RAGHORN

October 2018 Annual Edition

Molly Tomfohrde is pictured above with her bull elk from the 2017 elk harvest in Kittson County.

Elk Hunt 2017

Molly Tomfohrde took some time to share with us a few things about her elk hunting experience during the 2017 elk hunting season. This was her first year applying for the once-in-a-lifetime Minnesota elk hunt. In preparing for the main event she made multiple trips weeks in advance to scout the area, including an overnight stay the weekend before the hunt along with her boyfriend, Joel, who is an avid elk hunter. She also attended an orientation where the DNR provided some paperwork to complete during the hunt. This paperwork, which she jokingly referred to as her "diary" throughout the hunt, encouraged her to document daily hunting activities. She saw 13 different bulls, from spikes to raghorns to mature bulls as well as a variety of cows and calves (including a few collared elk). Molly also noted seeing a moose, wolves and black bears.

As far as the details of the hunt goes, Molly camped in a designated camping area in the Caribou WMA and what would be hunting zone 30. She did hear quite a bit of bugling throughout the entire hunt. One morning, at 3 a.m. she was awoken by a few bulls bugling near camp. She admits bugling is a lot tougher than she thought but managed to bugle back and forth with a few elk during the hunt. She also heard some chuckles by the bulls and some mews and chirps by cow elk. Hearing the bulls "talk" with the cows was quite interesting to see and hear. Despite having shot the bull on a Saturday, she called him on the prior Thursday and was able to bugle back and forth with him. Saturday morning, she had been bugling back and forth with a different bull until he stopped. She figured he must have caught wind of her. Molly decided to then move to a different location and as she was walking back to her vehicle, she looked off into a clearing and saw her bull. Before he ran, Molly used a cow call to get his attention and was given her opportunity. She was surprised to see how a cow call can stop a bull elk right in his tracks. The bull was killed on WMA land shortly after 8 a.m. using a 7mm Remington Magnum with just one shot around 100 yards away. This was Molly's first elk! When asked how she felt she said it all happened very fast, in fact it WAS so fast that she didn't have time to be nervous. She had to simply rely on her instincts to get into position, aim and take a shot. As she was preparing for a second shot, Joel, confirmed to her that he was down. Molly was in total shock and disbelief knowing that elk are large animals, but seeing a bull up close and personal definitely gave her a whole new perspective.

A few memorable parts of the hunt include the bugling back and forth with the elk. It was quite a rush. Also, being able to watch the herd bulls interact with their harem of cows was very cool to see. There looked to always be a "lead" cow that would check out an area before notifying the other cows that the coast was clear. Molly added that she learned the hard way that bulls have impeccable hearing. It was during a morning sit that she used a cow call to try and get a bull elk to come her way. A few minutes after calling, what looked like a cow elk came walking in front of her and went to the nearby pond for a drink. Before she knew it, the elk came within 5 yards and stared her down. It was a bull elk with only one eye, and one broken off antler and no antler on his other pedicle. He stared Molly down for what felt like forever, although, it was just a few minutes.

Molly mentioned that hunting in northwest Minnesota is very different than out west. In Caribou WMA, it is very flat, with a lot of thick wooded areas making it difficult to glass for elk but she was still able to

have a successful and enjoyable hunt. When asked if she had good experiences with the locals and DNR staff Molly said that it was a great experience with both and that the DNR was very helpful and informative in the hunting preparation. She would love for Minnesota to have more elk but understands that there are a lot of factors in play that determine when/how the population can be grown and would like to see more people have the opportunity to hunt for elk.

As far as advice for elk hunters, Molly said it was truly an once-in-a-lifetime opportunity and would encourage future hunters to treat it as such. She did see 13 different bulls throughout the hunt, some of which she saw multiple times. It was tempting to shoot an elk on the first day, but she was glad that she was patient and able to enjoy all of the encounters the remainder of the hunt. Molly shot her elk on day 8 of the 9 day hunt. She says to do your research on the area, go scouting, be patient and enjoy the opportunity.

Molly has definitely "caught the bug" and plans to go elk hunting out west in the years to come. Good luck on your future adventures!

The Story of Minnesota's Elk

The Rocky Mountain Elk Foundation recognizes Minnesota as an official elk state. Yet despite this esteemed acknowledgment by an organization that has done much to promote elk and preserve elk habitat, including in Minnesota, many people don't realize that Minnesota is home to wild elk. Minnesota's elk are not escaped, captive-bred elk, but, rather, are wild, native, and free-ranging elk staking out only a partial claim of what was originally a much more expansive range across Minnesota and throughout the Great Plains.

In 1840 elk ranged throughout most of Minnesota. Market hunting for elk was still occurring into the early 1890s. But by 1900 elk only existed in the extreme northwestern corner of the state in a few isolated pockets. By then, beginning in 1893, elk were protected in Minnesota. And it was in 1932 that the last verified sighting of a wild elk in the Northwest Angle occurred. In a very short period of time as Minnesota's timber was being logged and prairie sod plowed, elk began disappearing as settlers began appearing.

And yet these large members of the deer family (bull elk can reach weights of over 800 pounds) weren't absent from Minnesota for long; maybe they never entirely were. Nonetheless, the absence of elk was concern enough and, in 1913, the Minnesota Legislature allocated $5,000 for a plan to bring back elk to the state. As soon as the following two years, 1914-15, seventy elk were introduced into a holding

facility in Itasca State Park. Those translocated animals came from Jackson Hole, Wyoming, and from a private farm in Ramsey County, Minnesota.

The Itasca elk were intended to be a source-herd for future translocations into other areas of Minnesota. However, only 13 elk survived that first year in the park. As the years went by, the Itasca herd grew to 25 animals and, in 1929, eight elk were translocated from the herd to the Stony River Ranger District in Superior National Forest. Unfortunately, those elk were never able to establish a breeding population and eventually disappeared from the area.

Another re-introduction, this time in northern Beltrami County at the Red Lake Game Preserve in 1935, brought 27 elk into the area. Those animals rapidly established themselves and did extremely well. The herd grew to over 100 by the 1940s, but with their success came problems, too. The first documented crop and haystack depredation occurred in 1939. Ten years later crop depredation became severe. Soon after, depredation permits were issued by the state to affected farmers to shoot elk and, by 1976, the first elk management plan was drafted (a new, updated elk management plan now exists).

In 1985, landowners from the Grygla area lobbied, successfully, the Minnesota Legislature to mandate that the DNR relocate all of the elk. Only nine elk were captured and relocated to the Red Lake Indian Reservation when a lawsuit was filed by the Sierra Club that effectively stopped the elk capture effort. Two years later Minnesota lawmakers passed legislation to compensate landowners for crop damage and to limit the size of the elk herd. Periodic hunts would be held to control the herd size. The first-ever Minnesota modern era elk hunt was held in 1987.

Today, the Grygla area elk herd is not the only population of elk in Minnesota. Other herds spend their time in Kittson County where excellent food and habitat exists for elk to flourish. --Blane A. Klemek, MNDNR

2017 Minnesota Elk Harvest Report

Erik Thorson, Acting Big Game Program Leader
Ruth Anne Franke, Area Wildlife Supervisor (Karlstad)
Jason Wollin, Asst. Area Wildlife Manager (Karlstad)
Kyle Arola, Acting Wildlife Area Supervisor (Thief Lake)

Introduction

A limited number of licenses are offered to Minnesota residents to hunt elk. In 2017, there were two established zones open for elk hunting: 1) Zone 20 - Kittson County Central and 2) Zone 30 - Kittson County Northeast (Figure 1). Elk hunting in Zone 10, near Grygla, Minnesota, has been closed since 2013 because the population is below goal (Figure 2). In 2017, there were two regular season hunts held in both open zones: 1) Season A - September 9 through September 17 and 2) Season B - October 7 through October 15. The hunts were structured to fall within the breeding season when bull elk are most vulnerable and elk can be located by vocalizations.

Methods

All elk hunters are required to attend a mandatory orientation session the day before their respective hunts begin. At this session, DNR staff provide hunters with their license and a kit to collect biological samples from their harvested animal. Field samples collected by the hunter include blood, hair with skin, muscle tissue, ticks (if found), and the whole liver. Hunters must register their animal in person within 24 hours at the local DNR office. DNR staff help map the harvest location, provide a possession tag, and take the hunter-collected biological samples. DNR staff also collect lymph nodes, the obex (brain stem), the whole brain (with consent), and a tooth so an accurate age can be determined at a later date. Alternative arrangements are made for the collection of some samples, if immediate collection would interfere with a hunter's planned taxidermy mount. DNR staff submit all biological samples to Wildlife Health for disease testing and other monitoring projects.

Results

A total of 13 licenses (including one landowner permit each for Zones 20 and 30) were available and 1,695 individuals or parties (up to two hunters) applied for the opportunity to hunt elk for both zones and seasons (Table 1). Applicants were given the opportunity to select both zone and season in which to hunt. First, random drawings were held for landowners in their respective zones. Once landowner licenses were drawn and selected, two more drawings were held in the second round for applicants that had applied for 10 years or more and one elk license was drawn for each zone. All remaining landowners were then placed into the general drawing with all the other applicants for the remaining elk licenses available in the zone and season they had selected on their application. These licenses were distributed through a third random drawing conducted per zone.

In 2017, a total of 10 elk were harvested in zones 20 and 30 (Table 2). Long-term elk harvest for all zones is depicted in Tables 3 and 4.

Table 1. License allocation and application numbers of the 2017 Minnesota elk seasons

Kittson County Season A

Zone	Either-Sex	Antlerless	Bull-only	Total	Total Applicants
Zone 20 – Kittson Central	0	1	3	4	595
Zone 30 – Kittson Northeast	0	0	2	2	463
Total	**0**	**1**	**5**	**6**	**1,058**

Kittson County Season B

Zone	Either-Sex	Antlerless	Bull-only	Total	Total Applicants
Zone 20 – Kittson Central	0	1	3	4	303
Zone 30 – Kittson Northeast	0	0	3	3	334
Total	**0**	**1**	**6**	**7**	**637**

Table 2. Distribution of the 2017 Minnesota elk harvest.

Kittson County Central Hunt Zone
(20)

Season	Bulls-only Licenses	Antlerless Licenses	Bulls taken	Antlerless taken	Total elk taken
Season A (Sept 9 – 17)	3	1	3	1	4
Season B (Oct 7 – 15)	3	1	2	0	2
Total	**6**	**2**	**5**	**1**	**6**

Kittson County Northeast Hunt Zone
(30)

Season	Bulls-only Licenses	Antlerless Licenses	Bulls taken	Antlerless taken	Total elk taken
Season A (Sept 9 – 17)	2	0	2	0	2
Season B (Oct 7 – 15)	3	0	2	0	2
Total	**5**	**0**	**4**	**0**	**4**

Table 3. Grygla elk harvests, 1987-2017

	Grygla Elk Harvests			
	Bulls (or Either-Sex)		Antlerless	
Year	Permits	Harvest	Permits	Harvest
1987	2	1	2	1
1996	2	2	7 (1 alternate)	6
1997	5 (2 alternate)	1	5 (2 alternate)	2
1998	4 (2 alternate)	2	0	0
2004	1	1	4	2
2005	1	0	4	0
2006	2	2	6	2
2007	0	0	6	6
2008	2	2	10	6
2009	2	3*	12	11
2010	2	1	5	3
2011	2	2	3	0
2012	2	1	3	0
2013	Closed	0	Closed	0
2014	Closed	0	Closed	0
2015	Closed	0	Closed	0
2016	Closed	0	Closed	0
2017	Closed	0	Closed	0
Total	**27**	**18**	**67**	**39**

*One bull was a sub-legal spike and was legally tagged as an antlerless animal.

Table 4. Kittson County elk harvests, 2008-2017

	Kittson County (Combined Zone 20 & 30)			
	Bulls (or Either-Sex)		Antlerless	
Year	Permits	Harvest	Permits	Harvest
2008	1	1	10	10
2009	12	9[a]	4	5
2010	1	1	3	3
2011	2	3[b]	8[c]	4
2012	5	4[d]	13	3
2013	8	6	15	6
2014	9	6	0	0
2015	7	5	0	0
2016	7	5	0	0
2017	11	9	2	1
Total	**63**	**49**	**55**	**32**

[a] One additional bull (6x7) was wounded but not retrieved in 2009. It was found dead later and is counted in the total.

[b] One bull was a male calf and was legally tagged as an antlerless animal.

[c] Three unsuccessful hunters from the Grygla zone were invited to participate in the January extended season in Kittson County, however only 2 participated and were included in the number of antlerless permits issued.

[d] One bull was a sub-legal spike and was confiscated.

Figure 1. Kittson County Elk Hunt Zones

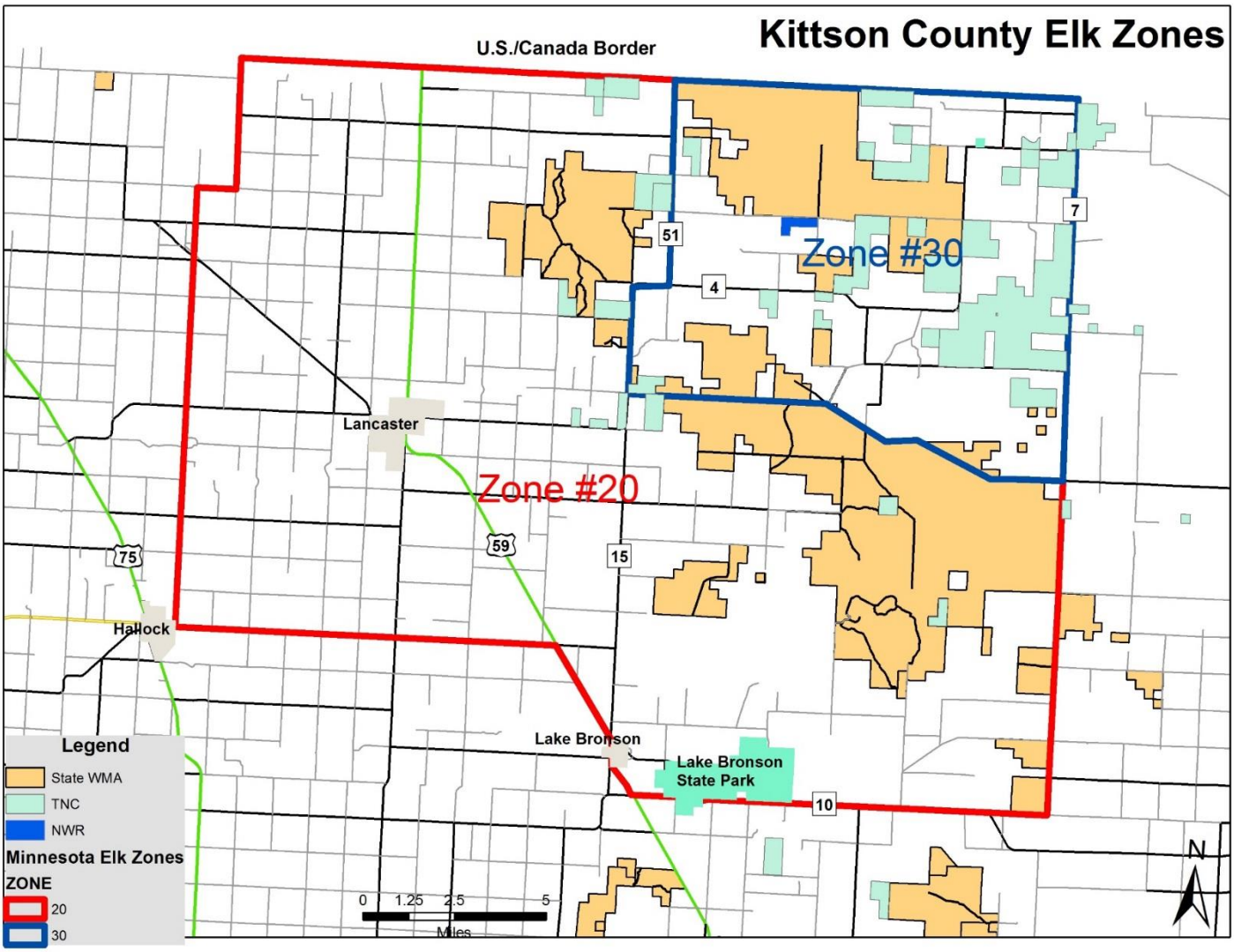
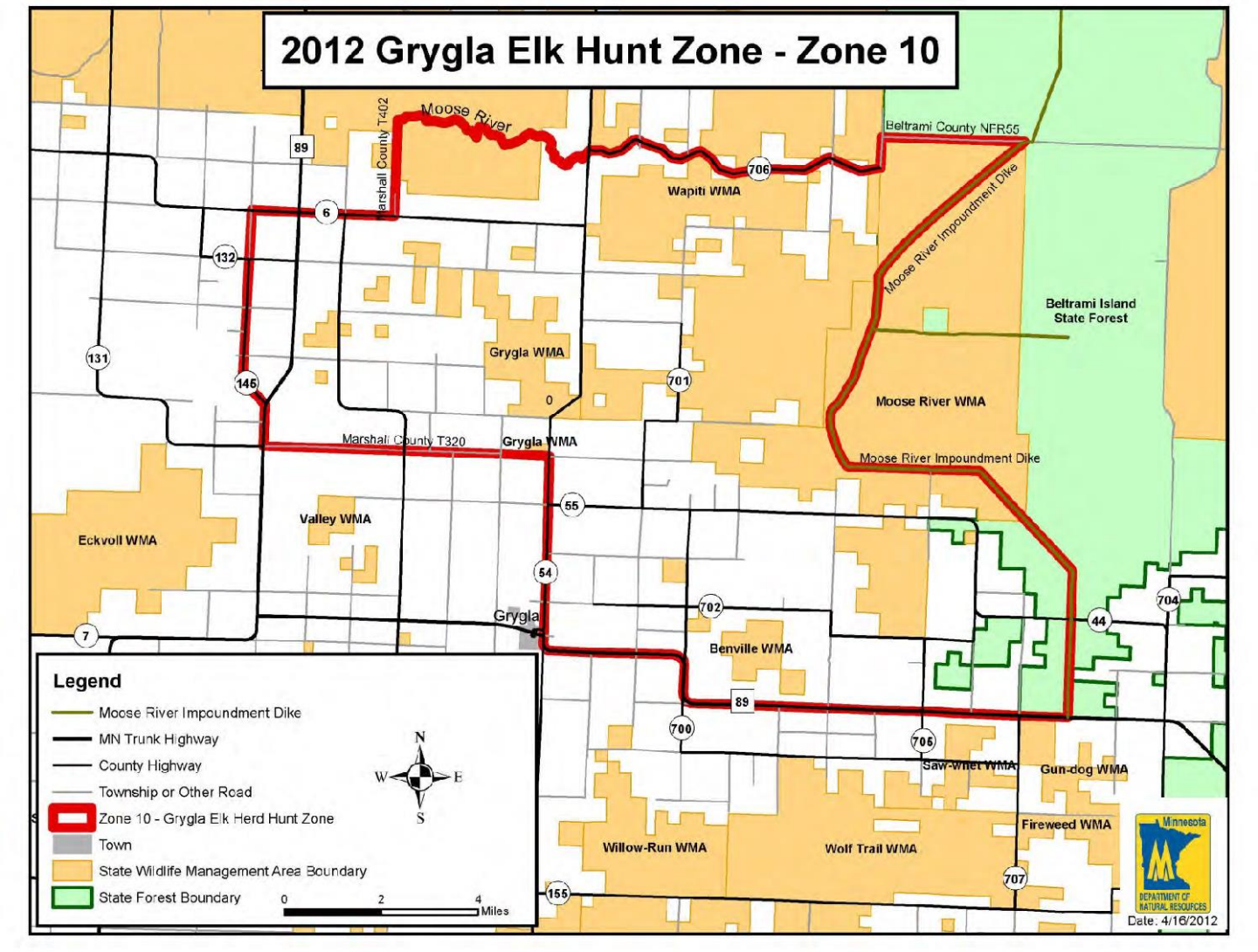


Figure 2. Grygla Elk Hunt Zone.



Detailed results of the 2018 elk hunt will be provided in the next issue. In summary, Kittson Northeast (Caribou), Zone 30, had one season with two hunters (Bull-Only tags). Success rate was 100% with a 6x6 bull and a large 7x8 bull harvested.

Kittson Central (Lancaster), Zone 20, had three seasons with a total of 20 hunters (4 Either-Sex and 16 Antlerless tags). Success was 75% rate overall.

A break down per season in Kittson Central, Zone 20:

- Season A) 7 for 7 with two 5x5 bulls and 5 cows.
- Season B) 6 for 7 with one 6x2 bull (broken antler) and 5 cows.
- Season C) 2 for 6 with no bulls and 2 cows.

Elk Research Updates

In 2016, the Minnesota Department of Natural Resources (MN DNR) began a study on Minnesota's free ranging elk population. This population is found in a highly agricultural region in northwestern Minnesota, primarily in Kittson, Roseau, and Marshall Counties (Figure 1). The purpose of this project was to collect baseline ecological data to provide a foundation for future research and management. Results from this study will help the MN DNR reduce elk conflicts with local landowners and inform management strategies to provide suitable habitat for this population. Our objectives for this project were to estimate the annual and seasonal home ranges of female elk for 2 full years. Using the home range estimations, we also measured annual and seasonal home range fidelity.

We fitted 20 female elk with global positioning system (GPS) collars in February 2016. These collars collected 4-hourly locations (6 total locations per day) for 2 years (Anderson et al. 2008). Only the locations taken between 15 April 2016 and 14 April 2018 were used for this study. We defined seasons that were biologically relevant for this population of elk based on seasonal environmental conditions, human disturbance, and their life history. These seasons were pre- to post-parturition (15 April – 30 June), summer (1 July – 31 August), harvest (1 September – 31 December), and winter (1 January – 14 April). Using the 4 hourly locations collected from the GPS collars, we estimated annual and seasonal home ranges for each elk.

Annual home ranges were defined by a 99% contour around the Brownian Bridge Movement Models (BBMMs) for individual elk in both years (Horne et al. 2007, Walter and Fischer 2016). We considered year 1 to be 15 April 2016 to 14 April 2017, and year 2 to be 15 April 2017 to 14 April 2018. To measure annual home range fidelity, we calculated the percent of the home range from year 2 that overlapped with year 1 for each elk. We defined seasonal home ranges for individual elk, using 99% BBMMs around the 4-hourly locations found within each season for both years. We measured seasonal home range fidelity by calculating the percent of the seasonal home range from year 2 that overlapped with the same season in year 1. The collared cows primarily remained in 4 separate sub-groups, and no interaction was seen between these sub-groups. Due to this we averaged the home range measurements, and overlaps, within each sub-group. The sub-groups are Caribou-Vita (CV), Grygla (GR), Lancaster North (LN) and Lancaster South (LS) (Figure 1).

The average annual home range size for all elk ranged between 71.8 km^2 and 111.4 km^2. The average annual home range size for year 1 was 71.9 km^2 ± 17.4 km^2 for CV elk (n=3), for the GR elk (n=2) it was 90.2 km^2 ± 24.4 km^2, 76.3 km^2 ± 3.4 km^2 was the average annual home range size for LN elk (n=9), and LS elk (n=5) had an average annual home range size of 79.7 km^2 ± 6.0 km^2. In year 2 the average annual home range size was 74.8 km^2 ± 0.7 km^2 for CV (n=2) elk, 111.4 km^2 ± 1.5 km^2 for GR elk (n=2), 77.7 km^2± 2.1 km^2 for LN elk (n=8), and 73.7 km^2 ±4.9 km^2 for LS elk (n=5) (Figure 2).

The average percent of annual home ranges from year 2 that overlapped year 1 was: 52.4% ± 10.3% for CV elk, 67.8% ± 0.22% for GR elk, 81.1% ± 3.1% for LN elk, and 65.4% ± 1.8% for LS elk (Figure 3). For Caribou-Vita (CV) elk, the average seasonal home range size was 26.7 km^2 ± 4.4 km^2 in parturition, 25.4 km^2 ± 6.0 km^2 in summer, 61.3 km^2 ± 10.3 km^2 during harvest, and 36.5 km^2 ± 2.5 km^2 in the winter. In the Grygla (GR) sub-group, the average seasonal home range size was 31.6 km^2 ± 3.2 km^2 in parturition, 22.0 km^2 ± 3.6 km^2 in summer, 103.1 km^2 ± 13.3 km^2 in harvest, and 39.3 km^2 ± 10.7 km^2 in the winter. Lancaster North (LN) elk had an average seasonal home range size of 56.2 km^2 ± 2.7 km^2 in parturition, 29.9 km^2 ± 1.9 km^2 in summer, 63.6 km^2 ± 2.1 km^2 in harvest, and 52.4 km^2 ± 2.1 km^2 in winter. For the Lancaster South (LS) sub-group, the average home range size was 34.1 km^2 ± 4.4 km^2 in parturition, 35.0 km^2 ± 4.2 km^2 in summer, 47.7 km^2 ± 2.1 km^2 in harvest, and 49.8 km^2 ±2.7 km^2 in winter (Figure 4). For all elk in all seasons, the average seasonal overlap ranged between 20% and 78.7% (Figure 5).

The average percent of annual home ranges from year 2 that overlapped year 1 was: 52.4% ± 10.3% for CV elk, 67.8% ± 0.22% for GR elk, 81.1% ± 3.1% for LN elk, and 65.4% ± 1.8% for LS elk (Figure 3). For Caribou-Vita (CV) elk, the average seasonal home range size was 26.7 km^2 ± 4.4 km^2 in parturition, 25.4 km^2 ± 6.0 km^2 in summer, 61.3 km^2 ± 10.3 km^2 during harvest, and 36.5 km^2 ± 2.5 km^2 in the winter. In the Grygla (GR) sub-group, the average seasonal home range size was 31.6 km^2 ± 3.2 km^2 in parturition, 22.0 km^2 ± 3.6 km^2 in summer, 103.1 km^2 ± 13.3 km^2 in harvest, and 39.3 km^2 ± 10.7 km^2 in the winter. Lancaster North (LN) elk had an average seasonal home range size of 56.2 km^2 ± 2.7 km^2 in parturition, 29.9 km^2 ± 1.9 km^2 in summer, 63.6 km^2 ± 2.1 km^2 in harvest, and 52.4 km^2 ± 2.1 km^2 in winter. For the Lancaster South (LS) sub-group, the average home range size was 34.1 km^2 ± 4.4 km^2 in parturition, 35.0 km^2 ± 4.2 km^2 in summer, 47.7 km^2 ± 2.1 km^2 in harvest, and 49.8 km^2 ±2.7 km^2 in winter (Figure 4). For all elk in all seasons, the average seasonal overlap ranged between 20% and 78.7% (Figure 5).

The sub-groups CV, LN, and LS had similarly sized home annual ranges, ranging between 71.9 km^2 and 78.7 km^2 while GR had the largest home ranges sizes, ranging between 90.2 km^2 and 111.4 km^2 (Figure 2). These sub-groups, CV, LN and LS, have larger population sizes than GR (Franke 2018), which could mean they experience more competition for resources than GR elk, thus restricting their annual home range size (Beest et al. 2015). The smaller size of the GR subgroup (15 individuals total) might allow for them to range further for resources throughout the year.

Summer season generally had the smallest HR size, while Harvest and Winter had the largest (Figure 4b). During the summer months, the most intense growing season, more food resources are available to the elk both on agricultural and non-agricultural land. For this reason, there is likely less need for them to move around the landscape looking for more resources (Anderson et al. 2005). In the harvest season the collared elk made larger movements, possibly to avoid the hunting and farming activities occurring during this time (Ager et al. 2003, Ranglack et al. 2017, Thurfjell et al. 2017). In winter there are less resources available overall causing elk to move around the landscape to find necessary resources (Anderson et al. 2005).

Collared elk in the sub-groups CV, LN, and LS all had home ranges that overlapped (seasonal and annual) greater than 50% indicating use of similar areas throughout the entire year. These 3 sub-groups are larger (50-100+ animals) and, again, competition for resources likely plays a role in these animals using both smaller and similar areas (Beest et al. 2015). Other studies have shown that elk use fragmented landscapes in agricultural regions (Stubblefield et al. 2006, Beck et al. 2013). The mixture of managed land and large amounts of available crops could be meeting the nutritional needs for these 3 subgroups, meaning there is no need for them to explore. For the GR sub-group, less competition from conspecifics allow for increased exploratory movements throughout the year. The 2 collared elk in GR only showed greater than 50% overlap in the harvest season, which was also when their home ranges were largest. The lowest percent overlap for GR was in winter, when there is the least food availability, and likely when they would have more need to explore for resources (Figure 5c, d.).

There is further work to be done to determine why Minnesota elk are choosing certain areas for their home ranges in different seasons. With the locations we used to create the annual and seasonal home ranges, we will be generating Resource Selection Functions (RSFs) to look at seasonal resource use (Manly et al. 2002). This will be done by comparing the resources used by the elk, with ones that are available in the landscape. Completion of this next objective will give us both the location elk are in throughout the year, and the resources that are important to them in different seasons.

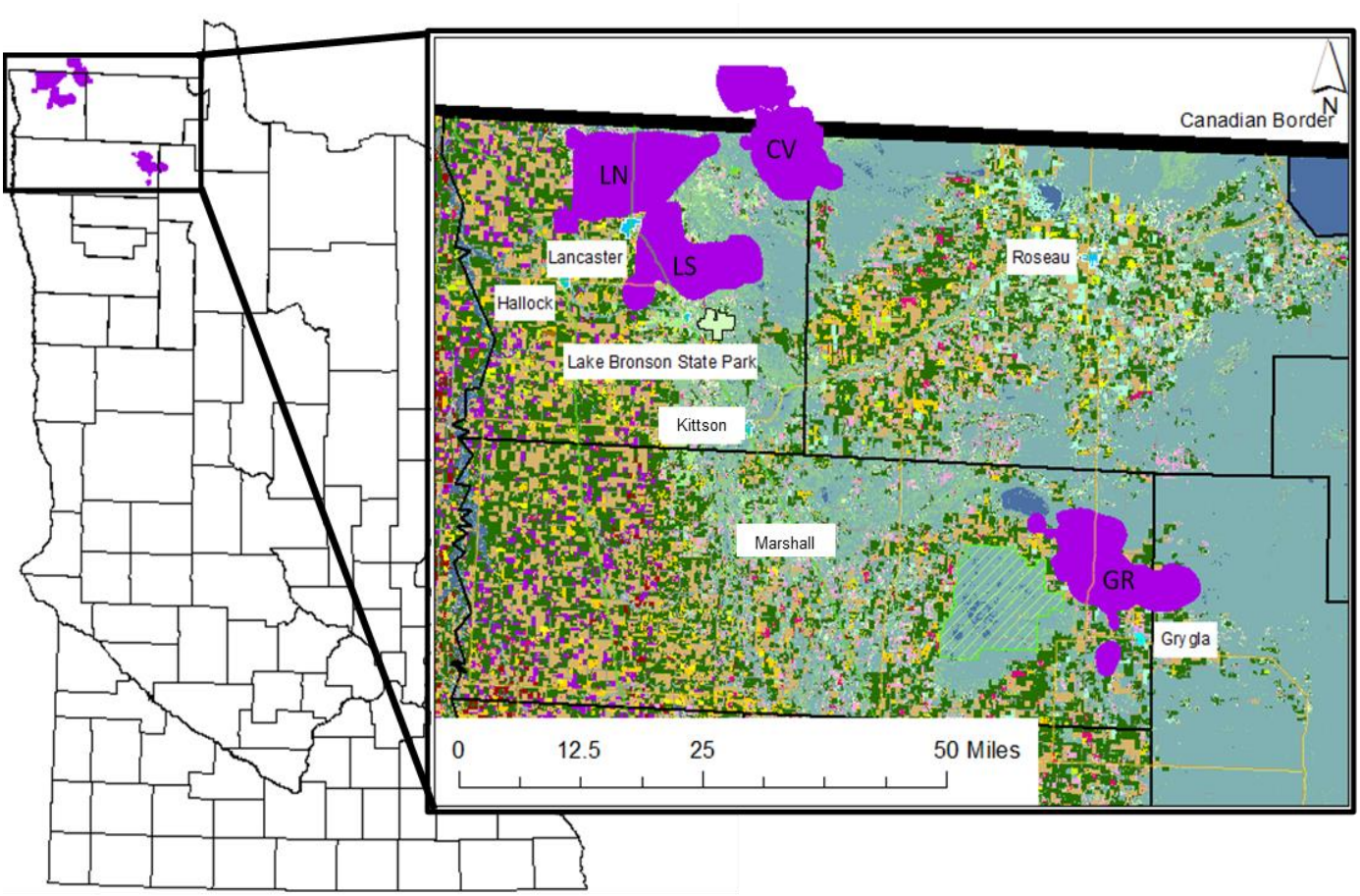


Figure 1. Study area for elk in Minnesota

Elk in Minnesota are found in the northwestern corner of the state, primarily in Kittson, Roseau, and Marshall Counties. This region is a patchwork of agriculture, private hunting lands, state owned lands, and federal wildlife reserves. The 4 sub-groups of elk are shown in purple. They are Caribou-Vita (CV), Grygla (GR), Lancaster North (LN), and Lancaster South (LS).

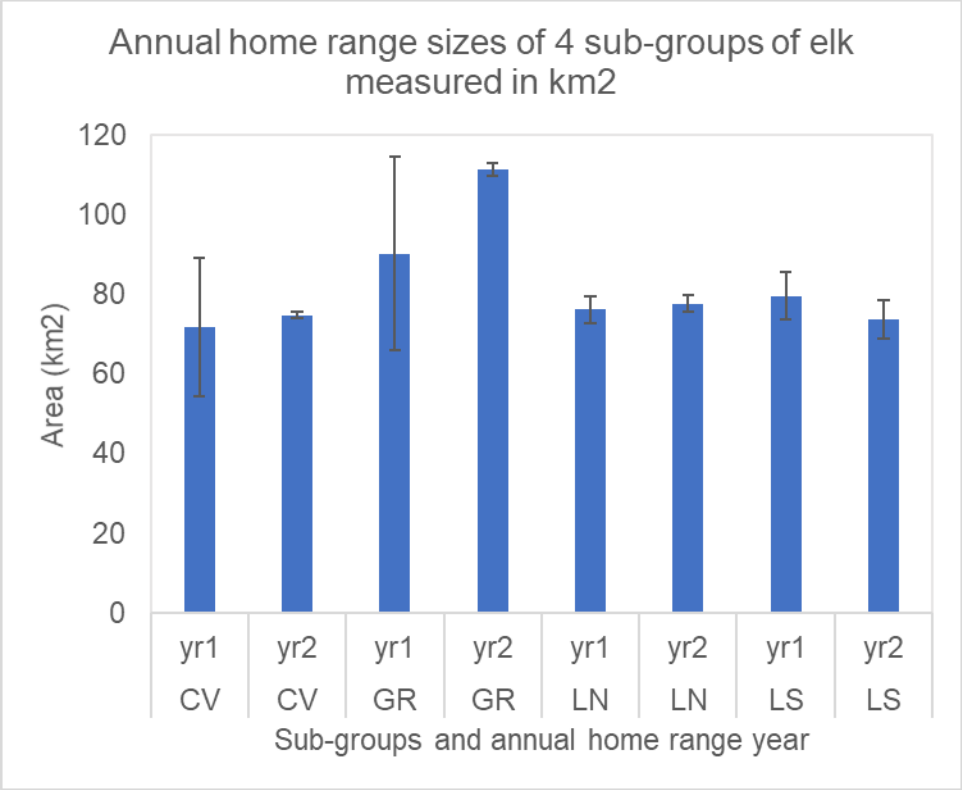


Figure 2. Annual home range sizes for elk in Minnesota

The average annual home range size for year 1 (yr1) 15 April 2016 to 14 April 2017, and year 2 (yr2) 15 April 2017 to 14 April 2018, of collared elk in Minnesota. Minnesota elk are separated into 4 separate sub-groups; Caribou-Vita (CV), Grygla (GR), Lancaster North (LN), and Lancaster South (LS). Home ranges were averaged among elk within their respective sub-group. Error bars indicate standard error.

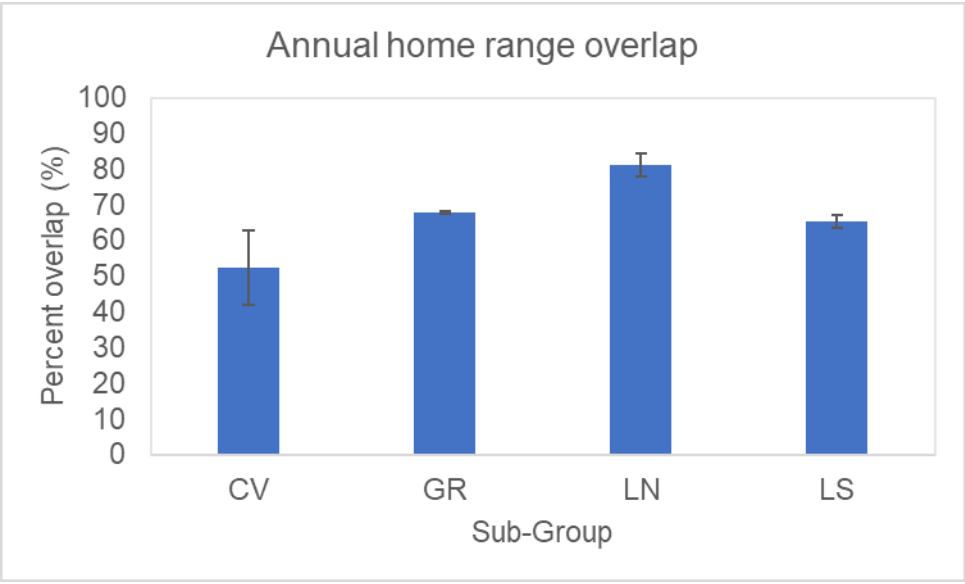


Figure 3. Annual home range overlap for elk in Minnesota

We measured the percent of the annual home range from year 2 that overlapped the home range from year 1. This was done for each elk, and then averaged among the 4 different sub-groups of elk, Caribou-Vita (CV), Grygla (GR), Lancaster North (LN), and Lancaster South (LS). Error bars indicate standard error.

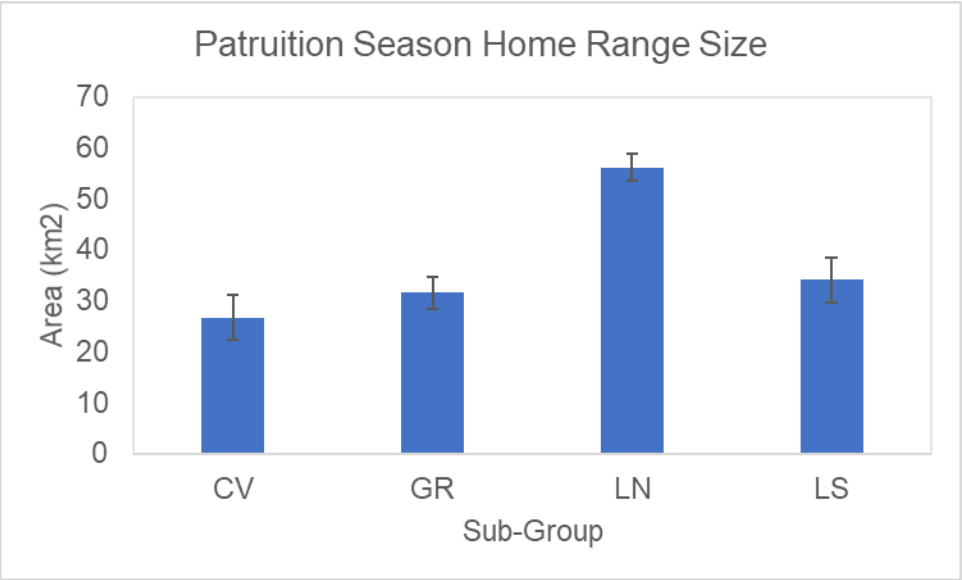


Figure 4.

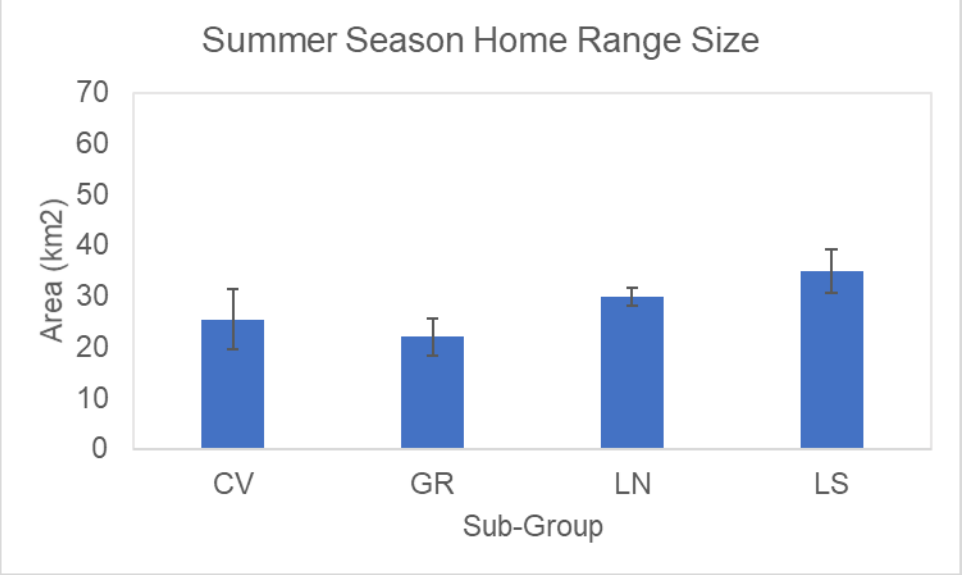


Figure 4b.

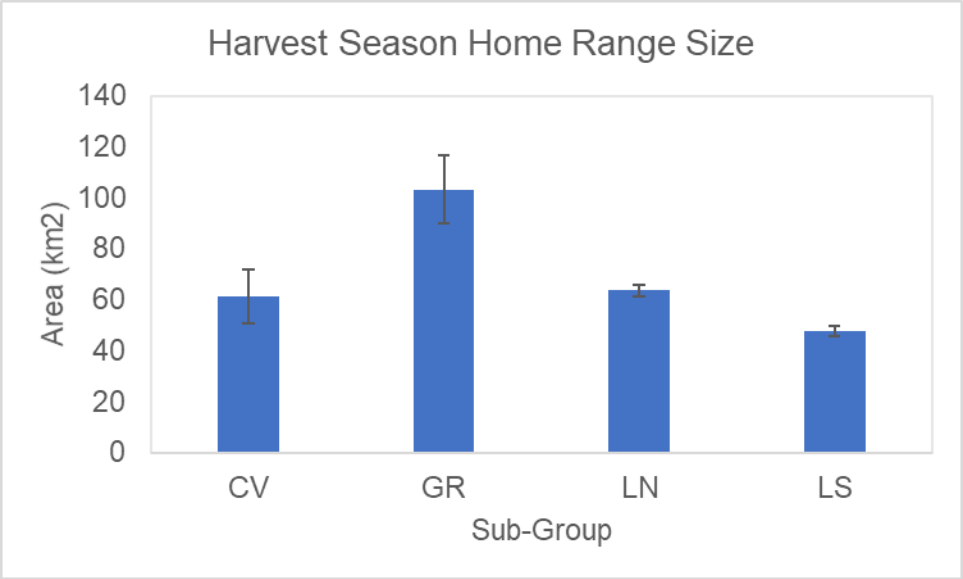


Figure 4c. Note larger y-axis scale to accommodate the much larger home range for the Grygla sub-group.

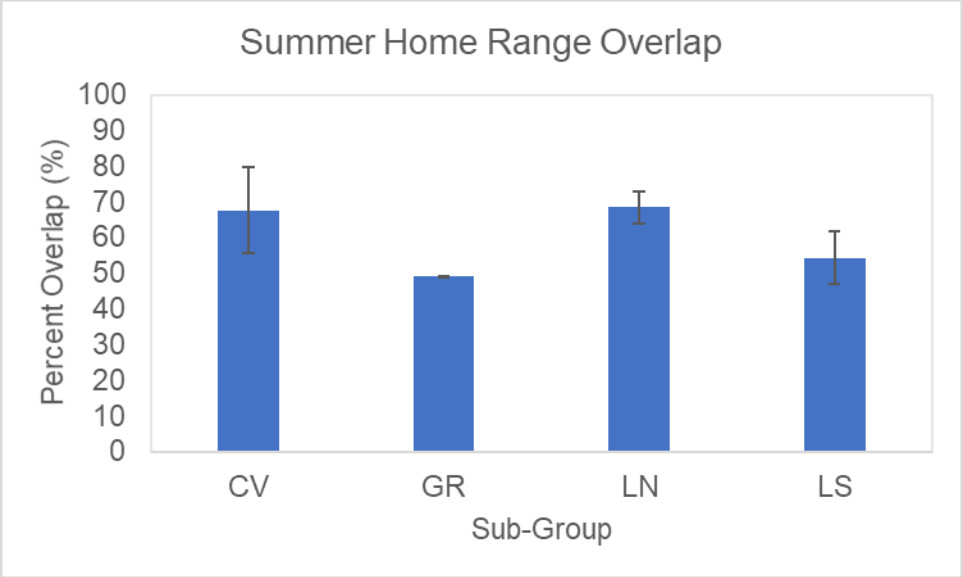
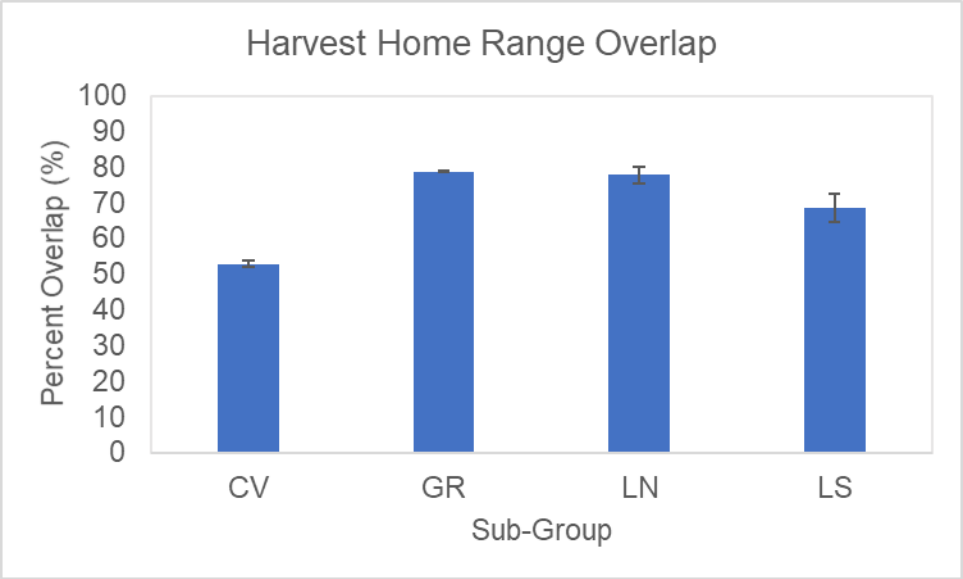


Figure 5b.



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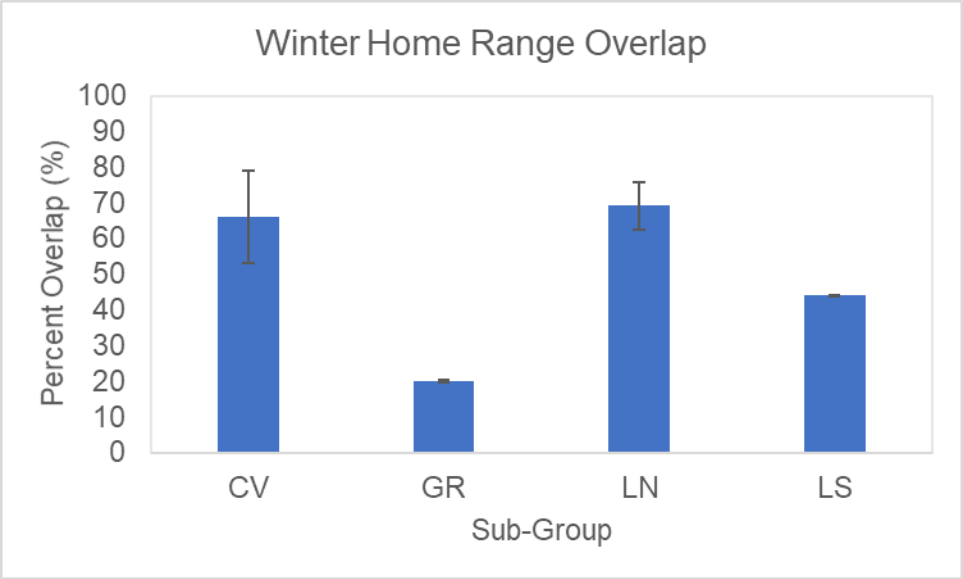


Figure 5d.

Figure 5. Seasonal home range overlap for elk in Minnesota

To calculate the seasonal home range overlap we calculated the percent of a season from year 2 that overlapped the same season from year 1. These seasons were pre- to post-parturition (15 April – 30 June), summer (1 July – 31 August), harvest (1 September – 31 December), and winter (1 January – 14 April). This was done for individual elk for each season, and the percentages were averaged within the 4 separate sub-groups of elk Caribou-Vita (CV), Grygla (GR), Lancaster North (LN), and Lancaster South (LS). Error bars indicate standard error.

Survey of Landowner Attitudes toward Elk in Northwest Minnesota

The Minnesota Cooperative Fish & Wildlife Research Unit at the University of Minnesota surveyed 3,000 private landowners in northwest Minnesota between October 2016 and April 2017 to describe landowner attitudes toward elk and preferences for future elk population management. Surveys were sent to all 768 private landowners within the core elk range who owned at least one-half acre of land. A larger study area surrounding the core elk range was defined based on the presence of habitat that could potentially hold elk in the future. In this area, a survey was sent to a random sample of 2,232 landowners with more than one-half acre. A total of 1,178 landowners (n = 390 within elk range; n = 788 outside range) returned the surveys. Landowners within the core elk range responded at a higher rate than landowners outside of the elk range (53% vs 37%, respectively). A majority of landowners within elk range (64%) and outside elk range (67%) had favorable attitudes toward elk. About half of respondents within elk range (46%) and outside elk range (58%) believed that the elk population in northwest Minnesota was too low. Similarly, about half of respondents within elk range (49%) and outside of elk range (58%) preferred increasing the elk population in northwest Minnesota. A majority of respondents within elk range (54%) and outside of elk range (62%) indicated they would be more likely to take a special trip to view elk if the elk population increases.

2018 Northwest Minnesota Elk Surveys

Minnesota DNR FAW staff used fixed-wing aircraft (Cessna 185 Skywagon) to conduct aerial elk surveys for the Lancaster and Grygla elk herds. We were also able to complete the Caribou-Vita survey again this year since Manitoba Wildlife secured funding to complete their aerial elk survey the same day on the Canadian side. We used MN DNR Forestry's Quest Kodiak turboprop airplane to complete the border survey. The MN DNR fixed-wing aircraft crew followed the same predetermined transects used in 2017—transects are spaced 1/5 mile apart and flown at an altitude of 300 to 400 feet and speeds of 80-85 mph. A pilot and two observers recorded elk locations and documented antlerless and antlered elk. Antlered elk were recorded as either branch antlered or spike bulls.

The surveys were completed between February 5th and March 11th, 2018. Snow depths and conditions varied across the elk ranges. Snow conditions were considered good in the Grygla area and fair to good in the Lancaster and Caribou-Vita survey blocks. Snow depths ranged from 12 to 15 inches in the Grygla and Caribou-Vita survey blocks and 8 to 10 inches in the Lancaster survey block. Weather conditions were average for this time of the year with temperatures ranging from a low of -15°F to a high of 34°F and mostly clear skies. We had a weather delay of one day during the Lancaster survey.

We waited again this year to complete the Caribou-Vita survey block since Manitoba Wildlife staff indicated that they were also planning to survey elk on the Canadian side in late February to early March. The surveys for both the Canadian and US border areas were completed on March 11th, 2018 within a two hour period of each other.

Grygla Survey Block

This survey started on February 5th and was completed on February 6th, 2018. The area surveyed was the same 133 mi^2 area that has been used the past two years. Total aircraft engine time to complete this survey (takeoff to landing) was 11.7 hours. The entire survey area received a light snowfall the day before which made for good survey conditions. The fixed-wing crew recorded elk at 5 separate locations within the survey boundary. Total elk observed was 15 and included: 7 antlerless (cows/calves) and 8 bulls (5 branch antlered and 2 spike bulls). Thief Lake WMA staff believed three of the seven antlerless elk were calves based upon ground observations during the summer.

Lancaster Survey Block—Water Tower and Percy WMA herds

This survey started on February 12th and after a one-day weather delay was completed on February 14th, 2018. The area surveyed was the same 167 mi^2 area that has been flown the past several years. Total aircraft time to complete the survey was 15.2 hours (takeoff to landing). The fixed-wing crew recorded elk at 5 separate locations within the survey boundary. Total elk recorded within the Lancaster survey block was 75 and included: 57 antlerless (cows/calves) and 18 bulls (13 branch antlered and 5 spike bulls). The Water Tower group had 35 antlerless elk—there were 7 branch antlered bulls located in the same woodlot as the antlerless group. The Percy WMA antlerless herd (22 elk) along with 6 branch antlered bulls and 3 spike bulls were observed approximately four miles northwest of the Percy WMA. One spike bull was located on the western edge of the Percy WMA.

Caribou-Vita Survey Block (a.k.a. border herd)

Minnesota DNR and Manitoba Wildlife staff successfully coordinated a joint aerial elk survey for the survey areas close to the US/Canadian border. This survey started and was completed on March 11th, 2018. The area surveyed in MN was the same 35.5 mi^2 area that has been surveyed the past few years. Manitoba also flew the same survey blocks as they did in 2017. Total aircraft time to complete the DNR survey was 3.0 hours (takeoff to landing). The fixed-wing crew recorded elk at one location (6 branch antlered bulls and 1 spike bull) within survey boundary. A majority of this herd was expected to be north of the Minnesota border—this assumption was as confirmed with the Manitoba aerial elk survey results. Manitoba completed an aerial survey for the Vita area the next day on March 12th.

Manitoba Wildlife staff used a Jet Ranger helicopter to fly north/south transects within predetermined survey blocks that covered a broad area along the border. They recorded 80 elk near the US/Canadian border and another 46 elk slightly north of Vita. Table 2 details the age/sex breakdown for these two populations in Canada.

Table 1 on page three summarizes MN DNR elk observations during the past five years of NW MN aerial elk surveys. The last two pages are maps showing the 2018 locations of elk within each survey block.

I would like to thank all those that helped with the survey this year, especially the fixed-wing pilots Chris Lofstuen, Bob Geving, and Luke Ettl who provided safe flying for all of us. Observers this year included: Kyle Arola (Thief Lake Assistant Manager), Jason Wollin (Karlstad Assistant Area Wildlife Manager), and myself. Special thanks again to Brian Haroldson who put together all of the survey materials and computer used during the survey—much appreciated!

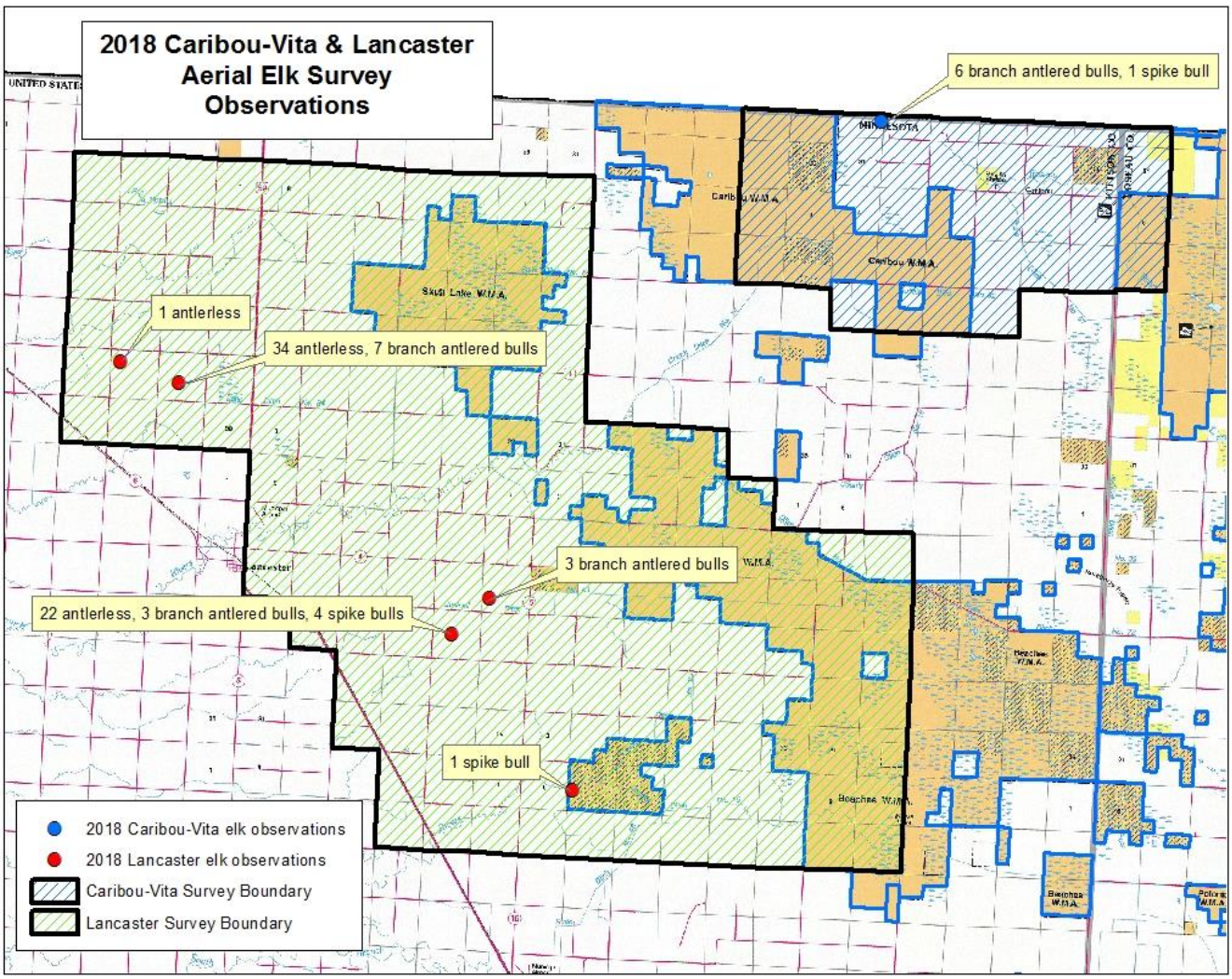
Table 1. Comparison of aerial survey elk observations between 2014 and 2018 for the Lancaster, Caribou-Vita, and Grygla herds.

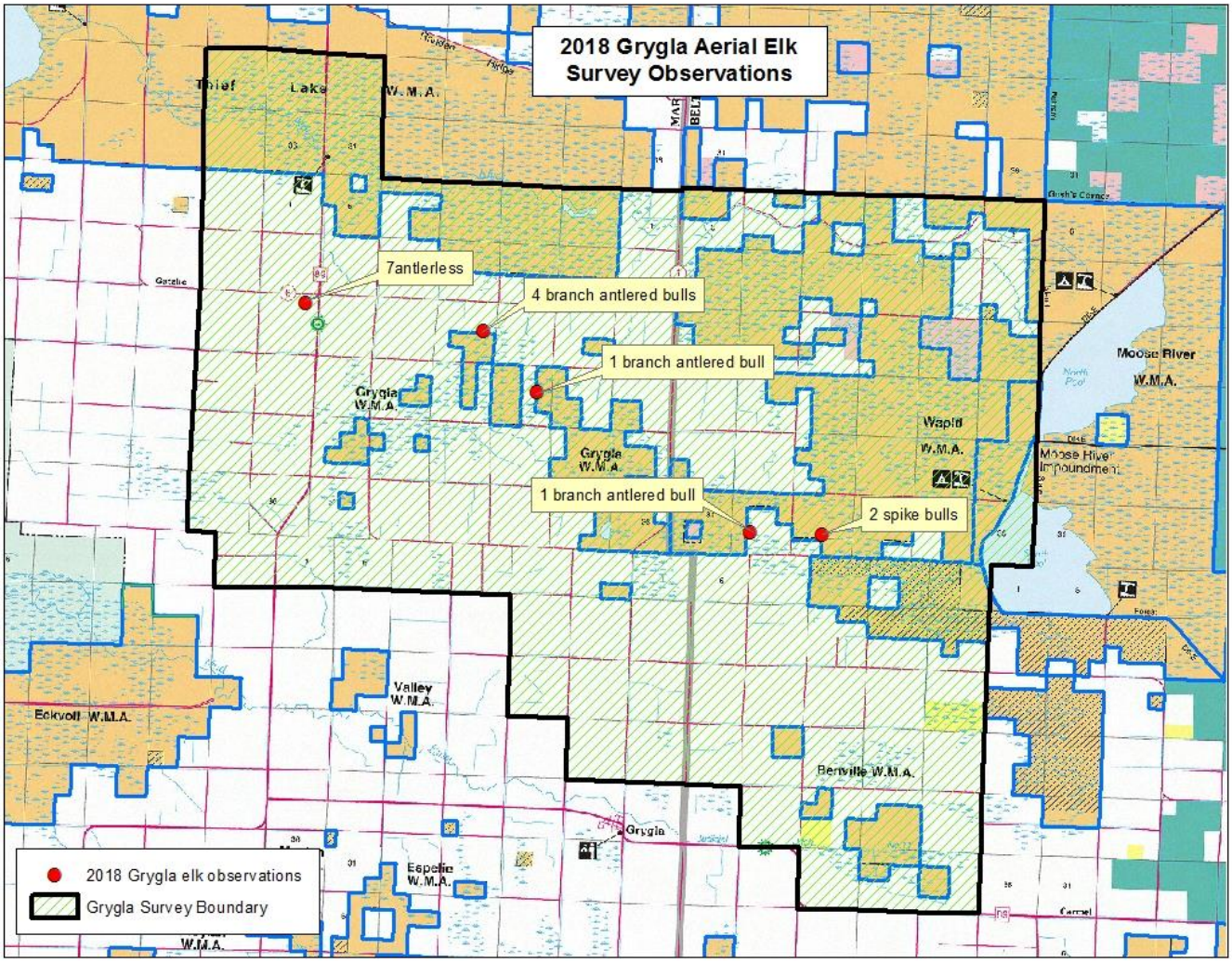
	Lancaster					Caribou-Vita (US side of border)					Grygla				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Spike bull	3	2	6	2	5	10	5	0	0	1	2	3	2	4	2
Branch antlered bull	14	16	12	14	13	7	17	6	1	6	4	6	9	6	6
Total bulls	**17**	**18**	**18**	**16**	**18**	**17**	**22**	**6**	**1**	**7**	**6**	**9**	**11**	**10**	**8**
Antlerless	**20**	**16**	**34**	**45**	**57**	**34**	**57**	**4**	**0**	**0**	**14**	**9**	**10**	**7**	**7**
Total elk	**37**	**34**	**52**	**61**	**75**	**51**	**79**	**10**	**1**	**7**	**20**	**18**	**21**	**17**	**15**

Table 2. Aerial survey elk observations recorded by Manitoba Wildlife—2017 and 2018

	Border (Caribou)		Vita		Combined Total	
	2017	2018	2017	2018	2017	2018
Spike bull	2	3	4	2	6	5
Branch antlered bull	17	12	7	5	24	17
Total bulls	**19**	**15**	**11**	**7**	**30**	**22**
Cow	68	*	32	*	100	*
Calf	21	*	12	*	33	*
Total antlerless	**89**	**65**	**44**	**39**	**133**	**104**
Total elk	**108**	**80**	**55**	**46**	**163**	**126**

* Manitoba Wildlife did not differentiate antlerless elk between cows and calves in 2018


2018 Caribou-Vita & Lancaster
Aerial Elk Survey
Observations
6 branch antlered bulls, 1 spike bull
1 antlerless
34 antlerless, 7 branch antlered bulls
3 branch antlered bulls
22 antlerless, 3 branch antlered bulls, 4 spike bulls
1 spike bull
2018 Caribou-Vita elk observations
2018 Lancaster elk observations
Caribou-Vita Survey Boundary
Lancaster Survey Boundary



Karlstad Habitat Projects Update

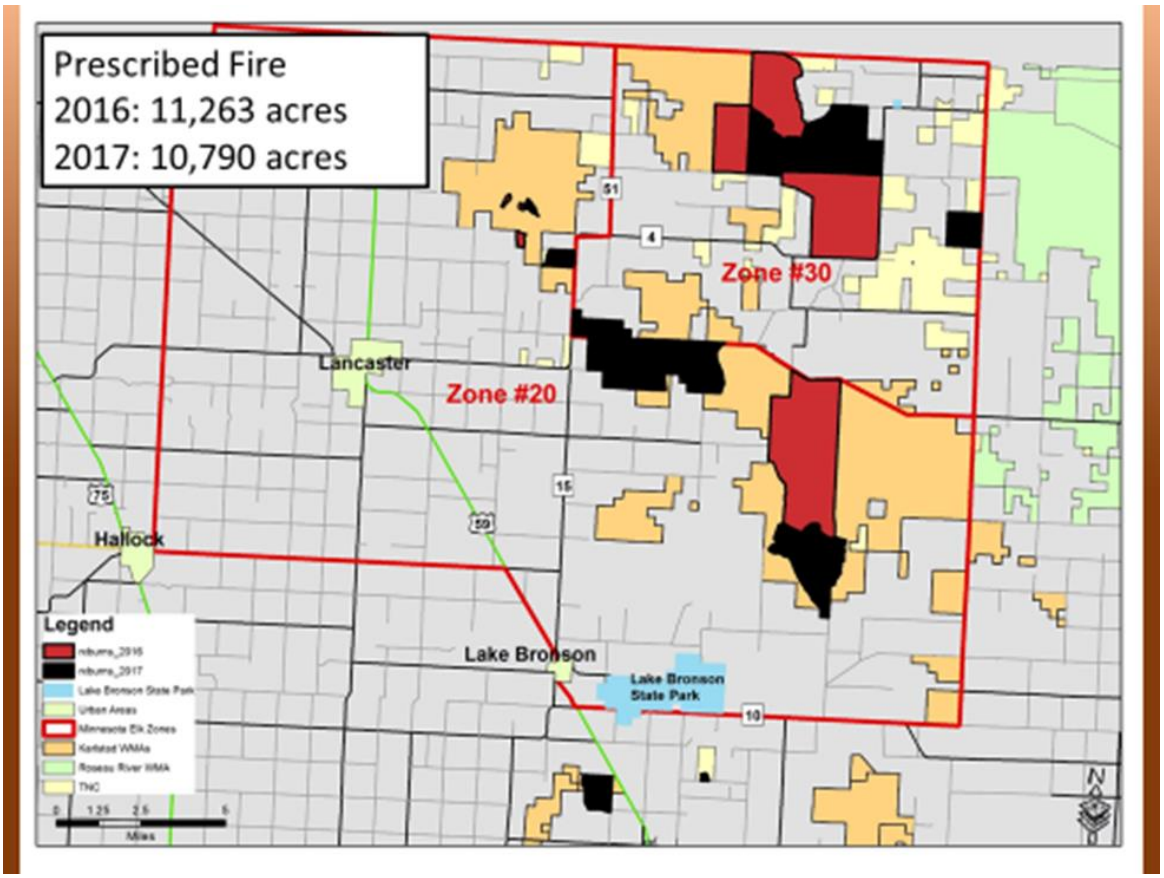
2017-18 Rx Fire

A total of 10,790 acres were prescribed burned in spring 2017 in the elk range. Fall weather conditions didn't permit burning in 2017.

A total of 8,191 acres were prescribed burned in elk range during spring 2018 (7 burns totaling 5,510 acres WMA, 2 burns totaling 2,681 acres The Nature Conservancy {TNC}), and 3 wildfires totaling 961 acres of WMA and TNC properties. WMAs included Beaches Lake, Caribou, Skull Lake, and Twin Lakes, as well as Wallace C. Dayton properties owned and managed by TNC. Due to drier conditions in spring, good brush control was achieved, which will be beneficial in maintaining open landscapes typical of Aspen Parklands.

Karlstad Wildlife thanks TNC, DNR Roving Burn Crew, other NW Wildlife Offices, DNR Forestry, and our partners from Rocky Mountain Elk Foundation and Minnesota Deer Hunter's Association for their assistance with prescribed burning. It's truly a team effort to accomplish our prescribed burns!

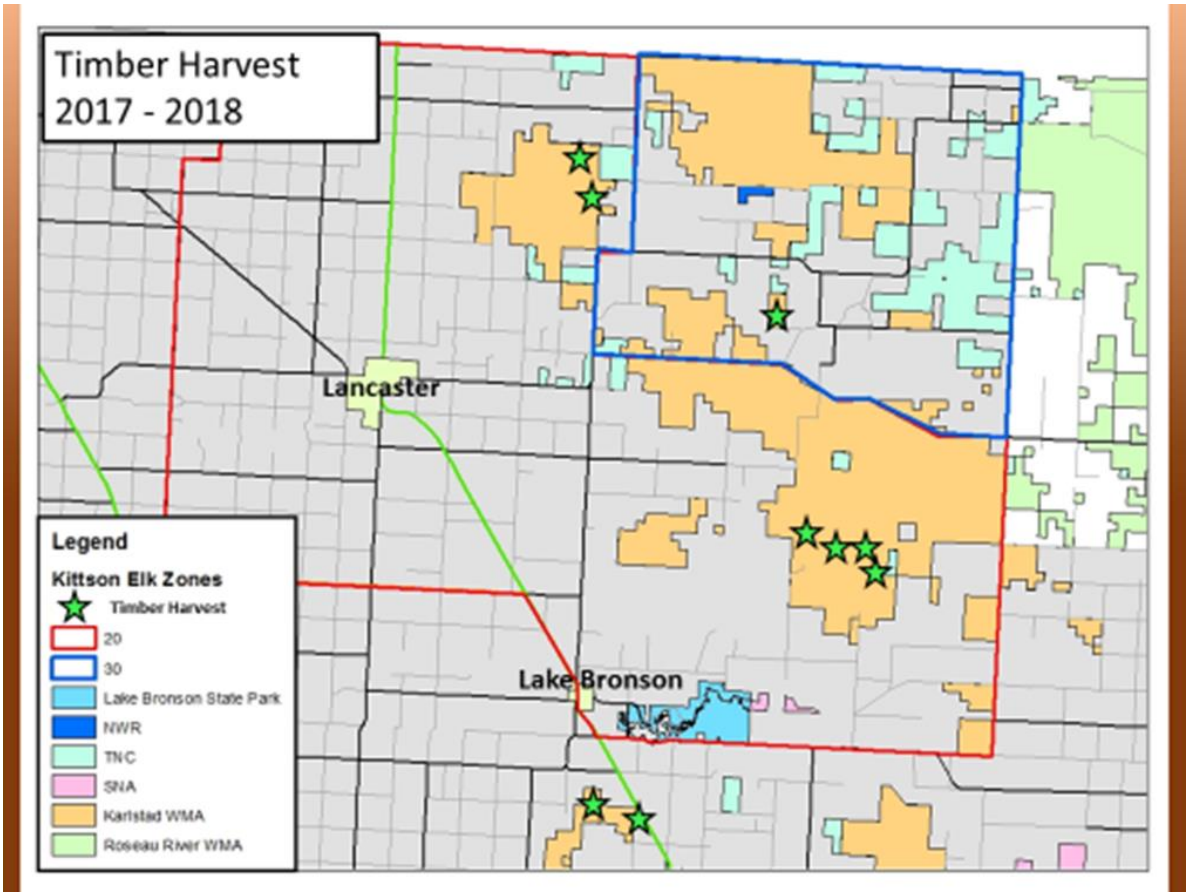
Beaches Pastures 5/14/2018



2017 Brush Mowing: A total of 311 acres were brush mowed in summer 2017, and 323 so far in 2018. WMAs include Pelan, Halma Swamp, Beaches Lake, and Skull Lake WMAs. Mowing projects are focused within burn units, so the open landscape created by the mowing can be maintained in the future with prescribed burns.

Summer brush mowing on Beaches Lake 2017; photo taken summer 2018 one year post-mow.

Summer 2017-Feb 2018: Thanks to a dry summer in 2017 and a robust demand for timber, commercial logging began in July with operations on higher ground in Beaches Lake WMA. Logging continued into the fall and winter on Beaches Lake, Skull Lake, and Halma Swamp WMAs in elk range. Nearly 1,300 acres were logged. About 12 cords/acre were harvested, for a total of just over 15,500 cords of mostly aspen and balm of Gilead.



Grazing: A total of 3,890 WMA acres will be grazed in 2018. All are in elk range.

News from The Nature Conservancy (TNC)

Submitted by: Jonathan Eerkes, Land Steward, The Nature Conservancy

Caribou and Beaches Lake WMA are the two largest WMA's in the Karlstad work area, and some of the larger WMA's in Minnesota. These WMA's hold significant acres of elk habitat. Combined, these WMA's comprise over 41,000 acres of mixed prairie, wetland and woodland habitats. Mixed in these WMA's is over 3800 acres of TNC property, adding up to over 45,000 acres of conservation properties.

For many years, The Nature Conservancy, MNDNR Wildlife Division and the MNDNR Forestry Division have been cooperating prescribed fires. The past three years have seen a number of factors come together to significantly increase the ability to put fire on the ground. These include:

- Funding through the Lessard Sam's Outdoor Heritage Council
- Funding both TNC and DNR fire crews
- Wildlife managers eager to have prescribed fire on their managed properties
- Appropriate staffing in the TNC and DNR offices
- Increased cooperation between MNDNR Forestry, MNDNR Wildlife and TNC

- Permissions from private landowners to burn their properties
- New strategies to implement fire effectively
- Good conditions for prescribed fire

Caribou and Beaches Lake WMA hold most of the prairie and wetland habitat in the Karlstad work area, but have seen significant encroachment by aspen woodlands. Elk are primarily grazers, and the loss of grassland directly affects the quality of forage available to them. Prescribed fire is an essential tool in trying to bring balance back to the system, and these two WMA's were targeted by the MNDNR and TNC as priorities for increased prescribed fire.

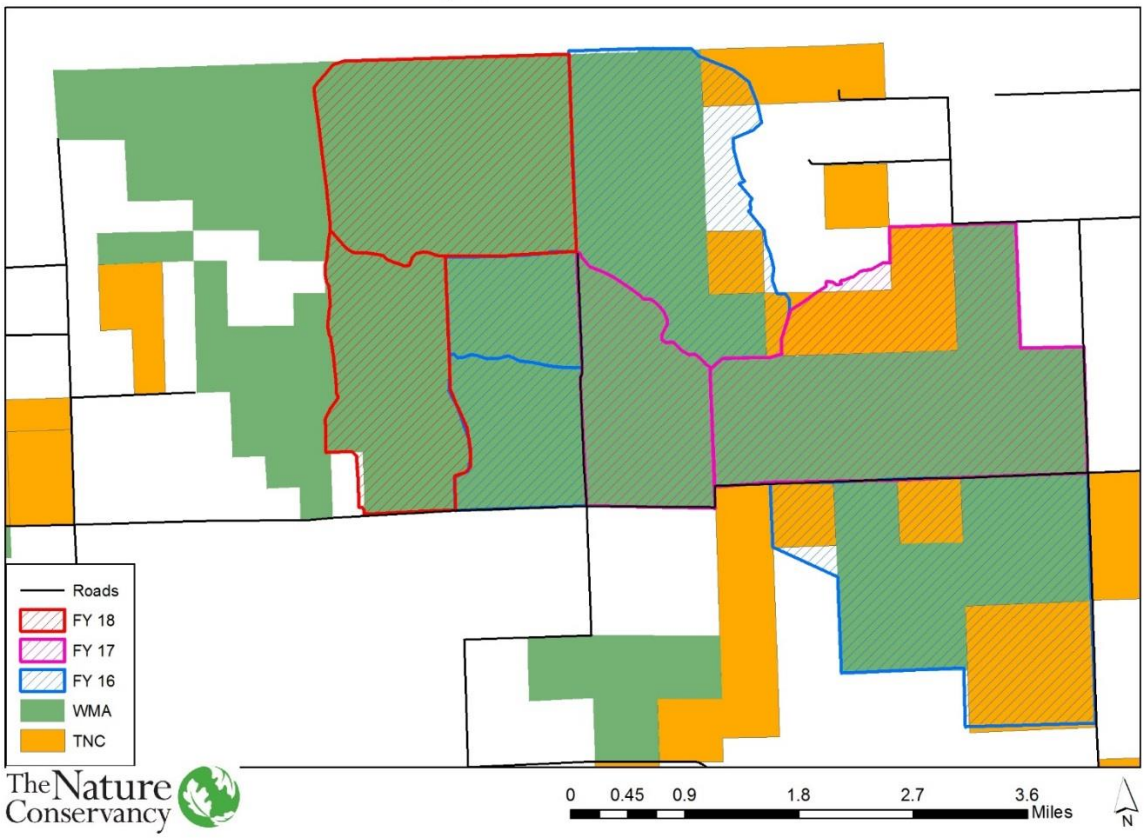
Not all of the 45,000 acres of conservation land is in an active burn unit. Some of the land, like a large rich fen in Beaches Lake WMA, needs fire at a less regular interval than the prairie habitat. Other areas have logistical issues that make it difficult to burn, such as irregular shaped boundary lines or a lack of adequate fire breaks. An active burn unit is a parcel that has all the necessary requirements for prescribed fire: Adequate and installed firebreaks, a completed and approved plan, and permissions to burn from surrounding private landowners.

Since 2010, TNC and MNDNR Wildlife have worked to create 6 new burn units on these WMA's for a total of 13 active burn units. **76% of the Caribou WMA** conservation area and **45% of the Beaches Lake WMA** conservation area are now under active fire management, and have had a successful prescribed fire within the last three years. By comparison, in 2012, only 21% of Caribou WMA and 6% of Beaches Lake WMA had been burned within a 5 years window!

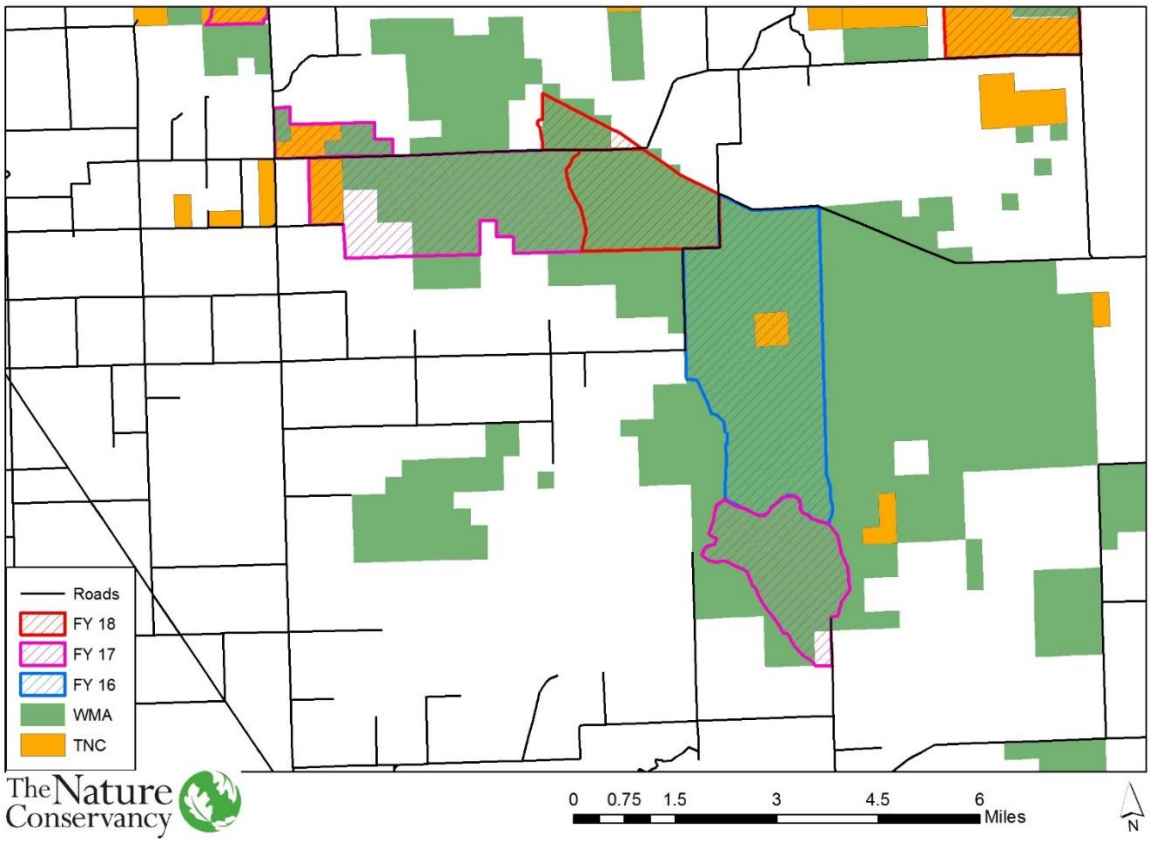
This clearly shows that provided the proper funding, staffing and initiative, we can begin to implement prescribed fire at very meaningful scale, and at a meaningful frequency. If this pace is maintained, it will have significant habitat improvement for elk as well as other wildlife.

Congratulations to TNC, MNDNR Wildlife and MNDNR Forestry for this major achievement!

Caribou WMA: Prescribed Fire FY 16, 17 18



Beaches Lake WMA: Prescribed Fire FY 16, 17 18



News from Thief Lake

Partners and interns making a difference on the ground

The Karlstad and Thief Lake DNR offices manage a lot of land, about 210,000 acres. That's a large area for just 6 fulltime staff to manage. From balancing budgets to planning the next prescribed fire, there is a lot to get done. To help keep up with all the habitat work we have been partnering with the Minnesota Deer Hunters Association (MDHA) and Rocky Mountain Elk Foundation (RMEF). These two organizations have helped us manage thousands of acres, primarily through prescribed fire and invasive species control. These management activities benefit many species of wildlife such as sharp-tailed grouse, waterfowl and, of course, elk.

Brush work at Thief Lake: Do more than elk benefit?

The majority of the units within the Thief Lake work area fall within the Tallgrass Aspen Parklands Province (TAP) which serves as a transition zone between the prairies to the west and the forests to the east. It makes for a diverse and productive landscape with tallgrass prairies, wet prairies and aspen savannas. These habitats evolved with frequent disturbances, primarily fire. European settlement brought fire suppression, farm fields, roads, and ditches which all impacted the natural disturbance regime. With a lack of fire and other disturbances the plant communities in many areas shifted from an early successional stage to an older one with increased amounts of woody vegetation. Today many of the habitat management activities we employ aim to restore, maintain and enhance early successional habitats along the numerous species of wildlife that depend on them.

Some of the common management activities we use to setback woody encroachment are mowing, shearing and hydro axing. These activities primarily take place in dense stands of willow and alder where it can be challenging to carry out other means of disturbance, such as prescribed fire. Opening these stands up results in fresh growth of woody vegetation for browsing by deer and increases the amounts of forbs and grasses for grazing by elk. Often times brush treatment sites are within burn units and the associated increase of fine fuels allow the units to be more conducive to prescribed fire.

A skidsteer with a fecon attachment

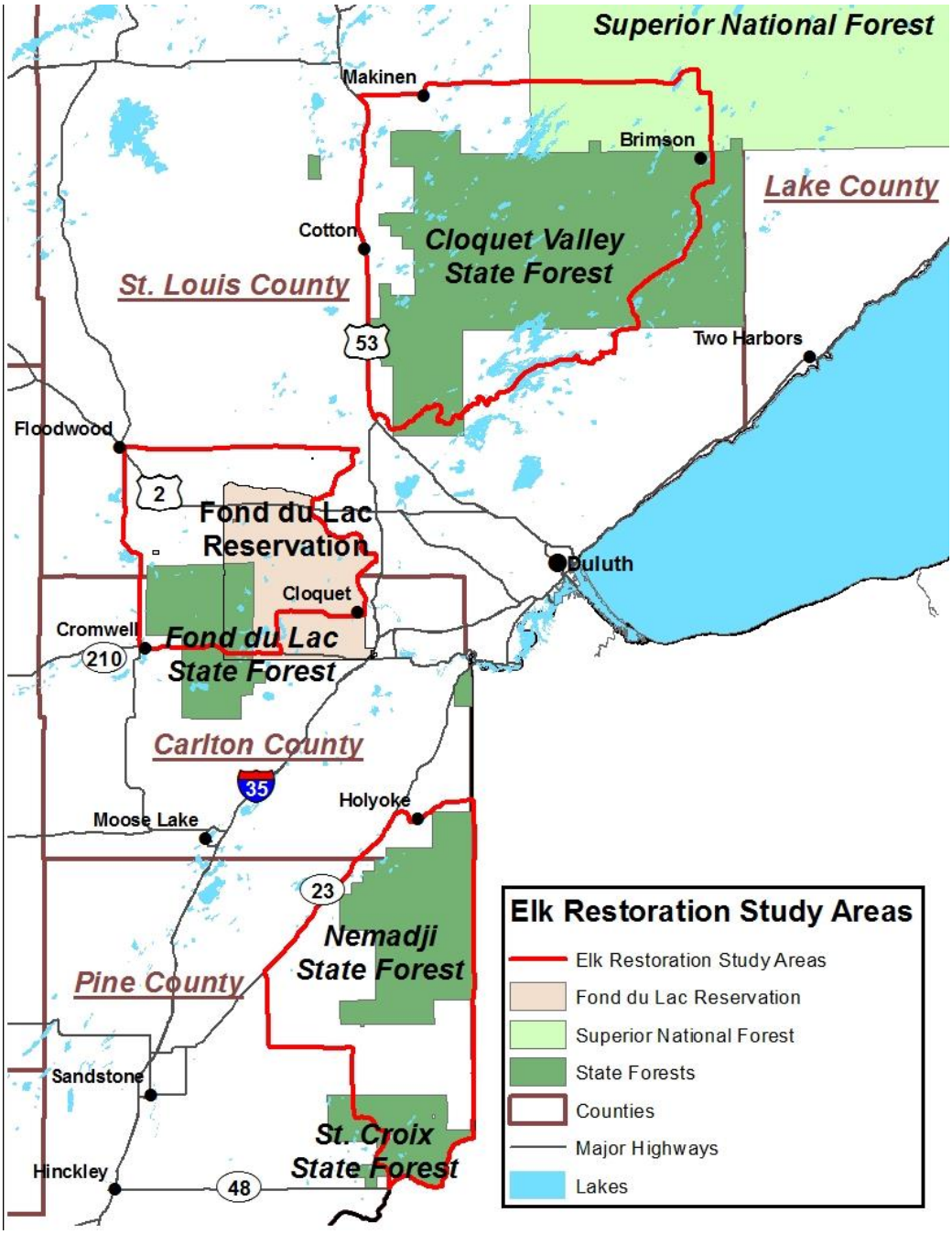
So who benefits from all this work? A prime example is the sharp-tailed grouse. They were once a common site throughout the state but are now restricted to the Northwest and East Central portions. Why the decline? The primary reason is the loss of the brushlands and grasslands that they depend on. Continuing to place an emphasis on early successional habitat management is critical to make sure these birds have suitable habitat now and in the future.

Eastern Minnesota Elk Restoration Update

Mike Schrage, Wildlife Biologist, Fond du Lac Resource Management Division

The study working to determine the feasibility of restoring elk to parts of northeast Minnesota in northern Pine, Carlton and southern St. Louis Counties is moving along towards completion. The initial public opinion survey asking people what they think about the idea of elk restoration was first mailed out last February. One survey was aimed at randomly selected landowners (defined as 10 or more acres) in or within five miles of our three study areas. Each study area received 1500 landowner surveys (4500 total). The second survey went out to 1000 randomly selected members of the public from each of four strata - northern Pine County, Carlton County, southern St. Louis County and the Duluth metro area (4000 total). The two surveys were identical except for some additional land use specific questions in the landowner survey. After the initial mailing, we did follow up mailings to non-respondents. A map of our three study areas is below if you need a refresher.

This past summer was spent entering and (as an error check) reentering all of the responses to all of the questions on the public opinion surveys. Dr. David Fulton and his student, Eric Walberg at the University of Minnesota are leading the human dimensions aspect of our study and they tell me Minnesotans are generally above average, as compared to the rest of the country when it comes to completing surveys. They were very pleased with the response rate to our elk survey. For landowners, the overall response rate to our survey was 60% and for the general public it was 46%. A solid response rate is necessary for ensuring our sample results accurately reflect the entire population. I'd like to think the idea of restoring wild elk to more of Minnesota was also a motivation for many people to return our surveys. Across the board our results would indicate there's a lot of support from both the general public and landowners for restoring elk to northeast Minnesota. When asked if they supported wild free ranging elk on their property, overall support amongst all landowners was 70% and ranged from 66% in our Fond du Lac Study Area to 73% in the Nemadji Study Area. Among the general public, overall support for restoring elk was 77% and ranged from 72% in Carlton County to 81% in southern St. Louis County.



The second part of the feasibility study is measuring habitat suitability. This part of the study is being led by Dr. James Forester and Dr. Nick McCann at the UMN. In 2017 a field crew from the University measured potential elk forage on public lands in our three study areas. As we expect there will be differences in the types and abundance of potential elk forage between private and public lands, this past summer the field crew focused on measuring vegetation on private lands.

Next steps on the habitat side include a lot of GIS work mapping land uses and vegetation types across the study areas and incorporating forage data into this. Ultimately the plan is to overlay habitat and public opinion survey results so habitat suitability and levels of public support can be compared and evaluated for a future elk restoration between the three study areas. The final report with the results of this feasibility study is due to the Legislative-Citizens Commission on Minnesota Resources next June. If the results for public support and habitat suitability are positive, then agency and

political leadership will have to determine whether or not to take the next steps in the restoration process. For more information on this project, please visit the project's website or Facebook page.

University of Minnesota - Northeastern MN Elk

Facebook - Northeastern MN Elk

This project has been an excellent partnership between the University of Minnesota, the Fond du Lac Band of Lake Superior Chippewa and the Rocky Mountain Elk Foundation. Major funding for the effort was provided by Minnesota's Environment and Natural Resources Trust Fund and significant assistance has been provided by Minnesota DNR and county land department staff.

Figure 1. Researchers conducting field measurements for determining elk habitat suitability.

Figure 1. Caitlin and Jacob cutting vegetation while Marissa starts on shrub sapling measurements.

DEPARTMENT OF NATURAL RESOURCES

For more information on elk and elk management in northwestern Minnesota, contact:

Ruth Anne Franke, DNR Karlstad area wildlife supervisor, ruth.anne.franke@state.mn.us, 218-436-2427 ext. 222.

Jason Wollin, DNR Karlstad assistant area wildlife manager, jason.wollin@state.mn.us, 218-436-2427 ext. 224.

Kyle Arola, Thief Lake WMA wildlife supervisor, kyle.arola@state.mn.us, 218-222-3747 ext. 222.

https://www.dnr.state.mn.us/hunting/elk/index.html

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