2013 to 2018

Omineca Moose Management Plan

Ministry of Forests, Lands and Natural Resource Operations
Fish, Wildlife and Habitat Management Branch
Province of British Columbia
Prince George, BC
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Introduction

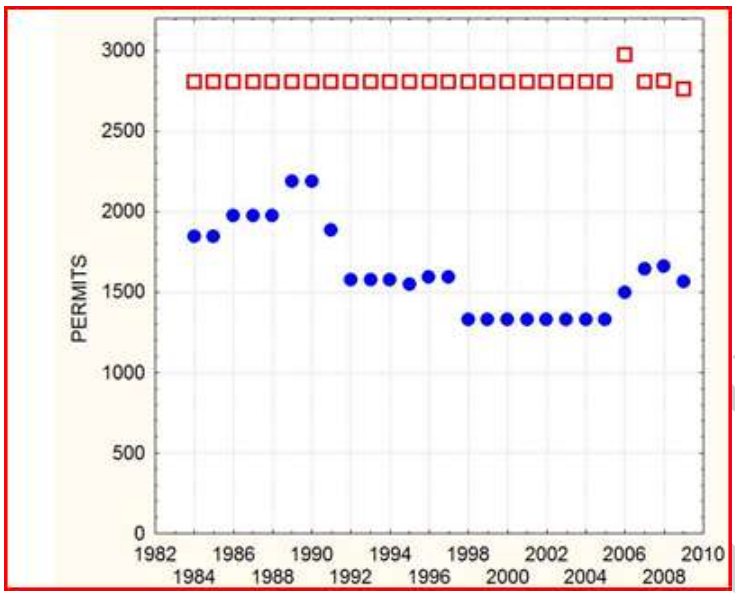

Figure 1: The number of Limited Entry Hunting Permits issued by year for bull (red squares) and cow (blue circles) moose for all Management Units in the Omineca region combined.

Between 1981 and 2011 Omineca moose management followed the 'constant effort' approach, illustrated in Figure 1, where effort is kept constant by issuing the same number of LEH permits each year. The constant effort approach generally produces the highest yield and the lowest coefficient of variation in population size (Beddington and May 1977, Fryxell et al. 2010, Boyce et al. 2012). However, if there is a long lasting change in the state of the environment (as opposed to a short term random variation in environmental conditions, e.g., a severe winter) or if hunting efficiency changes, a different constant effort level may be required for sustainability. The substantial reduction in 2011 moose population estimates in the southern Omineca (Cadsand et al. 2013 a, b), relative to the 2005 estimates (Walker et al., 2006 a b) suggested that something had changed, and that the constant effort strategy should be re-evaluated. The alternative management system (relative to a constant effort strategy), is a tracking strategy, where effort (e.g., LEH permit numbers) vary in proportion to population size. The management objectives and options presented for the Omineca region in this management plan were consistent with the principles and management levers as set out in the draft Provincial Framework for Moose Management in British Columbia (MFLNRO, 2012).

Hunter Consultation

Between May 2012 and January 2013, Omineca region staff in the Fish, Wildlife and Habitat Management Branch of the Ministry Forests, Lands and Natural Resource Operations developed this 2013-2018 Moose Management Plan for the Omineca Region in conjunction with representatives from First Nations communities, the Guide Outfitters Association of British Columbia (GOABC) and the British Columbia Wildlife Federation (BCWF).

May 2012: Wildlife staff met with GOABC and BCWF to present our 2011 survey results. Both groups agreed that LEH cow permit numbers should be reduced as much as possible, across the Omineca immediately. The Regional manager therefore reduced cow LEH permit numbers for

fall 2012 by about 40%, the minimum number of permits possible given the existing legislative restrictions.

Summer 2012: Meeting began between wildlife staff and individual First nations to present the 2011 survey results and set out a management planning course of action.

Fall 2012: Met twice with First Nations and stakeholders together to collect and consolidate all of the various objectives proposed.

December 2012: Presented to GOABC and BCWF the results of the moose surveys conducted earlier that month. Those stakeholder representatives agreed to a set of objectives and their preferred management option. (see below).

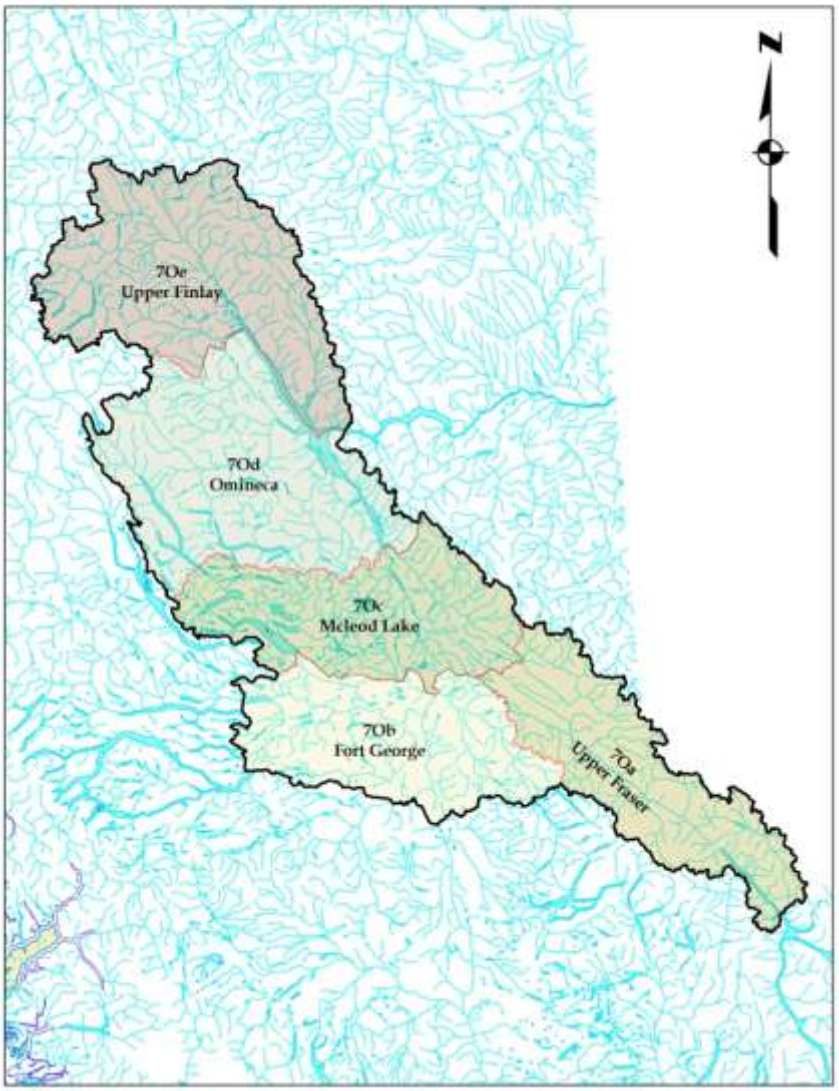

Figure 2: Game Management Zones (GMZs) of the Omineca

January 2013: Met with First Nations individually to present the December survey results and the management option preferred by the BCWF and GOABC. All First Nations agreed with that approach.

February 2013: Legislation was changed so that the preferred management option carried out.

Game Management Zones

Game Management Zones (GMZs), illustrated in Figure 2, are "amalgamations of Wildlife Management Units (WMUs) which share similar ecological characteristics and hunter harvest patterns and thus provide a suitable geographic framework for implementing population management strategies " (Hatter, 1999). As indicated in Table 1, GMZ's vary in the amount of information available on the status of their moose population

Table 1: Status of moose population information by Game Management Zone.

GMZ	Status
7Oa	Little information
7Ob	Most information, heaviest hunting pressure
7Oc	Parsnip (Fig 3)– objective since 2006 is to reduce moose numbers (Gillingham et. al., 2010) elsewhere little information
7Od	Little information
7Oe	Different constant effort history – no antlerless hunting

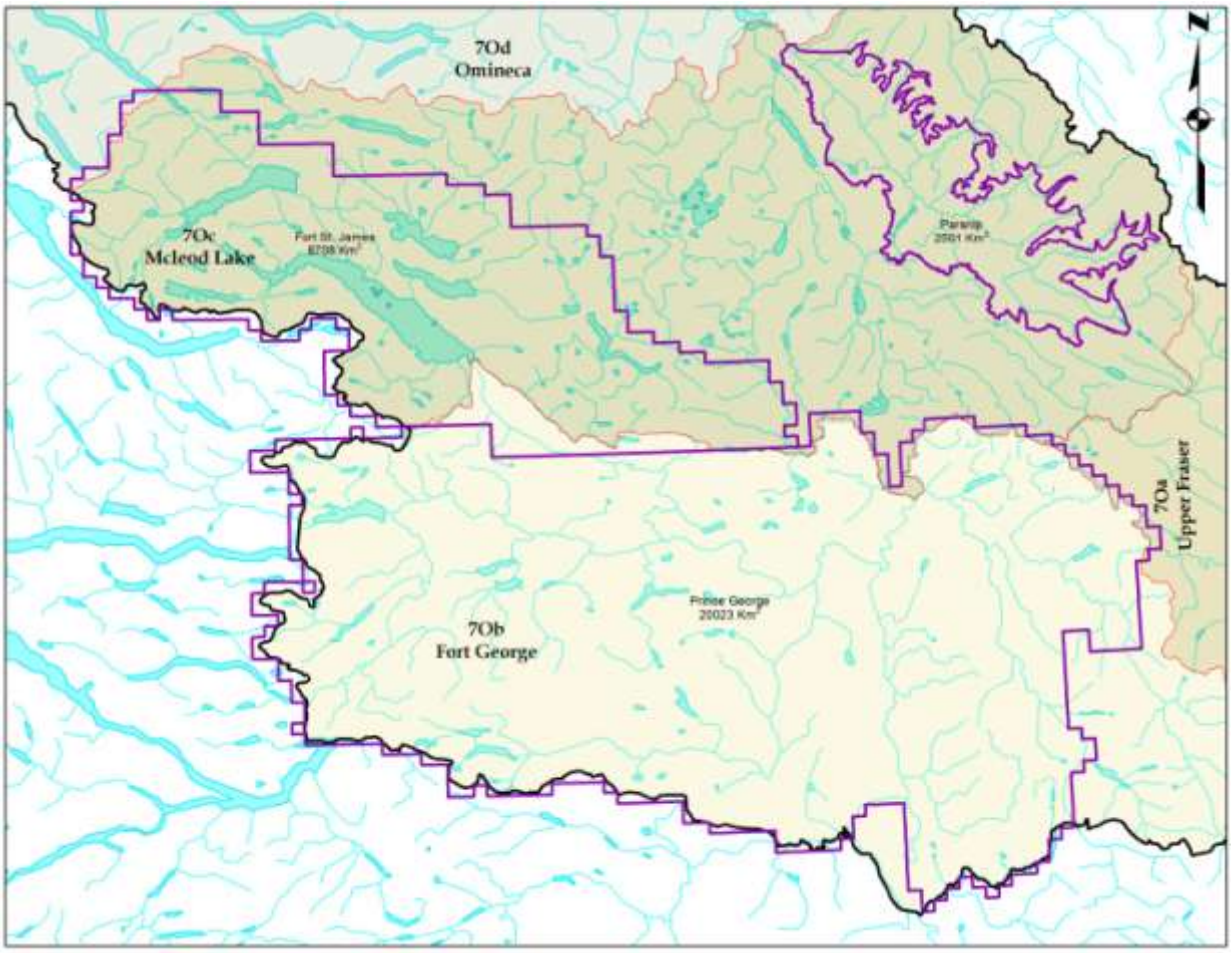

Figure 3: Southern Omineca population management units.

Population Management Units

To enable moose population management throughout the Omineca region three population management units (Figure 3) were identified within GMZs 7Ob and 7Oc; they are Parsnip, Prince George and Fort St. James. Population management units (PMUs) are defined as "the spatial scale at which a given big game population will be managed for hunting. This will normally be the geographic area that represents the year-round range of a big game population, while keeping interchange with other populations to a minimum" (MoE, 2009).

Fort St. James

The Fort St. James unit is 7,718 km². Prior to 2011, there were no moose density surveys for this unit. Repeated counts since 2002 in a subset of this area, the John Prince Research Forest, showed no trend in numbers (Courtier and Heard 2013). Density surveys in 2011/12 indicated low recruitment (30 ± 6.6 calves: 100 cows) and a low sex ratio (30 ± 19.3 bulls: 100 cows) and an estimate of 5900 ± 370 moose. A lower intensity 'check' survey of the high density areas (stratum 1 blocks) was flown in 2012/13 and the results were similar to 2011 (calf: cow ratio of 37 ± 11.7, bull: cow ratio of 47 ± 15.7 and density 30% higher in the stratum 1 blocks).

Prince George

The 15,994 km² Prince George unit is characterized by high hunter densities and relatively easy access. In 2005, there were 1.35 moose/km², for a population estimate of 23,300 (± 2,500, CV 11%) moose, with low recruitment (36 ± 3.6 calves: 100 cow ratios) and low sex ratios (25 ± 4.8 bulls: 100 cows) ratios (Walker *et al.*, 2006b), which was similar to 1998. The 2011/12 density was 0.63 moose/km² for an estimated population of 10,100 (± 670, CV 7%) moose. This represented a 50% decline from the 2005/06 survey. Similar levels of recruitment (27 ± 3.6 calves: 100 cows) and sex ratio (28 ± 9.9 bulls: 100 cows) were observed. A lower intensity 'check' survey was flown in 2012/13 and confirmed that the decline was substantial but indicated no further decline in density. Both recruitment (33 ± 2.6 calves: 100 cows) and sex ratio (35 ± 4.2 bulls: 100 cows) increased slightly (Cadsand *et al., 2013a)*.

Parnsip

The smallest of the PMUs at 2,500 km², the Parsnip unit is part of a long-term Caribou Recovery Strategy experiment (Gillingham *et al.*, 2010). Prior to the experiment, densities were around 1 moose/km². The 2005/2006 population estimate was 3,000 (± 440), recruitment was 30 ± 7.1 calves: 100 cows and the sex ratio was 59 ± 10.6 bulls: 100 cows (Walker *et al.*, 2006). After implementation of the experiment, by 2009 the population declined to 0.48 moose/km², or 1200 (± 300) moose and the sex ratio fell to 44 bulls: 100 cows (Gillingham *et al.*, 2010). The 2011/12 survey indicated 0.45 moose/km² for an estimated population of 974 (± 153, CV 16%) moose with a recruitment of 25 ± 4.7 calves: 100 cows and a sex ratio of 52 ± 5.7 bulls: 100 cows (Cadsand *et al.*, 2013b).

Moose Management Objectives

Following the discussions with hunter groups a suite of moose management objectives were developed:

- Increase the moose numbers to at least the number alive in 2005.
- Ensure that First Nations hunters have the ability to exercise their aboriginal rights to hunt moose in their traditional territories.
- Promote a sustainable guide outfitter industry
- Promote resident hunter participation, retention and recruitment
- Achieve a high sex ratio (i.e., greater than 30 bulls: 100 cows)
- Achieve a specified calf cow ratio (none specified, provincial)
- Achieve a specified hunter success rate (none specified)
- Achieve a high quality hunting experience (e.g., see many moose, minimal crowding of hunters)
- Promote a feeling of action and responsibility and involvement by invoking change, participating in management decisions and feel like they are "doing something".

These initial objectives were then condensed to the 5 objectives in Table 2. Four objectives were dropped. Ensuring supply of moose for First Nations was not an option; all objectives and actions must and do ensure that First Nations hunters have the ability to exercise their aboriginal rights to hunt moose in their traditional territories. Calf: cow ratios, hunter success and having a high quality hunting experience (with respect to seeing lots of moose) are a consequence of population growth. The degree of crowding is part of the hunter participation objective. Crowding may be reduced by a more complex set of management options than are currently proposed.

Table 2: Five moose management objectives for the south Omineca and their respective importance weighting.

	Objective	Importance Weighting	Rationale for importance rating
1	Increase the moose numbers to at least as many moose as were present in 2005.	5	Clearly the most important objective based on comments from users.
2	Promote resident hunter participation, retention and recruitment.	3	Promoting resident hunting is less important than population growth but more important than sex ratio
3	Promote a sustainable guide outfitter industry.	3	Support for the guide industry is equally important as promting resident hunting.
4	Achieve a high sex ratio (i.e., greater than 30 bulls: 100 cows)	1	Not by itself a very important objective because a high sex ratio could results from changes to either bull or cow numbers, i.e., a higher sex ratio would result from more bulls in the poopulation, which is what hunters want, or from fewer cows in the population which reduces population growth ptential, whcih is not what hunters want.
5	Social responsibility	1	Taking action and doing something; low weight because even the wrong action would be "doing something".

The rationale for relative importance of the 5 objectives is based on discussions with stakeholders and First Nations (but is still under review). The most important objective was assigned a weight of 5 with less important objectives receiving lower weights.

Management Options

For each objective, 8 possible management options were considered. The management options most likely to achieve each objective were assigned an Effect value of 5 with less effective actions receiving lower scores (i.e., 1). Score for each combination of management option and objective is the product of the Effect value and Importance Weighting (Table 4).

Rationale for the Effect Values

The Effect value (Table 4) for the 8 management options with respect to the increased moose numbers objective was based on a model of the relative rates of moose population growth

Table 3: The likelihood that each management option will satisfy a management objective, where changes are relative to hunting regulations and permit numbers in 2011.

	Management Option	Increase Moose Numbers Over 5 Years	Promote Resident Hunter Participation	Support Guide Industry	High Sex Ratio	Social Responsibility / Do SOMETHING!
1	Reinstate / INCREASE Cow LEH as in 2011	0%	High, no change in hunter numbers	High	High	Very Low
2	Substantially reduce cow hunting	8%	Low, Lose 3000 hunters	Low	Low	High
3	Substantially reduce calf hunting	2%	Low, Lose 1500 hunters	High	Neutral	High
4	Both 2) & 3)	10%	Low, Lose at least 3500 hunters	Low	Low	High
5	2) & 3) plus 50% reduction from 2007-11 bull hunting	10%	Very Low, Lose 6700 hunters	Very Low	High	High
6	2) & 3) plus 75% reduction from 2007-11 bull hunting	10%	Very Low, Lose 8000 hunters	Very Low	High	High
7	Eliminate spike-fork & calf season	1%	Low, Lose 4000 hunters	Low	Medium	High
8	No change relative to 2012	4%	Low, Lose 1200 hunters	Medium	Medium	Very Low

(Table 3). Zero growth was given a low Effect value and the highest growth (10%) was given the highest Effect value, which was 5.

The Effect value for the 8 management options with respect to resident hunting was based on how each option would change number of hunters so options that lose fewer hunters have a higher effect value. We assumed that 2 hunters are affected by a change in each LEH permit because of the shared hunt system and because most permit holders are accompanied by other hunters who hunt spike-fork or calf moose.

The Effect value for the 8 management options with respect to supporting the guide industry was based on how each option would change the number of moose that guides are allowed to kill. Any reduction in bull hunting (options 5-7) would have a low likelihood of supporting the guide industry and thus a low effect value. Because only some guides hunt cows, reductions in cow hunting (options 2, 4, 5, 6 and 8) would have adverse effects on those guides but the effect

is less than reductions in bull hunting. Reduction in calf hunting has almost no effect on the guide industry.

The Effect value for the 8 management options with respect to achieving a high sex ratio was based on the expected magnitude and trend in sex ratio. So a greater increase in the sex ratio would have greater effect values.

The Effect value for the 8 management options with respect to social responsibility was simply that doing anything was likely to meet that objective.

Table 4: Scoring matrix for each management option and management objective combination where score is the product of the option weight and the objective effectiveness value.

Management Option	Objectives Relative to 2011										Total Score
	Increase Moose Numbers over 5 Years		Promote Resident Hunter Participation		Support Guide Industry		High Sex Ratio		Social Responsibility / Do SOMETHING!		
	Weight 5		Weight 3		Weight 3		Weight 1		Weight 1		
	Effect	Score	Effect	Score	Effect	Score	Effect	Score	Effect	Score	
1 Reinstate / INCREASE Cow LEH as in 2011	1	**5**	5	**15**	4	**12**	5	**5**	1	**1**	**38**
2 Substantially reduce cow hunting	5	**25**	3	**9**	3	**9**	2	**2**	5	**5**	**50**
3 Substantially reduce calf hunting	2	**10**	4	**12**	4	**12**	3	**3**	5	**5**	**42**
4 Both 2) & 3)	5	**25**	2	**6**	3	**9**	2	**2**	5	**5**	**47**
5 2) & 3) plus 75% reduction from 2007-11 bull hunting	5	**25**	1	**3**	1	**3**	5	**5**	5	**5**	**41**
6 2) & 3) plus 50% reduction from 2007-11 bull hunting	5	**25**	1	**3**	1	**3**	5	**5**	5	**5**	**41**
7 Eliminate spike-fork & calf season	2	**10**	2	**6**	2	**6**	3	**3**	5	**5**	**30**
8 No change relative to 2012 when cow LEH permits were reduce by 40%	3	**15**	4	**12**	3	**9**	3	**4**	1	**1**	**41**

Decision Analysis and Recommended Management Direction

No one management option had a high likelihood of meeting all objectives (i.e., no row is all green, Table 3). Option 2 had the highest score (Table 4) and was the option agreed to by all users. Users supported a permit reduction to 10% of the number of cow LEH permits issued in 2011.

This reduction is anticipated to:

1. Increase moose numbers by 8% over 5 years,
2. Essentially eliminate cow moose hunting for the guide industry,

3. Reduce the number of resident hunters by 3000 per year,
4. Substantially reduce the calf kill because many calf hunters hunt only because they are accompanying cow LEH permit holders.
5. Slightly decrease population the sex ratios because there will be more cows in the populations, and
6. Demonstrate that we have done something to manage the moose population.

Users agreed that the reduction in LEH permit numbers should occur in all WMU's with a cow season.

The reduction in cow permit numbers will not be made in the Parsnip PMU where the moose management objective is different. The objective there is to follow the provincially mandated mountain caribou recovery plan; therefore permit numbers will remain the same as in 2011.

Future Moose Management Planning

This planning process identified management objectives and options and facilitated all users coming to a consensus on which options to pursue. This plan can also be used to support management decisions by other decision makers (e.g., those responsible for forest practices) to do what is necessary to promote the recovery of moose numbers.

The next steps are to commence management planning for the following five years or when these objectives have been met (i.e, will we increase cow LEH permit numbers when moose numbers increase to 2005 levels?)

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