2024 Big Game Surveys

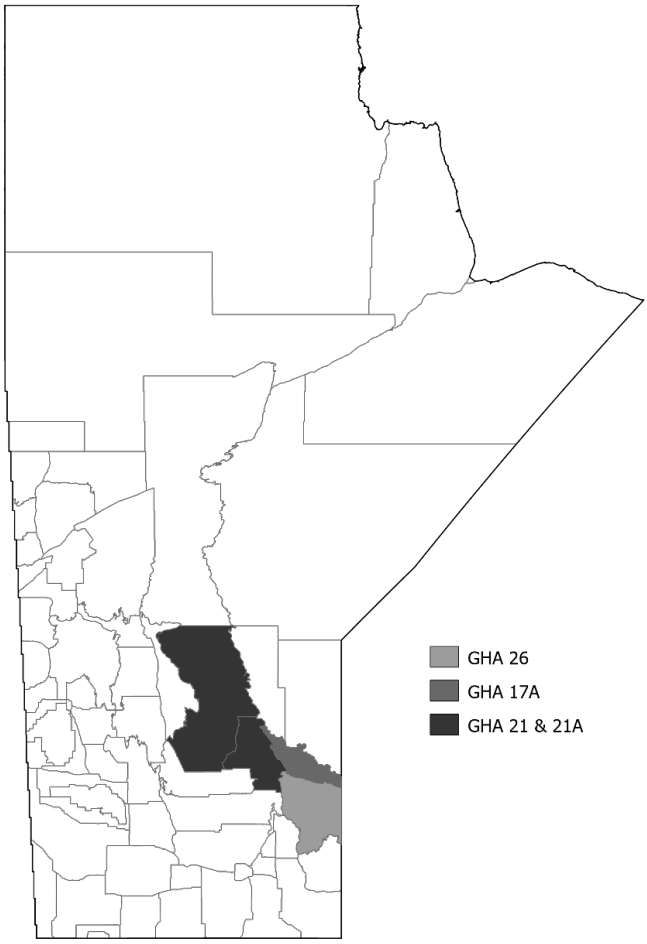
The Government of Manitoba collects a variety of information to help manage wildlife populations in the province. One method used to collect information is by conducting aerial big game population surveys. Repeated surveys in an area allow biologists to determine changes in population trends over time. In recent years, Manitoba has been making efforts to modernize the aerial survey program by using new and innovative technology, new survey design, and new statistical models. Use of new technology includes fixed-wing aircraft equipped with infrared (IR) and red-green-blue (RGB) cameras. IR cameras utilize the thermal signatures of wildlife and can be used to detect, quantify, and identify animals to species, sex, and age class (calf or adult) where possible.

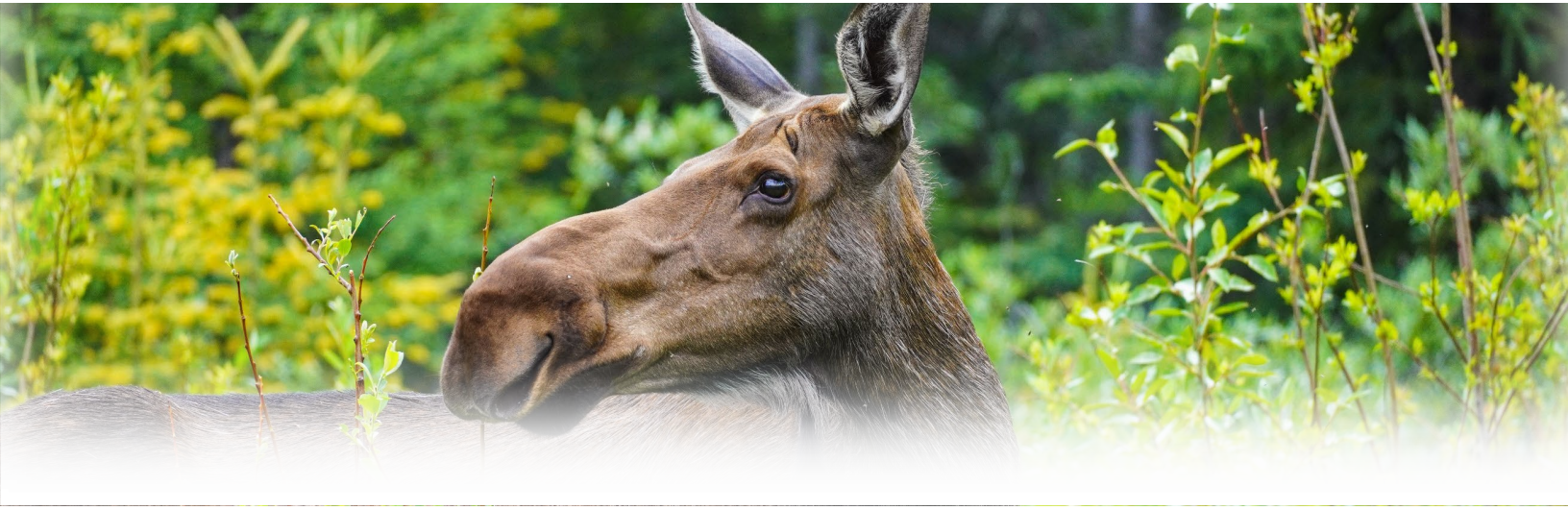
In addition to the new technology, Manitoba is also using a new survey design and statistical model to produce population estimates. In the past, population estimates have been derived using stratified random block sampling as described in Manitoba Big Game Survey reports prior to 2022. The new method, distance sampling, is a cost-effective, efficient, and field-validated survey method that is supported by published studies and is used to conduct big game surveys in other jurisdictions in North America. Utilizing IR technology and new survey methods allows Manitoba to survey larger areas more efficiently and with less demand on staff resources.

It is important to note that population estimates represent a scientific assessment based on current available data and best analysis methods. Re-analysis may occur as best scientific practices evolve and/or additional data or information becomes available.

In early 2024, aerial surveys were conducted in:

- **Game Hunting Area 26**
- **Game Hunting Area 17A**
- **Game Hunting Areas 21 & 21A**





Late Winter Surveys and Sex Identification

Bull moose shed their antlers each year, beginning in mid-December. Antlers begin to re-grow in early spring, resulting in antlerless bull moose throughout the late winter months. Traditionally, helicopter surveys in Manitoba have been conducted from late January until early March. Moose sex was identified based on the presence or absence of a vulva patch, a white patch of fur just below the tail of a cow moose, or by the presence of pedicle scars, a circular scar left on the head of a bull moose after the antlers have been shed. The presence or absence of a vulva patch is observed by circling and lowering the helicopter in an effort to identify the patch more closely on a standing moose or to get a bedded moose to stand up and move.

The infrared camera used for Manitoba's modern surveys is able to capture the heat of pedicle scars from newly shed antlers. The presence of pedicle scars can be used to confirm the sex of bulls (Figure 1); however, the absence of pedicle scars is not a reliable indicator of a cow. Typically, a bedded cow would be encouraged to stand up with a circling helicopter to observe the presence or absence of a vulva patch, a more reliable indicator of sex. However, one of the advantages of using fixed-wing planes with IR capabilities is the reduced stress on wildlife, allowing moose to remain undisturbed while being counted and therefore limiting the ability to observe the presence or absence of a vulva patch when moose remain bedded. Since bull moose had already shed their antlers and the majority of moose observed during these surveys were bedded, the proportion of individuals of unknown sex was high and therefore unreliable for a population-scale sex ratio. Based on this information, the Wildlife Branch plans to shift big game survey efforts to be predominately conducted in fall and early winter, when bulls retain their antlers, to produce more accurate sex ratio estimates.

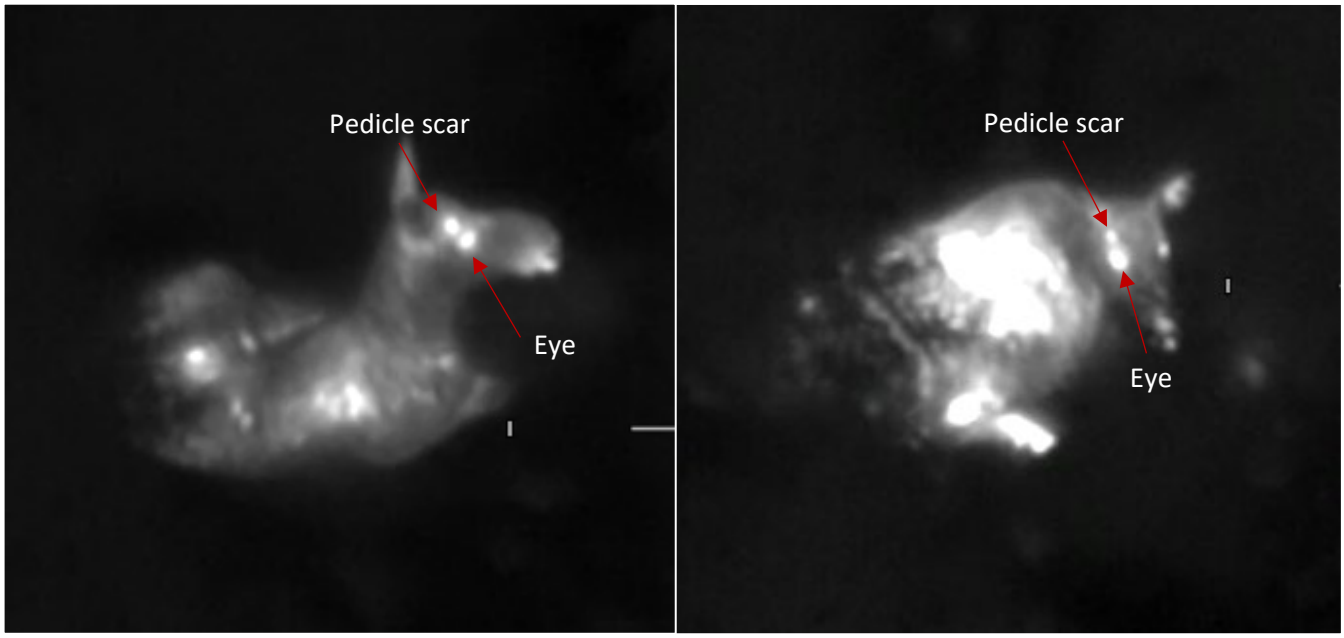
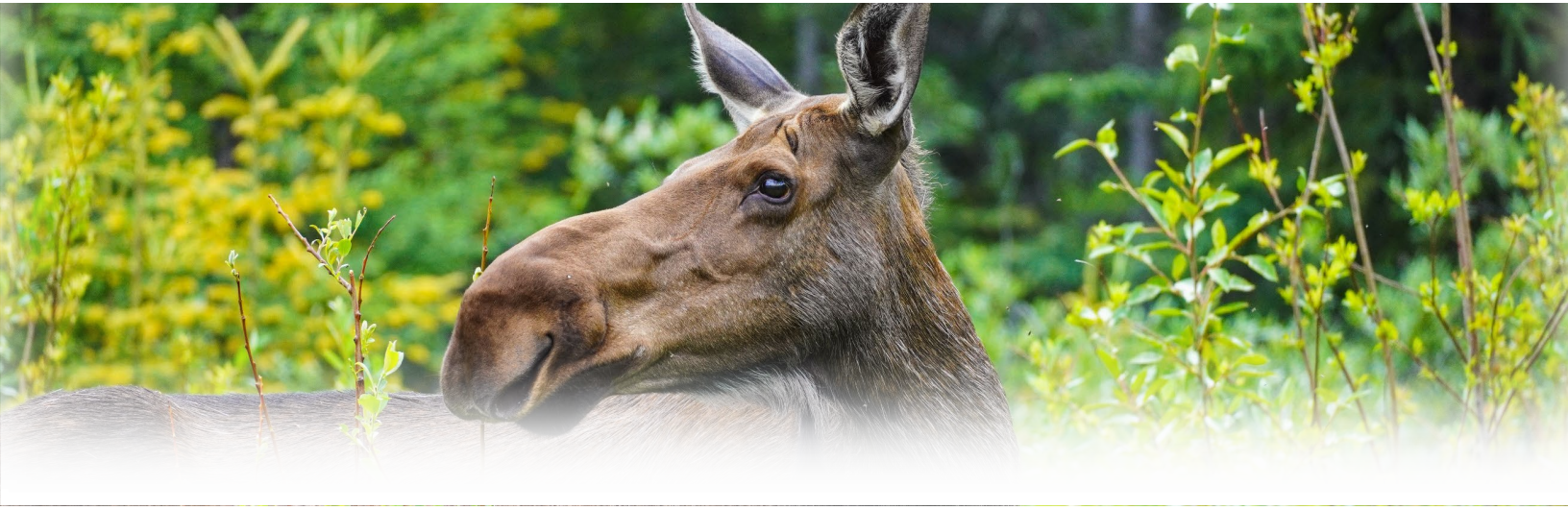


***Figure 1**. Pedicle scars used to sex bull moose during a late winter IR survey.*

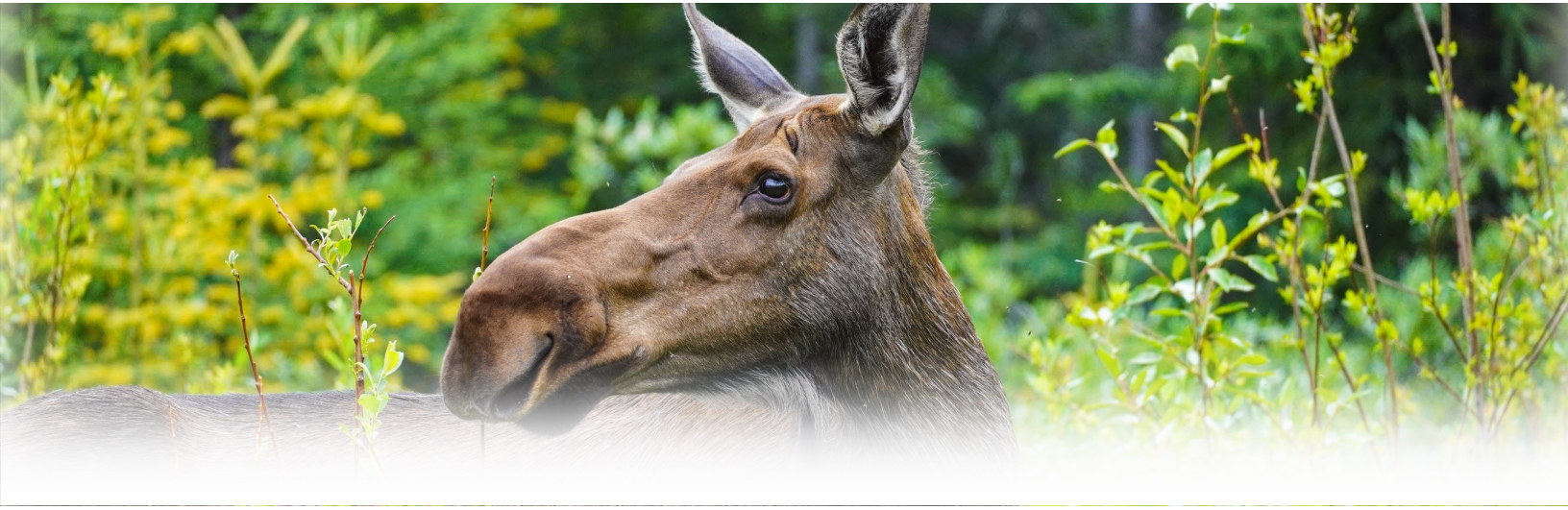


Game Hunting Area 26

Game Hunting Area (GHA) 26 (Figure 2) is located in eastern Manitoba, sharing its eastern border with Ontario and its western border with Lake Winnipeg. GHA 26 is approximately 7,244 km^2 and contains Nopiming Provincial Park to the east, and Manigotagen Provincial Park to the North. Dominant topography includes numerous lakes and wetlands, as well as slight undulating hills and rocky outcrops. Boreal forest stands in the area contain a mosaic of softwood species and broad leaf hardwoods. The traditional territories of Black River First Nation, Sagkeeng First Nation, and Hollow Water First Nation are within and directly surrounding GHA 26.

Figure 2. *Map of GHA 26.*

An infrared aerial survey was conducted for moose (*Alces alces*) throughout GHA 26 from February 28th to March 6th, 2024. The survey was conducted using a fixed-wing plane equipped with high resolution infrared imaging sensors and an on-board pilot and sensor operator. A distance sampling method was used, whereby linear transects of the entire area were flown and observations were recorded from the transect line. Transects were oriented East-West/West-East and were spaced 2.4 km apart.



When a heat source was detected, the distance of the animal from the transect was measured using a laser range finder. The aircraft then circled the thermal signature until the sensor operator identified the species and, where possible, sex and age class (bull, cow, or calf) of the individual. Once the exact location and number of individuals was recorded, the aircraft resumed surveying on transect. In total, 3,141 km of transect were flown within a total area of 7,244 km^2.

A population estimate for moose was derived using the Rdistance package in Rstudio. The total population is estimated to be 1,405 (90% CI: 1,020 – 1,792) moose, resulting in a total density of approximately 0.19 moose/km^2. This estimate indicates that the population has remained relatively stable since the most recent survey, flown in 2020, which produced a point estimate of 1,170 (90% CI: 989 – 1,350). The long-term trend suggests that the population has been gradually increasing since 2010 when the point estimate was 823 moose (90% CI: 699 – 947) (Figure 3).

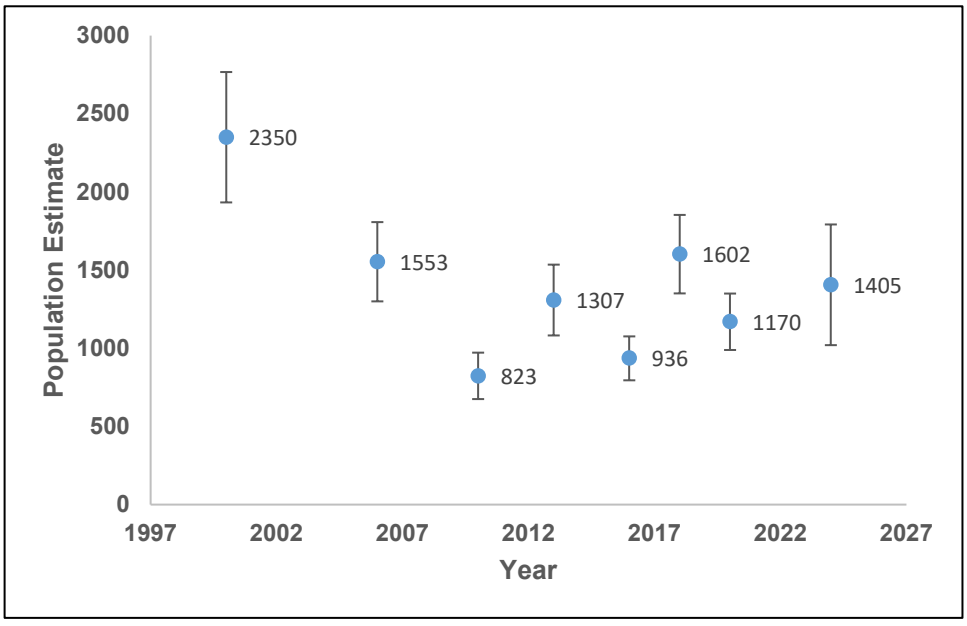
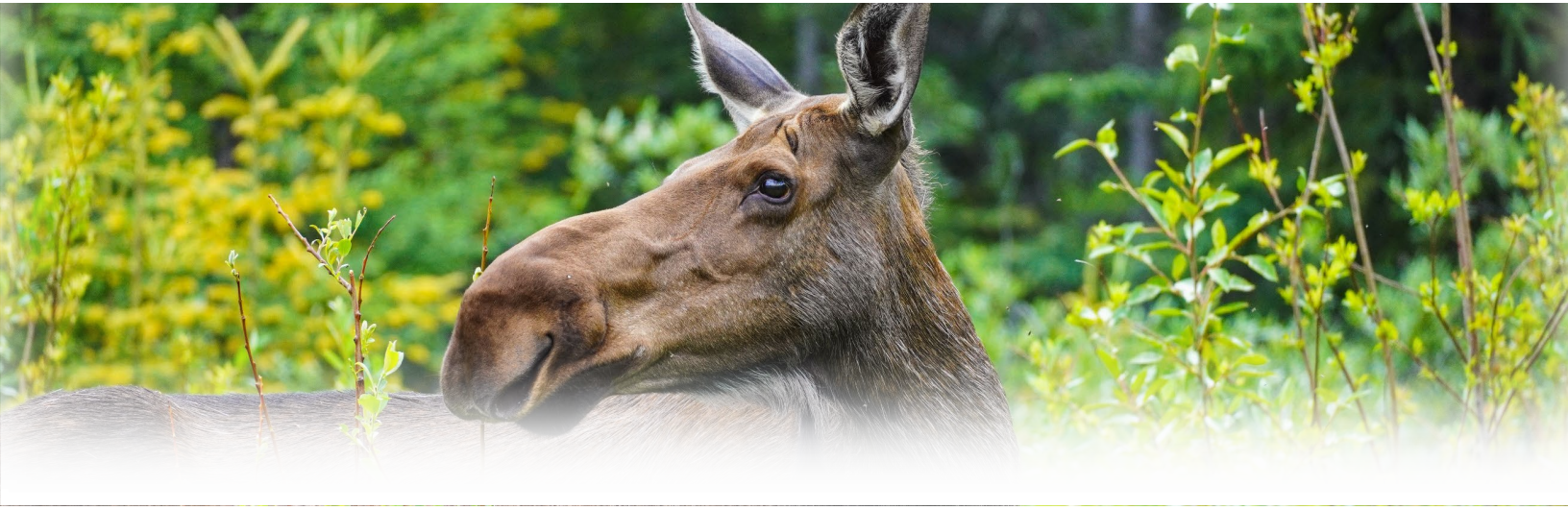


Figure 3. *Population trend of moose in GHA 26. The results from the 2024 survey indicate that the population has been slowly increasing since 2010. Surveys between 2010 and 2020 were completed using a stratified random block sampling method. The survey conducted in 2024 was completed using the distance sampling method. Error bars indicate ±90% confidence intervals.*



Game Hunting Area 17A

GHA 17A is located in eastern Manitoba in the Lac Seul Upland Ecoregion within the Boreal Shield Ecozone. The area is located northeast of the City of Winnipeg and is bordered by Lake Winnipeg to the west and the Manitoba-Ontario border to the east (Figure 4). GHA 17A is approximately 3,292 km^2 and is characterized by an interspersion of rock outcrops, bogs, fens, lakes, and rivers. GHA 17A contains South Atikaki Provincial Park, Wallace Lake Provincial Park, and a portion of Atikaki Provincial Park. GHA 17A also partly falls within the Pimachiowin Aki World Heritage Site. The traditional territories of Hollow Water First Nation and Bloodvein First Nation are within and directly surrounding GHA 17A.

Aerial surveys were conducted in GHA 17A from March 5th to March 10th, 2024. Surveys collected observations of both moose and boreal woodland caribou (*Rangifer tarandus*). The survey was conducted using the same methodology as the GHA 26 survey described above.

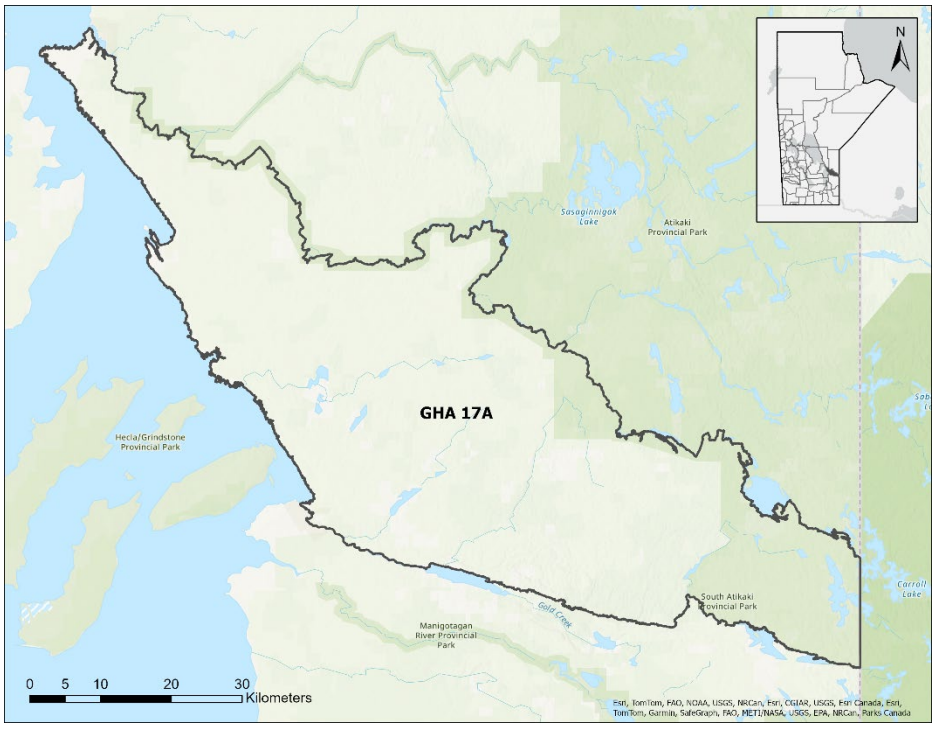
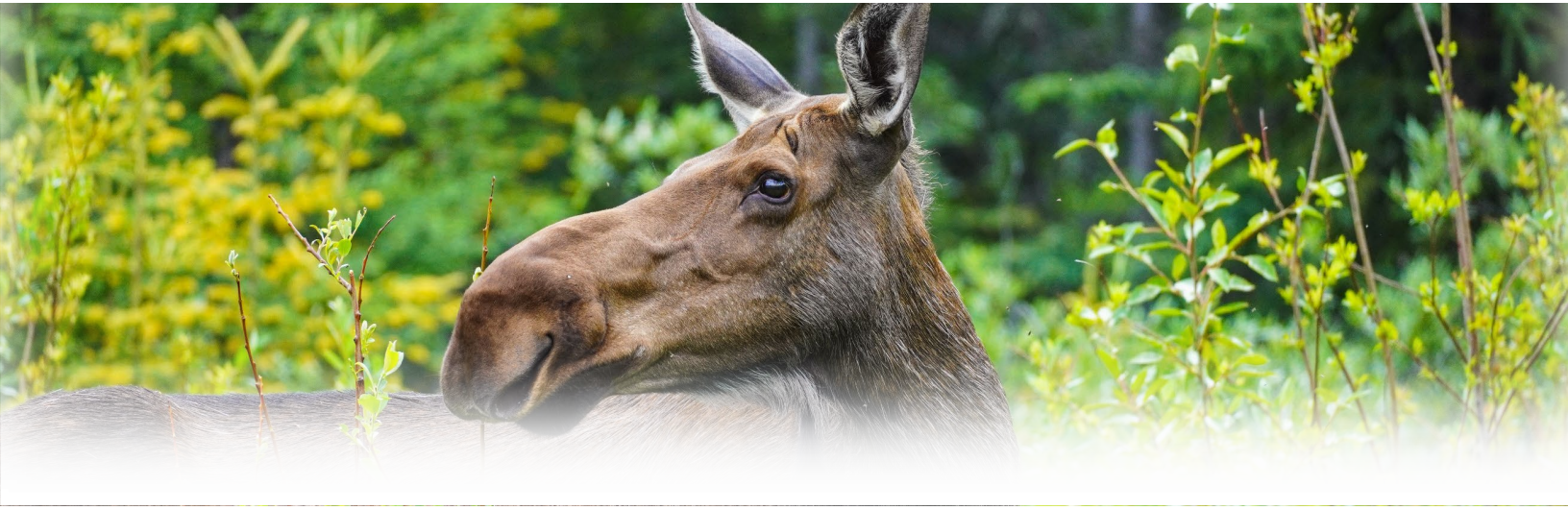


Figure 4. *Map of GHA 17A.*



A population estimate for moose was calculated using the Rdistance package in Rstudio. The total population is estimated to be 462 (90% Confidence Interval (CI): 359 – 673) moose, making up a total density of approximately 0.14 moose/km^2. This population estimate was not significantly different than the previous survey conducted in 2018, which was 383 (90% CI: 304 – 462), suggesting a relatively stable population. The long-term trend suggests that the population has remained stable since 2000 (Figure 5).

Two small groups (6 and 10 individuals, respectively) of boreal woodland caribou were observed in GHA 17A. These boreal woodland caribou observations will be used to inform future monitoring and management efforts. Other incidental observations of wolves, bear, and lynx were observed in GHA 17A.

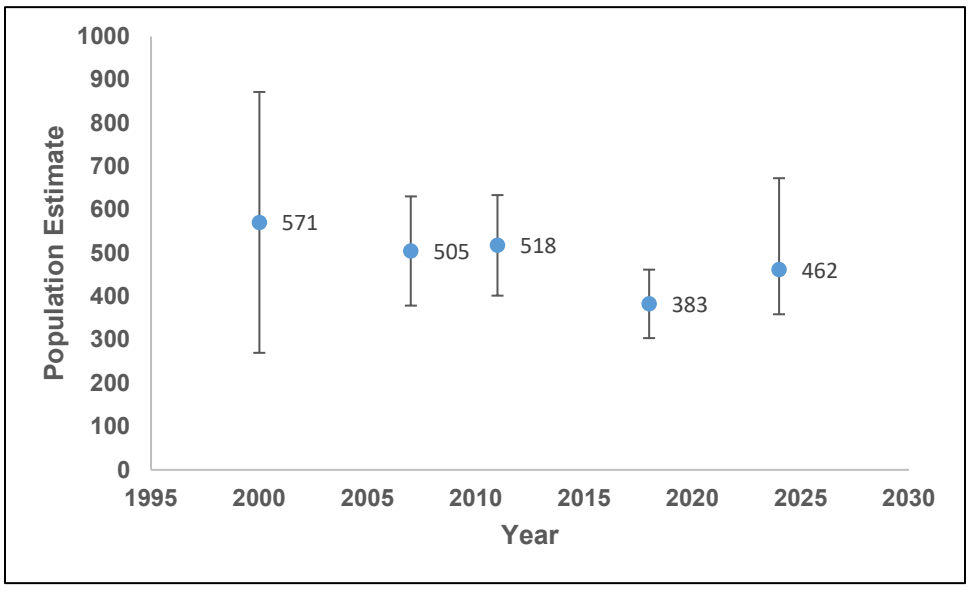


Figure 5. *Population trend of moose in GHA 17A. The results from the 2024 survey indicate that the population has remained stable since 2000. Surveys between 2010 and 2020 were completed using a stratified random block sampling method. The survey conducted in 2024 was completed using the distance sampling method. Error bars indicate ±90% confidence intervals.*

Game Hunting Areas 21 and 21A

GHA 21 and 21A are located in the central Interlake region, encompassing approximately 22,710 km^2, although the total land area is only 9,617 km^2 (Figure 6). This GHA is found in the Manitoba Lowlands eco-region and is characterized by large fens and muskegs, with interspersed hardwood, softwood, and mixed wood forests. The traditional territories of Fisher River Cree Nation, Kinonjeoshtegon First Nation, Peguis First Nation, Bloodvein First Nation, and the Anishinaabe Nation in Treaty 2 Territory are within and directly surrounding GHA 21 and 21A.

An infrared aerial survey was conducted for moose throughout GHAs 21 and 21A from March 14th to March 22nd, 2024. The survey in GHA 21 and the main landmass of 21A was flown in a similar manner to GHAs 26 and 17A, with 2.4km spaced transects oriented East-West. On the southern peninsula and islands of GHA 21A, transects were spaced closer together resulting in full-coverage (~530m spacing) and were oriented Northeast-Southwest (Figure 7).

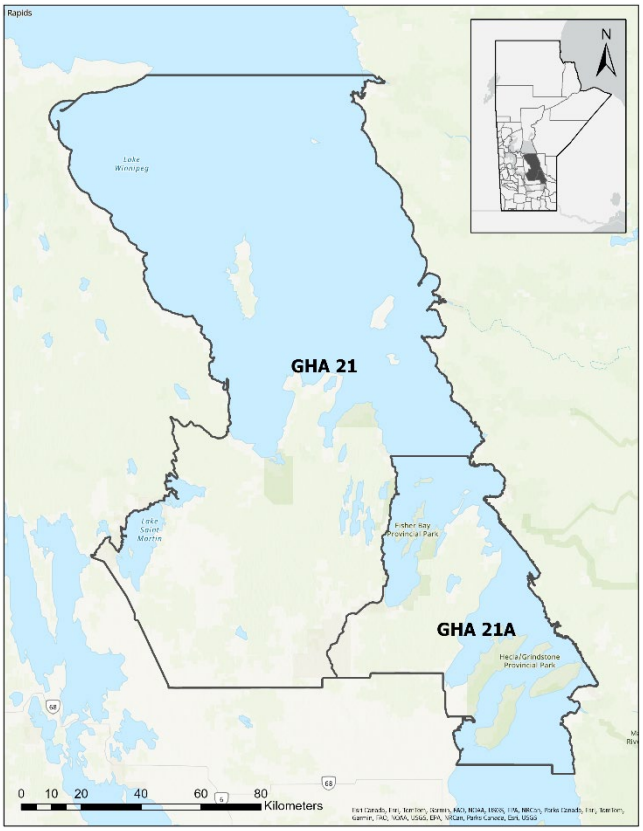


Figure 6. *Map of GHAs 21 and 21A.*

Moose density was very low in these areas with a total of eleven (11) moose observed in GHA 21 and twenty-nine (29) moose observed in GHA 21A. Due to the small number of observations, it is not possible to calculate an accurate population estimate; therefore, moose population numbers in these GHAs are reported as minimum counts. Although these minimum counts are not directly comparable to previous surveys, the results suggest that these populations are critically low, and have not recovered since the implementation of a Conservation Closure in 2018, when the population estimates were 67 (90% CI: 42 – 92) and 132 (90% CI: 76 – 188) in GHAs 21 and 21A, respectively.

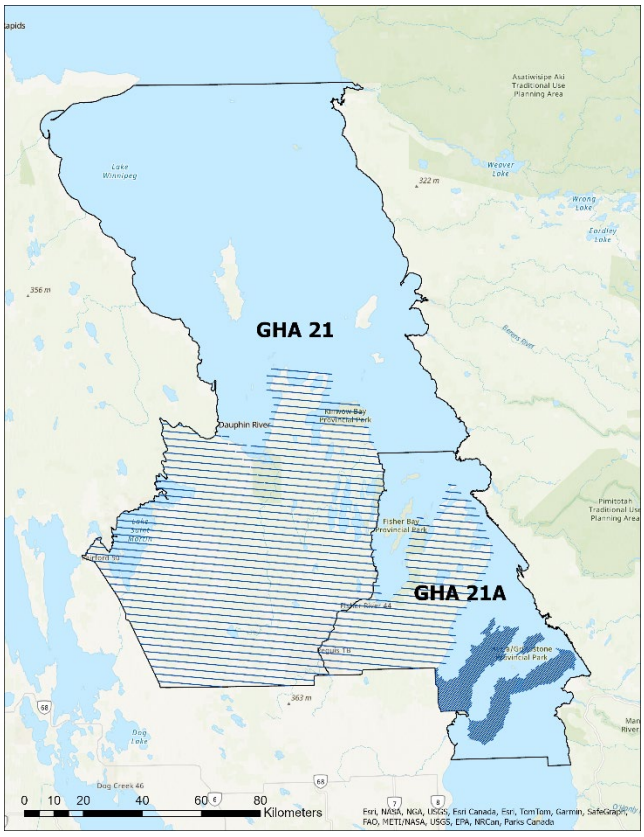


Figure 7. *Map of transects flown within GHA 21 and 21A.*

CONCLUSIONS

Manitoba recognizes that big game species are valued by Manitobans. The Wildlife Branch is committed to using the best available science and traditional knowledge to guide management efforts.

The 2024 spring survey results indicate stable moose populations in GHAs 26 and 17A, and a critically low moose population in GHAs 21 and 21A.

Although no population-level estimates were made for incidental sightings of boreal woodland caribou, bear, and wolves, these observation data will be used to inform future monitoring and management efforts for these species.

In order make informed management decisions regarding hunting opportunities and conservation of big game species, it is important to have reliable survey data. Incorporating new technology, such as infrared imaging, can increase the efficiency and reliability of data collection for big game aerial surveys. In addition to aerial surveys, the Wildlife Branch continues to study big game species through various research collaborations with Indigenous communities, other government agencies, and academic partners. Manitoba’s Wildlife Branch remains dedicated to obtaining accurate population data to support sustainable wildlife management.