



# MONITORING POPULATION TRENDS OF ELK IN NORTHWESTERN MINNESOTA – 2026

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## INTRODUCTION

Historically, elk (*Cervus elaphus*) inhabited much of Minnesota (O’Gara and Dundas 2002) but today are limited to three relatively small herds found in Kittson, Roseau, Marshall, and Beltrami counties in the northwestern portion of the state (Figure 1). Row crops are a dominant land use in this part of the state and subsequently, there is potential for crop depredation caused by elk. In response to concerns from agricultural producers, the 2016 Minnesota Legislature passed legislation limiting the size of the northwest elk herds ([2016 Minnesota Statutes Section 97B.516](#)). Specifically, the Grygla herd must be managed for 30-38 elk, the Kittson County herd for 50-60 elk, and the Caribou-Vita herd for 150-200 elk ([Interim Strategic Management Plan for Elk 2016-2019](#)). A 2024 amendment ([Chapter 116, sec 56](#)) to existing statute allows for an increase within the Kittson Central herd, from a 2023 population estimate of 75 elk up to 98 elk, to allow for genetic diversification and herd health. The legislation further directs the Minnesota Department of Natural Resources (MNDNR) to work with the “Grygla and Kittson elk working groups, private landowners, local units of government, and Minnesota tribal nations to develop a plan to enhance the size and range of Minnesota’s elk population and provide increased recreational opportunities while maintaining a positive existence for the long-term management of the population.”

Since the mid-1990s, MNDNR personnel have conducted an annual aerial elk survey during mid-January to mid-March in northwestern Minnesota. Our primary objective is to obtain minimum elk counts within each herd. The MNDNR staff use these data to monitor long-term trends, document changes in spatial distribution and sex ratios, and help set harvest quotas for potential hunting seasons.

## METHODS

We estimated elk populations in survey blocks encompassing the winter range of each herd (Figure 1). The Grygla survey block covers 144 mi<sup>2</sup> in Marshall and Beltrami counties and includes one herd of elk. The Kittson Central survey block comprises 183 mi<sup>2</sup> in Kittson County and includes two sub-herds of elk (Kittson Central North and Kittson Central South). The Caribou-Vita survey block incorporates approximately 35 mi<sup>2</sup> in Kittson and Roseau Counties and 180 mi<sup>2</sup> in Manitoba and includes at least two subherds, with one that frequently moves across the United States/Canada border (Figure 1). In general, the Caribou-Vita survey is only conducted in years when MNDNR staff can coordinate with Manitoba Conservation staff to complete concurrent surveys on both sides of the border. However, MNDNR Division of Enforcement coordinated with US and Canadian border patrol authorities to allow safe flights across the border into Manitoba airspace in 2023, 2025, and 2026.

During all surveys, we used two Cessna 185 fixed-wing aircraft and attempted to maintain flight altitude at 350 ft above ground level (AGL) and airspeed at 85-90 mi/hr. The pilot and two observers within each aircraft searched for elk along parallel, east-west transects spaced at 0.2-mi intervals. When an elk was sighted, we left the transect line and circled the observed animal(s) to determine group size and classify antlerless (cow, calf) and antlered animals. We did not attempt to differentiate between cows and calves because differentiation is difficult under existing flight protocols. Antlered elk were classified as either branched or spike bulls. We used 2 mobile

applications (Field Maps, Quick Capture; Environmental Systems Research Institute, Inc., Redlands, CA) and a global positioning system-enabled tablet computer to guide transect navigation and record survey data and aircraft flight paths directly to ArcGIS (Environmental Systems Research Institute, Inc., Redlands, CA) shapefiles. To maximize sightability, we completed surveys during winter when snow cover measured at least 8 in.

Historically, we have not accounted for visibility bias in our annual elk surveys. However, during 2014 to 2016, we estimated detection rate using a modified double-sampling method (Gasaway et al. 1986) to determine if our fixed-wing sampling protocol was adequate for enumerating elk. The location of each elk group sighted during the fixed-wing survey, generalized to the corresponding Public Land Survey (PLS) section, was relayed to a waiting helicopter flight crew. This crew then resurveyed each targeted PLS section, plus the 8 surrounding sections, to obtain a second count of animals. Our helicopter flight protocol included transect spacing of 0.2 mi, flight altitude of 200 ft AGL, and airspeed of 40-50 mi/hr. Those results showed that we observed 40 of 48 elk groups (mean = 0.83; range: 0.82-0.85) and 301 of 322 individual animals (mean = 0.93; range: 0.87-0.98) with the fixed-wing crew compared to the helicopter crew (Table 1).

## **RESULTS**

In 2026, we completed surveys within the Grygla, Kittson Central, and Caribou-Vita survey blocks with good to fair survey conditions (snow depth and weather; Figure 1). Snow depths averaged 8–16 inches across the Grygla and Kittson Central blocks. The snow depth in the Caribou-Vita block averaged 5–8 inches. Temperatures ranged from a low of -18°F to a high of 9°F with mostly sunny to mostly cloudy skies.

### **Grygla Survey Block**

This survey was conducted on 27 January and required 11.8 survey hours. We observed 41 elk, including 27 antlerless, 2 spike bulls, and 12 branched bulls (Table 2). We observed elk in 4 groups with a mean of 10.2 elk/group.

### **Kittson Central Survey Block**

This survey was conducted on 28 January and required 14.2 survey hours. We observed 48 elk, including 38 antlerless animals and 10 branched bulls (Table 3). We observed elk in 4 groups with a mean of 12.0 elk/group.

- The Kittson Central North subgroup had 2 total elk (2 branched bulls).
- The Kittson Central South subgroup had 46 total elk (38 antlerless, 8 branched bulls).

### **Caribou-Vita Survey Block**

This survey was conducted from 30 January to 2 February and required 18.4 survey hours. We observed 313 elk, including 286 antlerless animals, 5 spike bulls, and 22 branched bulls (Table 4). We observed elk in 10 groups with a mean of 31.3 elk/group. All animals were recorded on the Manitoba side of the border.

## **DISCUSSION**

Detection rate estimates from 2014 to 2016 indicate that detectability of elk during fixed-wing aerial surveys has remained reasonably constant across years and our survey crew is observing a high proportion of animals present during the surveys. Although the likelihood of missing animals increases as group size decreases, current survey design and protocols provide a reasonable ability to obtain a reliable minimum count of elk within each survey area. In turn, these minimum counts provide baseline information needed on the elk population, which is necessary given that the state legislature requires elk to be maintained at certain population levels. Although minimum counts provide adequate information given our current elk management goals, methodology may need to be altered if Minnesota's management goals

change (e.g., manage to increase elk numbers). Results from the 2026 aerial survey indicated that elk population trends varied among survey blocks in northwestern Minnesota, with increases observed in the Grygla and Kittson Central blocks, while no elk were observed on the Minnesota side of the Caribou–Vita block. Although these surveys provide minimum counts rather than a true census, they continue to offer reliable baseline information on elk populations

Several logistical factors affect aerial survey efficiency and accuracy. For example, inclement weather, aircraft mechanical problems, and staffing issues (e.g., crew availability) can result in unexpected flight delays. These flight delays can increase counting errors, such as double-counting or undercounting of animals, depending upon animal movement to/from surveyed and non-surveyed areas. To address these concerns with flight efficiency and accuracy, we modified our survey protocol and added a second flight crew beginning in 2024, with both crews flying simultaneously and dividing each survey block. Doubling our sampling effort decreases the overall time to complete surveys in our three sampling blocks, reducing the potential impact of flight delays and animal movement on survey accuracy.

In recent years, we have periodically observed animals outside of the established survey blocks. For example, in 2022, we counted 6 branched bulls from the Kittson Central herd approximately 1 mi east of the survey boundary. In 2023, we observed 5 antlerless elk from the Grygla herd approximately 1 mile west of the survey boundary. Finally, we observed 2 groups (i.e., a single branched bull and a group of 43 antlerless elk) within 1 mile of the Kittson survey boundary in our latest survey. Although these offsite observations were excluded from final counts to remain consistent with standard survey protocols, these observations were included to inform season-setting decisions. Additionally, public observations of elk outside our current survey boundaries has increased in recent years ([Elk sightings](#)), further indicating that elk may be missed due to our survey boundaries and shifting elk ranges. These incidental observations signify that our minimum counts are not a true census of the elk population in Minnesota and that our existing winter survey boundaries may not accurately represent their full winter range. Ongoing research aimed at outfitting elk with telemetry collars to obtain survival and movement data may inform decisions about potential changes to survey boundaries.

## **ACKNOWLEDGMENTS**

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## **LITERATURE CITED**

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**Table 1.** Detection rate metrics collected from fixed-wing and rotary-wing aircraft during winter elk surveys in northwestern Minnesota, 2014-2016.

Year	# Groups detected (fixed-wing)	# Groups detected (helicopter)	Proportion of groups detected (fixed-wing)	# Animals detected (fixed-wing)	# Animals detected (helicopter)	Proportion of animals detected (fixed-wing)
2014	15	18	0.83	94	108	0.87
2015	11	13	0.85	126	131	0.96
2016	14	17	0.82	81	83	0.98
Total	40	48	0.83 <sup>a</sup>	301	322	0.93 <sup>a</sup>

<sup>a</sup>Mean proportion of elk groups detected, 2014-2016.

**Table 2.** Grygla Block aerial survey observations of elk from 2014 to 2026 in northwestern Minnesota, USA.

Year	Spike Bulls	Branched Bulls	Antlerless	Total Elk	Antlered:Antlerless Ratio	Number of Groups	Group Size (mean)	Group Size (range)
2014 <sup>a</sup>	2	4	14	20	0.43	3	6.7	1–16
2015 <sup>a</sup>	3	6	9	18	1.00	4	4.5	1–12
2016 <sup>a</sup>	2	9	10	21	1.10	7	3.0	1–10
2017	4	6	7	17	1.43	3	5.7	2–8
2018	2	6	7	15	1.14	5	3.0	1–7
2019	1	10	8	19	1.38	4	4.8	1–8
2020	1	9	14	24	0.71	5	4.8	1–14
2021 <sup>b</sup>	-	-	-	-	-	-	-	-
2022	2	12	15	29	0.93	5	5.8	1–18
2023 <sup>c</sup>	1	10	13	24	0.85	5	4.8	1–17
2024 <sup>d</sup>	-	-	-	-	-	-	-	-
2025	0	6	18	24	0.33	2	12.0	5–19
2026 <sup>e</sup>	2	12	27	41	0.52	4	10.2	1–27

<sup>a</sup>Counts recorded from helicopter flights.

<sup>b</sup>Survey not completed due to MNDNR COVID-19 restrictions.

<sup>c</sup>Outside of the aerial survey boundaries, 5 additional antlerless elk were observed approximately 1 mile west of survey block. These animals were included when making season-setting decisions.

<sup>d</sup>Survey not completed due to insufficient snow cover.

<sup>e</sup>Outside of the aerial survey timeframe, 32 antlerless elk were seen and photographed in the survey block on 7 January 2026 by four MNDNR employees. Although the aerial survey observers (on 27 January 2026) recorded 27 antlerless elk, season-setting decisions will be made based on 46 total elk for the Grygla herd.

**Table 3.** Kittson Central Block aerial survey observations of elk from 2014 to 2026 in northwestern Minnesota, USA.

Year	Spike Bulls	Branched Bulls	Antlerless	Total Elk	Antlered:Antlerless Ratio	Number of Groups	Group Size (mean)	Group Size (range)
2014 <sup>a</sup>	3	14	20	37	0.85	8	4.6	1–17
2015 <sup>a</sup>	2	16	16	34	1.13	7	4.9	1–13
2016 <sup>a</sup>	6	12	34	52	0.53	4	13.0	2–21
2017	2	14	45	61	0.36	6	10.2	1–31
2018	5	13	57	75	0.32	5	15.0	1–41
2019	11	22	61	94	0.54	8	11.8	1–39
2020	6	27	70	103	0.47	11	9.4	3–28
2021 <sup>b</sup>	-	-	-	-	-	-	-	-
2022 <sup>c</sup>	5	28	51	84	0.65	8	10.5	3–28
2023 <sup>d</sup>	2	21	28	51	0.82	5	10.2	2–26
2024 <sup>e</sup>	-	-	-	-	-	-	-	-
2025	1	11	63	75	0.19	6	12.5	1–31
2026 <sup>f</sup>	0	10	38	48	0.26	4	12.0	1–39

<sup>a</sup>Counts recorded from helicopter flights.

<sup>b</sup>Survey not completed due to MNDNR COVID-19 restrictions.

<sup>c</sup>Outside of the aerial survey boundaries, 6 additional adult bull elk were observed approximately 1 mile east of survey block. These animals were included when making season-setting decisions.

<sup>d</sup>Outside of the aerial survey timeframe, 2 spike bulls and 22 antlerless elk were observed 5 days post-survey; observers were confident they had not been previously counted. These animals were included when making season-setting decisions.

<sup>e</sup>Survey not completed due to insufficient snow cover.

<sup>f</sup>Outside of the aerial survey boundaries, 1 branched bull and 43 additional antlerless elk were observed approximately 1 mile west and southwest of survey block. These animals will be included when making season-setting decisions.

**Table 4.** Caribou-Vita Block (Minnesota [MN] and Manitoba [MB]) aerial survey observations of elk from 2014 to 2026 in northwestern Minnesota, USA and southern Manitoba, CA.

Year	Spike Bulls		Branched Bulls		Antlerless		Total Elk		Antlered:Antlerless Ratio		Number of Groups		Group Size (mean)		Group Size (range)	
	MN	MB	MN	MB	MN	MB	MN	MB	MN	MB	MN	MB	MN	MB	MN	MB
2014 <sup>a</sup>	10	-	7	-	34	-	51	-	0.5	-	7	-	7.3	-	1–28	-
2015 <sup>a</sup>	5	-	17	-	57	-	79	-	0.25	-	2	-	39.5	-	9–70	-
2016 <sup>a</sup>	0	-	6	-	4	-	10	-	1.5	-	6	-	1.8	-	1–3	-
2017	0	6	1	24	0	133	1	163	0	0.23	1	-	1.0	-	1–1	-
2018	1	5	6	17	0	104	7	126	0	0.28	1	-	7.0	-	7–7	-
2019 <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020 <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2021 <sup>c</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2022 <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	5	4	12	19	79	108	96	131	0.22	0.21	7	10	13.7	13.1	1–33	1–35
2024 <sup>d</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2025 <sup>e</sup>	0	2	0	4	0	128	0	134	0	0.05	0	7	0	19.1	0	3–65
2026	0	5	0	22	0	286	0	313	0	0.09	0	10	0	31.3	0	1–103

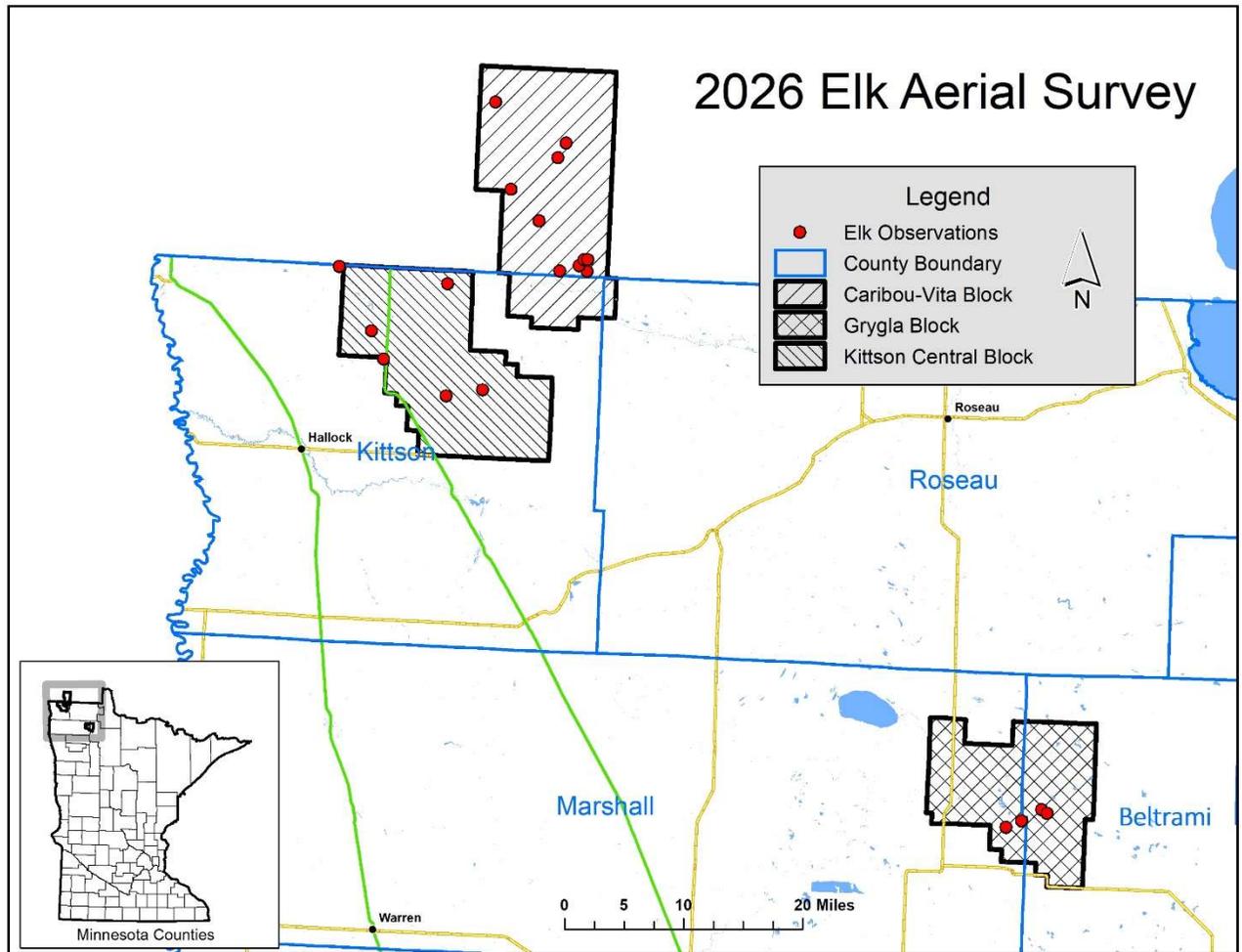
<sup>a</sup>Counts recorded from helicopter flights.

<sup>b</sup>Survey not completed because Manitoba Conservation was unable to fly Canadian side of border.

<sup>c</sup>Survey not completed due to MNDNR COVID-19 restrictions.

<sup>d</sup>Survey not completed due to insufficient snow cover.

<sup>e</sup>Survey was partially completed and ultimately halted due to airplane mechanical issues.



**Figure 1.** Elk observations during aerial survey within the Grygla, Kittson Central, and Caribou-Vita survey blocks in northwestern Minnesota, January-February 2026. Red dots indicate locations of elk observations.