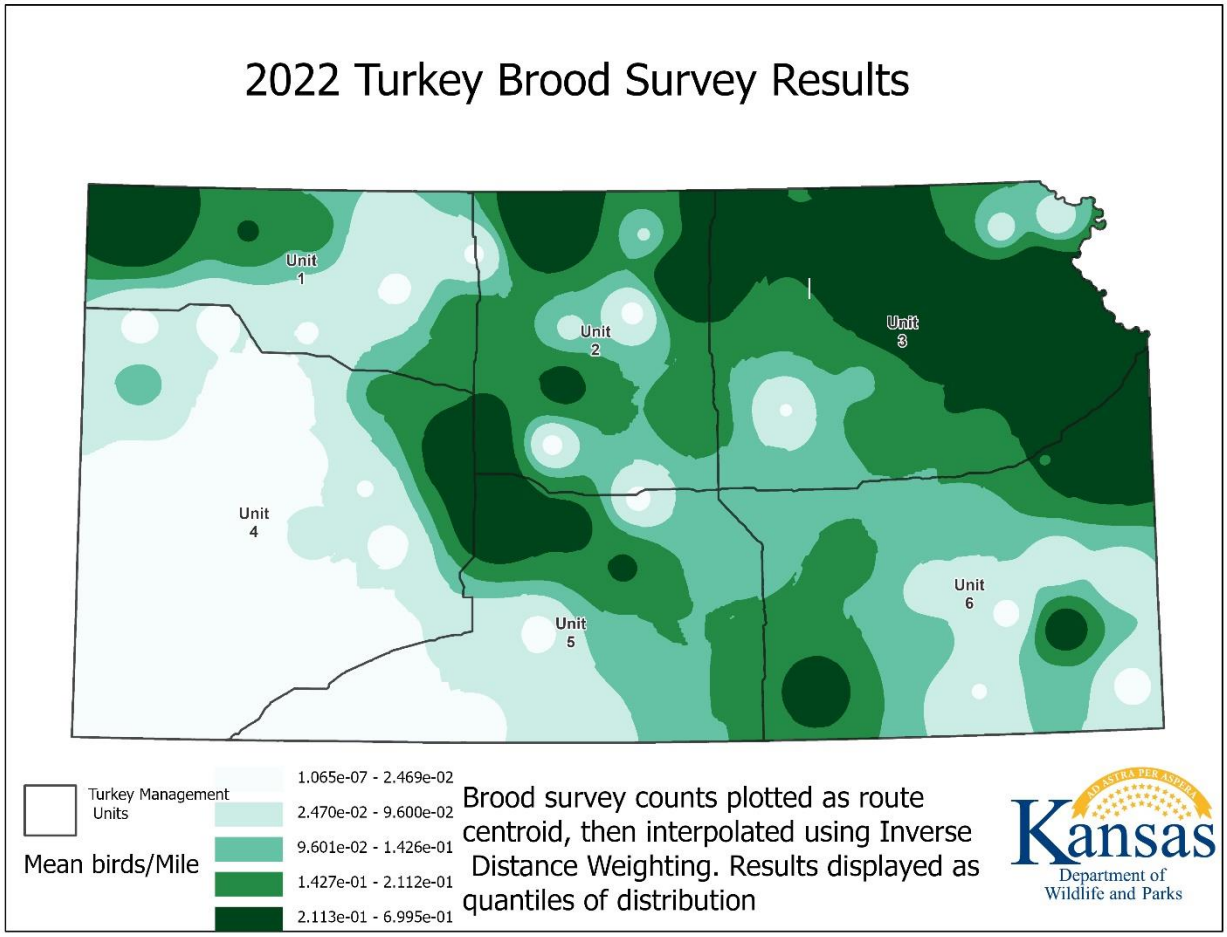

Figure 8. Relative turkey densities estimated from brood survey routes in Kansas, 2022.

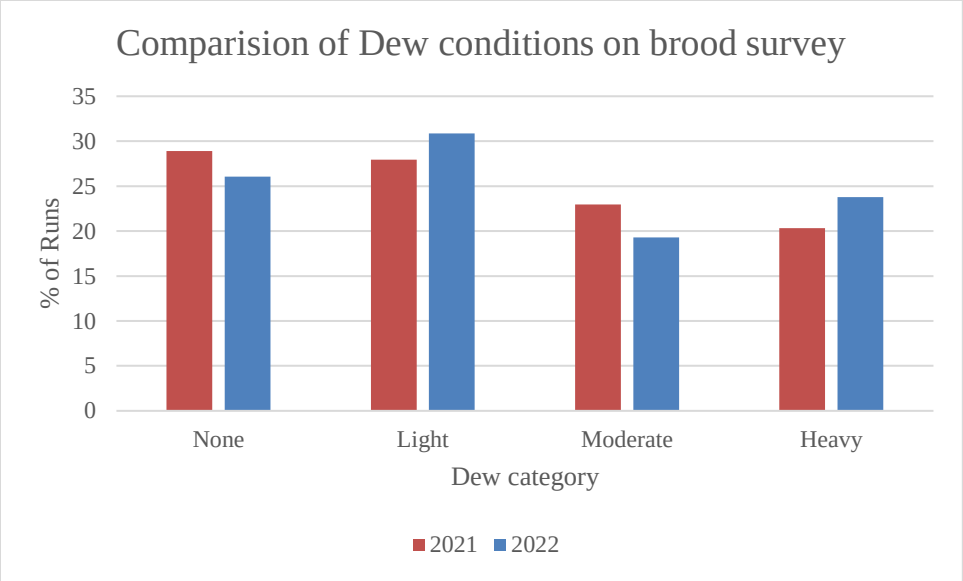

Figure 9. Interannual Comparison of Dew conditions during brood surveys. The presence of dew is one of the largest factors impacting detectability of birds during survey.