

# Observations of Deer and Wolves during the 2019 Moose Survey

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## Introduction

Each year, we conduct an aerial survey in northeastern Minnesota in an effort to monitor moose numbers (DeGiudice, 2019). While the objectives of this annual survey are to estimate moose numbers and demographics; since 2010, wolf and deer observations have been recorded as part of this survey and are summarized in this report. Over time these deer and wolf observations may provide useful trend data especially in regards to changes in relative numbers or locations of wintering deer. Observations of deer and wolves 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 8 transect lines spaced 1/3 of a mile apart. Most survey plots are stratified by expected moose density and randomly selected each year. In addition, 9 permanent plots are used to monitor the effects of large habitat changes on moose numbers over time. In 2019 a total of 52 moose survey plots (43 random and 9 permanent plots) totaling 694 mile<sup>2</sup> were flown from January 3-17.

In 2019, 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. 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 2019 and provides real time location information.

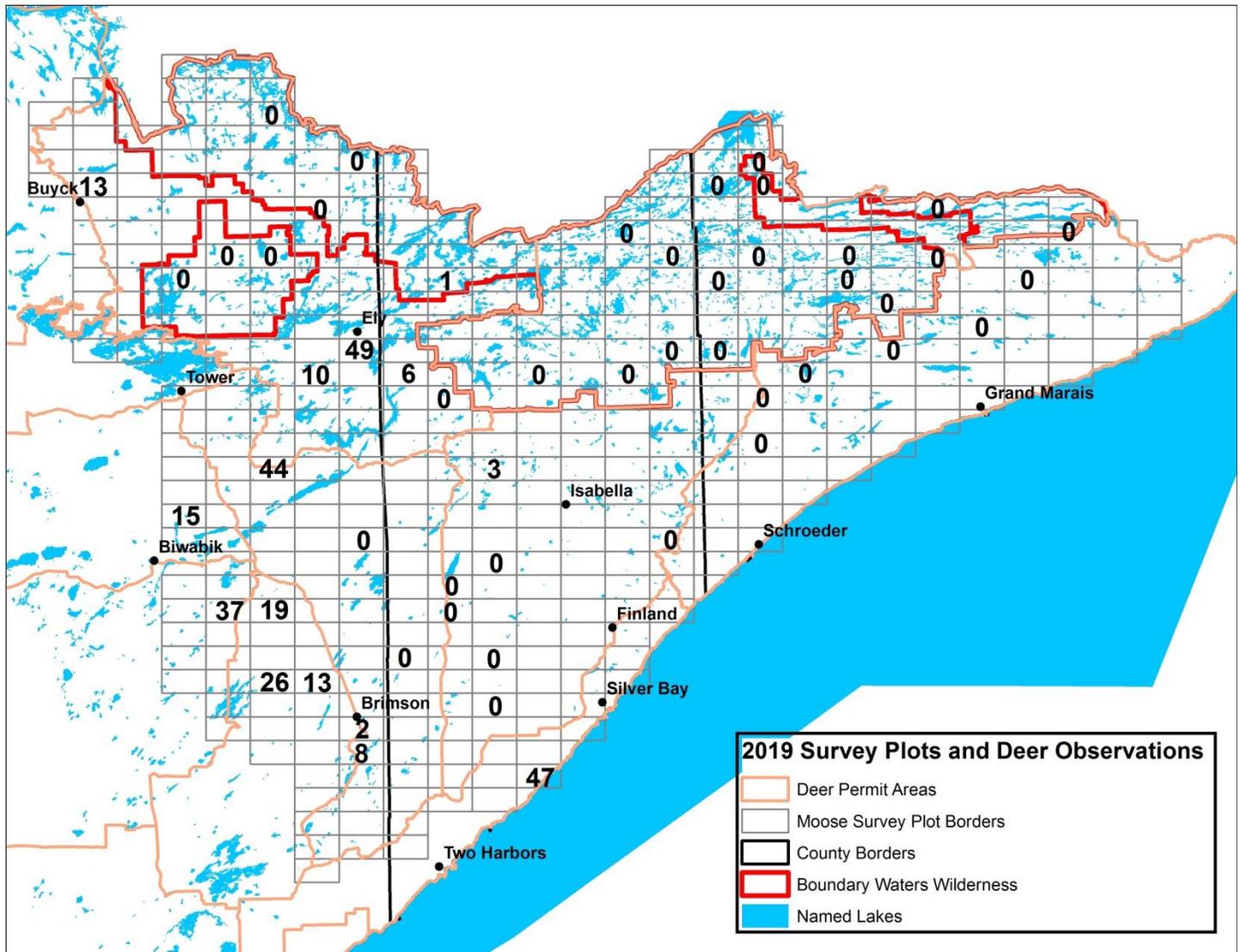
Deer are tallied as they are observed incidentally on the survey plots by the pilot or either observer. Although effort is made not to double count deer, no deviations from the transect lines are made to determine sex or age of deer or to verify if more deer were present than first observed. Locations of deer are not recorded except with reference to the survey plot.

Locations of wolf observations are recorded using DNRSurvey. In addition to wolves, observations of deer and moose carcasses judged to be wolf-kills are also recorded. Observations of wolves and carcasses have been recorded consistently on survey plots since 2010, but with less consistency in the first years as they were encountered outside of survey plots. In 2019 all presumed kill sites and direct visual observations were recorded where ever they were encountered during the operational period for the moose survey (i.e. on survey plots and during travel between survey plots, as well as from the ground). As 2019 was not a year for delineation of occupied wolf range, wolf tracks were not recorded.

## Deer Observation Results

A total of 317 deer were observed during the 2019 moose survey and 16 of 52 survey plots (31%) were occupied by 1 or more deer. The locations of 2019 moose survey plots and the number of deer observed on each plot are shown in Figure 1. A geographic distribution of deer is evident with the majority seen along the western edge of moose range and near the shore of Lake Superior where snow depth and winter severity are

typically less. Proximity to people and artificial feed sources on the landscape probably influence deer distribution as well.

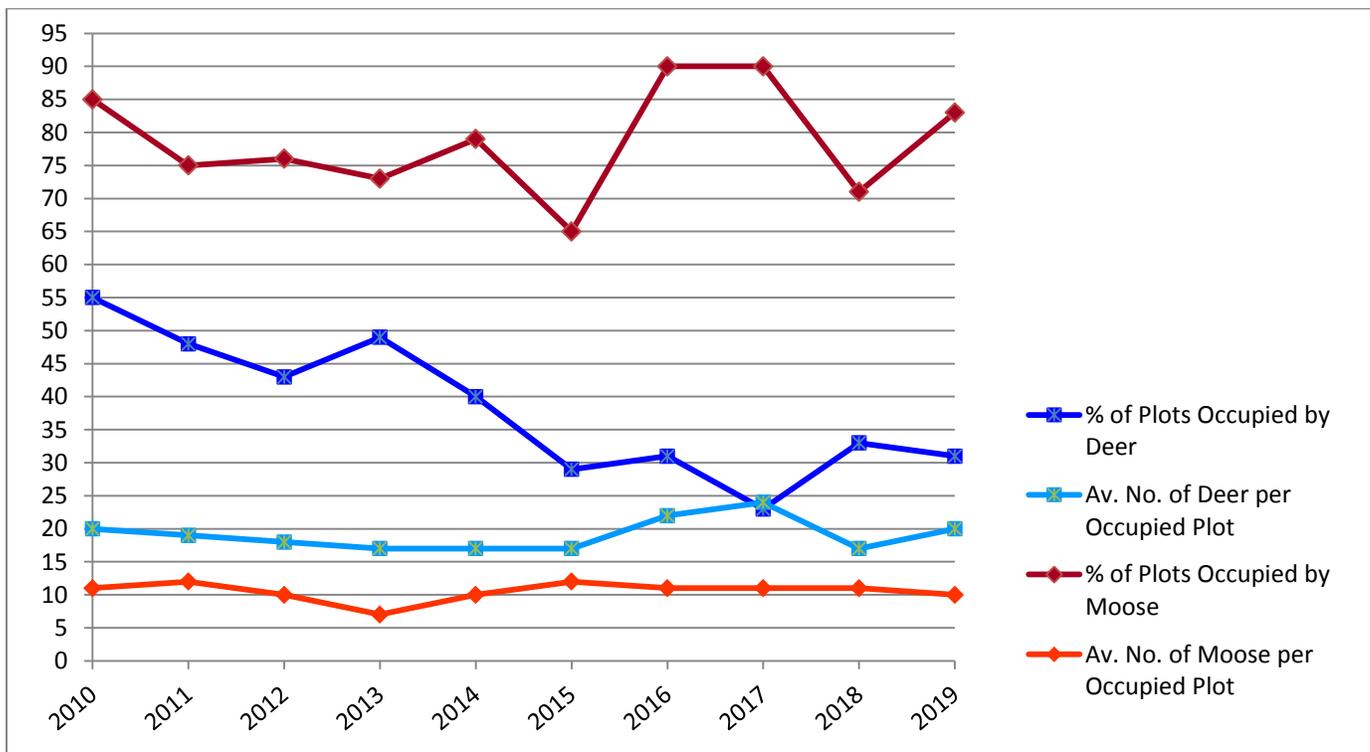


**Figure 1.** The number of deer observed on moose survey plots 2019.

On those plots occupied by deer in 2019, numbers averaged 20 deer per plot (range = 1–49). The number of deer per occupied plot since 2010 has averaged 19, and the percentage of plots occupied by deer has averaged 38%. Numbers of deer and moose per occupied plot and the percentage of plots occupied by both species are shown in 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 9 permanent plots, plots are randomly selected each year based on expected moose densities, not deer. This data is perhaps best suited for establishing long term changes in deer distribution across moose range. With this caution, a significant difference ( $P < .01$ ) exists in the percentage of moose survey plots occupied by deer between 2010-2014 and 2015-2019. From 2010-2014 deer occupied an average of 47% of the moose survey plots (range 40-55%). From 2015-2019 deer occupied an average of 29% of moose survey plots (range 23-33%). The average number of deer per occupied plot is not significantly different between the two time periods ( $P = .15$ ) so the decline may stem more from changes in geographic distribution of deer in mid-winter than from changes in actual deer numbers. From the locations of deer

observations between the two periods of time, 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, 2018). The winters of 2012-13 and 2013-14 were exceptionally severe and may help explain this change in geographic distribution.



**Figure 2.** Percent of moose survey plots occupied by deer and occupied by moose and average deer and moose numbers per occupied plot, 2010-2019.

### Wolf Observation Results

All of moose range in northeastern Minnesota is considered occupied wolf range (Erb et. al. 2018). In 2019, wolves on moose survey plots were observed on 3 different occasions. A pair of wolves was seen on Ella Lake in the Boundary Waters Canoe Area and 3 animals were observed between Two Island and Elbow Lakes. A single wolf was observed southwest of Tait Lake. In addition to wolves seen on the survey plots, a pair of wolves (possibly the same pair) was seen twice: once on the Ely airport and once on the river ice immediately south of the airport. Considering only observations of 2 or more wolves, the average pack size observed of all wolf groups observed from 2010-2019 has been 3.7 wolves (n=22, range = 2-11). Pack observations represent minimum pack size as some animals may have been missed.

No deer or moose carcasses attributed to wolf predation were observed in 2019. Carcass observations of deer or moose which appear to be wolf-kills are based on the judgment of the survey crew. However, these judgments are subjective. Research on moose in Minnesota indicates approximately 2/3rds of adult moose die from causes other than direct predation, so evidence of wolf feeding may merely represent scavenging. Wolf and wolf-kill observations during plot surveys are summarized in Table 1.

Survey Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of wolf sighting events	3	1	2	3	1	6	3	6	6	3
Total wolves seen	19	1	4	12	3	18	7	10	14	6
Range of group sizes observed	5-8	1	1-3	3-6	3	1-11	1-4	1-4	1-4	1-3
Number of deer carcasses	3	0	0	1	1	0	1	0	3	0
Number of moose carcasses	1	0	1	2	0	0	1	0	3	0

**Table 1.** Summary of wolf and wolf-kill observations observed on moose survey plots, 2010-2019.

### Acknowledgments

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Previous reports of wolf and deer observations during the moose survey for 2010-2018 can be found at <http://www.fdlrez.com/RM/wildlifereports.htm>