PHEASANT CROWING SURVEY - 2019

PERFORMANCE REPORT
STATEWIDE WILDLIFE RESEARCH AND SURVEYS

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

Grant W-39-R-25

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May 2019

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KANSAS PHEASANT CROWING SURVEY – 2019
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INTRODUCTION

The Kansas Department of Wildlife, Parks, and Tourism (KDWPT) collects breeding population data for pheasant (*Phasianus colchicus*) by conducting crow counts throughout the pheasant range in the state. Measurable wild pheasant populations do not occur in south-east Kansas (Osage Cuestas Region). Pheasants are an extremely important wildlife resource for Kansas, and these indices help monitor population change through time.

METHODS

The survey period was from April 25 through May 15, 2019. Pheasant routes are ~20 mile transects, with at least 2 miles between each of the 11 stops. At stops, observers listen for 2 minutes and count all the audible 2-note (syllable) crows heard from male pheasants. The Pheasant Crow Survey Index (PCSI) is the mean number of crows per 2-minute stop for each route. The first stop begins 45 minutes before sunrise and continues through the last stop. Noise interference is taken into consideration, and data are censored if the observer feels noise is severely inhibiting their ability to count crows.

The results of the 2019 survey and comparisons to the 2018 data are presented in Table 1. There were 63 of the 65 established routes assigned for 2019 (routes in Osage and Coffey counties are run only in even-numbered years), and 59 of the 63 were successfully completed. Extensive rainfall and flooding throughout the survey period prompted a one-week extension to allow for further data collection and 12 routes were surveyed during this time. Personnel assigned to these surveys are noted in Table 2. Range wide and regional trends since the survey's 1997 initiation are shown in Figure 1. Location of routes within the state are shown in Figure 2.

Data Analysis
Given that samples are taken on permanently established routes, samples are not independent and thus a paired-sample t-test is used to draw inter-annual comparisons. A two-tailed test with an alpha level 0.10 was used to identify statistically significant differences between years at regional and statewide scales. Routes that do not have consistent observers are removed from analysis of inter-annual comparisons to remove observer bias in analysis.

Inverse Distance Weighting is a mapping technique that can be used to interpolate data between survey points, providing estimates to areas not surveyed. This technique has limitations at smaller scales (e.g., within counties and townships) because no habitat variables are included (only count data), but is useful for large-scale interpretation of statewide data for regional comparisons. Inverse Distance Weighting was used by assigning the route-specific PCSI to the centroid of each route. All sampled routes were used to extrapolate data throughout Kansas' pheasant range (Figure 3). For comparison, the interpolated percent change of the PCSI the previous year's survey is also included where observers are consistent (Figure 4).

RESULTS

Range-wide
The 2019 PCSI was 11.29 crows per stop across all 59 surveyed routes. Among the 52 comparable routes (sampled both years by same observer), there was no significant change ($P = 0.19$) in the statewide mean from 2018 (-9%). The PCSI increased or remained the same on 18 of the comparable routes and decreased on the remaining 34 routes relative to 2017 (Table 1).

Flint Hills: Of the 7 established routes 6 were completed. The regional PCSI was 1.23, indicating no significant change from 2018 ($P = 0.32$). **Glaciated Plains:** Of the 6 established routes 5 were

completed. The regional PCSI was 0.46, indicating no significant change from 2018 (P = 0.57). **Northern High Plains:** All 12 routes were completed. The regional PCSI was 16.67, indicating no significant change from 2018 (P =0.94). **Smoky Hills:** Of 20 established routes 19 were completed, the regional PCSI was 12.2, indicating a significant decrease of -23% from 2018 (P =0.003). **Southern High Plains:** Of 7 established survey routes 6 were completed in this region. The regional PCSI was 20.06, indicating no significant change from 2018 (P = 0.29). **South-Central Prairies:** All 11 routes were completed this year. The regional PCSI was 4.46 indicating no significant change from 2018 (P = 0.33).

DISCUSSION

The spring pheasant survey results can represent two important life stages for pheasant populations. Spring surveys can indicate over-winter survival for a population. During extended harsh conditions, winter can be a bottleneck for some upland game populations. However, unlike states in the northern portion of the pheasant range, Kansas rarely has winter weather that is extreme enough to have significant impacts on survival. When overwinter survival is high, spring surveys also reflect the previous breeding season success (i.e., production) for the population. Spring crow counts usually do not predict fall populations well, but rather indicate breeding population potential.

During the winter of 2018-2019 there was copious amounts of precipitation including some significant blizzard like conditions in late winter into early spring. However, these storms were relatively short lived and snow cover was not extended so were unlikely to have had any significant impact on the population. With little precipitation during the winter of 2017-2018, last spring started off dry with little sub-surface soil moisture. Perennial cover such as CRP had benefited from heavy spring rains the previous spring, but the lack of precipitation created overall less than ideal nesting conditions in 2018. Heavy rain began during the nesting season, including localized flooding, causing lower nest success in some areas. Rain remained heavy throughout much of the summer, this delayed wheat harvest which is typically seen as a positive for pheasants, but the wheat was relatively short and likely wasn't offering much nesting cover last year. As a result of heavy precipitation, reproductive success reduced last year, but populations remained relatively stable in most regions. The impacts of these events were most evident in the Smoky Hills which was the only region to have a significant decrease in the crow index this year. The High plains faired well this year with the Northern High Plains remaining very similar to last year and the Southern High Plains index displaying a non-significant increase. While the Central Regions didn't fare as well, the South-Central prairies experienced staff changes, excluding several routes with traditionally higher densities from the analysis.

In general pheasant production is optimized in Kansas with near average rainfall, with conditions that are too wet or too dry reducing success. The spring PCSI in Kansas went from its peak in 2011, through a precipitous decline into 2014. Extreme drought plagued the primary KS pheasant range during this time, causing severe population declines. From 2014-2016, drought conditions improved giving way to improved habitat conditions. With these improved conditions the reproductive output of the Kansas pheasant population increased, as indicated by increasing PCSI, in 3 consecutive years. This resulted in the 2017 statewide PCSI returning to pre-drought averages. In 2019 the pheasant range has received heavy winter precipitation, producing good soil moisture and thus nesting cover. However, rainfall across the state this spring has been heavy and included flooding. Researchers currently tracking pheasants in the state have already documented a delayed nesting activity. Heavy precipitation and flooding can cause nest abandonment or destruction. Displacement due to these events likely impacted count on some routes. At this point it is unclear how large of an impact this heavy rainfall will be.

Despite fluctuation Kansas pheasant populations remained viable across the primary range. As weather has improved, pheasant populations have demonstrated their ability to recover quickly, with indices returning to near average levels after dramatic declines (Figure 1). Fall pheasant populations are highly dependent on production and survival of young of the year. With habitat conditions this year it difficult to speculate what production to expect. Brood survey data will be collected in late July and August, and summarized in early September. Fall population estimates will be much more accurate once this data is available.

Table 1. Regional changes in pheasant crow counts in Kansas from 2018 to 2019.

Flint Hills

Route	2018 C/S	2019 C/S	% Δ
Butler-Marion	0.91	0.55	-40
Cowley-Sumner	7.00	NA	NA
Dickinson-Clay	8.30	2.64	-68
McPherson-Marion	2.73	2.18	-20
Morris	0.80	0.36	-55
Riley	0.73	1.64	125
Wabaunsee	0.09	0.00	-100
Region Mean	**2.26**	**1.23**	**-46**

Glaciated Plains

Route	2018 C/S	2019 C/S	% Δ
Brown-Nemaha	0.55	0.82	50
Jackson-Jefferson	0.20	0.45	127
Marshall	1.45	0.64	-56
Perry WA	0.80	0.27	-66
Shawnee	0.00	0.13	NE
Tuttle Creek WA	0.55	NA	NA
Region Mean	**0.60**	**0.46**	**-23**

Northern High Plains

Route	2018 C/S	2019 C/S	% Δ
Cheyenne	19.14	15.00	-22
Decatur	29.25	25.08	-14
Gove SW	4.22	4.89	16
Graham	26.91	26.27	-2
Logan SE	7.20	4.27	-41
Norton	21.91	34.45	57
Rawlins-Thomas	14.70	4.45	-70
Scott	26.22	20.44	-22
Sheridan	10.00	10.09	1
Sherman	13.91	24.27	75
Thomas	11.55	14.18	23
Wichita-Greeley**	19.60	6.09	-69
Region Mean	**16.82**	**16.67**	**-1**

Southern High Plains

Route	2018 C/S	2019 C/S	% Δ
Finney	31.55	33.64	7
Ford	7.50	28.00	273
Gray	28.40	NA	NA
Kearny-Hamilton	16.09	13.20	-18
Morton-Stanton	4.36	3.18	-27
Seward-Haskell**	10.56	15.27	45
Stevens	20.33	27.09	33
Region Mean	**15.97**	**21.02**	**32**

Smoky Hills

Route	2018 C/S	2019 C/S	% Δ
Barton	16.27	9.27	-43
Cloud	2.90	2.64	-9
Ellis	24.27	16.64	-31
Ellsworth	4.10	4.36	6
Hodgeman	21.40	NA	NA
Lincoln	14.91	11.64	-22
McPherson	6.82	2.64	-61
Mitchell	10.67	11.36	7
Ness-Lane	31.00	25.00	-19
Osborne	11.73	9.73	-17
Ottawa**	11.64	5.90	-49
Phillips	10.18	8.40	-18
Republic	15.30	12.22	-20
Rice	12.45	4.91	-61
Rooks	22.91	14.73	-36
Rush	36.64	26.45	-28
Smith	26.40	22.82	-14
Trego	22.18	30.55	38
Washington	4.30	1.55	-64
Wilson WA	12.45	5.18	-58
Region Mean	**15.86**	**12.23**	**---- 3223***

South-Central Prairies

Route	2018 C/S	2019 C/S	% Δ
Clark	3.60	7.00	94
Comanche	0.73	0.91	25
Edwards**	13.22	19.09	44
Harper	8.27	2.45	-70
Kingman-Reno	5.45	2.18	-60
Pawnee**	19.00	30.36	60
Pawnee (Irrig.)	12.73	13.64	7
Pratt**	5.09	8.86	74
Reno	9.25	5.45	-41
Sedgwick-Harvey	1.50	1.00	-33
Stafford-Barton**	21.45	16.30	-24
Region Mean	**5.93**	**4.66**	-21

Statewide	**11.68**	**10.68**	**-9**

*Note: C/S = Mean Crows per Station; % Δ = percent change; * = significant change (P ≤ 0.10)*

**Route not included in regional or state means, info. is presented for descriptive purposes only

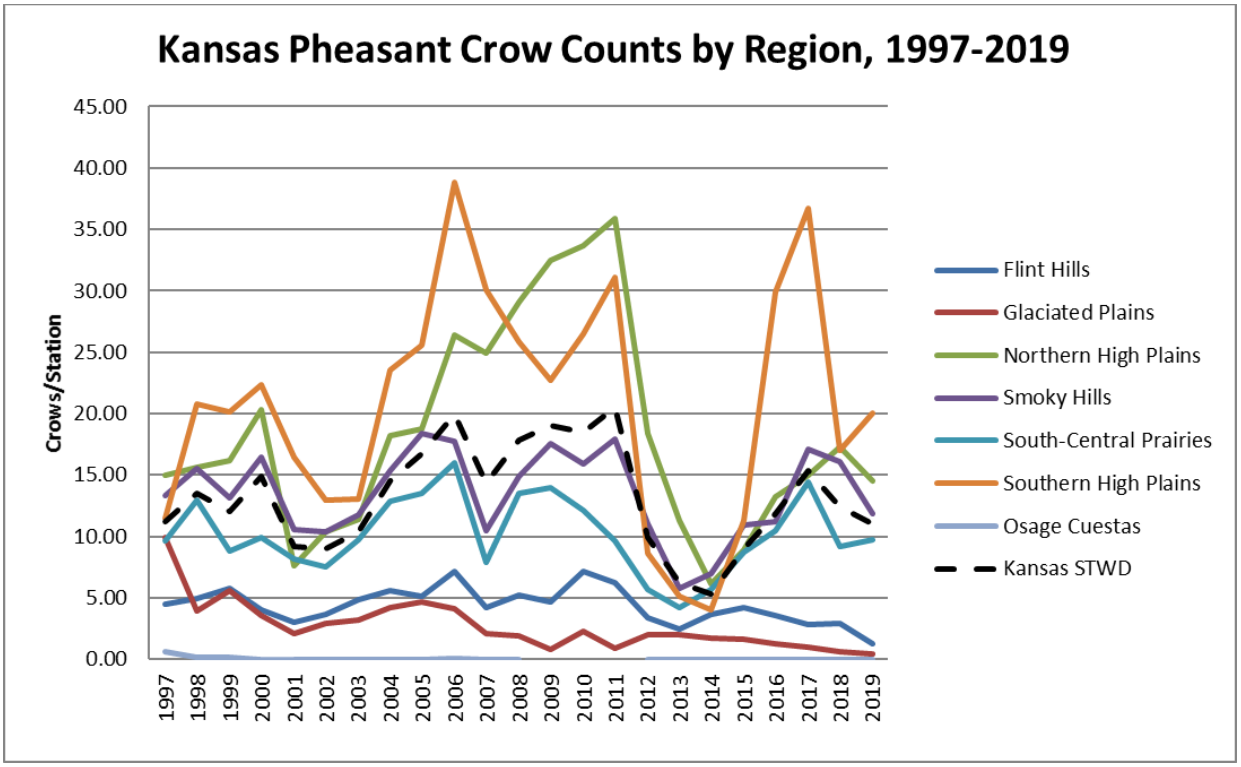
Osage Cuestas region is only surveyed biennially thus info is excluded from inter-annual comparison

Table 1. Pheasant crow survey routes and observers in Kansas, 2019.

Route	Observer	Route	Observer
Barton	Gene Schneweis	Norton	Luke Winge
Brown-Nemaha	Tyler Warner	*Osage***	*Matt Peek*
Butler-Marion	Charles Cope	Osborne	Toby Marlier
Cheyenne	Abigal Athen	Ottawa	Pat Riese~
Clark	Jon Zuercher	Pawnee	Logan Shoup~
Cloud	Luke Kramer	Pawnee (Irrig)	Tom Bidrowski
*Coffey***	*Alex Lyon*	Perry WA	Andrew Page
Comanche	Matt Hanvey	Phillips	Mark Shaw
Cowley-Sumner	Kurt Grimm	Pratt	Logan Shoup~
Decatur	Daniel Howard	Rawlins-Thomas	Kevin Klag
Dickinson-Clay	Clint Thornton	Reno	Kyle McDonald
Edwards	Logan Shoup~	Republic	Rob Unruh
Ellis	Mike Nyhoff	Rice	Steve Adams
Ellsworth	James Svaty	Riley	Corey Alderson
Finney	Kurtis Meier	Rooks	Michael Zajic
Ford	Aaron Baugh	Rush	Jason Wagner
Gove SW	Lynn Davignon	Scott	Abe Lollar
Graham	Eric Wiens	Sedgwick-Harvey	Charles Cope
Gray	Manuel Torres	Seward-Haskell	Lazar Kelly~
Harper	Craig Curtis	Shawnee	Brad Rueschhoff
Hodgeman	Aaron Baugh	Sheridan	Abigal Athen
Jackson-Jefferson	Tyler Warner	Sherman	Abigal Athen
Kearny-Hamilton	Kurtis Meier	Smith	Luke Kramer
Kingman-Reno	Kyle McDonald	Stafford-Barton	Logan Shoup~
Lincoln	James Svaty	Stevens	Kraig Schultz
Logan SE	Randy Rodgers	Thomas	Kevin Klag
Marshall	Megan Smith	Trego	Kent Hensley
McPherson	Jason Black	Tuttle Creek WA	Nathan Henry
McPherson-Marion	Jeff Rue	Wabaunsee	Brad Rueschhoff
Mitchell	Chris Lecuyer	Washington	Megan Smith
Morris	Brent Konen	Wichita-Greeley	Kevin Luman~
Morton-Stanton	Kraig Schultz	Wilson WA	Scott Thommason
Ness-Lane	Randy Rodgers		

~ new observer for route;
** Osage and Coffee only run on even years

Figure 1. Regional trends for pheasant crow survey index in Kansas, 1997-2019.



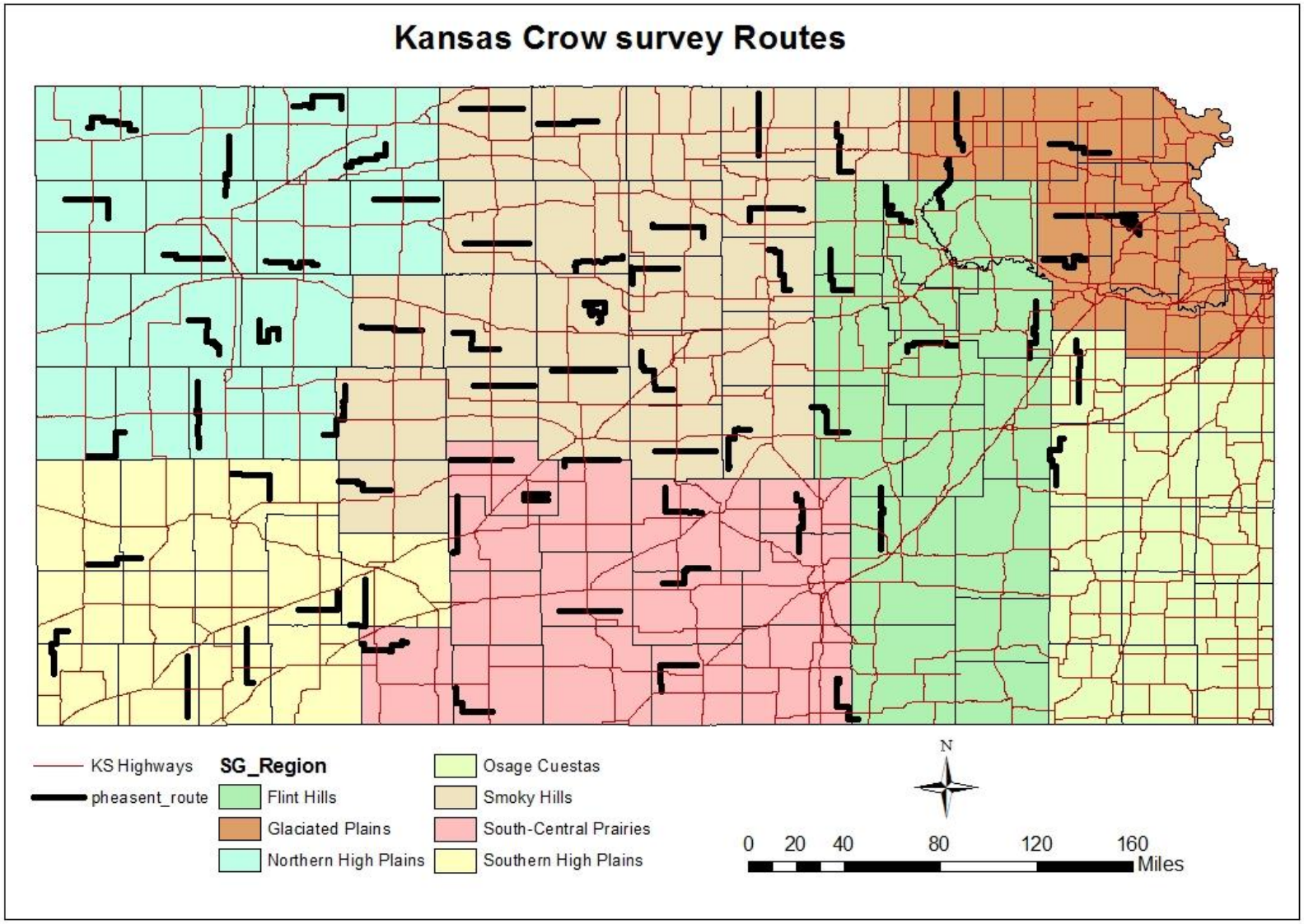


Figure 2. Current pheasant crow survey routes and management region boundaries.

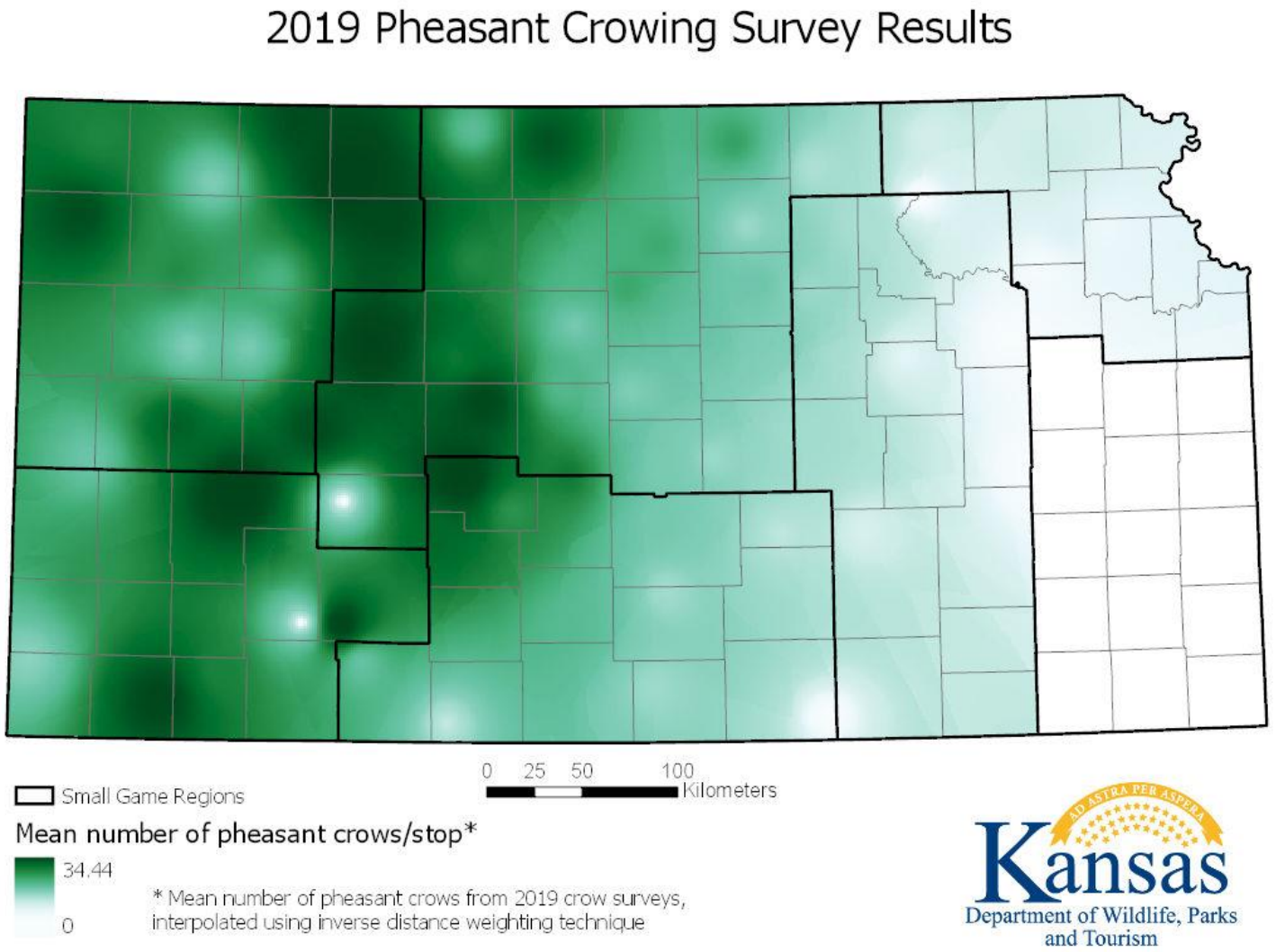


Figure 3. Pheasant breeding population index (crows per station) interpolated from route-specific indices across pheasant range in Kansas, using Inverse Distance Weighting technique, 2019.

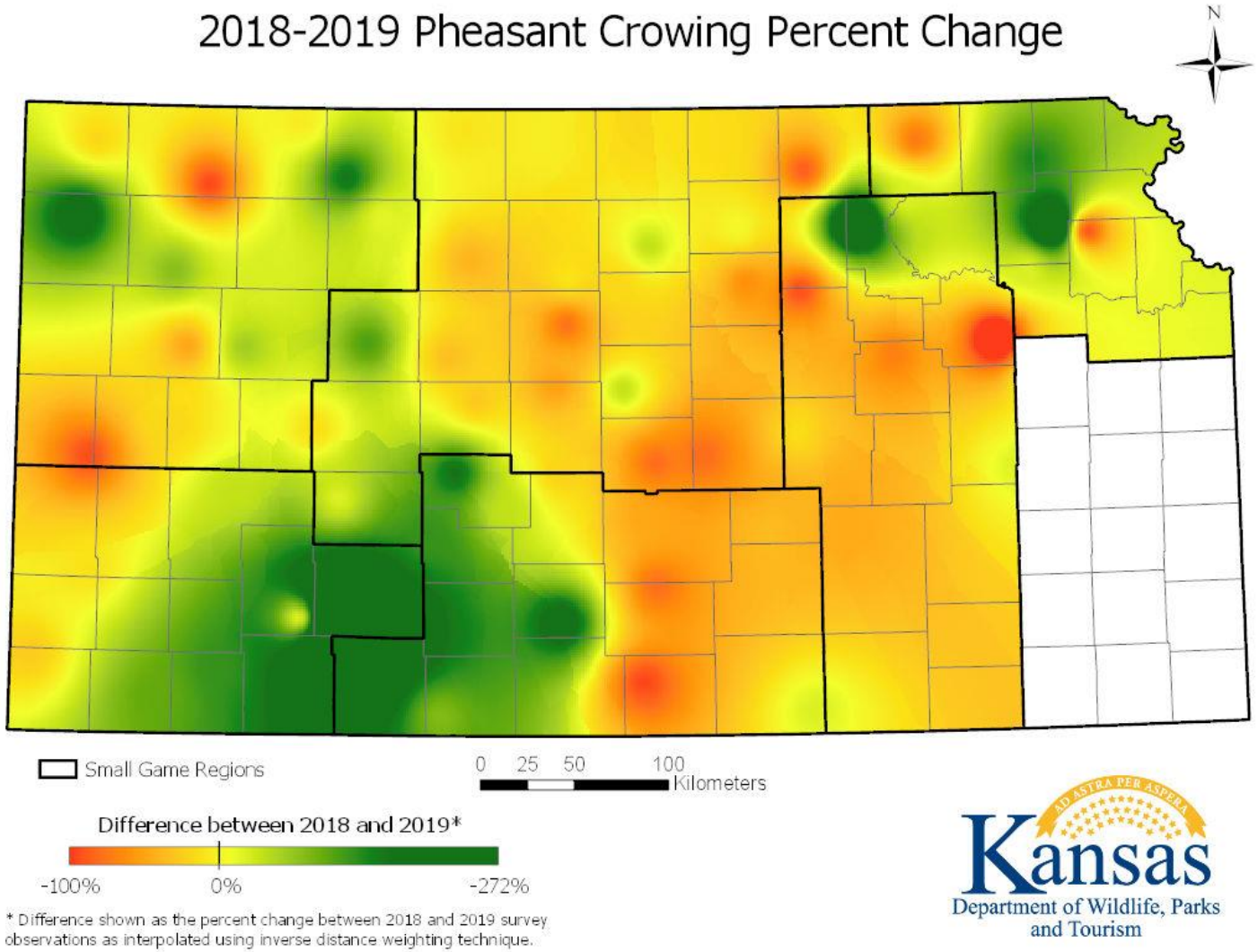


Figure 4. Percent change (2018 to 2019) in pheasant breeding index (crows per station) interpolated across pheasant range in Kansas.