QUAIL, PHEASANT, & TURKEY BROOD SURVEY – 2023

Performance Report

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QUAIL, PHEASANT, AND TURKEY BROOD SURVEY RESULTS – 2023

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 2023 summer brood survey were from July 16 – August 26 (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 all 78 established routes between July 17 and August 28. There were 2 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 2023, there was a non-significant decrease in the statewide roadside index of pheasants (-12%) compared to 2022. While there were statistically significant declines in the Smoky Hills, all remaining regions saw some improvement. (Table 2). Pheasants per mile was highest in the Smoky Hills, with the highest index in Greeley County (Table 2). Similar to last year, few pheasants were detected in the Glaciated plains regions with only 1 route detecting pheasants last year. While Flint Hills region generally has lower pheasant densities there were large increases in routes this year. No pheasants were detected in the Osage Cuestas of southeastern Kansas.

Production indices were largely improved this year (Table 3). The chicks/hen and chicks per brood saw large increases (Table 3). There were no broods observed in the Glaciated Plains region. Pheasant hatch peaked statewide in early to mid-June with more than 50% of broods estimated hatch date in the first 2 weeks of June (Figure 3).

Quail

There was a non-significant decline in the statewide roadside index of quail (-15%) compared to 2022. The Smoky Hills saw a statistically significant decline (-42%) and a non-significant yet large apparent decrease also occurred in the Flint Hills (-45%). The Southern High Plains (120%) and South-Central prairies (52%) both had large yet non-significant increases in quail densities (Table 4). 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 South-Central Prairies followed by Flint Hills, with the highest index recorded in Coffey County (Table 4). Scaled quail were only recorded on Hamilton and Morton County routes.

Statewide there were fewer broods recorded brood size was much larger this year. The Osage Cuestas and Southern High plains saw the greatest improvements in production after poor production last year (Table 5). Largest declines in production this year were in the Northern High Plains region where quail are limited and drought impacts were the worst. Quail hatch peaked in late June with production dropping off but continuing through July (Figure 5).

Turkey

The statewide roadside index of turkey remained the same this compared to 2022. 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

Drought gripped the state last year limiting production and leaving limited cover on the landscape. These low numbers carried over to spring reducing the breeding potential of populations in some regions for 2023. Drought continued well into the spring limiting the growth of annual covers such as wheat. Much of the residual growth from perineal covers was removed as forage for cattle. This left limited nesting cover entering the nesting season. Precipitation began in early May and continued through most of the summer leaving much of the western regions of the state above average on precipitation. This greatly improved the available cover for broods on the landscape with weeds and wildflowers responding within failed crop fields, pastures, and CRP that had been hayed. However, this rain was too late to greatly improve nesting conditions particularly for pheasants and prairie chickens that have peak nesting earlier then quail. Despite above average summer precipitation there were 103 counties in the state this year that registered D2 or greater on the Drought severity index, triggering the release of Emergency use of CRP for forage. Brood habitat was excellent across much of the state and if nesting habitat was present chick survival should have been high. This was supported by large brood sizes on the survey. There were a few periods of prolonged extreme heat late in the summer that could impact chick survival but given the abundance of insects and habitat conditions this was not expected to have dramatic effects. While some of these area in North Pheasants are an important resource to Kansas. Within the last decade, estimated annual harvests have been trending down with the expiration of CRP fields and return of this habitat to traditional agricultural practices. Despite a reduced roadside index in 2022 harvest rates for pheasants remained unchanged, likely due to concentration of birds in limited habitat making

remaining birds easier to target last year. After declines on surveys and limited nesting cover, there was limited opportunity for improvements this year. As a result the statewide estimate remained low, as expected. With roadside densities that are similar to last year we expect that harvest success will be similar to 2022. However, this can be impacted by hunter effort and the improved habitat conditions may make it difficult to target birds this season as they are less likely to be concentrated. The Smoky Hills declined but remained the highest regional estimate of pheasants in 2023. The high plains regions saw some improvement and likely hold opportunities in areas that maintained some birds and cover last fall.

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 Kansas has largely maintained these higher densities thus far. Spring densities remained high based on spring whistle surveys. The recent drought conditions and subsequent precipitation have again created conditions that could result in another population spike. We did not see an initial spike this year as the roadside survey estimates declined slightly, but the precipitation may have been a little late for large increases this year. If precipitation remains adequate there is potential for these conditions to produce even better quail hunting in years to come. Declines in the Smoky Hills and Flint Hills where quail densities had been very high may result in closer to average densities. However this weas paired with increases in the Southern High Plains and the south Central Prairies providing much more even distribution of quail across the quail range this year. The South-Central Prairies had the highest roadside density this year (Figure 6). Based on roadside survey estimates, we expect hunters to maintain success rates similar to the last few years.

After increases in the roadside estimates for turkeys last year, the estimates this year remained the same. There were no significant differences in the any of the regional estimates. After several consecutive years of declining estimates, the stable estimates are promising. However, 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. Hunting opportunity has become much more restricted as populations have declined for turkeys and there is no fall season in 2023. The Northcentral region had the highest roadside estimate this year (Figure 8).

Table 1. Upland game bird brood routes and observers in Kansas, 2023.

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	Connor Rolen	4
Butler	Tyler Burt	4	Montgomery	Ryan Lies	4
Cherokee	David Jenkins	4	Morris	Brent Konen	4
Cheyenne	Abby McGuire	4	Morton	Kraig Schultz	4
Cloud	Matt Farmer	4	Neosho	Logan Martin	4
Coffey	Matt Peek	4	Ness	Andy Nelson	4
Comanche	Matt Hanvey	4	Norton	Luke Winge	4
Cowley	Kurt Grimm	4	Osage	Alex Lyon	4
Decatur	Daniel Howard	4	Osborne	Chris Lecuyer	4
Dickinson	Clint Thornton	4	Pawnee	Kevin Wood	4
Doniphan	Jesse Morland	4	Phillips	Eric Wiens	4
Elk	Viki Cikanek	4	Pottawatomie	Ben Couchman	4
Ellis	Luke Kramer	4	Pratt	Wes Sowards	4
Finney	Jared King	4	Rawlins	Kevin Klag	4
Ford	Jeff Sutton	4	Reno	Keith Murrow	4
Franklin	Ryan Tewllman	4	Republic	Rob Unruh	4
Geary	Corey Alderson	4	Rice	Steve Adams	4
Gove	Matt Schmidt	4	Rooks	Cale Hedges	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	6	Sherman	Abby McGuire	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	Zerick Kuecker	4	Thomas	Jared Ireland	4
Kingman	Troy Smith	3	Trego	Kent Hensley	4
Kiowa	Logan Shoup	4	Wabaunsee	Darin Porter	4
Labette	Rob Roggin	4	Wallace	Abby McGuire	4
Lane	Angie Reisch	3	Wilson	Cassie Wells	4

Table 2. Annual regional changes in mean pheasants per mile (P/M), 2023.

Route	2022 P/M	2023 P/M	% Δ
	Flint Hills		
Butler	0.00	0.01	0
Cowley	0.01	0.00	0
Dickinson	0.31	0.54	70
Elk	0.01	0.00	-100
Geary	0.00	0.00	NE
Greenwood	0.00	0.00	NE
Marion	0.06	0.08	38
Morris	0.00	0.01	NE
Pottawatomie	0.03	0.00	-100
Wabaunsee	0.00	0.00	0
Region	**0.04**	**0.08**	**82**
	Glaciated Plains		
Atchison	0.01	0.00	-100
Brown	0.01	0.00	-100
Doniphan	0.00	0.00	0
Jackson	0.00	0.00	0
Jefferson	0.00	0.00	0
Marshall	0.00	0.03	NE
Region	**0.00**	**0.00**	**94**
	Smoky Hills		
Barton	0.53	0.05	-91
Cloud	0.01	0.03	100
Ellis	0.39	0.03	-93
Hodgeman	0.16	0.13	-22
Jewell	0.05	0.19	286
Mitchell	0.24	0.16	-31
Ness	0.08	0.06	-27
Osborne	0.05	0.00	-100
Phillips	0.04	0.13	200
Republic	0.02	0.01	-67
Rice	0.71	0.39	-44
Rooks	0.62	0.38	-39
Rush	0.26	0.36	42
Russell	0.03	0.07	100
Saline	0.01	0.00	-100
Smith	0.13	0.16	25
Trego	0.46	0.05	-88
Region	**0.22**	**0.13**	**-42***

Route	2022 P/M	2023 P/M	% Δ
	Northern High Plains		
Cheyenne	0.06	0.27	388
Decatur	0.11	0.23	107
Gove[a]	NA	0.17	NA
Graham	0.13	0.16	24
Greeley	0.17	0.82	392
Lane	0.01	0.10	900
Logan	0.04	0.07	80
Norton	0.03	0.00	-100
Rawlins	0.09	0.14	67
Scott	0.17	0.14	-17
Sheridan	0.05	0.02	-50
Sherman	0.17	0.10	-41
Thomas	0.00	0.13	NE
Wallace	0.10	0.03	-67
Region	**0.09**	**0.12**	**35**
	South-Central Prairies		
Barber	0.01	0.00	-100
Comanche	0.00	0.00	0
Harvey	0.04	0.00	-100
Kingman	0.00	0.03	NE
Kiowa	0.24	0.26	9
Pawnee	0.07	0.16	112
Pratt	0.24	0.21	-15
Reno	0.01	0.02	125
Stafford	0.03	0.02	-40
Region	**0.07**	**0.08**	**7**
	Southern High Plains		
Finney	0.09	0.01	-92
Ford	0.03	0.01	-80
Gray	0.01	0.00	-100
Hamilton	0.02	0.01	-33
Haskell	0.06	0.09	50
Kearny	0.11	0.10	-13
Meade	0.01	0.06	700
Morton	0.09	0.06	-38
Seward	0.11	0.04	-67
Stanton	0.05	0.01	-86
Stevens	0.11	0.33	188
Region	**0.07**	**0.07**	**4**
Statewide	**0.10**	**0.09**	**-12**

* = 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), 2023.

Region	2022C/H	2023C/H	%Δ	2022 C/B	2023 C/B	%Δ	2022 B/H	2023 B/H	%Δ
Flint Hills	4.9	8.0	64	5.5	7.2	31	1.0	0.8	-22
Glaciated Plains	0.0	0.0	0	0.0	0.0	NE	0.0	0.0	0
Northern High Plains	3.0	11.3	270	3.3	5.9	77	0.9	0.5	-43
Osage Cuestas	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0
Smoky Hills	4.9	5.9	22	5.0	4.6	-9	0.8	0.7	-16
South-Central Prairies	5.9	11.1	88	5.5	6.5	19	0.7	0.8	5
Southern High Plains	1.7	4.5	159	2.1	3.4	62	0.7	0.6	-17
Statewide	4.2	7.4	74	4.4	5.2	18	0.6	0.8	24

Table 4. Annual regional changes in mean quail per mile (Q/M), 2023.

Route	2022 Q/M	2023 Q/M	% Δ
	Flint Hills		
Butler	0.15	0.29	89
Cowley	0.78	0.23	-71
Dickinson	0.05	0.09	86
Elk	0.08	0.06	-25
Geary	0.25	0.05	-81
Greenwood	0.26	0.21	-18
Marion	0.22	0.03	-87
Morris	0.01	0.15	1900
Pottawatomie	0.06	0.04	-33
Wabaunsee	0.06	0.12	89
Region	**0.21**	**0.12**	**-45**
	Glaciated Plains		
Atchison	0.07	0.05	-30
Brown	0.13	0.04	-71
Doniphan	0.19	0.27	42
Jackson	0.18	0.05	-70
Jefferson	0.07	0.03	-56
Marshall	0.31	0.11	-65
Region	**0.16**	**0.09**	**-42**
	Northern High Plains		
Cheyenne	0.00	0.00	0
Decatur	0.00	0.02	NE
Gove[a]	NA	0.00	NA
Graham	0.02	0.02	50
Greeley	0.00	0.00	0
Lane	0.01	0.02	100
Logan	0.00	0.00	0
Norton	0.24	0.07	-73
Rawlins	0.11	0.00	-100
Scott	0.02	0.00	-100
Sheridan	0.01	0.00	-100
Sherman	0.00	0.00	0
Thomas	0.00	0.00	0
Wallace	0.00	0.03	NE
Region	**0.03**	**0.01**	**-59**
	South-Central Prairies		
Barber	0.05	0.32	571
Comanche	0.04	0.14	233
Harvey	0.00	0.06	NE
Kingman	0.14	0.20	40
Kiowa	0.11	0.28	144
Pawnee	0.14	0.02	-84
Pratt	0.11	0.23	113
Reno	0.23	0.12	-48
Stafford	0.13	0.08	-40
Region	**0.11**	**0.16**	**52**
	Smoky Hills		
Barton	0.13	0.04	-67
Cloud	0.11	0.13	13
Ellis	0.22	0.03	-88
Hodgeman	0.50	0.03	-93
Jewell	0.12	0.17	41
Mitchell	0.13	0.29	122
Ness	0.07	0.02	-67
Osborne	0.35	0.01	-98
Phillips	0.13	0.05	-61
Republic	0.15	0.08	-50
Rice	0.09	0.25	169
Rooks	0.10	0.16	57
Rush	0.33	0.06	-83
Russell	0.22	0.07	-68
Saline	0.25	0.04	-83
Smith	0.21	0.38	82
Trego	0.00	0.00	0
Region	**0.18**	**0.11**	**-42***
	Southern High Plains		
Finney	0.01	0.04	400
Ford	0.02	0.01	-33
Gray	0.00	0.02	NE
Hamilton	0.12	0.54	347
Haskell	0.00	0.00	0
Kearny	0.01	0.01	100
Meade	0.01	0.11	1300
Morton	0.03	0.10	200
Seward	0.16	0.00	-100
Stanton	0.00	0.00	0
Stevens	0.14	0.21	53
Region	**0.05**	**0.10**	**120**
	Osage Cuestas		
Allen	0.06	0.01	-75
Bourbon	0.01	0.05	700
Cherokee	0.15	0.03	-78
Coffey	0.04	0.58	1340
Franklin	0.01	0.01	0
Labette	0.05	0.00	-100
Miami	0.02	0.01	0
Montgomery	0.14	0.13	-12
Neosho	0.05	0.07	56
Osage	0.13	0.06	-56
Wilson	0.07	0.04	-40
Region	**0.06**	**0.09**	**56**
Statewide	**0.11**	**0.09**	**-15**

*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, 2023.

Region	2022 C/A	2023 C/A	%Δ	2022 C/B	2023 C/B	%Δ	2022 B/A	2023 B/A	%Δ
Flint Hills	0.7	1.0	46	6.2	8.6	39	0.12	0.07	-37
Glaciated Plains	2.3	0.8	-64	8.1	8.3	2	0.23	0.10	-57
Northern High Plains	4.4	0.2	-95	14.7	3.0	-80	0.20	0.00	-100
Osage Cuestas	0.4	1.8	347	5.6	7.3	29	0.06	0.21	259
Smoky Hills	2.1	1.8	-14	8.8	8.5	-4	0.17	0.11	-35
South-Central Prairies	1.8	1.0	-44	9.9	9.9	0	0.15	0.06	-58
Southern High Plains	0.4	1.0	144	9.5	8.8	-8	0.02	0.06	165
Statewide	1.1	1.2	11	4.4	8.5	91	0.25	0.09	-64

Table 6. Annual regional changes in mean turkey per mile (T/M), 2023

Route	2022 T/M	2023 T/M	[a]% Δ	Route	2022 T/M	2023 T/M	% Δ
	Northeast				Northcentral		
Atchison	0.24	0.29	21	Barton	0.00	0.00	0
Brown	0.06	0.03	-50	Cloud	0.38	0.27	-28
Dickinson	0.02	0.06	167	Ellis	0.19	0.45	134
Doniphan	0.04	0.12	167	Jewell	0.09	0.52	508
Franklin	0.21	0.17	-17	Mitchell	0.00	0.00	0
Geary	0.13	0.24	89	Osborne	0.08	0.40	392
Jackson	0.24	0.30	29	Phillips	0.01	0.05	250
Jefferson	0.70	0.44	-37	Republic	0.24	0.67	175
Marshall	0.22	0.15	-32	Rooks	0.19	0.03	-85
Morris	0.15	0.74	400	Rush	0.46	0.13	-72
Osage	0.19	0.15	-23	Russell	0.26	0.20	-23
Pottawatomie	0.35	0.37	6	Saline	0.21	0.15	-29
Wabaunsee	0.21	0.01	-97	Smith	0.49	0.48	-3
Region	**0.20**	**0.22**	**12**	**Region**	**0.20**	**0.26**	**29**
	Northwest				Southcentral		
Cheyenne	0.44	0.07	-84	Barber	0.04	0.01	-83
Decatur	0.17	0.00	-100	Comanche	0.00	0.00	0
Graham	0.00	0.00	0	Harvey	0.13	0.20	53
Norton	0.04	0.03	-20	Kingman	0.14	0.04	-72
Rawlins	0.22	0.09	-58	Kiowa	0.03	0.00	-100
Sheridan	0.02	0.00	-100	Meade	0.00	0.00	0
Sherman	0.00	0.00	0	Pawnee	0.41	0.06	-84
Thomas	0.00	0.00	0	Pratt	0.00	0.00	0
Region	**0.11**	**0.02**	**-78**	Reno	0.23	0.22	-3
	Southwest			Rice	0.00	0.05	0
Finney	0.04	0.04	-100	Stafford	0.25	0.23	-8
Ford	0.00	0.00	0	**Region**	**0.11**	**0.07**	**-34**
Gove[a]	NA	0.05	NA		Southeast		
Gray	0.00	0.00	0	Allen	0.05	0.05	0
Greeley	0.00	0.00	0	Bourbon	0.05	0.40	771
Hamilton	0.00	0.00	0	Butler	0.17	0.09	-48
Haskell	0.00	0.00	0	Cherokee	0.00	0.00	0
Hodgeman	0.00	0.00	0	Coffey	0.10	0.06	-42
Kearny	0.00	0.00	0	Cowley	0.26	0.16	-39
Lane	0.00	0.00	0	Elk	0.13	0.28	110
Logan	0.00	0.05	NE	Greenwood	0.07	0.39	480
Morton	0.00	0.00	0	Labette	0.12	0.04	-67
Ness	0.02	0.00	-100	Marion	0.10	0.01	-86
Scott	0.00	0.00	0	Miami	0.44	0.23	-47
Seward	0.00	0.00	0	Montgomery	0.02	0.04	100
Stanton	0.00	0.00	0	Neosho	0.31	0.08	-75
Stevens	0.00	0.00	0	Wilson	0.00	0.08	NE
Trego	0.16	0.01	-51	**Region**	**0.14**	**0.15**	**10**
Wallace	0.13	0.08	-92				
Region	**0.02**	**0.01**	**-53**	**Statewide**	**0.13**	**0.12**	**-1**

*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), 2023.

Region	2022 P/H	2023 P/H	%Δ	2022 P/B	2023 P/B	%Δ	2022 B/H	2023 B/H	%Δ
Northcentral	1.8	1.3	-29	5.4	5.5	1	0.33	0.21	-36
Northeast	1.4	0.8	-46	5.1	4.1	-20	0.28	0.18	-36
Northwest	3.4	0.5	-84	4.3	3.0	-30	0.64	0.18	-72
Southcentral	1.1	2.0	76	6.2	6.0	-3	0.15	0.30	95
Southeast	0.7	1.6	138	4.3	4.5	3	0.16	0.37	130
Southwest	0.0	3.0	NE	0.0	4.5	NE	0.00	0.33	NE
Statewide	1.4	1.2	-13	5.1	4.7	-8	0.25	0.23	-8

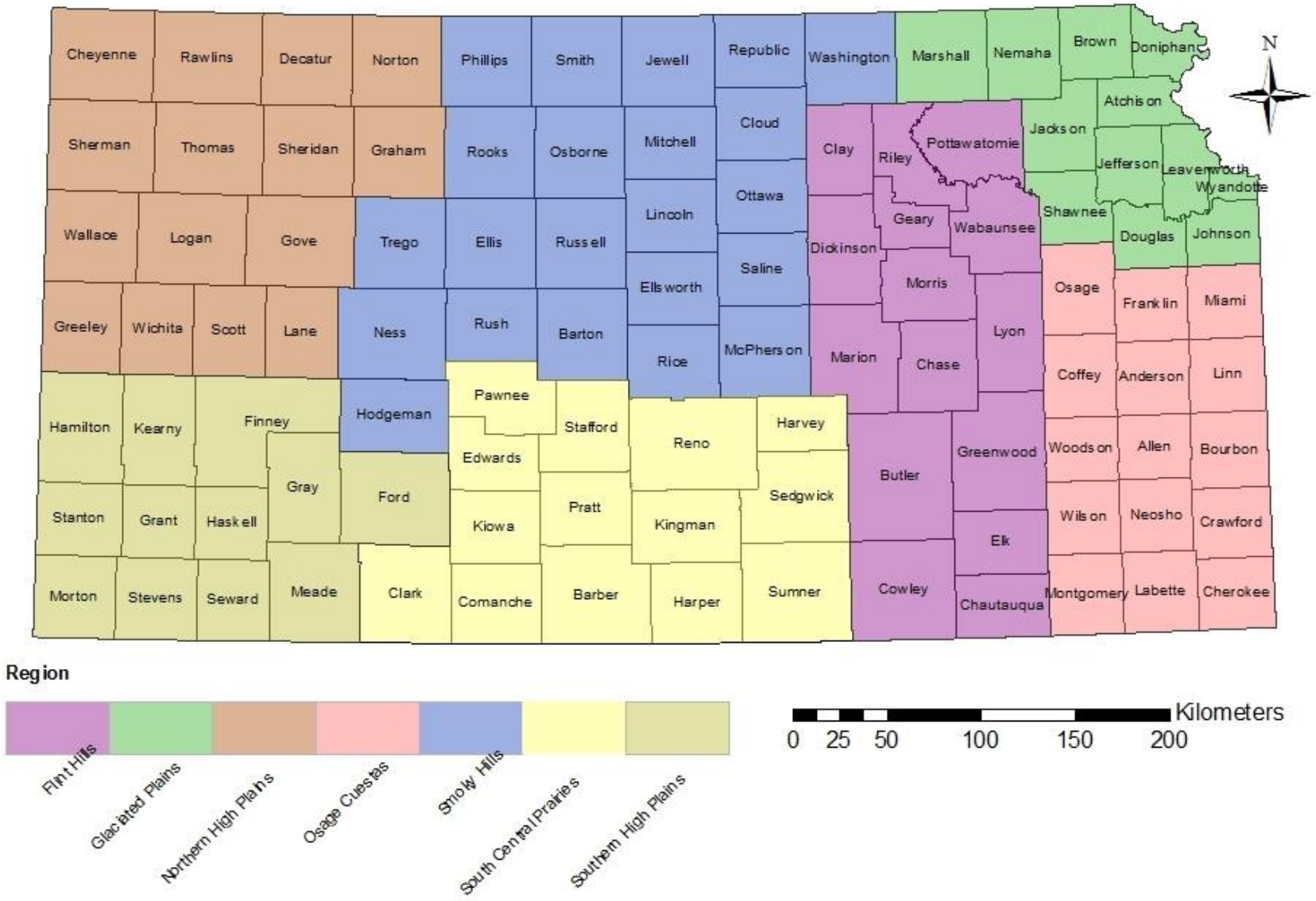

Figure 1. Kansas Small Game Regions.

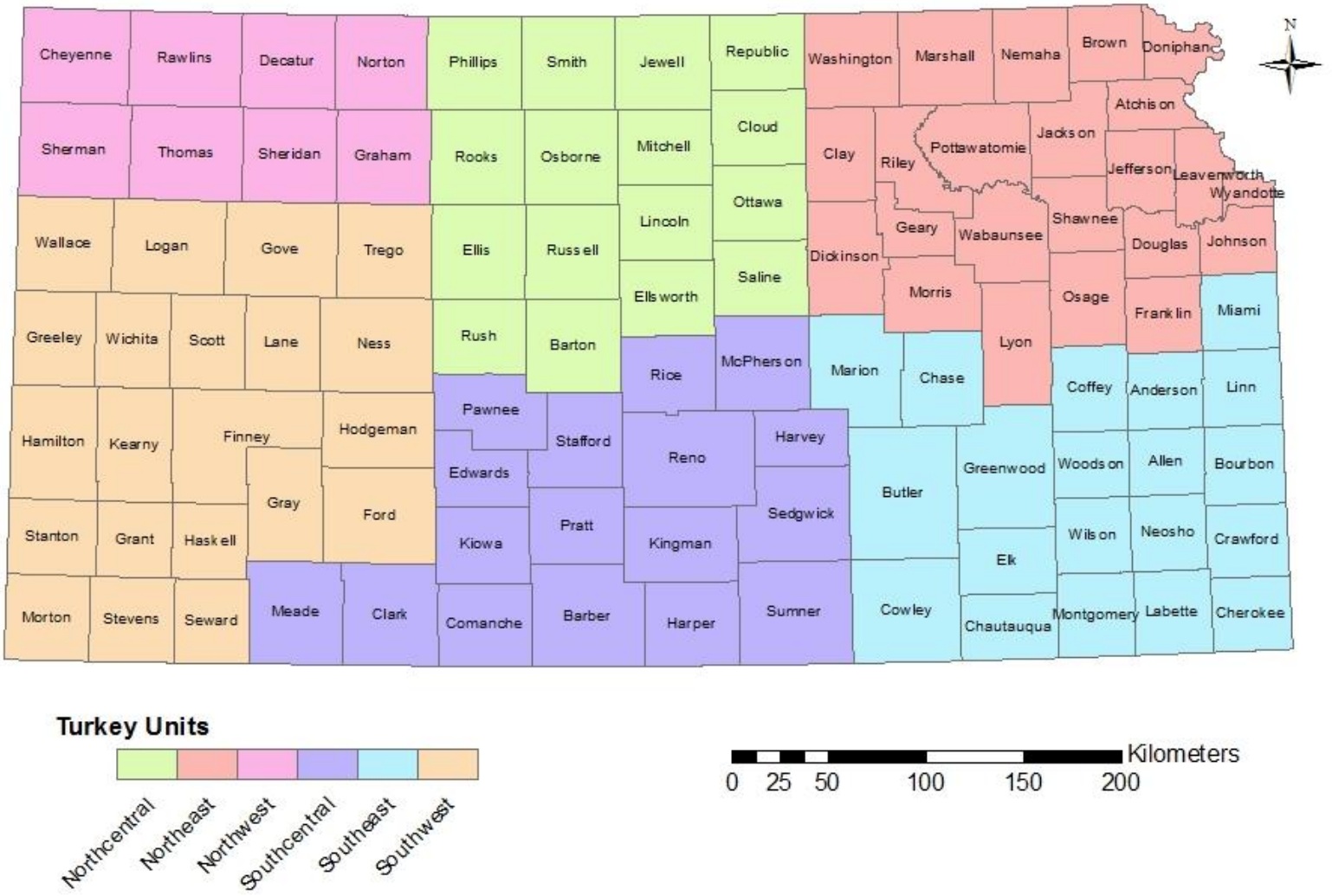

Figure 2. Kansas Turkey Management Regions.

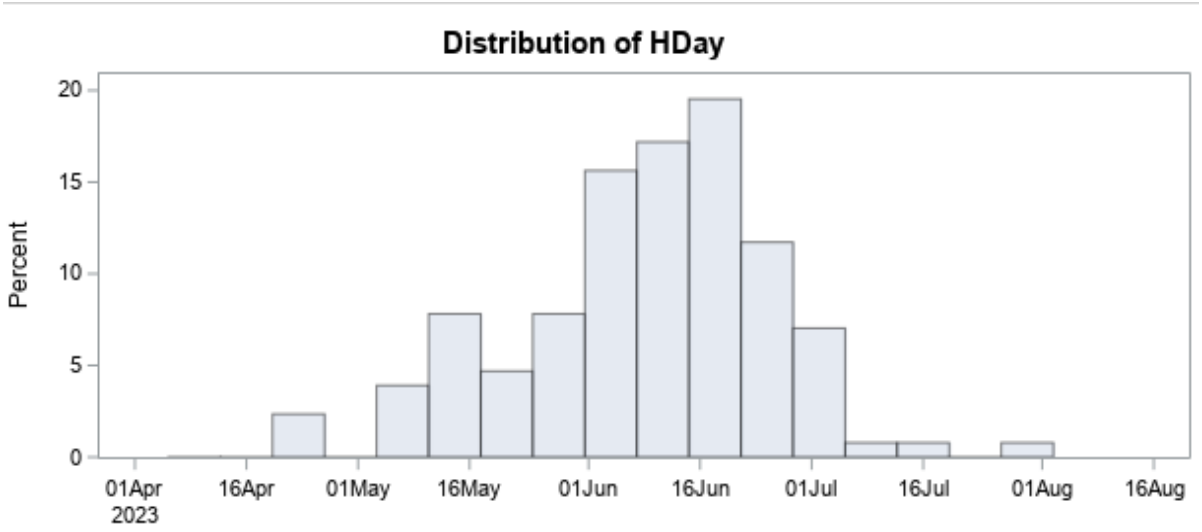

Figure 3. Weekly hatch dates of pheasant broods estimated from age at detection.

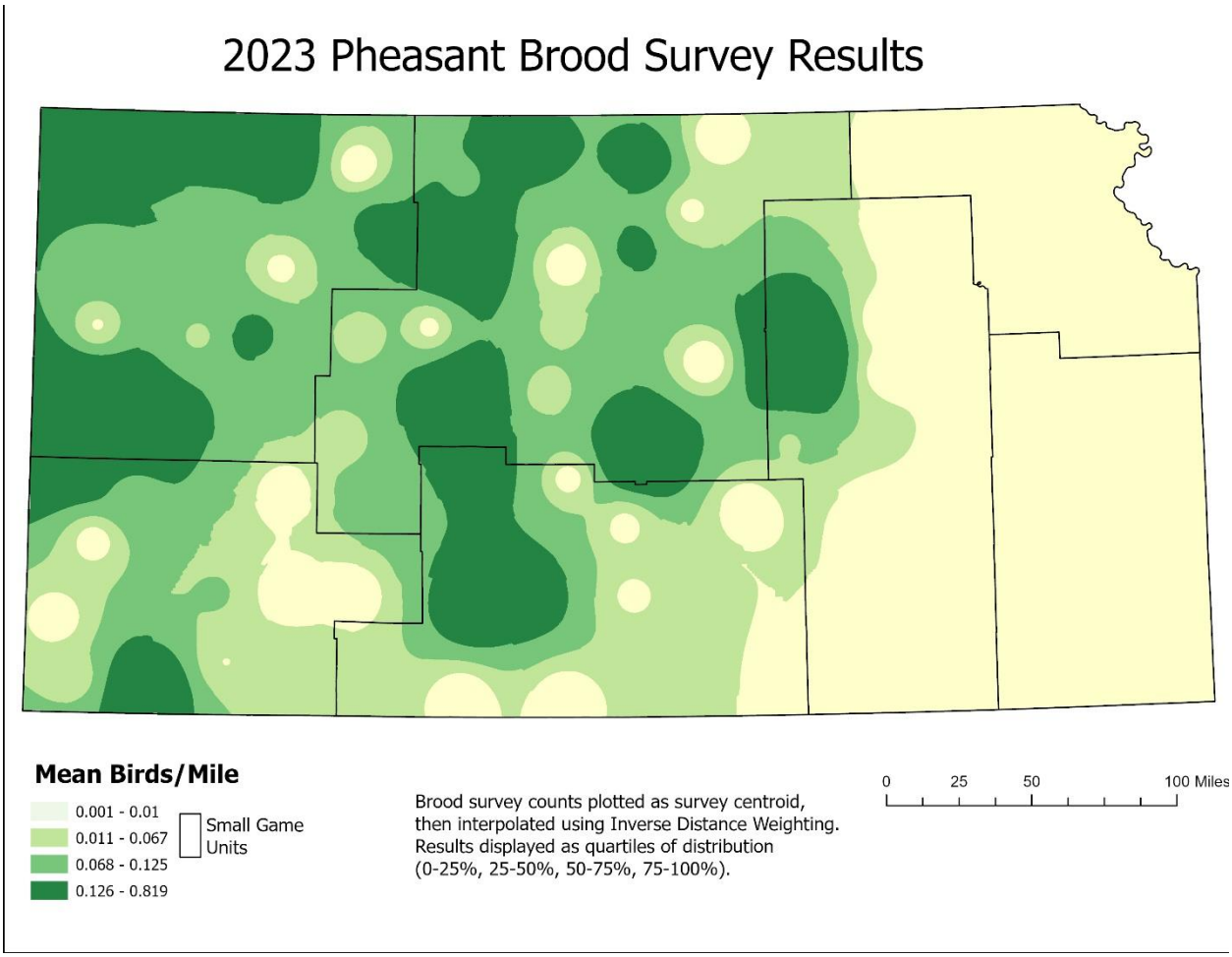

Figure 4. Relative pheasant densities estimated from brood survey routes in Kansas, 2023.

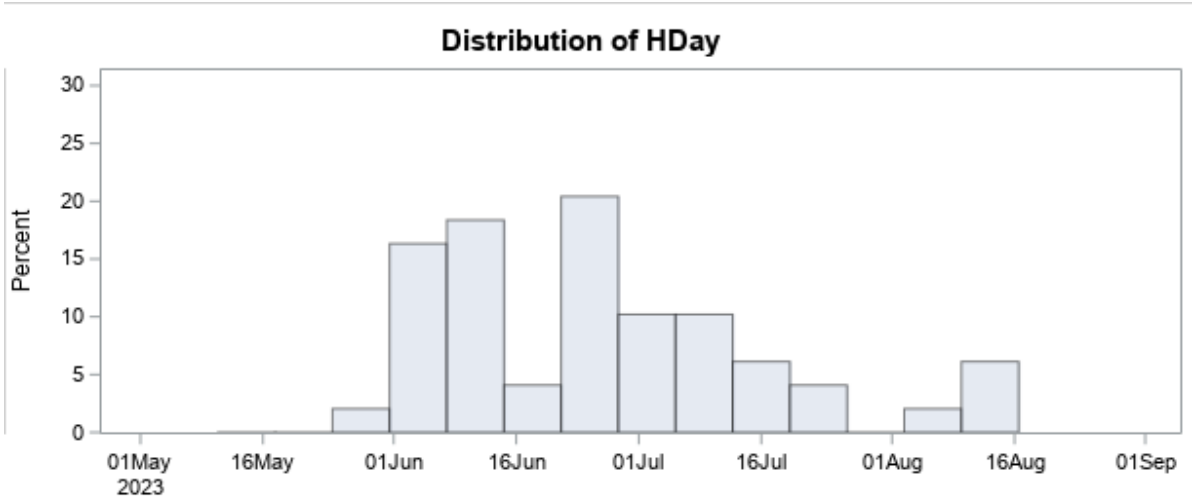

Figure 5. Weekly hatch dates of quail broods estimated from age at detection.

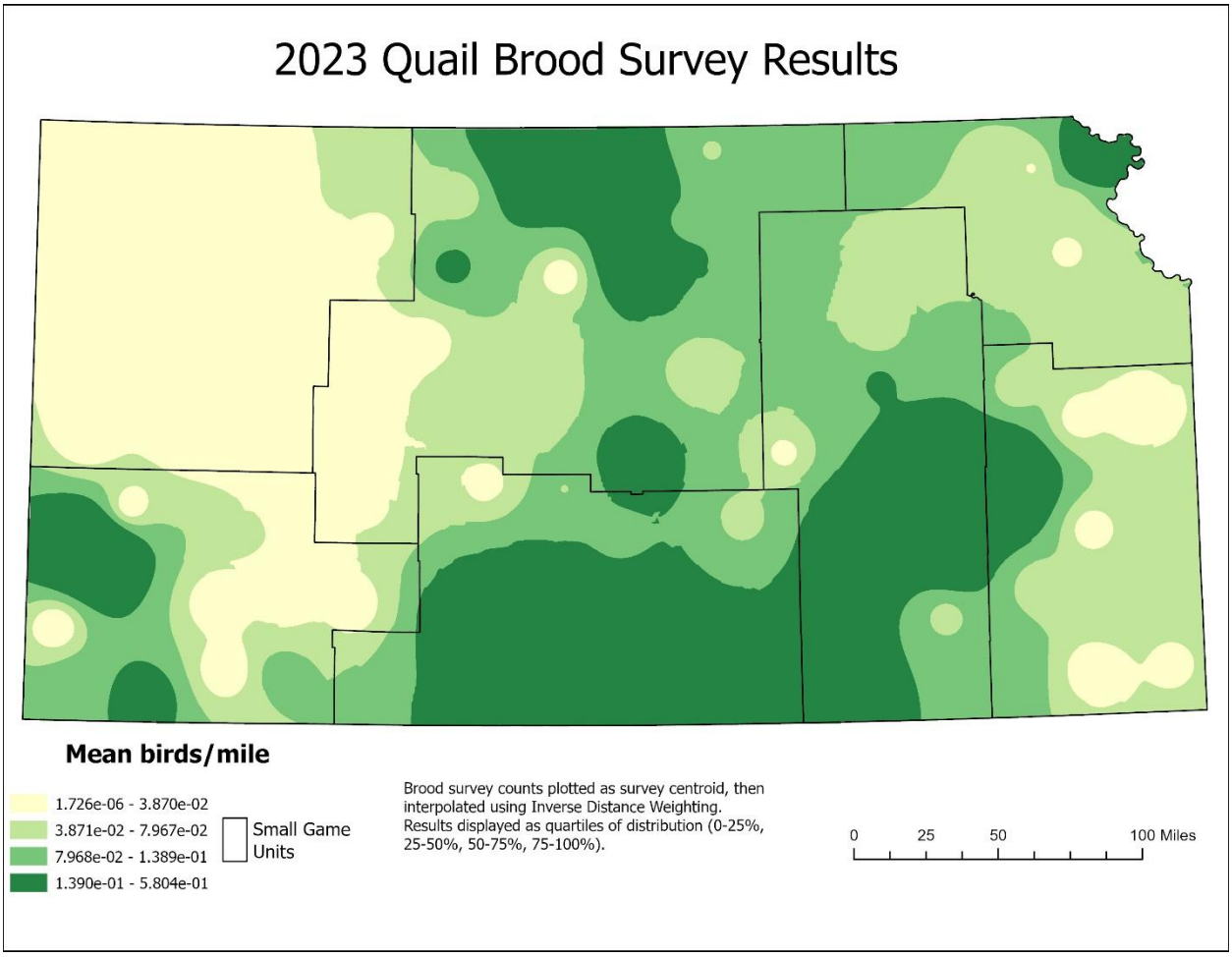

Figure 6. Relative quail densities estimated from brood survey routes in Kansas, 2023.

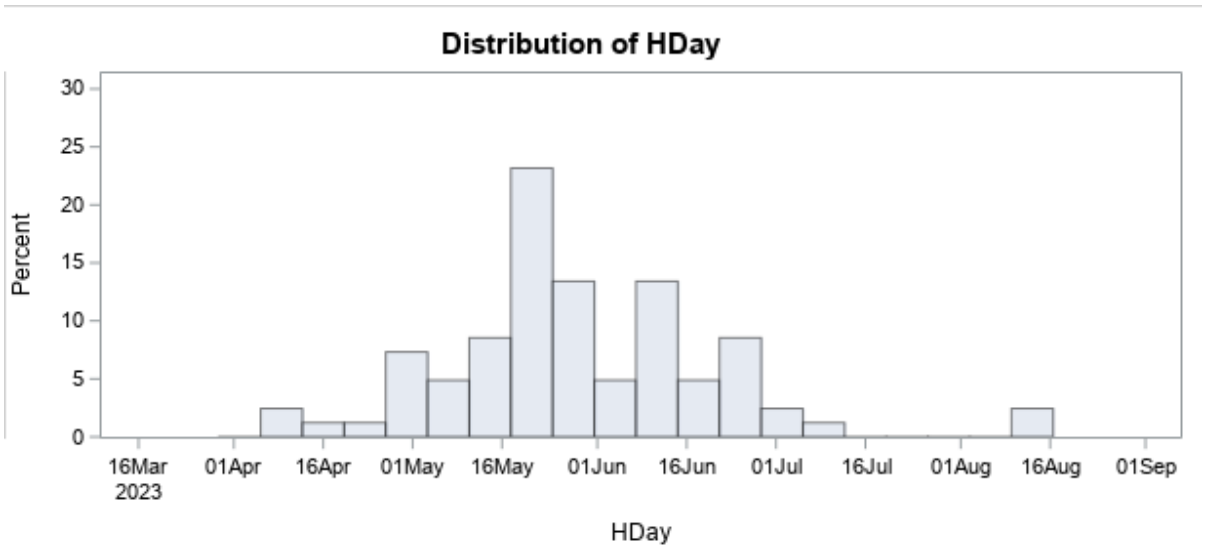

Figure 7. Weekly hatch dates of turkey broods estimated from age at detection.

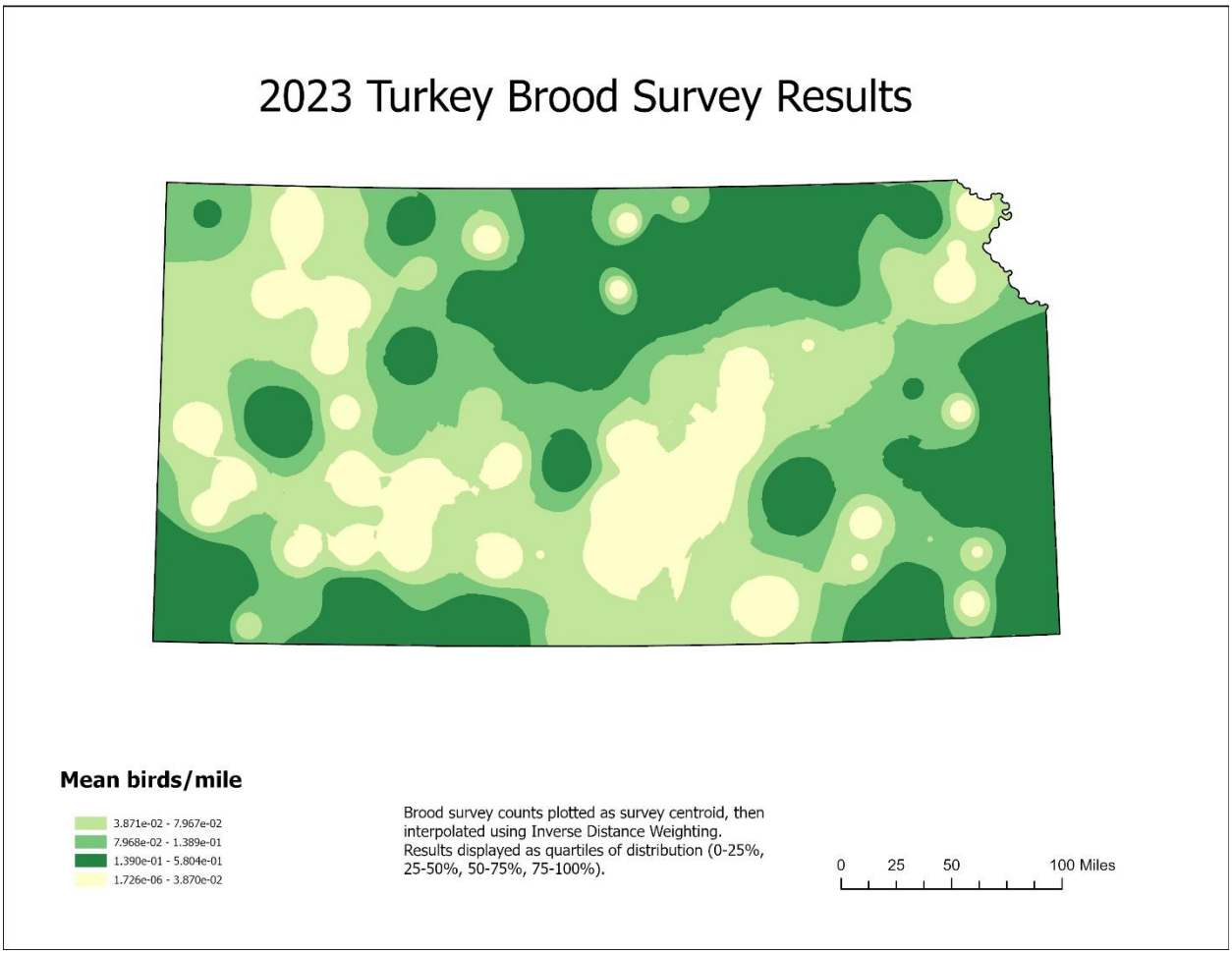

Figure 8. Relative turkey densities estimated from brood survey routes in Kansas, 2023.

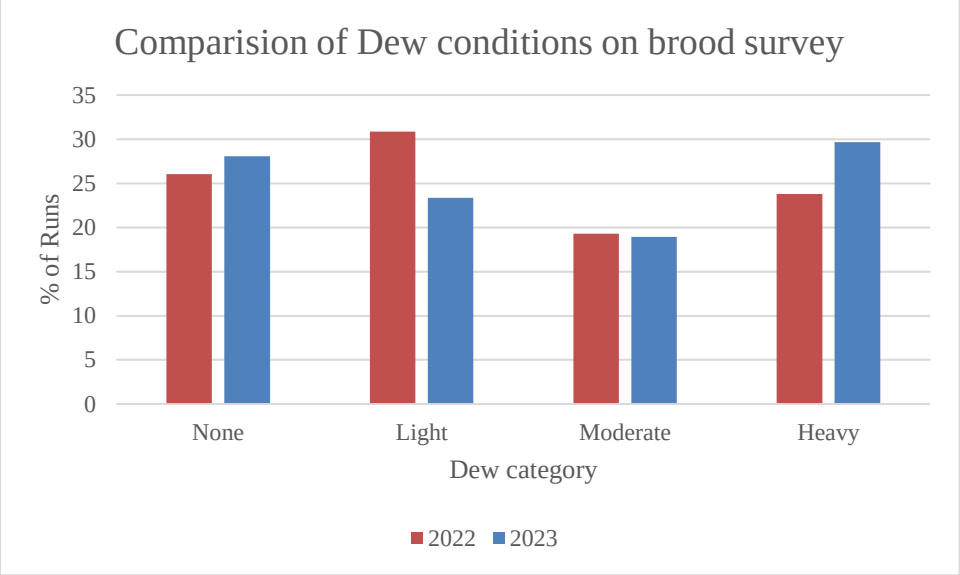

Figure 9. Interannual Comparison of Dew conditions during brood surveys. The presence of dew is one of the largest factors impacting detectability of birds during survey.