March 2025 Mulchatna Caribou IM
Status & Information
Submitted by ADF&G

Under its statutory intensive management (IM) directives, the board identified Mulchatna caribou as important for human consumption and adopted harvest and population objectives (AS 16.05.255(e); 5 AAC 92.108). An intensive management program was authorized in 2011 (5 AAC 92.111(c)).

Intensive Management

Since 2023, the Alaska Department of Fish and Game (department) has removed 175 brown bears, 5 black bears, and 19 wolves from localized areas defined by where the western Mulchatna caribou herd (WMCH) is calving and where the bear and wolf take by the public has remained relatively low. In 2023, 94 bears were removed (82/1,000 mi^2) from a 1,200 mi^2 area; and in 2024, 81 brown bears (152/1,000 mi^2) were removed from a 530 mi^2 area representing an 80% and 147% reduction, respectively, based on the plausible, yet conservative, estimate of 103 brown bears per 1,000 mi^2 (Walsh et al. 2010). Removal activities only occurred in the WMCH calving area.

At the 2022 Central and Southwest Alaska Board of Game (board) meeting in Wasilla, a precise numerical reduction level was not specified for predators; and therefore was not included in the Intensive Management Plan (5 AAC 92.111I(2) (D)): "the bear population objective for the MCH [Mulchatna caribou herd] Predation Management Area is to annually reduce the number of bears in the predator control areas to a level that results in increased calf survival and recruitment." The objective for bear control in the IM Operational Plan was to "remove all bears within the Bear Predation Control Area" (ADF&G 2023a:18), defined by the western calving area. The WMCH calving area in 2023 where departmental removal occurred is 1,200 mi^2 which is only 1.8% of affected subunits (Units 17B, 18, and 19B; 63,620 mi^2); and at 530 mi^2 in 2024 composed only 0.08% of the affected units which are remote and intact.

The department has a responsibility to ensure the sustainable management of both bears and caribou. Removing all bears within a small proportion of lands where harvest rates are low is sustainable, because the vast majority of the bear population is conserved within the much larger refugia that is the nontreatment area where removals do not occur. This is true for both the broader affected areas (Units 17B, 18, and 19B) as well as at the individual subunit scale. Previous IM programs have demonstrated bears' ability to repopulate removal areas over time and the department expects bear densities to return to pretreatment levels within 3–5 years. Despite the number of bears that were removed, the department did not observe less bears in the much smaller removal area in 2024. The removal rate of bears in 2024, which was 1.5 times greater rate from the previously described estimated bear density, is clear evidence that additional brown bears have been temporarily immigrating to the calving grounds from surrounding areas with potentially higher bear densities (e.g., Togiak National Wildlife Refuge) where predation control does not occur. These areas serve as considerable refugia for predators from predator removal. For example, Togiak National Wildlife Refuge (NWR; Units 17 and 18) and Yukon Delta NWR (portion of area south of the Yukon River in Unit 18) provide a combined 15,916 mi^2 of refugia where departmental bear removals cannot occur.

Caribou Response

Young female Mulchatna caribou have a moderately high parturition rate despite serum antibodies indicating continued exposure to *Brucella* in the WMCH and low calf recruitment to 5-months-of-age prior to department predator removals. Low female calf recruitment to breeding age during and after the lower adult female survival of 2016 and 2017 may have shifted the female segment to an older age structure where senescing individuals are inadequately replaced by young females (Paragi and Landsiedel 2024). Ongoing and future nutritional, disease, and habitat research will complement the understanding of the relationship between caribou nutrition and parturition rate, and how climate change may be affecting habitat suitability for caribou in the MCH range (Paragi and Landsiedel 2024).

Fall composition surveys completed in October of 2023 and 2024 following predator removal indicated calf-to-cow ratios of 44:100 and 54:100, respectively, which is indicative of a significant positive response to the department's predator removals in both years for increased early calf survival in the western group (*n* = 1,840 caribou classified). This is the highest ratio for western Mulchatna caribou since data collection began in 1999 (average ratio 1999–2022 = 24:100; Landsiedel and Lichwa 2023, Landsiedel and Lichwa 2024). In comparison, 2023 surveys in the eastern group (*n* = 1,808) indicated calf-to-cow ratios of 32:100, with the average calf-to-cow ratio at 25:100 during 1999–2022. Survival probabilities for WMCH neonate calves in 2024 were 0.51 (95% confidence interval [CI] = 0.35–0.75) through October, and 0.44 (95% CI = 0.29–0.66) through mid-March. These probabilities of survival for WMCH are higher than what has been reported at approximately 6 months of life (October–November) and at 10–11 months or one-year of life in the Fortymile (<50% & 31%; ADF&G), Western Arctic (37% to March, ADF&G), Chisana (37% and 25%; Adams et al. 2019), and Delta (40% and 30%, Valkenburg et al. 2004) caribou herds. It is too soon to confirm whether the increase in summer calf survival for the western Mulchatna caribou herd will lead to increased survival to breeding age; however, the department will be monitoring survival and recruitment. There has been an increase in the Mulchatna caribou population (Landsiedel and Paragi 2024) from 12,112 ± 702 caribou in 2022 to 14,846 ± 619 caribou in 2024. This represents an increase of 10% per year, which likely would not have been achieved without a reduction in bear predation and the resulting increase in calf survival.

Brucella exposure and cases of disease have been present in MCH since at least 2015. No *Brucella* bacteria or disease was detected in necropsied calves sampled in 2024, although positive antibody titers were detected in 20% of 10-month-old females in the WMCH indicating environmental exposure. However, the department did not detect an effect of *Brucella* seropositivity on pregnancy outcomes, although the 2 nonpregnant females in our study were seropositive for *Brucella*. Evidence from October 2023 Mulchatna caribou herd captures did not support the expected negative impact of a *Brucella suis biovar 4* outbreak on reproduction as a large proportion of seropositive females were lactating (*n* = 10/15) and similar numbers of seronegative females were lactating (*n* = 19) and nonlactating (*n* = 21; K. Denryter, J. Crouse, and J. Landsiedel, unpublished data).

While predation was not likely a cause of the initial MCH population decline, predation does appear to be an important factor in limiting caribou herd growth at the current low MCH population size. Research case

studies have shown that improving the survival of multiple, successive ungulate calf cohorts can allow population growth in the absence of multiple severe winters and disease (Gasaway et al. 1983, National Research Council 1997, Hayes et al. 2003). Sufficiently reducing the abundance of relevant predators (those affecting calf and adult survival of healthy caribou) for ≥2 years may stimulate modest growth of MCH during a prey-harvest closure. In other words, passive management (i.e., without predation control) would likely require a continued harvest closure for several years to promote herd recovery. A short-term goal is to resume a limited subsistence harvest of bull caribou as progress toward reaching the amounts reasonably necessary for subsistence (ANS). Improved calf survival and herd growth are metrics for when to suspend predator control (5 AAC 92.111; Alaska Department of Fish and Game 2023a). If MCH shows continued growth potential after modest recovery (e.g., meeting the lower IM objective), then female harvest can be used to meet subsistence needs while slowing or stopping herd growth to reduce forage competition.

Background

The Mulchatna herd grew approximately 17% annually during 1981–1996, which at the time was the highest sustained rate of increase of any caribou herd in Alaska in more than 50 years (Valkenburg et al. 2016). This herd likely exceeded 190,000 caribou at its peak in 1997. By 2008 the herd had experienced a dramatic and precipitous decline to about 20,000 caribou. Based on limited data on nutritional condition and range observations, the department determined that its 1990s peak herd size was unsustainable. The July 2024 population survey estimated the total herd abundance at 14,846 ± 619 caribou, with 7,393 ± 320 in the Eastern Mulchatna caribou herd (EMCH) and 7,453 ± 530 in the western Mulchatna caribou herd (Lichwa and Landsiedel 2024).

The department's original recommendation to reduce predator abundance was based in part on modeling of caribou demographics and was provided to the Alaska Board of Game (BOG) at the March 2007 meeting. This model demonstrated that a few years of exceptionally large female cohorts had negative impacts on calf production and its influence would likely impact population dynamics in the following years, which is why an IM program was not initiated at that time. After several more years, department research from 2011–2014 and 2017–2021 documented that calf mortality was largely driven by predation (90%) most of which was attributed to bears (46%) and wolves (22%; ADF&G 2022).

Only a few communities exist near the Mulchatna calving ranges (east and west). As a result, there has been a sporadic take of wolves and bears by public hunters and trappers. In addition, there has been an irregular distribution of take through public control efforts (same day airborne [SDA]) under the MCH intensive management program. The remoteness of the area and lack of consistent wolf tracking conditions have also led to minimal SDA participation and take. Between 2011 and 2022, wolf removal efforts in Units 17B and 17C were not of a level consistent enough to have significant impact on wolf predation or resulting calf or adult survival (National Research Council 1997:184). Removal remained well-below the ≥55% reduction threshold associated with prey numeric response (National Research Council 1997:184) despite expansion of the control area in regulatory year 2017 (RY17; begins 1 July and ends 30 June the following calendar year).

Mulchatna caribou continued to decline despite public control efforts and productive parturition rates. By fall 2021 (RY21) caribou harvest was closed entirely to residents under both federal subsistence and state hunts. In RY22 the wolf control area was expanded northwest and southeast to include the recent calving range of the western group (upper Kisaralik and Eek drainages, Unit 18 and upper Aniak and Holitna drainages, and Unit 19B) and the winter range of the eastern group (Kvichak drainage, Unit 9B), respectively (Paragi and Landsiedel 2024).

Mortality causes differed between eastern and western Mulchatna caribou herd (MCH) groups and shifted over time as the respective caribou calving ranges shifted, with bear predation becoming more important relative to wolves in the western group after 2014; this was somewhat opposite in the eastern group (Paragi and Landsiedel 2024).

This led the Board of Game to identify that agency predator control would be prudent for the western group in addition to SDA wolf control by public permittees to temporarily reduce relevant predator species to as low as possible on the calving grounds during the calving period. This was considered to be the best option for improving survival of calves.

While the department did not conduct a comprehensive survey of available habitat across the range of the MCH, high rates of parturition from 2-year-old and 3-year-old caribou indicated that habitat would likely be able to support increased herd sizes or densities. Our belief is supported based on traditional knowledge of local residents who have testified that habitat could support increased densities of caribou.

Wolves

It has been difficult to enumerate wolf densities despite efforts prior to the implementation of wolf control and again prior to expansion in the MCH. Previous efforts were impacted by limited successful collaring of wolves and the harvest of those that were collared. Wolf density in fall 2007 was approximated as 28–32 wolves/1,000 mi^2 in Unit 17B, and 25–34 wolves/1,000 mi^2 in Unit 17C based on harvest data, incidental observations, and trapper questionnaires (Woolington 2009; see also 2011 IM Plan, 5 AAC 92.125(o), Register 198). The IM Operational Plan (ADF&G 2023a:12) described wolf density in late winter from intensive aerial surveys (February–March 2012) and radiocollaring 5 packs (2016). In both years densities ranged from approximately 5.5–7.5 wolves/1,000 mi^2; however, these were underestimates due to poor survey conditions in 2012 (ADF&G 2023a:12) and legal public take of collared wolves in 2017 (ADF&G 2023b:9) that hindered mapping of pack territories. These density estimates are low compared with other wolf populations in caribou-moose systems of Alaska with comparable prey biomass (Keith 1983, Fuller et al. 2003, Adams et al. 2008). The removal of 77 wolves from Units 17B and 17C over the RY07 winter corresponds to 20–29 wolves/1,000 mi^2 in spring from a pretreatment fall density of 25–34 wolves/1,000 mi^2, without corrections for natural mortality or emigration (potentially biased high) or immigration (Paragi and Landsiedel 2024). Removal of 94 wolves from Units 17B and 17C in RY11 corresponds to a 21–30% reduction, and a removal of 65 wolves in RY17 corresponds to a 14–20% reduction. Both these reduction estimates, even if biased low, are far below the ≥55% reduction threshold associated with prey numeric response (National Research Council 1997:184). Other years of wolf removal during RY12–RY22 were far lower.

Without a robust precontrol estimate, the level of wolf reduction (the sum of wolves removed under control efforts and harvest) has been somewhat uncertain (Paragi and Landsiedel 2024). However, considering known information and a spatial mismatch between the MCH calving grounds and where the bulk of wolf removals occurred by harvest and control, these efforts have likely been insufficient to reduce predation adequately to stimulate prey population growth.

Bears

The department assessed the sustainability of removing all bears on the WMCH calving grounds by considering the general status of the affected bear population (Units 17B, 18, and 19B) and the proportion of the population that may be impacted by the removal. Multiple lines of evidence indicate that the status of the affected bear population is robust. Bear harvest is relatively low, the age of brown bear harvest has remained stable, and hunters report seeing numerous bears on the landscape. Advisory Committees within the region consistently indicate that bear populations are robust, and the committees regularly share concerns about the impacts of the abundant bear population on caribou and moose populations. There have been no climatic or other events that we are aware of that would be anticipated to decrease bear abundance, and in fact sockeye salmon returns, which are important to bear productivity in the region, have been particularly high in the last decade. In addition, ADF&G biologists and others have continued to see ample numbers of bears in the region, including on the calving grounds after removals.

Removing all bears on the WMCH calving grounds only affects a small proportion of the affected bear population. The calving grounds are a small proportion of the area over which the affected bear population occurs. In 2023, departmental removal occurred over 1,200 mi^2 which is only 1.8% of affected subunits (Units 17B, 18, and 19B; 63,620 mi^2), and in 2024, department removal only occurred within 530 mi^2 (0.08% of the affected units). In 2023, the largest amount of area where removals occurred was in Unit 17B, which was still a small proportion of the total area of 17B (6.14%). The majority of the bear population occurs outside of the removal area in the affected subunits, even after considering that bears are not distributed evenly across the landscape and likely congregate to some degree on the calving grounds. Most of the affected bear population is conserved within the much larger refugia that is the nontreatment area where removals do not occur. Given the ample area not affected by department bear removals, large effects on the overall bear population are highly unlikely, and any minor effects are likely to be of short duration.

Based on the indicators of the affected bear population being robust and the removals only affecting a small proportion of the affected bear population, the department has determined that removing all bears from the WMCH calving grounds has been and will continue to be sustainable.

To understand pretreatment bear density for the 2023 removal effort, the department considered 2 previous abundance estimates for brown bears in overlapping portions of Unit 17 that included use of radio collars to develop a correction factor for bears not seen during intensive aerial surveys. Van Daele et al. (2001) reported a minimum density of 47 adult brown bears/1,000 mi^2 from a 1993 survey but speculated that the actual density might have been double the minimum estimate. Walsh et al. (2010) estimated 70 independent brown bears/1,000 mi^2 (95% confidence interval [CI] = 55–88) or 103 brown bears/1,000 mi^2 (95% CI = 80–140) from a 2003–2004 survey. The latter survey area overlapped but was much larger than

the 1993 survey area, and it was immediately adjacent to the southern edge of both the 2023 and 2024 core calving grounds and removal area for the western group.

Walsh et al. (2010:48) described the impetus for the 2005 survey:

> *In recent years, concerns have been regularly voiced during local village meetings, Alaska Department of Fish and Game (ADF&G) meetings, and Federal Subsistence Regional Advisory Council meetings that brown bear populations are increasing, and this increase has adversely affected wildlife populations targeted by subsistence hunters. The lack of quantitative information on bear abundance has prevented resource managers from adequately addressing these concerns.*

The average annual public harvest by hunters across the WMCH calving grounds of 15 bears equates to 2.3 bears per 1,000 mi^2 within the 6 harvest reporting areas (6,476 mi^2) including or intersecting the 2 predator control search areas, where these 6 harvest reporting areas combined would presumably contain 695 brown bears (103 bears per 1,000 mi^2; Paragi and Landsiedel 2024). This harvest from an estimated 695 brown bears is an approximate 2.2% harvest rate. Miller (1993) reviewed research from multiple areas of Alaska and conservatively judged 5% of the population as a sustainable harvest rate for brown bears but was later corrected to 5% of the female portion of the population. Further, a study conducted in Canada described sustainable harvest rates of 4–10% of the estimated population (Mclellan et al. 2016). More recent estimates in less productive (smaller salmon returns) areas of Alaska estimated that up to 7.7% of the bear population may be sustainable (Schmidt et al. 2021). Although more recent estimates of sustainable yield for brown bears are substantially higher (Brockman et al. 2020).

Bear mortality since 1999 (the MCH population decline) represents 7–8% annually which falls within or under previously published sustainable harvest limits including department control efforts. The long-term average estimated harvest rate is 5% but bear densities may have changed over that duration. The proportion of females within the harvest over the assessment area of WMCH represents an average of 39% (range 29–47).

The department is not aware of any research on the effectiveness of predator reduction where brown bears are the primary predators of caribou calves; however, Ballard and Miller (1990) documented that a 60% minimum brown bear reduction (nonlethal, 1 year) had positive effects on moose calf survival in Unit 13E at a density of 1.8 moose per mi^2. In contrast, a subsequent 36% reduction in brown bears through elevated harvest over a 7-year period did not produce an increase in moose abundance.

Research beginning in 2011 on the 2 MCH subgroups (ADF&G 2022) identified 89% of mortality during the first 2 weeks of life as predation, with 46% from bears. The level of nonpredation perinatal mortality in MCH (11%) was similar to that of the Fortymile caribou herd during a period of increase (9% over 6 years, n = 353; Boertje et al. 2017:435–436).

References Cited

Adams, L. G., R. Farnell, M. P. Oakley, T. S. Jung, L. L. Larocque, G. M. Lortie, J. Mclelland, M. E. Reid, G. H. Roffler, and D. E. Russell. 2019. Evaluation of maternal penning to improve calf survival in the Chisana caribou herd. Wildlife Monographs 204: 5-46. https://doi.org/10.1002/wmon.1044

Alaska Department of Fish and Game. 2022. Mulchatna caribou herd overview. Presentation to the Alaska Board of Game. RC4: Department Reports & Recommendations, Tab 1.4, Central & Southwest Region Meeting: January 21–29, 2022, Wasilla. https://www.adfg.alaska.gov/static/regulations/regprocess/gameboard/pdfs/2021-2022/csw/rc4_tab1.4_mch_overview.pdf

Alaska Department of Fish and Game. 2023a. Operational plan for intensive management of caribou (*Rangifer tarandus*) in Game Management Units 9B, 17, 18, 19A & 19B during regulatory years 2022–2028. Division of Wildlife Conservation, Juneau.

Alaska Department of Fish and Game. 2023b. Annual report to the Alaska Board of Game on intensive management for caribou with wolf predation control in Game Management Units 9B, 17B&C, and 19A&B, the Mulchatna caribou herd. Division of Wildlife Conservation, Juneau.

Ballard, W. B., and S. D. Miller. 1990. Effects of reducing brown bear density on moose calf survival in Southcentral Alaska. Alces 26:9–13.

Boertje, R. D., C. L. Gardner, M. M. Ellis, T. W. Bentzen, and J. A. Gross. 2017. Demography of an increasing caribou herd with restricted wolf control. Journal of Wildlife Management 83:429–448.

Brockman, C. J., W. B. Collins, J. M. Welker, D. E. Spalinger, and B. W. Dale. 2017. Determining kill rates of ungulate calves by brown bears using neck-mounted cameras. Wildlife Society Bulletin 41:88–97.

Brockman, C., M. R. Guttery, B. W. Dale, R. A. Schwanke, R. W. Tobey, and E. N. Koons. 2020. Effect of harvest on a brown bear population in Alaska. Journal of Wildlife Management. https://doi.org/10.1002/jwmg.21861

Gasaway, W. C., R. O. Stephenson, J. L. Davis, P. E. K. Shepherd, and O. E. Burris. 1983. Interrelationships of wolves, prey, and man in Interior Alaska. Wildlife Monographs No. 84.

Hayes, R. D., R. Farnell, R. M. Ward, J. Carey, M. Dehn, G. W. Kuzyk, A. M. Baer, C. L. Gardner, and M. O'Donoghue. 2003. Experimental reduction of wolves in the Yukon: Ungulate responses and management implications. Wildlife Monographs No. 152.

Landsiedel, John H., and E. Lichwa. 2023. (October 23). 2023 fall MCH composition survey [Memo]. Alaska Department of Fish and Game. https://www.adfg.alaska.gov/static/applications/web/nocache/research/programs/intensivemanagement/pdfs/2023_fall_mch_composition_calf_survival.pdf42C31C9E13B1D863170ABB652C21F9CA/2023_fall_mch_composition_calf_survival.pdf

Landsiedel, John H., and E. Lichwa. 2024. (December 18). 2024 fall MCH composition and calf survival [Memo]. Alaska Department of Fish and Game.

https://www.adfg.alaska.gov/static/applications/web/nocache/research/programs/intensivemanagement/pdfs/2024_fall_mch_composition_calf_survival.pdfF07D94F1B62F57F9321AA66B6FA7A14E/2024_fall_mch_composition_calf_survival.pdf

Lichwa, E. and J.H. Landsiedel. 2024. (July 22). 2024 Mulchatna caribou herd photo survey [Memo]. Alaska Department of Fish and Game. https://www.adfg.alaska.gov/static/applications/web/nocache/research/programs/intensivemanagement/pdfs/2024_mulchatna_caribou_herd_photo_survey.pdfBFA2BE4B32C2CB16AC6D3BB9DB22E33A/2024_mulchatna_caribou_herd_photo_survey.pdf

McLellan, B. N., G. Mowat, T. Hamilton, and I. Hatter. 2016. Sustainability of the grizzly bear hunt in British Columbia, Canada. Journal of Wildlife Management 80: 396–413

Miller, S. D. 1993. Brown bears in Alaska: A statewide management overview. Alaska Department of Fish and Game, Division of Wildlife Conservation, Wildlife Technical Bulletin 11, Juneau.

Miller, S. D., G. C. White, R. A. Sellers, H. V. Reynolds, J. W. Schoen, K. Titus, V. G. Barnes, Jr., R. B. Smith, R. R. Nelson, W. B. Ballard, and C. C. Schwartz. 1997. Brown and black bear density estimation in Alaska using radiotelemetry and replicated mark-resight techniques. Wildlife Monograph 133:3–55.

National Research Council. 1997. Wolves, bears, and their prey in Alaska: Biological and social challenges in wildlife management. National Academy Press, Washington, D.C.

Paragi, T. F., and J. H. Landsiedel. 2024. Review of factors in public and agency predator control for Mulchatna caribou, 2012–2023. Alaska Department of Fish and Game, Wildlife Management Report ADF&G/DWC/WMR-2024-1, Juneau.

Schmidt, J. H., H. L. Robinson, L. S. Parrett, T. S. Gorn and B. S. Shults. 2021. Brown bear density and estimated harvest rates in northwestern Alaska. Journal of Wildlife Management 85(2):202 – 214.

Valkenburg, P. B., M. E. McNay, and B. W. Dale. 2004. Calf mortality and population growth in the Delta caribou herd after wolf control. Journal of Wildlife Management 32(3):746 – 756.

Valkenburg, P., B. W. Dale, J. L. Davis, M. M. Ellis, R. D. Boertje, M. A. Keech, D. D. Young Jr., R. M. Eagan, R. W. Tobey, C. L. Gardner, R. A. Sellers, L. G. Butler, J. D. Woolington, B. D. Scotton, T. H. Spraker, M. E. McNay, A. R. Aderman, and M. J. Warren. 2016. Monitoring caribou herds in Alaska, 1970–2008, with focus on the Delta caribou herd, 1979–2007. Alaska Department of Fish and Game, Wildlife Technical Bulletin ADF&G/DWC/WTB-2016-16, Juneau.

Van Daele, L. J., J. R., Morgart, M. T. Hinkes, S. D. Kovach, J. W. Denton, and R. H. Kaycon. 2001. Grizzlies, Eskimos, and biologists: Cross cultural bear management in Southwest Alaska. Ursus 12:141–152.

Walsh, P., J. Reynolds, G. Collins, B. Russell, M. Winfree, and J. Denton. 2010. Application of a double observer aerial line-transect method to estimate brown bear population density in southwestern Alaska. Journal of Fish and Wildlife Management 1:47–58.

Woolington, J. D. 2009. Unit 17 wolf management report. Pages 121–127 [*In*] P. Harper, editor. Wolf management report of survey-inventory activities 1 July 2005–30 June 2008. Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Project 14.0, Juneau.