
FACT SHEET

December 18, 2017

Ministry of Forests, Lands, Natural Resource
Operations and Rural Development

British Columbia Moose: December 2017

Summary:

Moose are a conspicuous and iconic part of British Columbia's fauna that have environmental, economic, social and cultural importance. First Nations rely on moose for social, ceremonial, and sustenance purposes. Moose also provide sustenance and recreational opportunities to resident and non-resident hunters, and in this context their harvest provides economic benefits through the sale of hunting licenses and associated expenditures. Collectively, moose play a vital role in the well-being of many communities and individuals.

Ministry staff and partners are continuing research, undertaking surveys, assessing moose health and working closely with First Nations and stakeholders to gain more understanding and better inform management decisions. Last year, approximately \$1.2 million was invested in targeted enhancement activities focused on habitat and access management, in addition to the approximately \$750,000 in inventory and management and \$250,000 in research.

This "Fast Facts" highlights important updates and accomplishments from across the province aimed towards management of moose populations. The Province's work builds on the [2015 Provincial Framework for Moose Management](#), the findings of a 2013 comprehensive moose population research project undertaken to investigate declines in B.C.'s interior, and "A Strategy to Help Restore Moose Populations in British Columbia." Research study was recently expanded to investigate causes of calf mortality to better understand factors behind the decline.

Some highlights of the work conducted over the past year include:

Continued declines in moose populations in several areas of the Province, while in other areas they remain stable or have increased. Though in some cases the declines are expected as a result of landscape-level changes due to both human impacts and natural process of disturbance and succession, the causes are complex and it will take time to fully understand all the factors involved.

Calf survival was identified as an important factor in population trends. Initial findings suggest calf mortality in late winter and spring are a main contributing factor to the declines. The ministry is investigating multiple factors that may be causing the high mortality rates observed as part of the research project, and will use the results to better inform management decisions and project investments.

Additional highlights from the research, enhancement, inventory and outreach are provided below, as well as detailed summaries from each region around the province.

Research:

The provincial moose research project is investigating cow moose survival as it relates to landscape change. In April 2017, the provincial moose research project entered its fifth year.

- There are currently over 200 cow moose radio-collared in five study areas. Each animal with a radio collar is sampled at capture for health parameters and then tracked by satellite. If the moose dies, the collar sends a signal to crews that then investigate the cause of mortality.
- The project has revealed adult cow survival from 2012-2016 was above 85%. Of those mortalities, about 23% appear to be related to infectious diseases or other health challenges such as poor body condition.
- The most recent data showed cow survival from 2016/17 at 90%, slightly higher than what is normally required for a stable population (i.e. 85%).
- The current research project was expanded in winter 2016-17 by collaring 20 eight month-old calves. This is the first time moose calves have been collared in the province.
- These calves experienced substantial mortalities (11 or 55%), all between March 26 and April 30, 2017. Mortalities were caused by predation (5), health-related causes (5) (e.g. starvation, high parasite loads), and 1 motor vehicle collision.
- This data is improving our understanding of the timing of moose calf deaths since they are typically inventoried in January and February and previously assumed to survive the next few months into their second year. While informative, calf survival data is very preliminary and additional information is needed.
- For more information about the Moose Research project consult the following links:
 - Provincial Moose Research Project: [Research Design 2014](#)
 - Provincial Moose Research Project: [Progress Report 2015](#)
 - Provincial Moose Research Project: [Progress Report 2016](#)
 - Provincial Moose Research Project: [Progress Report 2017](#)
- An online annual moose winter tick survey initiated in 2014 is also continuing. This program uses direct observation by both scientists and the public who see moose and report their condition. The degree of hair loss reported helps indicate the prevalence and severity of tick infestations on moose, which can have a direct impact on their survival. For more information visit: www.gov.bc.ca/wildlifehealth/mooseticksurvey

Moose Enhancement:

- In October 2016, the Province announced an investment of \$1.2 million to help support moose populations.
- All projects undertaken fit within the recommendations made in “A Strategy to Help Restore Moose Populations in British Columbia” released in July 2016.
- 95% of the \$1.2 million moose enhancement funding was spent in 2016/17.

- Access management and habitat enhancement projects not completed in 2016/17 have been carried forward into 2017. \$1 million has been committed for 2017/2018 for inventory and enhancement work.

Broadening Moose Enhancement via Renewed Forestry Practices and the Cumulative Effects Framework:

- To strengthen the management of all forest values, a number of improvements were made to Forest Stewardship Plans (FSPs) in 2016 including:
 - The Province provided Ministerial and Chief Forester direction on government's expectations that forestry operations fully meet the integrated stewardship expectations. In this direction wildlife has been referenced, including moose. This includes both the prescriptive (FSP) and non-prescriptive (professional reliance) components of forest management. The Chief Forester guidance can be found at: http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/laws-and-policies/to_all_dms.pdf
 - Further clarity on governance expectation, establishing district 'letters of expectation' for FSP content and local level expectations for integrated resource management. Where here appropriate these explicitly include management expectations on moose. These letters can be found at: <http://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/policy-legislation/legislation-regulation/forest-range-practices-act>
 - The Province approves FSPs before any logging or logging-related activity occurs. In March 2017, the Province issued guidance that stated FSPs should be thoroughly updated to reflect current management issues across the province, including issues of habitat management. The Delegated Decision Makers are using this, and the above, in their determination processes.
- The Ministry develops specific planting guidance for the management of non-timber values; there is work underway to develop forestry replanting direction (stocking standards) tailored to also support moose habitat creation. This will include the options for the planting of different tree species or stock age – all of which can be used to create reforested habitat that is better for moose.
- Moose habitat is also being addressed through the Forests for Tomorrow Program. While economic return is one of the primary focuses, the program must also be delivered with an integrated resource management lens. Once key areas for moose management/recovery are identified, Forests for Tomorrow projects can include moose-enhancement components such as:

- Targeted Forest Service road deactivation and access management.
 - Changes in brushing to enable growth/retention of cover/forage.
 - Planting quick-growing species along roadsides.
 - Not planting wetter areas, and letting them regenerate with species such as willow.
- Through the Forest and Range Evaluation Program the ministry is building a moose protocol to evaluate site-level assessment of habitat, post-harvest. This information will be used to inform forestry practice improvements, and monitoring of overall trends in habitat characteristics. The moose protocol is in the final design stage and will undergo stakeholder review shortly. The intention is for the protocol to be included in the ministry's field sampling for natural resource districts, starting in 2018. Likely, it will be applied to targeted areas, where moose populations have been identified as a concern.
 - The ministry is leading the development of Natural Resource Monitoring and Assessment Reports, which compile the best available information on the specific values for a geographic area. These reports incorporate FREP data (above) along with Cumulative Effects Framework assessment information, as well as additional information for other priority wildlife. Information on moose populations and trends is becoming a standard component included in the Natural Resource Monitoring and Assessment reports. These reports are collating information for both moose populations and habitat trends which are core considerations for resource management decision makers.

Moose Inventory:

In 2016/17 there were 23 population surveys conducted in six regions. The current (2017) moose population estimate for B.C. is 120,000 to 205,000.

http://www.env.gov.bc.ca/fw/wildlife/management-issues/docs/2014_Provincial%20Ungulate%20Numbers%20Oct%2030_Final.pdf

Some surveys analyzed the estimated population size and density of moose on the landscape while others were done to determine the composition of the moose population (a key indicator in determining population trends). For a regional breakdown of the most recent inventory results, see below.

Region by Region Analysis

The following is a region-specific breakdown of this year's survey work. Note that bull-to-cow ratio of 30 bulls for every 100 cows is considered desirable; although in areas where moose densities are low (typically in the far north), the ratio should be 50 bulls for every 100 cows. A ratio of 25 to 30 calves for every 100 cows is considered a good calf-to-cow ratio for stable populations, but should be higher if increasing populations are desired, since calves are

counted in winter and suffer additional mortality throughout the spring and summer.

Both types of ratios are used by wildlife managers as indicators of population trends.

Peace Region:

- Two surveys were conducted in the South Peace Game Management Zone (GMZ) (Management Units 7-20 and 7-22). Overall, populations in the South Peace GMZ appear to be increasing, based on population increase since previous surveys and demographic parameters.
- MU 7-20 saw a population increase of 53% since 1998, with moose appearing to be thriving in the agricultural areas within this Management Unit.
- Both bull-to-cow and cow-to-calf ratios are healthy for both Management Units, and therefore are indicative of stable or growing populations. The bull-to-cow ratios of 29:100 in MU 7-20 and 45:100 in MU 7-22 are near or above provincial management targets. Calf-to-cow ratio is also indicative of growing populations (35:100 in MU 7-20 and 38:100 in MU 7-22).
- Populations in the Northeast Rockies GMZ appear to be declining, likely due to poor calf survival and recruitment. Surveys were conducted in Management Units 7-57 and 7-58 revealing relatively low moose densities. Similar densities in neighbouring MU 7-42 in 2015 indicated a 74% population decline compared against the late 1990s. Observed cow-to-calf ratios were also low (7:100 in 7-57 and 14:100 in 7-58).
- Given the different conditions in the Northeast Rockies as compared to other areas of moose decline, additional study is warranted. Predation appears to be limiting moose population growth in this area.

Omineca Region:

- Two inventories were conducted in winter 2016/17: one in the southern Omineca (Prince George East, Prince George West and Fort St. James areas), and one in the central Omineca (around the Nation and Omineca River).
- Populations around Prince George have continued to decline from highs of 1.35 moose/km² in 2005, to between 0.40/km² to 0.46/km² in 2016. In the Fort St. James area, declines have gone from 0.77 moose per km² in 2011 down to 0.47/km² in 2016.
- Populations in the central Omineca have also declined, but the data should be viewed with caution due to low snow levels that may have moved moose down into the low to mid-level elevation survey areas. In the Omineca River valley (a key over-wintering area) moose densities declined from 3.43 moose/km² (2005) to 0.35/km² in 2016. However, the larger inventory in the central Omineca shows declines from 0.30 moose per km² to 0.21/km² over the same time frame.
- There are two study areas from the Provincial Moose Research Project in the Omineca: Prince George South and the John Prince Research Forest (near Fort St. James). Based on March surveys of collared cows, both areas had calf to cow ratios of 40 calves per 100 cows. However, by May, calf numbers in Prince George south had declined by 50 per cent. This finding is consistent with other regions. While we cannot confirm the calves are dead as opposed to being separated from their mother, it is unlikely that pair bonds would have been broken in early May.

Skeena Region:

- Surveys were conducted in the Nass, Bulkley Valley/Lakes District and Entiako areas.
- Preliminary results from the Nass survey suggest a population estimate double that of a 2011 survey, showing recovery since the initial report of declines in 2007. Bull ratios are high (77 bulls to 100 cows) as are calf ratios (44 calves to 100 cows) at the time of the survey.
- In the Bulkley Valley/Lakes District poor snow conditions in 2017 did not allow for a full survey as planned, but a composition survey was completed measuring population ratios. Preliminary results suggest that bull-to-cow ratios were unchanged since 2012 at 35 bulls to 100 cows. Calf ratios decreased from 38 calves per 100 cows in 2012 to 21 calves per 100 cows in 2017. A full survey is planned for the winter of 2017/18 to obtain a population estimate and further assess trends.
- In the Entiako, calf survival was measured based on assessing radio-collared cow moose, revealing a ratio of 9 calves per 100 cows (3 calves for the 35 total collared cows). This calf ratio was lower than ratios observed in the 2016 Entiako survey and the 2013 Tweedsmuir-Entiako Survey. The calf survey is part of the larger moose research project that will help inform future management efforts.

Cariboo:

- In the Cariboo, surveys were conducted in five Management Units with mixed results.
- In Alexis Creek (MU 5-13A), moose densities were down 30% compared to the previous survey conducted in 2003, which was consistent with declines in neighbouring areas surveyed over the past 2-5 years. The bull-to-cow ratios were adequate at 39 bulls per 100 cows, but the calf-to-cow ratio was low, at only 14 calves per 100 cows at the time of the survey.
- In Big Creek (MU 5-04), the estimated moose density increased over 50% from when last surveyed in 2012, although 2012 survey conditions were considered poor and the percentage increase should be interpreted with caution. Estimated bull-to-cow ratio was 45 bulls per 100 cows and estimated calf-to-cow ratio was 30 calves per 100 cows, which were both considered adequate.
- Composition surveys conducted in MUs 5-12A, 5-13B and 5-13C (North Chilcotin) found bull/cow ratios ranging from 33 to 56 bulls per 100 cows and calf/cow ratios ranging from 21 to 30 calves per 100 cows at the time of the survey.
- Overall, bull-to-cow ratios in the Cariboo are consistently above provincial minimum targets, with some sign of population recovery in the South Chilcotin.
- However, calf-to-cow ratios in several Chilcotin MUs are lower than required to maintain stable populations, and will require future monitoring.
- Surveys of the Nazko area of the North Chilcotin are planned for this coming winter to better understand status and trends in North Chilcotin moose populations.

Thompson:

- Surveys were conducted in five Management Units (3-20, 3-27, 3-29, 3-30A, 3-30B, and 3-31) during the winter of 2016/17.
- Densities in 3-31 (east of the Fraser and northwest of Clinton) were found to be largely stable from the early 2000s, with bull ratios having declined to 32 bulls per 100 cows. Calf ratios are at 32 calves per 100 cows, which under ordinary circumstances would be considered stable, but low against historic norms for the area and for the purposes of growing moose populations.
- Densities in 3-30A (south of the Bonaparte River) have declined by 15-25% since the 1990s, bull ratios have declined and were below objectives (23 bulls to 100 cows) and calf ratios are considered stable but low for the purposes of growing moose populations (26 calves to 100 cows).
- Composition surveys in 3-20 (south of Kamloops), 3-29 and 3-30B (north of Cache Creek and Kamloops) indicated bull ratios below objectives (20-21 bulls per 100 cows). Bull ratios in 3-27 (northeast of Kamloops) slightly exceeded objectives (34 bulls/100 cows). Calf ratios were considered low in all areas (18-27 calves/100 cows).

Okanagan:

- Surveys were conducted in six Management Units throughout the Okanagan (MUs 8-01, 8-03, 8-04, 8-05, 8-08, 8-09, and 8-11).
- In the four MUs representing the southern portion of the Okanagan GMZ (MUs 8-01, 8-08, 8-09, and 8-11), results showed overall increases relative to previous surveys with respect to bull-to-cow ratios.
- Both 8-08 and 8-11 on the western side of the Okanagan Valley met provincial management objectives of 30 bulls per 100 cows. However, the surveys reaffirmed the low bull ratios documented in the 2014 survey of 8-01 and 2013 survey of 8-09 (southeast of Okanagan Lake). Calf ratios varied from 19 to 39 calves per 100 cows with a low in 8-09 and high in 8-08 at the time of the survey.
- Despite localized challenges in the Okanagan GMZ, the overall bull ratio of 39 bulls per 100 cows is above the recommended ratio for the Okanagan.
- Surveys in the southwest part of the region (MUs 8-04, [including 8-03 which has only a limited amount of moose habitat] and 8-05) had never been conducted before and resulted in population estimates of 150 and 327 moose respectively with calf ratios of 28-29 calves per 100 cows. This estimate was similar to pre-survey estimates for MU 8-04 and more than double pre-survey estimates for MU 8-05.

Kootenays:

- Surveys conducted in the Flathead area (MU 4-01) found moose populations to be stable since the last survey in 2007, with high calf-to-cow ratios (51 calves per 100 cows). Five sets of twins were seen during the survey indicating good early winter calf survival.
- The bull-to-cow ratio was 37 bulls per 100 cows, which is lower than estimated in 2007 (84 bulls per 100 cows).

Outreach:

- Ministry staff continues to communicate closely with First Nations and regional and provincial wildlife stakeholders on program delivery and status of the moose enhancement program and research.
- In addition to significant in-house expertise, the Province also works collaboratively with universities to improve science information to guide moose management.
- The Province also commissioned a series of short films on wildlife survey methods and the results of some recent wildlife surveys. This is part of an ongoing effort to find innovative ways of sharing the information we collect with the public. Videos include:
 - How we count moose (<https://www.youtube.com/watch?v=tMOIK2jwzN0>)
 - What we do with survey data
<https://www.youtube.com/watch?v=p8FdBM6OLUs>
 - Alsek moose survey results (Skeena region):
<https://www.youtube.com/watch?v=6HphraH1haA>
 - Peace region survey results: <https://www.youtube.com/watch?v=O68o2R5mF2E>

Previous Moose Fact Sheets:

- 2014 Moose Fact Sheet: http://www.env.gov.bc.ca/fw/wildlife/management-issues/docs/factsheet_provincial_moose_population_june2014.pdf
- 2013 Moose Fact Sheet: http://www.env.gov.bc.ca/fw/wildlife/management-issues/docs/factsheet_provincial_moose_population_april2013.pdf
- 2012 Moose Fact Sheet: http://www.env.gov.bc.ca/fw/wildlife/management-issues/docs/factsheet_provincial_moose_population_may2012.pdf

Contact: Media Relations
Ministry of Forests, Lands, Natural
Resource
Operations and Rural Development
250 356-7506