Observations of Deer from the 2023 Moose Survey

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Introduction

Each year, we conduct an aerial survey in northeastern Minnesota in an effort to monitor moose numbers (Giudice, 2023). 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.

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. Since 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 10th habitat plot was added to monitor the effects of the recent Greenwood Fire. In 2023 a total of 53 moose survey plots (43 random and 10 habitat plots) totaling 708 mi^2 were flown from January 6-28.

In 2023, the survey was flown using a Bell Jet Ranger (OH-58) 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 250 feet above the ground at 58-63 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 2023 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 78 deer were observed during the 2023 moose survey and 8 of 53 survey plots (15%) were “occupied” by 1 or more deer (ignores detectability). On the 8 plots occupied by deer in 2023, numbers averaged 10 deer/plot (range = 1–38). The locations of 2023 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 seen along the western edge of moose range at the time of the survey or along the shoreline of Lake Superior (Schrage, 2014, 2015, 2022, this report). Proximity to people and artificial feed sources on the landscape influence deer distribution as well.

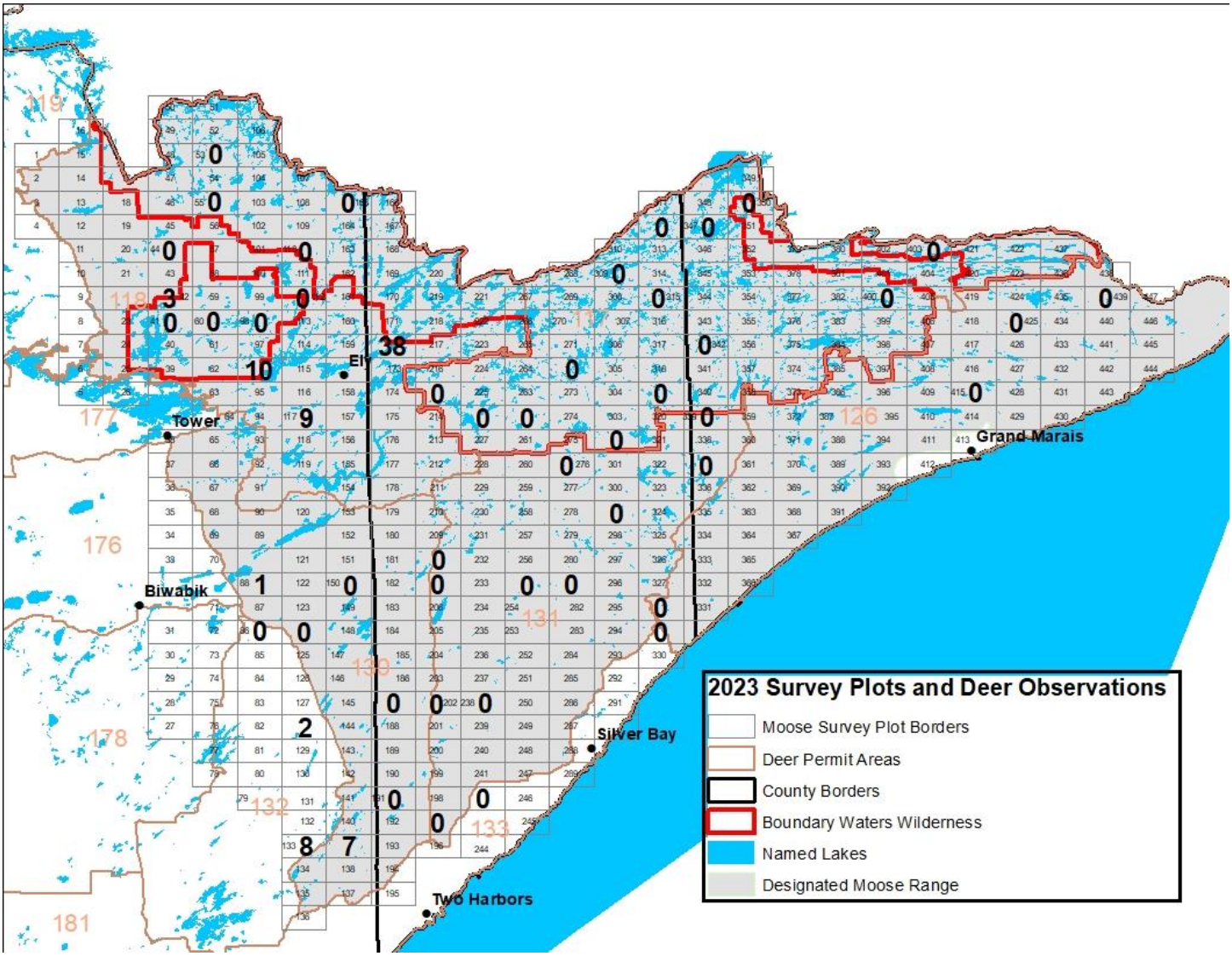

Figure 1. Distribution and number of deer observed on 2023 moose survey plots.

Total deer observed, the percentage of plots occupied by deer and average numbers of deer per occupied plot from 2010-2023 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 perhaps best suited for establishing long-term changes in deer distribution across moose range. With this caution however, a significant difference ($P<0.01$) exists in the percentage of moose survey plots occupied by deer between 2010-2014 and 2015-2020. From 2010-2014 deer occupied an average of 47% of the moose survey plots (range 40-55%). From 2015-2020 deer occupied an average of 29% of moose survey plots (range 23-33%). The average number of deer per occupied plots is not significantly different between the two time intervals ($P=0.31$), so the decline may stem in part from changes in geographic distribution of deer in mid-winter than from changes in actual deer numbers. However, total numbers of deer observed during the moose survey also have declined steadily from 439 in 2010 to 78 in 2023 even with increasing numbers of plots flown. One example is moose survey plot 172 northeast of Ely. 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. 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 apparently declined or disappeared during mid-winter in

recent years (Schrage, 2014, 2015, 2022, this report). The recent trend in winter severity may explain much of this decline. As currently determined by the MDNR's Winter Severity Index for white-tailed deer, the majority of moose range since the winter of 2012-13 has routinely ranked towards the upper end of the moderate category or into the severe winter category. Only the winter of 2020-21 ranked as a mild winter for deer across the majority of moose range (MDNR, 2023).

Year	Total Moose Plots	Total Deer Observed	Percentage of Plots Occupied by Deer	Average Number of Deer / Occupied Plot
2010	40	439	55	20
2011	40	356	48	19
2012	49	382	43	18
2013	49	412	49	17
2014	52	350	40	17
2015	52	254	29	17
2016	52	356	31	22
2017	52	285	23	24
2018	52	290	33	17
2019	52	317	31	20
2020	53	215	28	14
2021	no survey			
2022	53	148	23	12
2023	53	78	15	10

Table 1. Numbers of moose plots flown, total numbers of deer observed, percent of moose survey plots occupied by deer and average number of deer/occupied plot, 2010-2023.

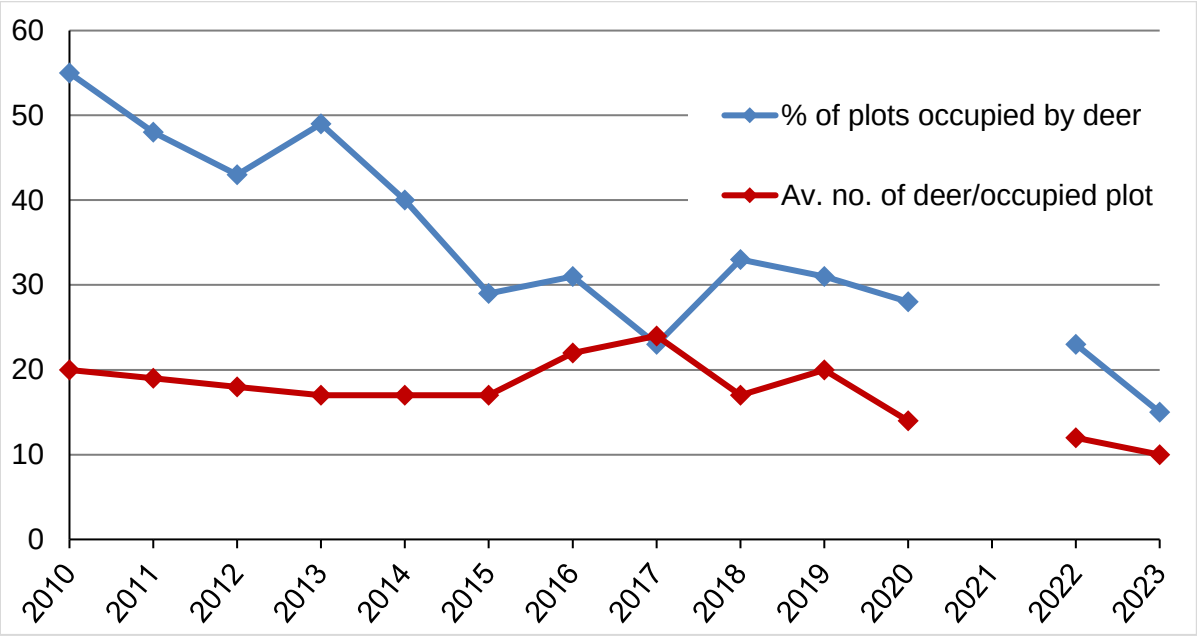

Figure 2. Trends in percent of moose survey plots occupied by deer and average number of deer/occupied plot, 2010-2023. No survey was flown in 2021.

Acknowledgments

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Previous reports of deer observations during the moose survey for 2010-2022 can be found at http://www.fdlrez.com/RM/wildlifereports.htm