

# Observations of Deer from the 2024 Moose Survey

Mike Schrage, Fond du Lac Resource Management Division

## Introduction

Each year, we conduct an aerial survey in northeastern Minnesota in an effort to monitor moose numbers (Giudice, 2024). While the objectives of this annual survey are to estimate moose numbers and demographics, since 2010 deer observations have been recorded as part of this survey and are summarized in this report. Over time, these observations may provide useful trend and geographic distribution data, especially in regards to changes in relative numbers or locations of wintering deer. Observations of deer were recorded in years prior to 2010, but with less consistency, and changes to the methodology of the moose survey in 2004 and 2005 render comparisons with earlier years more difficult. Attempts in 2014 to locate copies of deer observation data from survey years before 2010 were unsuccessful.

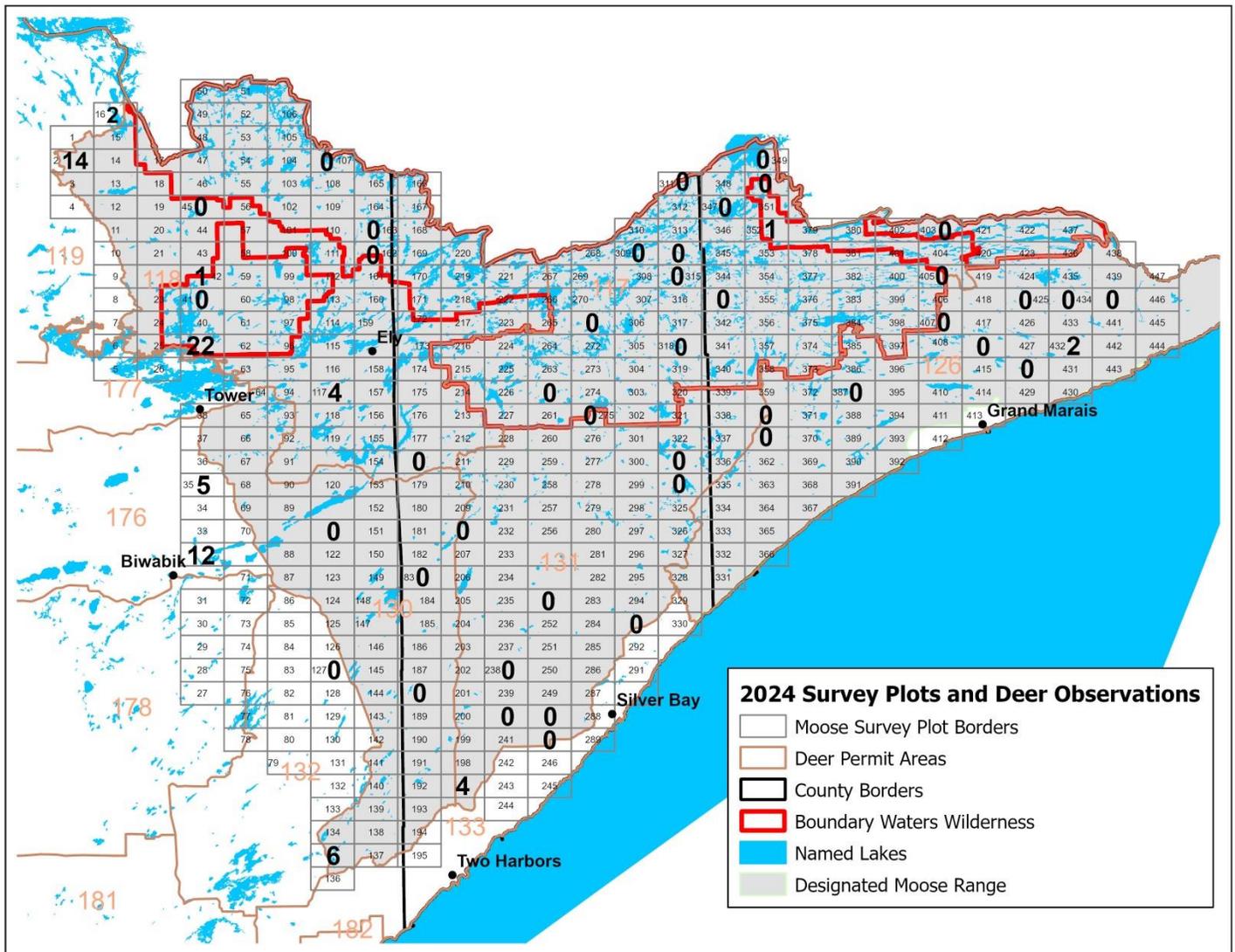
## Methods

Moose survey plots are located across moose range in northeastern Minnesota (Figure 1). Since 2005 all moose survey plots have been rectangular (5 x 2.67 mi.) and oriented east to west with a total of eight transect lines spaced 1/3 of a mile apart. Most survey plots are stratified by expected moose density and randomly selected each year. In 2012 nine semi-permanent habitat plots, used to monitor the effects of large habitat changes on moose numbers over time, have been flown annually. In 2022 a 10<sup>th</sup> habitat plot was added to monitor the effects of the recent Greenwood Fire. In 2024 a total of 53 moose survey plots (43 random and 10 habitat plots) totaling 708 mi<sup>2</sup> were flown from 17 January to 02 February.

In 2024, the survey was flown using a Bell 206B3 and a MD 500E helicopter operated by the Enforcement Division of the Minnesota Department of Natural Resources (MDNR). Transect lines are flown at an average of 200-350 feet above the ground at 52-69 miles per hour. The pilot is seated in the right front with an observer in the left front, and another observer in the rear directly behind the pilot. The program DNRSurvey, on Toughbook® tablet style computers, was used to record survey data in 2024 and provides real time location information. Deer are tallied as they are observed incidentally on the survey plots by the pilot or either observer. Although effort is made not to double count deer, no deviations from the transect lines are made to determine sex or age of deer or to verify if more deer were present than first observed. Locations of deer are not recorded, except with reference to the survey plot.

## Results

A total of 73 deer were observed during the 2024 moose survey and 11 of 53 survey plots (21%) were “occupied” by 1 or more deer (ignores detectability). On the 11 plots occupied by deer in 2024, numbers averaged 7 deer/plot (range = 1–22). The locations of 2024 moose survey plots and the number of deer observed on each plot are shown in Figure 1. The area surveyed to estimate moose numbers is greater than the area designated by the MDNR as moose range where management activities directed towards moose take place. Combined with past years’ observations, a geographic distribution of deer is evident with the majority of deer seen at the time of the survey along the western edge of moose range or along the shoreline of Lake Superior (Schrage, 2014, 2015, 2023, this report). Proximity to people and artificial feed sources on the landscape influence deer distribution as well.



**Figure 1.** Distribution and number of deer observed on 2024 moose survey plots.

Total deer observed, the percentage of plots occupied by deer and average numbers of deer per occupied plot from 2010-2024 are displayed in Table 1 and Figure 2. Short-term trends in the numbers of plots occupied by deer or the geographic distribution of those plots, should be viewed cautiously. Except for habitat plots, survey plots are randomly selected each year based on expected moose densities, not deer densities. These data are best suited for establishing long-term changes in deer distribution and relative abundance across moose range.

With this caution however, total numbers of deer observed during the moose survey have declined steadily from 439 in 2010 to 73 in 2024 even with an increased number of plots flown. In addition, a significant difference ( $P < 0.01$ ) exists in the percentage of moose survey plots occupied by deer between the first five survey years - 2010-2014 versus the last five - 2019-2024 (no survey in 2021). From 2010-2014, deer occupied an average of 47% of the moose survey plots (range 40-55%). From 2019-2024 deer occupied an average of 24% of moose survey plots (range 15-31%). In addition, the average number of deer/occupied plot has significantly declined as well from a mean of 18 deer/occupied plot from 2010-2014 to 13 deer/occupied plot from 2019-2024 ( $P < 0.05$ ). Two additional examples of this decline are moose survey plots 172 northeast of Ely and 32 east of Biwabik. In 2023, 38 deer were counted on plot 172. In 2010, 93 deer were counted on

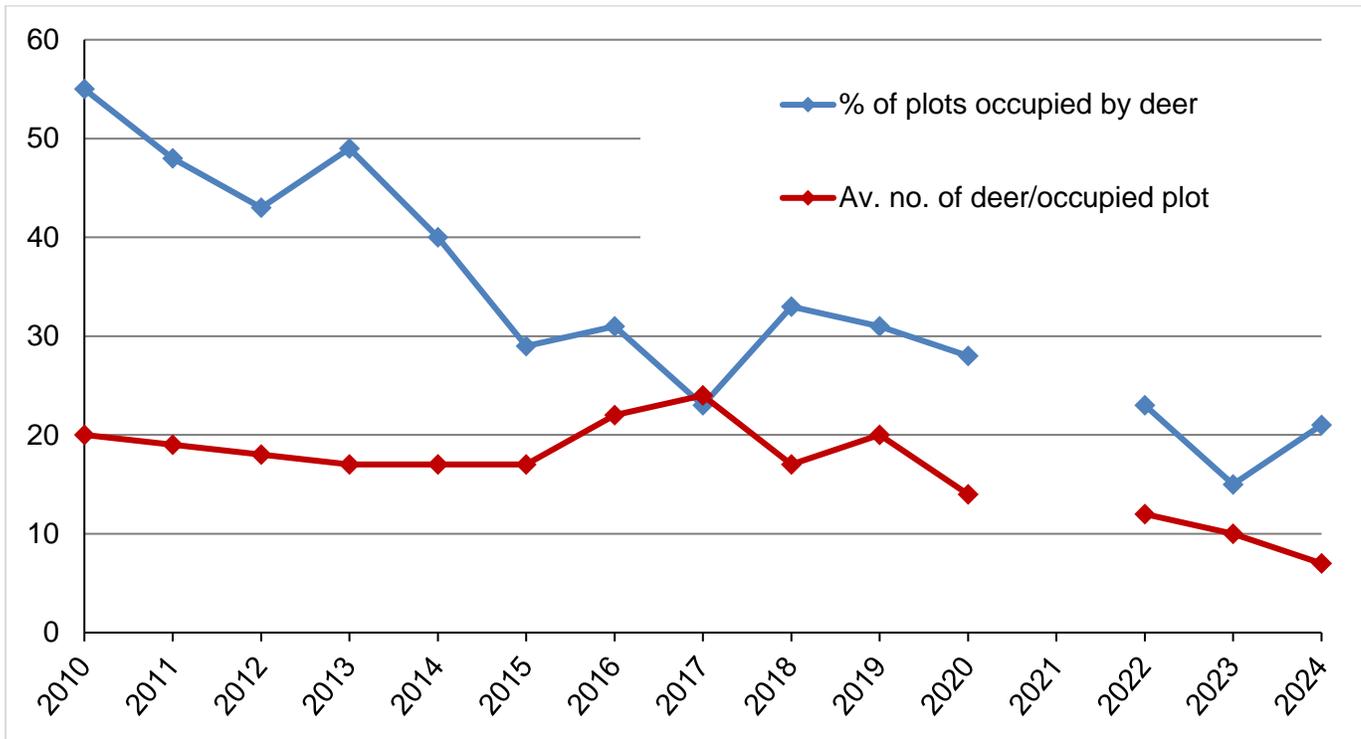
plot 172 – more than the entire number of deer observed in 2023. Similarly, in 2024, 12 deer were counted on plot 32 while in 2018, 83 deer were counted on plot 32 – more than the entire number of deer observed in 2024.

A geographic change in deer distribution appears evident as well. As compared to observations in earlier years, deer numbers in the Boundary Waters Canoe Area south of the Echo Trail, along the Gunflint Trail and in places near Isabella have declined or disappeared during mid-winter in recent years (Schrage, 2014, 2015, 2023, this report). Some of these changes are likely related in part to changes in private deer feeding operations over time.

The recent trend in winter severity likely explains much of the decline in deer observations. As currently determined by the MDNR’s Winter Severity Index (WSI) for white-tailed deer, eight of the previous 15 winters in moose range have been considered “severe” ( $WSI \geq 120$ ). Only the winters of 2011-12 and 2020-21 ranked as “mild” ( $WSI \leq 50$ ) for deer across moose range (Ethan Bott, Minnesota IT Services pers. comm. and MDNR, 2024). In Table 1 below the WSI is given as an average of the calculated WSI for each Deer Permit Area (DPA) in moose range. For the winters of 2008-09 to 2016-17 this included DPAs 117, 118, 122, 126 and 127. In 2017 boundary changes to some DPAs in northeast Minnesota were made to better align with designated moose range so for the winters of 2017-18 onwards this includes DPAs 117, 118, 126, 130 and 131.

Survey Year	Total Moose Plots	Total Deer Observed	Percentage of Plots Occupied by Deer	Average Number of Deer / Occupied Plot	Previous Winter’s Winter Severity Index
2010	40	439	55	20	167
2011	40	356	48	19	96
2012	49	382	43	18	150
2013	49	412	49	17	46
2014	52	350	40	17	123
2015	52	254	29	17	226
2016	52	356	31	22	111
2017	52	285	23	24	87
2018	52	290	33	17	97
2019	52	317	31	20	116
2020	53	215	28	14	139
2021	no survey				139
2022	53	148	23	12	39
2023	53	78	15	10	147
2024	53	73	21	7	144

**Table 1.** Numbers of moose plots flown, total numbers of deer observed, percent of moose survey plots occupied by deer, average number of deer/occupied plot and calculated WSI for moose range for 2008-09 to 2022-23.



**Figure 2.** Trends in percent of moose survey plots occupied by deer and average number of deer/occupied plot, 2010-2024. No survey was flown in 2021.

### Acknowledgments

Funding for the moose survey was provided by the Fond du Lac Band of Lake Superior Chippewa, the 1854 Treaty Authority and the Minnesota Department of Natural Resources. DNRSurvey software support was provided by Brian Haroldson with MDNR Wildlife Research. In 2024 deer observation data were collected with the assistance of DNR Area Wildlife staff, Jessica Holmes and Nancy Hansen; 1854 Treaty Authority Wildlife staff, Morgan Swingen and Sammi Shimota; and MDNR pilots, Brad Maas and Grace Zeller.

### Literature Cited

- Giudice, J.H. 2024. 2024 Aerial Moose Survey. Minnesota Department of Natural Resources, St. Paul.
- Minnesota Department of Natural Resources. 2024. Deer reports and statistics <https://www.dnr.state.mn.us/mammals/deer/management/statistics.html> Accessed 29 March, 2024.
- Schrage, M.W. 2014. Observations of Wolf and Deer During the Moose Survey 2010-2014. Fond du Lac Resource Management Division, Cloquet, Minnesota.
- Schrage, M.W. 2015. Observations of Wolf and Deer During the 2015 Moose Survey. Fond du Lac Resource Management Division, Cloquet, Minnesota.
- Schrage, M.W. 2022. Observations of Wolf and Deer During the 2022 Moose Survey. Fond du Lac Resource Management Division, Cloquet, Minnesota.

Previous reports of deer observations during the moose survey for 2010-2023 can be found at <http://www.fdlrez.com/RM/wildlifereports.htm>