

2014 BANCROFT/NORTH HASTINGS ELK RESEARCH AND MONITORING UPDATE

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(1) Number of Elk in the Bancroft Area Core elk range: To determine the estimated size of the elk population in the Bancroft/North Hastings core elk range (a 2,500 km² area), two aerial surveys were conducted on January 29, 2014, and February 4, 2014, using an OMNR EC 130 helicopter. The first survey included the use of telemetry to locate each of the major social groups of elk in the Bancroft core elk area. Each group was photographed to assist in verification of the numbers of bulls, cows, and calves in each social group. We note that the number of elk in the photographs may be different from the observed count due to the evasion of elk at the time of the photography. The second survey was conducted by flying to the location where elk groups were traditionally located in previous years but did not involve the use of telemetry. The results of the two different survey methods were used to determine if similar population estimates could be achieved with and without the use of telemetry. If this is the case, then non-telemetry surveys could be used in future years in the event that there are few or no functioning collars on elk at that time.

The helicopter crews for the two surveys included pilot Doug Holtby (OMNR Aviation Services), Mike Allan, Steve Bennett (OMNR WRMS), Erin MacDonald, Colin Higgins, Steve Lawrence, and Glen Brethour (Bancroft District OMNR). A total of **159** different elk were observed on the January 29th survey and **104** elk were tabulated on the

February 4th survey. Based on observations of photographs (which depicted 135 of the 159 elk) taken during the 1st survey, the approximate (some photos were difficult to interpret especially when elk were in cover) sex/age classes of elk observed during the first survey included **93 cows, 21 bulls** (including 7 mature which are those with > 5x5 racks for the purposes of this report), **and 21 calves**. Of the elk observed in the 1st survey, 39 had radio collars. Twenty-three elk had collars in the 2nd survey. Using a modified Petersen estimate (Ecological Methodology software, version 7.2), the estimated number of elk in the survey area (2,500 km² area) during the January 29, 2014 survey was $\bar{x} = \mathbf{380 (297-560)}$ (95% Confidence Interval). The elk population estimate using data from the 2nd survey on February 4, 2014 was $\bar{x} = \mathbf{416 (303-652)}$ elk. *As the two estimates were similar, non-telemetry survey methods could be used in future years when there are few or no functioning collars remaining on elk in the core elk area.* However, this non-telemetry survey method is dependent on previous knowledge of the locations of elk social groups which are known for the Bancroft core elk area. If elk move from their traditional winter range they will be difficult to locate during surveys without telemetry. Knowledge of traditional elk ranges is lacking for eastern Ontario where several hundred elk sightings have been reported. It should be noted that the number of elk in the Bancroft area could decrease depending on winter severity. This is also a pre-calving population estimate (calves are born in late May/early June).

Based on photographs taken during the January 29, 2014 survey, 23 percent (21/93) of the cows in the photographs were accompanied by calves born during the previous year. The bull to cow ratio acquired from the survey and photographic data was 23:100. Using only mature bulls, the mature bull to cow ratio drops to 8:100. This low

mature bull to cow ratio is of concern as a ratio of 20:100 (mature bulls to mature cows) is ideal to maintain maximum productivity (McCorquodale et al. 2011; Raedeke et al. 2002; Stalling et al. 2002). However, it must be remembered that mature bull elk tend to remain solitary or congregate in small groups during the winter and are very difficult to locate during surveys unless they are collared.

The January 29, 2014, elk population estimate (\bar{x} = 380) is lower (24%) than the January 2013 estimate (\bar{x} = 500 elk) {but similar to the 2009 estimate (\bar{x} = 372)}. This difference between the 2013 and 2014 estimates may be real or it may be due to violation of the population estimator assumptions such as closed populations, no immigration/emigration of elk, number of marked individuals should include at least 40% of the population, etc. We realize population estimator models are not perfect, but currently, they are the most reliable methods available to us to estimate elk population size. *Using the best science we have, our best estimate is that there are approximately (round numbers) 300 to 600 elk within the Bancroft core elk zone.* This approximates the MNR's elk population objective for the Bancroft core elk area.

Figure 1. Photo of January 2014 elk survey crew from right to left: Mike Allan, Steve Bennett, pilot Doug Holtby, Erin Macdonald, and Colin Higgins. Photo by Colin Higgins.



Within the Bancroft core elk area there are several social groups of elk. The **Lingham Lake/Queensboro elk group** is doing well with **52** elk {32 cows, 10 bulls (5 mature), 10 calves} being observed during the January 2014 survey (Figure 2). This is the same number as observed during the 2013 survey. Two groups of elk were noted in the Lingham area, one at the Lingham Dam and the other 20 km south near Actinolite during both survey dates. Based on different elk observed during the 2013/2014 surveys, the Lingham/Queensboro elk population appears stable.

Figure 2. Part of the Lingham elk social group that were located near Lingham Lake on January 29, 2014. Photo by Colin Higgins.



Thirty-three elk were observed in the **Turriff elk social group** during the telemetry flight (Figure 3). However only **26** were photographed including 22 cows, 0 bulls, and 4 calves. The number of elk observed during January 2014 was numerically

lower compared to the 2013 survey (43 elk). The **Mephisto/Limerick Lake** elk group remained stable with respect to animals observed during 2014 (**n=14**) (Figure 4). Ten elk were photographed including 8 cows, 0 bulls, and 2 calves. Thirteen elk were observed during the 2013 survey.

Figure 3. Part of the Turriff elk social group as observed from the helicopter on January 29, 2014. Photo by Colin Higgins.



Figure 4. Part of the Mephisto elk group (9) as observed from the helicopter on January 29, 2014. Photo by Colin Higgins.



The **New Carlow/Boulter area** elk group remains fairly stable with 22 elk {9 cows, 5 bulls (all immature), 2 calves in photos} being located during the January 2014 survey (Figure 5). This is numerically higher than the 17 elk observed during the 2013 survey.

Figure 5. Part of the New Carlow elk group observed from the helicopter on January 29, 2014. Photo by Colin Higgins.



The **Hartsmere elk group** appears to be decreasing with **33** elk {22 cows, 6 bulls (2 mature), 3 calves in photos} being observed during January 2014 (Figure 6). In addition, during a December 2013 ground survey, only 1 mature bull was noted in the Hartsmere herd. During the January 2013 survey, 41 elk were counted. Two surveys were conducted during 2012 with 47 and 44 elk being detected. Fifty-three elk were observed in 2011. The apparent numerical decrease in the number of elk may be due to the main social group separating as winter feeding by residents is common in that area. However, the decrease may be real as this area receives heavy hunting pressure (during the September hunt as well as the aboriginal harvest) as it is well known where these elk are located. Meningeal worm is also present in the elk population which contributes to mortality.

Figure 6. Part of the Hartsmere elk social group located on January 29, 2014. Photo by Colin Higgins.



Only one 5x5 bull elk (mature) was observed in the **Madoc area** during the 2014 survey; however, residents have noted a few elk in the area during 2013, primarily in the agricultural area north of Hwy 7 and east of Hwy 62. None of those animals are collared which makes them extremely difficult to locate. No elk were observed in Little Ireland during the Jan 29 flight but 3 elk were seen during the second survey on Feb. 4 (2 cows and one calf). No elk were observed in the Boulter area and only 1 bull was observed in the Kaladar area on Jan 29. Two bulls were located west of Kaladar on Feb 4/14.

It should be noted that an increase or decrease in the number of elk observed annually does not necessarily equate to a population increase or decrease as the key determining factor in the population estimator model is the number of collared animals observed during the survey.

During 2013, elk were reported in many areas outside of the Bancroft area core elk zone from the Ottawa valley to Kingston to Bobcaygeon. These areas were not flown during the survey. In addition, there are no functioning radio-collars in these areas and the elk would have been very difficult to locate.

(2) 2013 Elk Harvest: A total of **23** elk {9 bulls (including 8 mature), 14 cows} were harvested during the September, 2013, Ontario elk hunt (OMNR 2014) which is restricted to the greater Bancroft area. The September harvest represented about 5 % (23/500) of the January 2013 elk population estimate. If needed, future harvests can be used as a management tool to modify elk population numbers (by modifying the number of tags allocated/year) to bring them within the OMNR elk population objective.

Ideally, mature bull (≥ 3 yrs of age or $> 5x5$ rack) to cow ratios should be at least 20:100 to maximize productivity as mature bulls do the majority of breeding (Raedeke et

al. 2002; Stalling et al., 2002). It must be noted that of the 30 bull elk harvested during the September 2011/12/13 hunts in the Bancroft area, **25 (83%) were mature bulls** (>5x5 rack). Only **12 of 26 bull elk** (mature bull to cow ratio of 12:100) observed during the January 2013 elk survey were mature. During the January 2014 survey, **7 of 21 bulls** (based on photos) were mature (mature bull to cow ratio of **8:100**). Even more concerning is that in the area that received the greatest hunting pressure during 2011-2013 (Turriff, New Carlow, Hartsmere) only **2 of 11** bulls observed during the January 2014 aerial survey were mature.

The ratio of mature bull to cow elk in the Bancroft area should continue to be monitored in future years. This is a potential concern as overharvest of mature bulls has been documented on numerous occasions in the western U.S. as resulting in elk population declines due to too few mature bulls being involved in breeding (McCorquodale et al. 2011; Raedeke et al. 2002; Stalling et al. 2002).

(3) Mike Allan MSc abstract, Trent University, 2014.

Mike Allan completed his MSc at Trent University during January 2014. The focus of his study was on elk calving sites in the greater Bancroft area. The following is a brief synopsis of Mike's research:

Calving site selection and fidelity in a restored elk (Cervus elaphus) herd in Bancroft Ontario, Canada.

Michael R. Allan

Parturition site selection by ungulates is believed to be influenced by forage abundance and concealment from predators. In 2011 and 2012, I used vaginal implant transmitters and movements to identify calving sites for 23 GPS collared elk (*Cervus elaphus*) from a restored herd. I tested the hypothesis that maternal elk used sites with

higher forage and denser concealment compared to pre-calving sites at micro and macrohabitat levels. I detected no significant microhabitat differences from direct measurements of vegetation. At the macrohabitat scale, based on proximity of landcover classes, mean distances to hardwood forests was significantly less for calving (153 m) than pre-calving sites (198 m).

Figure 7. MNR research technician Steve Bennett measures an elk calving site near the Black River, east of Cooper, Ontario (photo: M.Allan).



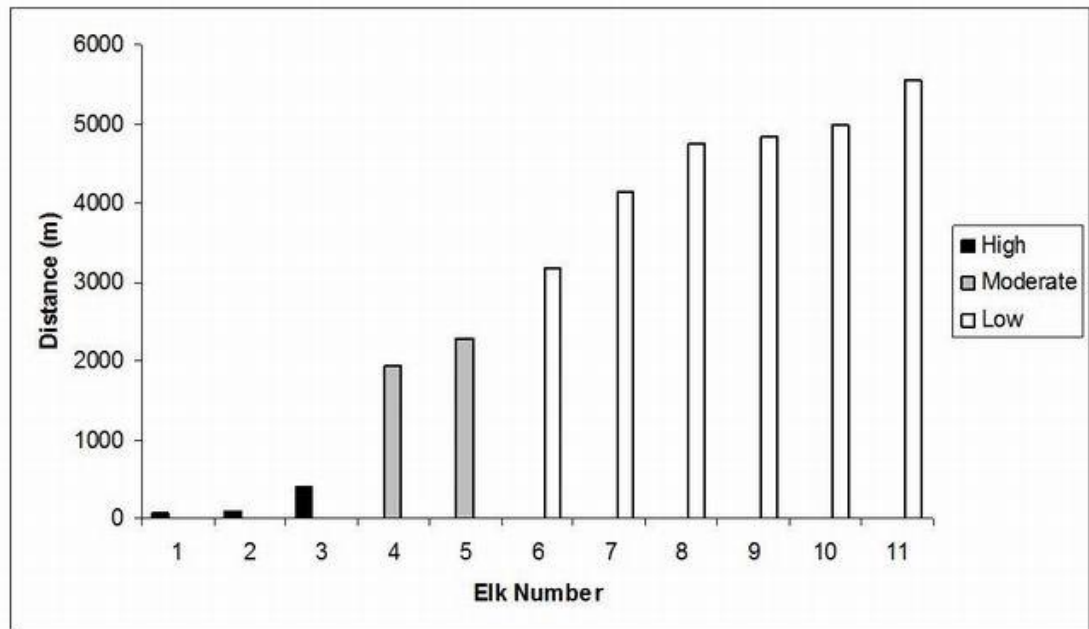
Figure 8. MNR research technicians (L-R) Luke Buchanan, Erin Scharf, Steve Bennett and Zach O’Krafka evaluate an elk pre-calving site near the Black River, east of Cooper, Ontario (photo: M. Allan).



Site fidelity is hypothesized to offer security in terms of familiarity to an area. I tested the hypothesis that females demonstrated fidelity to their previous year’s location during pre partum, parturition, post partum, breeding and winter periods. Elk were more philopatric during parturition and post partum than during breeding. Compared to winter elk were more philopatric during pre-partum, parturition and post partum periods. Expressed as distance between consecutive-year calving locations, site fidelity varied

with 27% of females exhibiting high (<1 km), 18% moderate and 55% (>2.9 km) low fidelity.

Figure 9. Parturition site fidelity expressed as high (< 1 km), moderate (> 1km and <2.9 km) and low (>2.9 km) for GPS collared female elk in the Bancroft-North Hastings herd 2011-2012.



I measured nearest-neighbor distances at calving time, exploring the hypothesis that females distance themselves from conspecifics. Elk increased the average distances to collared conspecifics during parturition; however, sample sizes were small. This strategy might influence calving site selection.

Rapid movement prior to parturition, low site fidelity and spacing-out of females during parturition appear to be strategies to minimize predator risk and detection. Little evidence of selection for vegetation structure suggests this may not be limiting to these elk. The results of this study do not suggest any pressing requirements for silviculture,

habitat or landscape management guidelines to protect specific features needed for elk calving sites for the Bancroft-North Hastings herd.

Figure 10. Distance to nearest neighbour for GPS collared female elk in the Lingham group of the Bancroft-North Hastings herd during 7 parturition periods, 2011-2012. Bars represent ± 1 standard error.

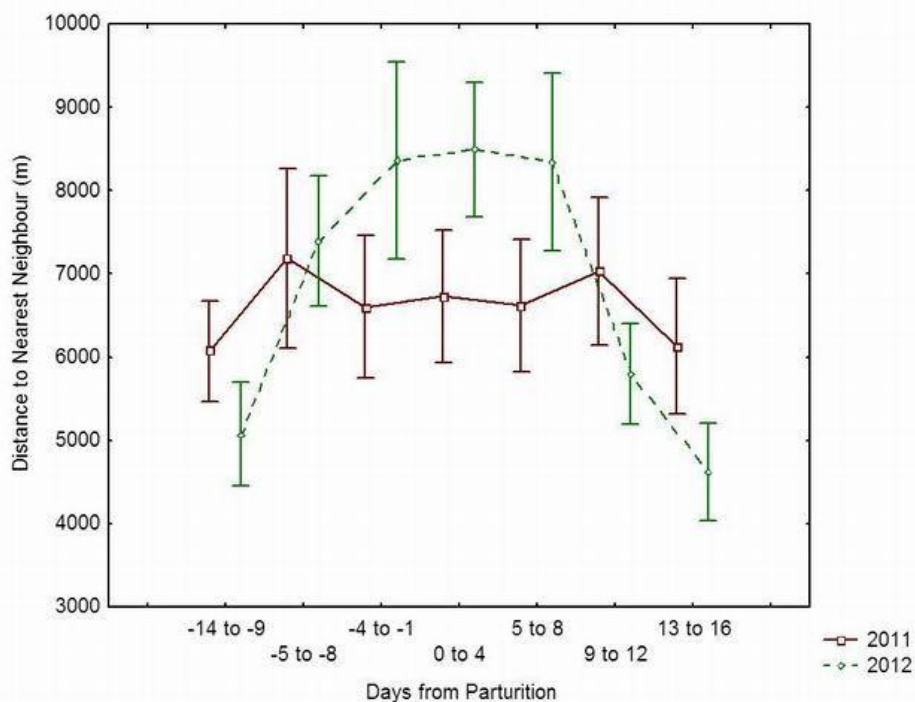


Figure 11. A GPS collared female elk with a calf in Hartsmere, Ontario, July 2012

(photo:M.Allan)



(4) Recommendations for the future research and management of elk in southern Ontario:

The following recommendations are suggested to maintain an elk population size of 400 to 600 elk in the Bancroft core elk area (2500 sq km):

- 1) Continue to monitor elk in the Bancroft core elk area through annual aerial surveys. If elk population size increases or decreases beyond the OMNR elk population objective, the harvest can be used to bring elk numbers more in-line with the population objective.
- 2) Conduct research on non-telemetry inventory methods that provide population estimates comparable to telemetry survey methods. If funding can be acquired, capture and collar (VHF) at least 5 elk in each of the 6 social groups of elk in the Bancroft core elk area to maintain a method of locating elk groups during surveys as well as to maintain the number of collared animals (>40% of population) to allow confident population estimates.
- 3) If the mature bull to cow ratio drops below 20:100, decrease the number of bull tags allocated during the harvest. If mature bull to cow ratios drop substantially (as has occurred in Hartsmere/Turriff/New Carlow) consider further options to avoid a possible population decline due to too few mature bulls participating in breeding activities.
- 4) Expand research and monitoring activities to include elk in eastern Ontario. OMNR biologists and the public have reported several hundred elk sightings in eastern Ontario (the area from Kaladar to Ottawa to Cornwall and

Kingston/Belleville, west to Port Hope). Activities could include capturing and collaring a few elk in each of the major elk groups in eastern Ontario as well as a survey to estimate how many elk are in the eastern part of the province. This would provide baseline information should a harvest be planned for eastern Ontario in the future.

(5) Acknowledgments: Thanks to the many people and organizations who assisted with the Bancroft area elk program over the last 15 years (2000 to 2014), either financially or in the field. They include: the Quinte Elk Restoration Committee; Safari Club International (Ottawa and Ontario chapters); the Ontario Federation of Anglers and Hunters, MNR Aviation Services; MNR Wildlife Research and Monitoring Section (Dr. J. Chris Davies, manager), MNR Bancroft District (Vince Ewing, manager) and MNR Peterborough District (Karen Bellamy, manager). Special thanks to Mike Allan of the MNR Wildlife Research & Monitoring Section for his contributions and assistance to the elk research program. The Bancroft update was reviewed by the following OMNR staff: Dr. Chris Davies, Vince Ewing, Deb Stetson, Mike Allan, Christie Curley, Suzy Shalla, and Erin MacDonald.

(6) Literature cited

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Copies of the 2014 annual elk report can be obtained from:

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