

# MAYO COMMUNITY MOOSE MONITORING PROJECT

2001-2013 REVIEW



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# **MAYO COMMUNITY MOOSE MONITORING PROJECT 2001-2013 REVIEW**

## **Yukon Department of Environment Fish and Wildlife Branch TR-14-07**

### **Acknowledgements**

The Yukon Department of Environment provided funding and staff to coordinate this project. The Mayo District Renewable Resources Council and the First Nation of Na-Cho Nyäk Dun provided advice in establishing the monitoring program and ongoing support in running it over the past thirteen years. We especially thank all the hunters who have taken the time to record their observations and contribute their knowledge to this program and the community. Their names are listed in an appendix of this report.

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## Summary

- We developed a pilot community-based program for monitoring the moose population in the Mayo area, based on the observations of local hunters. The main purpose of this project was to evaluate the utility and feasibility of using observations of hunters to provide useful annual information about the status of the local moose population.
- We distributed booklets with data tables and maps to about 20 active local hunters in late summer each year from 2001 through 2013, and asked them to write down the dates, age, sex, and location of every moose they saw from August through October.
- An average of 18 hunters returned completed moose observation booklets each year, and they reported an average total of 392 moose. Of these moose, an average of 275 per year were of moose seen in the Mayo area from August through October; the balance of moose were seen further afield and in other months.
- Observations by hunters provided annual estimates of calf survival that have the potential to supplement data provided by periodic aerial surveys as a part of a regular monitoring program. Estimates of sex ratios (numbers of bulls compared to numbers of cows) from the ground-based monitoring were more variable among years and appear to be influenced by factors other than just the population composition.
- Community ground-based monitoring provides additional benefits of formally recording numerous additional details about moose sightings and observations of other wildlife species, and encouraging stewardship through direct community involvement in monitoring.

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## Introduction

This report summarises the results of the Mayo Community Moose Monitoring Project, a pilot program run from 2001 through 2013 to evaluate the feasibility and utility of using ground-based observations of hunters to monitor the local moose population.

Moose are a staple food source for many residents in central Yukon. Monitoring the health of local populations of moose is a high priority to ensure harvest rates remain sustainable given moose abundance and natural mortality rates. Monitoring has typically entailed periodic (each 5–8 years in the Mayo area) aerial censuses which provide data on abundance and population composition by age and sex. In high priority areas, aerial surveys to estimate recruitment (survival of calves to breeding age) have also been sometimes flown in years between censuses to supplement data on population health.

Aerial surveys are costly and there has consistently been a higher demand for closer monitoring of moose populations around communities than it has been possible for the Yukon government to meet within its limitations of budget and personnel. Alternative monitoring methods that could provide data on moose population health more frequently and at lower cost have been continually considered and evaluated during the past few decades.

*The Integrated Wildlife Management Plan for the Na-cho Nyak Dun Traditional Territory, May, 1997*, a collaborative plan between the Yukon Fish and Wildlife Branch, First Nation of Na-Cho Nyäk Dun, and the Mayo District Renewable Resources Council (RRC), made a number of recommendations about monitoring moose populations. The plan recognised the high cost of aerial censuses and suggested a monitoring program based on multiple indicators and methods. These included annual low-intensity aerial surveys to monitor recruitment and the formal recording of local knowledge from the people who know the area best.

In response to these recommendations in the community plan, the Yukon Fish and Wildlife Branch worked with the RRC and First Nation to develop an organised way to annually record local observations of the most active hunters. The Mayo Community Moose Monitoring Project was launched in the fall of 2001 and has been conducted annually since then.

## Methods

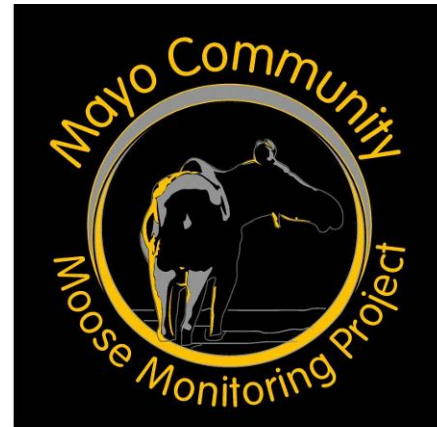
We developed booklets for local hunters to use for recording their observations each year (see 2013 booklet in Appendix 1).

Each booklet was made up of a cover page, a page of text describing the program, a page of text describing what each participant would be asked for and provided with, a page of text of instructions, a data sheet with example data recorded, 5–10 blank data sheets, and 8 maps. The text and data pages were printed on standard letter-sized paper, the maps were printed on ledger-sized paper, and all were bound in clear-fronted Duo-Tang report covers.

The key points of the program were:

- We asked all participants to individually record all observations of moose they made from August through October, by age and sex of moose. This covers the main hunting season.
- We asked participants to record locations of moose to whatever level of detail they were comfortable with and provided them with maps.
- We invited participants to add additional comments about moose and other wildlife species seen.
- We committed to keeping all individual information collected confidential, to be used by the regional biologist, First Nation, and RRC, and only published in summary format.
- We committed to sending out annual summaries of the information.

- We gave each participant a ceramic mug with the project's logo (see Fig. 1) and printed with the year of participation. Each participant was also eligible for a draw for \$100 of gasoline; 5 winners were drawn each year.



**Figure 1.** Mayo Community Moose Monitoring Project logo.

Each year, we drew up a list of about 20 of the most active moose hunters in the Mayo area as potential participants. Once the program had become established, we were able to select hunters who we knew from past experience were willing and diligent about recording their observations. We also added local Government (Yukon and First Nation) staff—biologists, technicians, conservation officers, natural resources officers, mining inspectors—whose jobs involved substantial field time in the fall to the list of participants.

We distributed booklets to all participants in late July or early August. During the fall, we opportunistically discussed the project with participants as we encountered them to remind them about recording observations. We collected the booklets in November each year. Data from the booklets were entered into a database over the winter and we sent out 1-page newsletters summarising the results.

## Results and Discussion

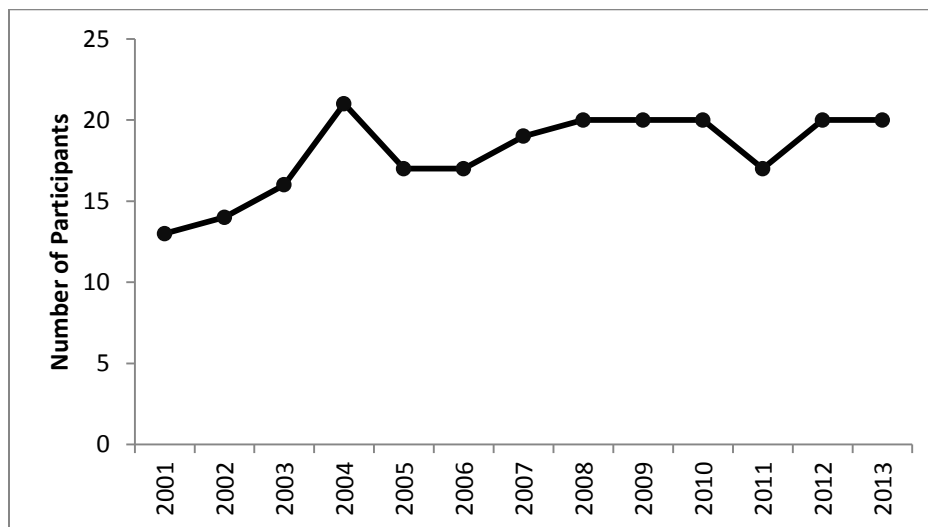
### *Participation*

Each year from 2001 through 2013, we distributed 20 to 22 of the moose monitoring booklets.

We collected back 13 to 21 completed booklets per year, with an average of 18 participating observers (see Fig. 2). In most years, a few booklets were lost or a few participants were not able to get out in the bush hunting because of illness, other commitments, or a variety of other reasons.

### **Observations of Moose**

Participants in the Mayo Community Moose Monitoring Project focussed their hunting in the Mayo area but also did some hunting further afield (see Map 1). Hunters provided enough information on locations of their observations to identify the Game Management Subzone for 76% of sightings, and the Moose Management Unit (MMU) for 95% of sightings.




**Figure 2.** Number of moose booklets successfully completed each year for the Mayo Community Moose Monitoring Project.





Map 1  
Moose Observations by  
Moose Management Unit

0 10 20 30 km  
1:1,500,000

 Moose Management Unit  
(average # moose seen  
per year)



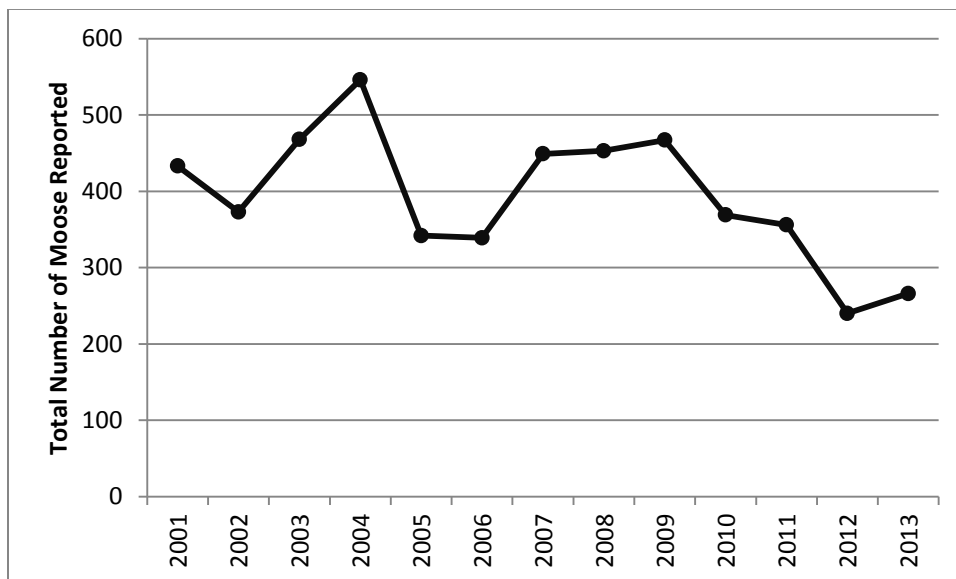
Most hunters hunted in either the Mayo (58% of moose reported) or Upper Klondike Highway (22%) Moose Management Units. Almost all of the more remote observations were made by government staff as they carried out their job duties.

While we asked hunters to only record their observations from August through October, many also recorded observations in other months as well—7% of observations were outside the target time period. Of those observations made from August through October, 25% were in August, 64% in September, and 11% in October.

Project participants reported an average of 392 moose per year, and annual totals ranged from 240 to 546 (see Fig. 3).

In most years, close to 400 moose were reported. Of these, 275 moose per year were seen on average in the Mayo and Upper Klondike Highway Moose Management Units between August and October.

Besides the basic information about numbers, ages, sexes, and locations of moose seen, many hunters also recorded detailed notes about their observations. These added valuable information about general abundance of moose and hunters, condition and sizes of animals, moose behaviour, hunting conditions, observations of predation, and potential enforcement issues (see text box on the next page).



**Figure 3.** Total number of moose reported each year for the Mayo Community Moose Monitoring Project.

### **Text Box 1. Examples of Detailed Notes about Moose Observations**

Big cow with calf. It looked very healthy compared to moose at lake. Young cow skinny—probably chased away this year.

Cow-calf with 3-4-yr old bull. Another cow-calf one ridge over, 2-3 miles away.

On north side of lake. Probably the same cow with twins I saw on Sept 7th. Cow was light coloured and calves were dark.

Full sized bull but only 45" horns with light beams. Bet he's a 3-year old. Still some fat on him, liver just starting to go. Small bulls are just starting.

Shot this moose. Medium sized, had only one horn; the other may have broken off when it was green. Has been beat up—ribs and hind quarter bruised up.

Near creek. Shot the bull. Did not see any other moose all the way to the highway.

Small bull (24-36" antlers). The moose seemed to be a lot more active in early September, then there were not many sightings during the middle two weeks, activity picked up again the last week in September. Unseasonal warm temperatures especially during the evenings may have contributed to this trend.

Same cow in same place as yesterday. Young bull shot by hunter.

So far we've seen no large bulls or evidence of rutting. Seems like a late, warm year, leaves still on the trees, very little frost. We've been about 20 miles up or down river since Sept 17th. We heard cranes at 10 pm.

Saw 2 bulls together, some sparring. Third bull, same size, probably the same one we saw earlier downriver. Some 3-way sparring. We watched for hour and a half as they made their way down the gravel bar. The two original ones seemed to be moving the other guy along, sometimes with real fighting—just occasional sparring. One swam back and forth across river again. Heard a high pitched "squeak" I've never heard before, some grunting.

Cold morning temperatures on Sept. 22, 23, 24. Ice on back sloughs and ponds. Have been on the river every day since Sept 22 and the moose we saw on Sept 28 were the first ones we've seen. Hardly any fresh tracks. Ponds freezing must have triggered the moose to leave the valleys.

We've been surprised how few other hunters we've seen. On the 18th and 19th we saw 5 other boats and on the 22nd we saw 2 boats heading upriver and that's it.

Also found moose kill with just 4 quarters and horns taken. Took pictures and will give them to CO when developed.

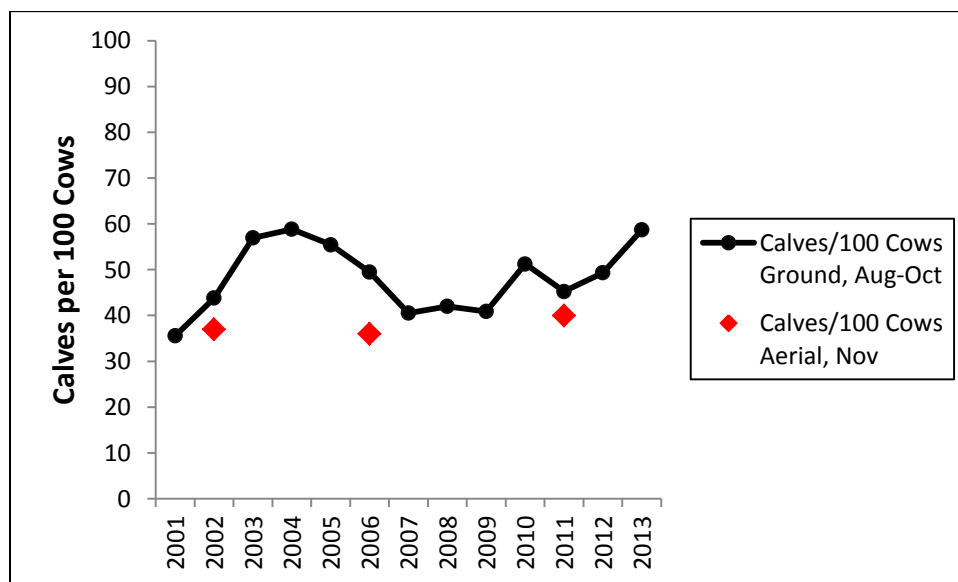
Grizzly bear just killed this moose (legs were still kicking).

### **Moose Population Indices**

We pooled all observations of moose made in the Mayo and Upper Klondike Highway Moose Management Units between August and September to calculate indices of population composition by age and sex.

The number of calves for every 100 adult cows is typically calculated as an index of calf survival from our observations of moose in aerial surveys. We calculated the same indices each year from the ground-based data (see Fig. 4). From 2001 through 2013, there was an average of 48 calves seen in August through September for every 100 cows. This ranged from 36 to 59 calves per 100 cows annually, with highest number seen 2003–2006 and 2013.

We have no comparable data from aerial surveys during the same season to compare to our estimates from the ground-based monitoring. Our aerial moose surveys are conducted 2–3 months later than the dates of most of our hunter observations, a period during which there is undoubtedly additional calf mortality. There have been 3 November censuses of moose in the Mayo area since 2001—a 2002 census in the Upper Klondike Highway MMU (O'Donoghue et al. 2003) and censuses in the Mayo MMU in 2006 (Ward et al. 2006) and 2011 (O'Donoghue et al. 2012).



**Figure 4.** Number of calves seen for every 100 cows reported by hunters each year from August to October in the Mayo and Upper Klondike Highway Moose Management Units.

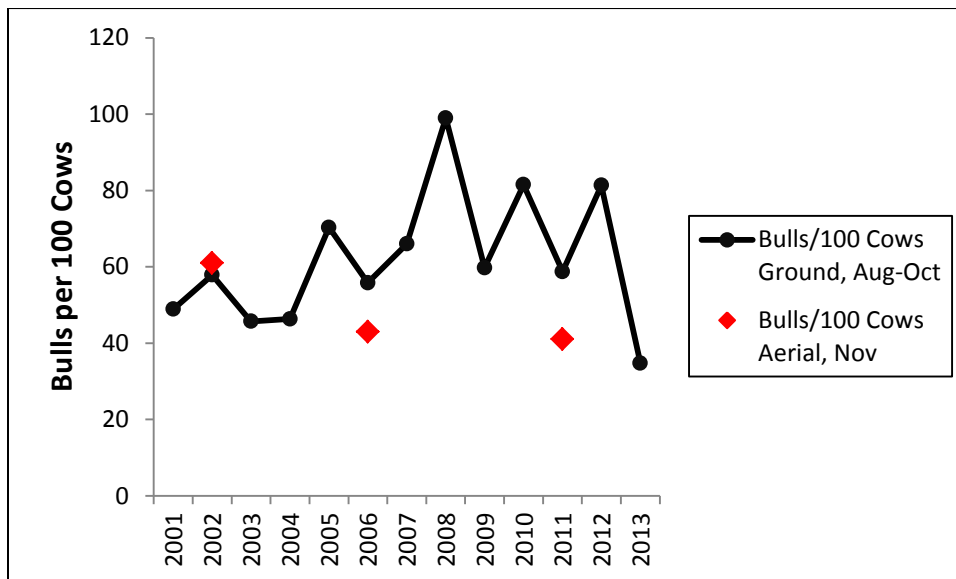


We plotted estimated calf-cow ratios from these early-winter censuses to compare them with the fall estimates from the ground-based monitoring (see Fig. 4). Ground-based estimates were close to and a bit higher than estimates from aerial surveys in 2 of the 3 years (2002 and 2011) and were more positively biased in 2006.

While we cannot directly compare the fall and early-winter indices of calf survival, it is encouraging that the ground-based estimates are consistently slightly lower than the estimates from the early winter as additional calf mortality is expected during that period. The ground-based calf-cow ratios also follow relatively consistent trends among consecutive years which would be expected in natural populations affected by similar conditions from year-to-year.

We will require more years of data to be able to judge the ability of ground-based monitoring to detect actual changes in calf survival, but at this point it appears to show promise as a method for supplementing our information about moose population health, providing annual estimates at a relatively low cost.

We also calculated sex ratios (numbers of bulls per 100 cows) from our fall ground-based data and compared them to early-winter estimates from aerial censuses in the same 3 years (see Fig. 5). While data from the aerial surveys suggested a fairly low and slowly declining proportion of bulls from 2002 to 2011, the estimates from hunter observations were highly variable even among consecutive years, ranging from 35 to 99 bulls for every 100 cows.



**Figure 5.** Number of bulls seen for every 100 cows reported by hunters each year from August to October in the Mayo and Upper Klondike Highway Moose Management Units.

Bull moose typically increase movement rates while cows become more sedentary during rutting season, when most of our ground-based observations were made (Hundertmark 1997). We would therefore expect that sex ratios calculated from observations of hunters would be positively biased. This was the case in most years (see Fig. 5), but the proportion of bulls seen varied greatly among years and apparently was not a reliable indicator of the proportion of bulls in the population. The timing of the rut varies from year to year and movement rates of bulls are affected by many factors including the pattern of temperatures and early snowfalls (see Text Box 1.). Encounter rates of hunters with bull moose accordingly are also affected by many factors besides the number and proportion of bulls in the population, and this affects the sex ratios calculated from hunter observations.

### ***Other Wildlife Sightings***

Participants in the Mayo Community Moose Monitoring Project also reported observations of a wide variety of other wildlife including fish, birds, and other mammals besides moose.

Caribou were the most frequently reported of other wildlife, with an annual average of 32 animals seen and observations made in all 13 years.

Grizzly bears were reported in 12 years (1–21 bears), sheep in 11 years (3–120 sheep), black bears in 10 years (2–21 bears), wolves in 7 years (1–7 wolves), and mule deer in 6 years (1–14 deer). Hunters also recorded observations of whitefish, water birds, grouse, birds of prey, songbirds, bats, marten, otters, lynx, and porcupines. They also often recorded detailed notes about what they were seeing (see examples in Text Box 2).

### ***Community Support***

The Mayo Community Moose Monitoring Project has been well-supported locally both by participants and other residents, and information from the monitoring is highly valued. Recommendations to continue with the program have been included in each of the 3 community fish and wildlife work plans developed since it was initiated in 2001. Regular participants in the program frequently request their annual booklets before we solicit their participation for another year.

Besides the data from the monitoring, there is also a tangible stewardship benefit derived from directly involving local residents in monitoring. When observations of community members are formally collected and used when making resource management decisions, it directly leads to greater interest and involvement in observing changes in the local environment and, when necessary acting to deal with issues as they arise.

## **Text Box 2. Examples of Detailed Notes about Observations of Other Wildlife**

Lots of dead or dying whitefish floating with tails up. Approximately 20-30 seen during September.

Saw seven swans; have been around west end shallows for 3-4 days now.

Two swans in frozen area at far end of the lake. Very wintery. 1" ice in shallows and bays. Ducks are V-ing up.

Grouse heard drumming wings in September. Strange season for this.

The sandhill crane migration was enormous this year. We watched for 2-3 hours as flock after flock flew over - thousands of cranes in total.

On one trip around the lake we saw 12 eagles, 3 golden and 9 bald. Most I have ever seen.

Saw 1 adult and 1 immature bald eagle at entrance to lakes.

White phase gyrfalcon.

Wolf pack was around the lake most of September. Moose were scarce compared to other years.

Saw 3 wolves at kill site of Sept. 25: 2 grey and 1 large black one with a limp.

Saw grizzly with 3 cubs feeding on moose kill 1 mile below creek. Lots of cranes every day especially on 21 Sep. and 24 Sep. in strong wind.

Two large bull caribou and 8 cows at 14:00 hrs.

Two mule deer, both does, on river bank just down from mouth of river.

Five sheep on mountain: 1 ram and 4 ewes.



## Conclusions and Recommendations

- The Mayo Community Moose Monitoring Project provides annual data on survival of moose calves, and it has the potential to be a valuable component of the overall program of monitoring the health of the local moose population. This ground-based monitoring does not appear to be suitable for monitoring the proportion of bulls in the population.
- Ground-based monitoring of moose also provides detailed information about moose, other wildlife, and environmental conditions that participants are observing, and encourages greater local involvement and stewardship in resource management.
- We recommend that we continue to collect ground-based observations of moose and further evaluate the utility of the data for measuring annual variation in survival of moose calves.

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## Appendix A

### 2013 Mayo Community Moose Monitoring Project Booklet



# **Community Moose Monitoring Project**

## **Mayo Area**

### **2013**



**Name:**

## **Community Moose Monitoring Project**

### **Mayo Area, 2013**

Thank you for agreeing to take part as an observer for the thirteenth year of the Community Moose Monitoring Project for the Mayo Area. You were selected because you are one of the most active people outdoors in the community and we value your knowledge of wildlife in the area.

The Community Moose Monitoring Project is a cooperative effort between the Mayo District Renewable Resources Council, YTG's Fish & Wildlife Branch, and the Na-Cho Nyäk Dun Lands & Resources Dept. Since the settlement of land claims, we have been actively working with the community to co-manage wildlife. This project is another step towards directly involving local residents in trying new ways to keep track of the health of our wildlife populations.

The main goal of this project is to collect information from knowledgeable local residents about the moose they're seeing while they're on the land, and to use this information to help us determine how the local moose population is doing. These observations can tell us a great deal about, for example, how well calves are surviving, and how many bulls are present to breed with the cows. In the past, we've always relied only on surveys from airplanes for this information, but we cannot do these often enough.

The records of observations we're asking you to keep are one part of the whole program for monitoring moose in the Mayo area. We also periodically fly over the area to see how the information we get from aerial surveys compares to what we see from the ground.

Thank you again for agreeing to take part in this project. You are among the first local experts in the Yukon to be selected for this kind of project, and your observations will be extremely valuable in helping our community ensure that our moose population remains healthy.

# **Community Moose Monitoring Project**

## **Mayo Area – 2013**

### **What are we asking you to do?**

We request that you keep a record of all the moose you see during the months of August, September and October this year. This book includes the charts for doing this, instructions on how we'd like you to fill them out (on the next page), and maps you can use if you like.

As one of the people in the community who spends the most time on the land, you see many animals and signs that tell you how well the local moose population is doing this year. Your observations will help us a great deal in doing our job of keeping track of the local population.

We would also greatly appreciate it if you could add any other observations or thoughts you have on other wildlife sightings, the weather, the condition of the land, or whatever else you feel is important.

The only other thing we'd ask of you is that you be willing to spend a bit of time with us when we ask you how this is going later this fall.

### **Our commitment to you**

- ❖ Your observations will remain confidential. They will be used by the Mayo District RRC for its work, and by the YTG Regional Biologist (Mark O'Donoghue) and the Na-Cho Nyäk Dun Lands office for assessing the health of the local moose population. These records will remain in the RRC office.
- ❖ We will summarise the results of this year's monitoring in a short summary report and send it to you. Information such as the locations or specifics of each observation will not be presented in the report.
- ❖ We are asking you for a few minutes of your time each time you see moose. This is a voluntary project, but we would like to recognise the contribution that you are making to the community by offering you a Community Moose Monitoring Program mug when you submit your completed observations of moose for the season. We will also draw the names of 5 participants, and each of these will receive a \$100 credit for gas at a local station.

# Community Moose Monitoring Project

## Mayo Area - 2013

### Instructions for Recording Your Observations

1. Please fill out the chart on a different line each time you make an observation of moose. There are some examples of how you would write observations down on the next page.
2. When you see moose, please remember the number of animals, their ages (adult, yearling, or calf) and sexes if you can see them well, and their location. Write these down on the chart as soon as you get a chance.
3. Ages of animals can be hard to determine, so if you can't tell, just fill in the boxes on the chart you know, and note what you're unsure of in the Comments section. Yearling bull moose (1½-year olds) usually have antlers that are just spikes or forked, without the "palms" or large forward-projecting "brow palms" of older bulls. Yearling cows can be difficult to distinguish from older cows, especially when they're alone, so if you're not sure, just write down that they're cows.
4. Fill in the location of each observation in the last column of the chart. You can do this either by describing the location or by putting a numbered dot on one of the maps in the back of this book, and writing the map number in this column. If you would rather not reveal where you're hunting, that's fine. Just describe the location in as much detail as you're comfortable with (for example, "Stewart River" or "Game Management Subzone (GMS) 4-04" or even just "Mayo area").
5. Any additional comments, such as the habitat the animals were in, the sizes of antlers, or whether or not you think you've seen them before, can be made in the box below each observation line.
6. If you would like to record any other observations of wildlife or about the land, please do so. They will be extremely valuable!
7. That's it! We will be talking with you periodically during the fall to see how this is going. If you have thoughts on how this project could be done better, please let us know.

## Community Moose Monitoring Project – Mayo Area

### EXAMPLES

List Each Observation Separately							
Date	Total Number of Moose	Number of Adult Bulls	Number of Yearling Bulls	Number of Adult Cows	Number of Yearling Cows	Number of Calves	Location Description or Location Number on Map
25 Aug.	2			1		1	McQuesten Lake
<b>Comments:</b> On lakeshore. I think this cow and calf are the same ones I saw yesterday.							
1 Sept.	1			1			Mayo Lake
<b>Comments:</b> In burn on hill above lake. Young cow. Might be a yearling.							
5 Sept.	1						Map # 5, Location # 1
<b>Comments:</b> Wading in slough. Too far away to tell age or sex. Location marked on map.							
8 Sept.	2	2					GMS 404 (or "Mayo area")
<b>Comments:</b> (In this example, the observer prefers not to reveal the exact location, and so only writes down the Game Management Subzone (GMS) or a general description of the location.)							
25 Oct.	12					3	Ethel Lake
<b>Comments:</b> Caribou. 3 were calves, but I couldn't identify the rest.							

## Community Moose Monitoring Project – Mayo Area

### Observations of Moose

<b>List Each Observation Separately</b>							
<b>Date</b>	<b>Total Number of Moose</b>	<b>Number of Adult Bulls</b>	<b>Number of Yearling Bulls</b>	<b>Number of Adult Cows</b>	<b>Number of Yearling Cows</b>	<b>Number of Calves</b>	<b>Location Description or Location Number on Map</b>
<b>Comments:</b>							
<b>Comments:</b>							
<b>Comments:</b>							
<b>Comments:</b>							
<b>Comments:</b>							



# MAPS

**(Use the following maps to mark the locations  
of moose observations if you want to,  
or just use them for your own information)**

[Note: Eight maps included with booklets distributed to participants not included here. Only one data sheet is shown here; 5-10 provided to each participant.]

## Appendix B

### Mayo Community Moose Monitoring Project Participants, 2001-2013

Following is a list of hunters, government staff, and others (e.g., community bus driver) who have participated in the Mayo Community Moose Monitoring Project from 2001 to 2013. We sincerely thank all of them for their time, knowledge, and commitment to the community.

Blair Andre	William Hummel	Dave Moses
Mary Beattie	Don Hutton	Stewart Moses
Pete Beattie	Jimmy Johnny	Tommy Moses
Dennis Buyck	Kevin Johnstone	Mark O'Donoghue
Steven Buyck	Aaron Koss-Young	Frank Patterson
Jim Carmichael	Michel Lebrot	Franklin Patterson
Vince Fraser	Simone MacDonald	Walter Peter
Jim Genier	Bruce MacGregor	Kent Sinnott
Don Germaine	Corey Mackie	Glen Sorenson
Minnie Hassen	Dick Mahoney	Crystal Stevens
Keith Hepner	Rory Masters	Steve Therriault
Dawna Hope	Dan McDiarmid	Pat Van Bibber
Lena Hummel	Russell McDiarmid	
Nancy Hummel	Bernard Menelon	