

# **Estimated Number and Area of Prairie Dog Colonies in Kansas in 2019.**

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## **Summary**

We surveyed black-tailed prairie dogs (BTPD) in Kansas using methods similar to those used by McDonald et al. (2015). Farm Service Agency (FSA) National Agriculture Imagery Program (NAIP) 1-meter resolution imagery from 2019 was used to locate potential prairie dog colonies within randomly selected 2x2 mile grid cells in Kansas. Aerial surveys were then conducted to verify the identification and activity status of potential colonies. Rangewide estimates of the area and number of active prairie dog colonies in Kansas were calculated. It was estimated that 1710 prairie dog colonies covering 44,919 acres existed in Kansas in 2019. Both of these estimates represent significant declines from surveys conducted within the past 20 years, and the area estimate has fallen far below the 130,000 acre goal set forth in the Kansas BTPD Conservation and Management Plan (Kansas BTPD Working Group 2002). This decline is likely primarily the result of county-level poisoning efforts allowed by state law.

## **Background & Methods**

The Kansas Department of Wildlife, Parks and Tourism (KDWPT) intermittently surveys black-tailed prairie dogs (BTPD) across their historical range in Kansas. Rangewide surveys were previously conducted by KDWPT in 2000 and 2008. Shortly after the latter, the Western Association of Fish and Wildlife Agencies (WAFWA) Prairie Dog Conservation Team (PDCT) began participation in efforts to develop a rangewide monitoring protocol. Initial efforts resulted in the recommendations by McDonald et al. (2011), which was followed up with a rangewide survey effort (McDonald et al. 2015).

Generally following the recommendations of McDonald et al. (2015), we used free, 2019 Farm Service Agency (FSA) National Agriculture Imagery Program (NAIP) 1-meter resolution imagery to identify potential BTPD colonies rangewide in Kansas. Review of the NAIP imagery began in May 2020, and was completed by two individuals. The potential BTPD range in Kansas was overlaid with a 2x2 mile square grid (N=12,785). A total of 1234 (9.7%) of these cells were randomly selected for sampling (Figure 1). We surveyed the same cells as McDonald

et al. (2015), except that they recommended increasing the number of cells surveyed in Kansas to achieve a coefficient of variation below 15%, so we increased the number of randomly selected cells to be surveyed by 200, to 1234 cells.

The perimeter of potential colonies was digitized in ArcGIS (ArcMap10.2.2), and the total area was calculated, as well as that within the sample cell. Most of the search was conducted at a scale of 1:4000. One hundred and five cells (8.5%) were independently double sampled by both NAIP surveyors to account for false negatives. Colony boundaries of commonly identified potential colonies were also reconciled as per McDonald et al. (2015).

We conducted aerial surveys in October and November 2020 to verify the identification and activity status of all potential colonies. Potential colonies were classified as active, partially active, inactive, inactive old, and not BTPD. For partially active colonies, the estimated percent active was recorded based on visual assessment. The estimated percent active was applied to the total colony area to calculate an active colony area that was used to calculate the statewide estimate. Colony areas classified “inactive” were considered relatively recently vacated by BTPDs (burrows present and vegetation not fully recovered from BTPD presence), whereas “inactive old” colony areas no longer had visible burrows and vegetation had largely recovered from BTPD presence with the exception of bare areas sufficient to allow the site to be identified during NAIP assessment. We recorded this variation because whereas recently inactive colonies could have been active at the time of the NAIP survey, “inactive old” colonies clearly were not.

We generally applied the estimation methods of McDonald et al. (2015) with the primary difference in survey methodology being our incorporation of aerial survey results. Our results are an estimate of the number and area of active prairie dog colonies in Kansas, whereas McDonald et al.’s estimate represented “potential BTPD colonies” – having not excluded inactive colonies and misidentifications.

## **Results**

A total of 290 potential colonies were identified using NAIP imagery. The aerial classification of these potential colonies is provided in Table 1. Active or partially active colonies were located in 126 of 1234 cells (10.2%) and 37 of 62 counties (60%) surveyed.

We estimated a total area of 44,919 acres of active BTPD colonies in Kansas (90% CI = 36,646;53,192; SE 5,029; COV 0.112). The total estimated number of colonies, and the number of colonies greater than 100 acres is found in Table 3. No colonies greater than 500 acres were located.

Figure 1. Location of 2x2 mile cells (n=1234) surveyed for prairie dogs in Kansas.

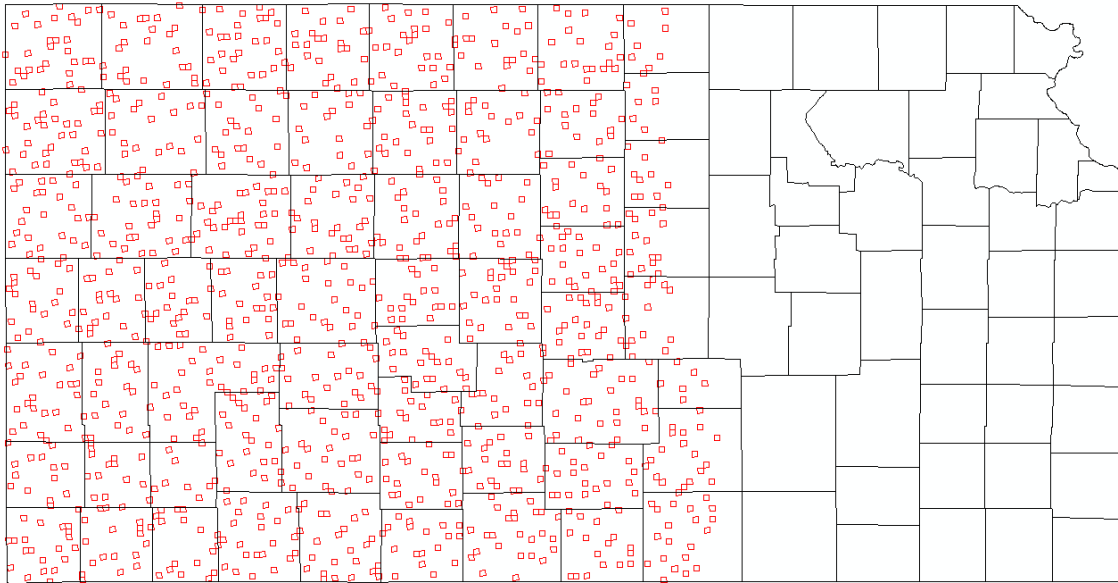


Table 1. Aerial classification of potential prairie dog colonies identified by NAIP.

Colony Status	Number	<sup>1</sup> Total area (ac)	<sup>1</sup> Ave Colony Area (ac)	% of Number	% of Area
Active	173	7744	45	60%	69%
Inactive	21	323	15	7%	3%
Inactive old	30	795	27	10%	7%
Not prairie dog	39	1593	41	13%	14%
Partially active	27	809	30	9%	7%
<b>Total</b>	<b>290</b>	<b>11264</b>		<b>100%</b>	<b>100%</b>

<sup>1</sup>Includes the area both in- and outside the survey cell.

Table 2. Estimated number of active prairie dog colonies in Kansas and their lower and upper confidence limits

	Number	90% lower limit	90% upper limit	Standard Error	Coefficient of Variation
Total Colonies	1710	1618	1801	55	0.033
Colonies > 100 acres	42	9	75	20	0.545
Colonies > 500 acres	0				

## **Discussion**

The identification of active prairie dog colonies using NAIP imagery poses some challenges. It can be difficult or impossible to differentiate active and recently inactive prairie dog colonies. To a lesser extent, differentiating prairie dog colonies from other structures on the land such as ant and gopher mounds can be an issue. However, these concerns were negated by conducting an aerial survey of every potential colony. In our survey, 69% of the potential colonies and 76% of the total area proved to be active colonies. Just 13% and 14%, respectively, were cases of misidentification (Table 1).

Relatively recent statewide estimates for prairie dogs in Kansas include a corrected estimate for Pontius (2002) in 2000 of 4729 colonies and 126,013 acres (see Peek and Houts 2009). Peek and Houts (2009) estimated 4257 colonies and 148,284 acres in 2008. McDonald et al. (2015) estimated 2553 “potential colonies” and 154,775 acres in 2015, but their estimate was not corrected for misidentification of non-prairie dogs and inactive colonies during the NAIP survey, so the portion of active colony area at that time is unknown. Even with the likelihood of overestimate, this survey detected a significant decline in colony number from previous surveys.

Our current estimate of 1710 colonies and 44,919 acres represents a substantial decline in the number and area of prairie dog colonies in the state. This estimate is well below the objective of 130,000 acres identified in The Kansas BTPD Conservation and Management Plan (Kansas BTPD Working Group 2002). The 130,000 acre goal represented less than 1% of estimated suitable habitat available at that time.

The plan also calls for maintaining distribution over 80% of the historical range (Kansas BTPD Working Group 2002). Our survey identified active colonies in just 58% of the counties surveyed. Our survey was not intended to detect every colony. Therefore, it is probable that colonies exist in counties where our survey detected none. However, in the eastern part of the range in particular, the long-term viability of the few remaining isolated colonies is questionable.

## **Conclusion**

We believe our survey effectively estimated the number and area of prairie dogs in Kansas. These estimates represent a significant decline from past surveys, and are well below objectives identified in The Kansas BTPD Conservation and Management Plan (Kansas BTPD Working Group 2002). This decline is likely primarily the result of county-level poisoning efforts allowed by state law. These campaigns are currently jeopardizing the important role of prairie dogs in much of the Kansas ecosystem. We recommend repeating this survey effort in approximately 3 years pending NAIP availability.

## Literature Cited

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