OPERATIONAL PLAN FOR INTENSIVE MANAGEMENT OF MOOSE IN GAME MANAGEMENT UNIT 19A DURING REGULATORY YEARS 2020–2025

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DIVISION OF WILDLIFE CONSERVATION

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This operational plan has been prepared by the Alaska Department of Fish and Game (ADF&G) to provide supporting information on the intensive management (IM) plan for moose in Game Management Unit (Unit) 19A during regulatory years 2020 through 2025 (RY20–RY25; RY = 1 July–30 June, e.g., RY20 = 1 July 2020–30 June 2021). The IM plan for moose in Unit 19A is found in Title 5, Alaska Administrative Code, Section 92, Part 123 (abbreviated as 5 AAC 92.123). Based on the biological and management information for this area (Appendix A), this operational plan describes the rationale for evidence of limiting factors; choice of indices for evaluating treatment response; and decision frameworks on implementation, suspension, or termination for predation control, habitat enhancement, and prey harvest strategies. *Intensive Management Protocol* (ADF&G 2011) describes the administrative procedures and the factors and strategies in adaptive management of predator–prey–habitat systems to produce and sustain elevated harvests of caribou, deer, or moose in selected areas of Alaska. The IM plan for moose in Unit 19A was developed based on the recommendation of the Stony–Holitna Fish and Game Advisory Committee (SHAC) and at the request of the Alaska Board of Game (board).

BACKGROUND

The moose population in Unit 19A declined beginning in the early 1990s; conflicts between users intensified, and moose hunting regulations became more complicated. These conflicts led to the creation of the Central Kuskokwim Working Group, made up of representatives of multiple user groups, and the development of the Central Kuskokwim Moose Management Plan (CKMMP), which was finalized in June 2004. Currently there is a Tier II hunt (TM684) in the Lime Village Management Area (LVMA) and a Tier II hunt (TM680) downstream from and including the George River drainage and downstream from and excluding the Downey Creek drainage. The remainder of Unit 19A recently opened in RY19 under a tier I registration permit (RM682; Figure 1).

A wolf control IM plan was first adopted by the board in March 2004 for the Central Kuskokwim and consisted of Units 19A and 19B. It was approved for 5 years beginning 1 July, 2004. The board approved a predator control program and the commissioner issued public aerial shooting permits or public land and shoot permits as methods of wolf removal pursuant to AS 16.05.783. In January 2006, the board adopted a revised IM plan in the form of an emergency regulation. The emergency regulation limited control activities to Unit 19A to make it consistent with the board's previous findings that implemented wolf control in Unit 19A only. Also, the emergency regulation clarified and updated key components of the plan that included wildlife population and human use information, predator and prey population levels and objectives, plan justifications, methods and means, time frame for updates and evaluations, and miscellaneous specifications. In May 2006, the board further modified the emergency regulation and adopted it as a final regulation.

In March 2009, the board reauthorized the predation control IM plan for 5 years, from 1 July, 2009 through 30 June, 2014. This plan established the Central Kuskokwim Villages Moose Management Area (CKVMMA), generally within the drainages of the Holitna, Hoholitna, and Stony Rivers. The intent was to focus IM activities in a relatively small portion of the unit where the take of wolves was high. In western Unit 19A wolf take was low and the board did not reauthorize the issuance of permits in this area.

In March 2012, the board amended the IM plan, establishing a 3,905 mi^2 Wolf Control Focus Area (WCFA) and adding black and brown bear control within a 534 mi^2 Bear Control Focus Area (BCFA). The WCFA was the same area as the CKVMMA, and the BCFA was mostly within the WCFA.

Most recently, the board reauthorized the predation control plan in March 2014 for 6 years. This reauthorization included wolf control in the WCFA as well as the option for additional bear control within the BCFA. This plan expires June 30, 2020.
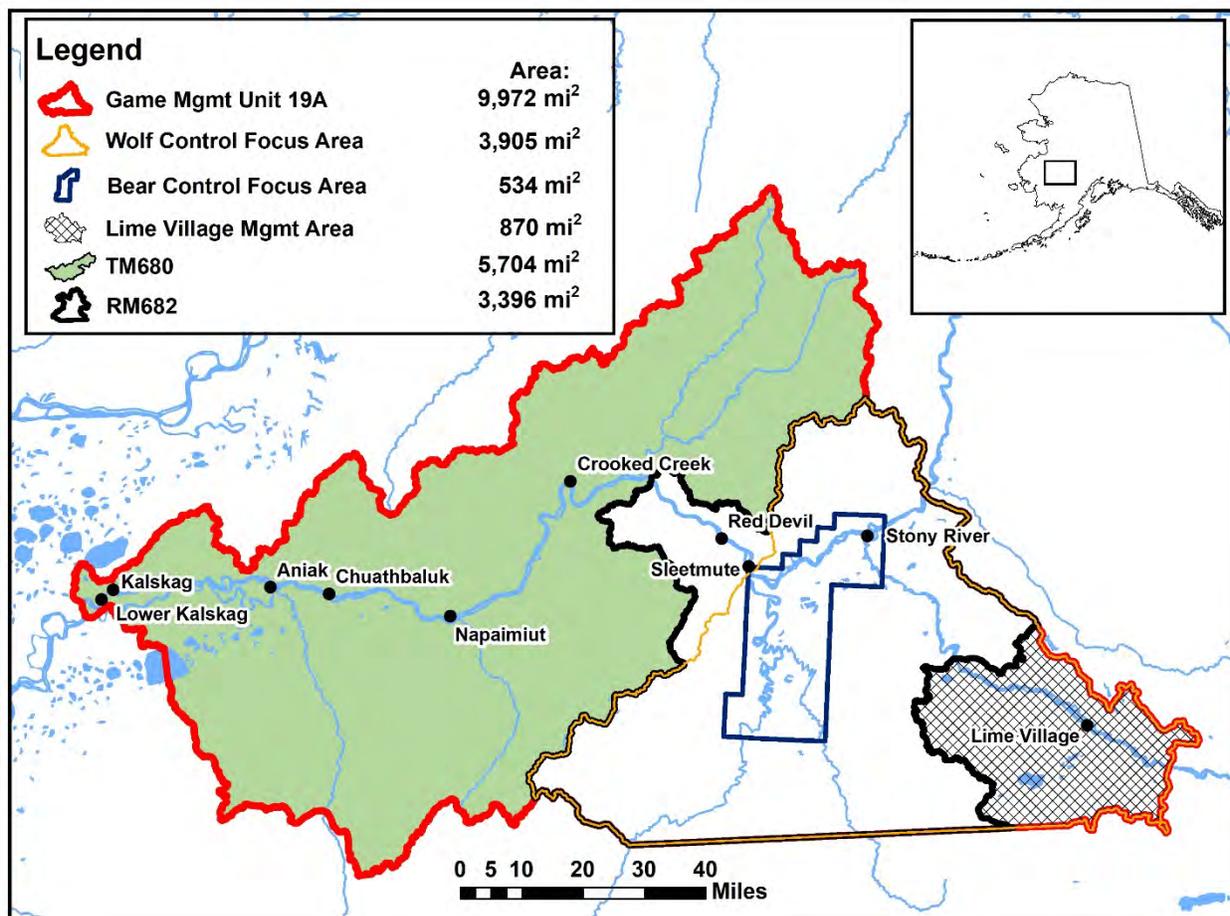

Figure 1. Unit 19A, the Wolf Control Focus Area, the Bear Control Focus Area, the Lime Village Management Area (TM684), the TM680 hunt area, and 19A remainder (in white, RM682).

In Unit 19D East, Keech et al. (2011) demonstrated in a 3-predator, 1-large prey system, substantial predator treatments within a small area was an effective way to increase moose survival and population size. Subsequent to predator removals, harvest increased and Keech stated that managers and policymakers may expect similar results from predator treatment programs elsewhere, but use less costly and less thorough study designs (Keech 2012). Rationale for this IM Operational Plan is based on that research.

ADAPTIVE MANAGEMENT FRAMEWORK

Adaptive management is a process in which programs are designed to maximize what can be learned from management actions for potential application elsewhere, not simply modifying management in light of experience (National Research Council 1997:122). Managers wishing to use the best available information for management decisions or recommendations often need to generate new information for specific field situations (National Research Council 1997:174). Any section of the following framework may be modified as new information comes to light in the study area or the scientific literature. Lack of an anticipated response may require evaluation of additional criteria or a research project to understand which additional factors may be influencing the system and whether they are feasible to manage.

I. TREATMENTS

A. *Predation Control:*

Unit 19A (9,972 mi^2) defines the population of wolves. The pre-control population was estimated in winter 2006 at 150 wolves. Wolf control may be conducted annually by issuing pilot and gunner permits to the public using aerial or land and shoot methods during November through April. Department control using aerial, land and shoot, or ground-based methods may also be conducted if public permittees are unable to achieve the control objective.

The WCFA (3,905 mi^2) defines where aerial wolf control may be conducted. The 2006 pre-control estimate within the WCFA is 75 wolves. The wolf control objective in the WCFA is to reduce wolf numbers by at least 60–80 percent of the pre-control estimate. Removing wolves only from the WCFA will ensure that wolves persist in Unit 19A.

The BCFA (534 mi^2) defines where bear control may be conducted. If conducted, control will be done using aerial, land and shoot, or ground-based methods by the department only. Bear control objectives will be to temporarily reduce black and brown bear numbers to the lowest level possible. Because the area is small relative to Unit 19A, the effect on the overall bear populations in the unit is insignificant. Meat and hides will be salvaged and distributed in Unit 19 communities.

Presently known alternatives to predator control for reducing the number of predators are ineffective, impractical, or uneconomical in the Unit 19A situation. Hunting and trapping conducted under authority of ordinary hunting and trapping seasons and bag limits is not an effective reduction technique in sparsely populated areas such as this. Relocation of wolves and bears is impractical because it is expensive, and it is very difficult to find publicly acceptable places for the relocated animals.

B. *Habitat Enhancement:*

Based on available data, habitat does not appear to be a factor limiting population growth of moose in the WCFA. The most recent twinning survey conducted by ADF&G in 2018 found a twinning rate of 65% within the BCFA. A 2006 survey of browse utilization found low

browse removal rates in Unit 19A (Paragi et al. 2008). Since habitat does not appear to be limiting at this time there are no habitat enhancement projects proposed as part of this plan.

C. *Prey Harvest:*

Twinning rates are a sensitive indicator of moose nutritional status (Boertje et al. 2009) and will be carefully monitored within the BCFA. If the 2-year average twinning rate is >20% we will continue to promote growth. At a rate of 15–20% the number will be stabilized through harvest. If the 2-year average twinning rate is <15% number of moose will be reduced through harvest. Predator control will be suspended if harvest alone is insufficient to reduce moose numbers.

II. ANTICIPATED RESPONSES TO TREATMENTS

In Unit 19D East, Keech et al. (2011) demonstrated in a 3-predator, 1-large prey system, substantial predator treatments within a small area was an effective way to increase moose survival and population size. We anticipate similar results as we continue wolf and bear control in the same area.

A. *Predator Abundance:*

An estimate using pilot interviews and harvest data estimated 20 wolves in the WCFA post-control in spring 2015. This represented an approximately 74% reduction from pre-control numbers. However, low pilot availability and poor snow conditions have hampered control efforts and wolf numbers have recovered substantially since then. By February 2019 a wolf survey in the WCFA revealed 60 wolves (15.9 wolves/1000 mi^2) which is only a 20% reduction from pre-control levels. This is in line with the expectation that wolves would recover to pre-control levels in 3–5 years in the WCFA if wolf control were suspended (National Research Council 1997:52–53).

Based on extrapolation of densities from other areas, an estimated 2,500–3,000 black bears exist in Unit 19A, including approximately 135–160 black bears within the BCFA. Based on the same extrapolations, an estimated 180–210 brown bears exist in Unit 19A, including approximately 10–15 brown bears within the BCFA. A total of 138 black bears and 15 brown bears were removed from the BCFA in 2013 and 2014. Bears in Unit 19D East surrounding McGrath recovered quickly after removal efforts in 2003 and 2004 (Keech et al. 2011) and it is anticipated bear numbers in the BCFA have recovered to pre-control levels. Finally, because the BCFA is a relatively small geographic area, removing bears from within it will have only a minor effect on the bear populations in Unit 19A overall.

B. *Predation Rate:*

Predation rates on moose in Unit 19D East were substantially reduced after combined bear and wolf control (Keech et al. 2011). Similar reductions in predation were seen in Unit 19A immediately following bear control in 2014. Annual spring twinning and fall composition

surveys will be attempted annually, as well as less frequent density estimates in the BCFA and WCFA. These data will help to further assess the intended effectiveness of the IM program.

C. *Prey Abundance:*

Moose abundance was estimated at 0.5 moose/mi^2 (2,030 moose) within the WCFA and 1.4 moose/mi^2 (728 moose) in the BCFA in March 2017. Based on the case history of bear and wolf control in Unit 19D East (Keech et al. 2011), we expect moose abundance to increase in the WCFA, but predominantly within and adjacent to the BCFA. The expected increases in abundance will be utilized and regulated in accordance with principles in part E and F.

D. *Prey Recruitment:*

Moose calf survival within the BCFA in 2013 and 2014 was 51% and 41% respectively. While we do not have pre-control data, this was likely an increase in survival. In Unit 19D which had pre-control information annual calf survival increased from an average of 30% prior to predator removals to 45% post predator treatments (Keech 2012). While we do not have annual calf survival pre-control, we have composition data which suggest a positive improvement. For the most recent 2 years preceding bear control, fall composition surveys showed an average of 37 calves:100 cows. For the most recent 2 years following bear control fall composition surveys found an average of 53 calves:100 cows.

E. *Prey Productivity or Nutritional Condition:*

Twinning rates will be monitored within the BCFA. If the 2-year average twinning rate is >20% we will continue to promote growth. When 2-year average twinning rate is 15–20% moose density will be stabilized through harvest. If 2-year average twinning rate is <15% moose density will be reduced through harvest. Predator control will be suspended if harvest alone is insufficient to reduce abundance.

F. *Harvest:*

Harvest in Unit 19A is accomplished using tier II hunts and a resident-only tier I registration permit. Bear and wolf reduction should result in an increase in harvestable surplus of moose. In the LVMA, ANS is 30–40 moose; and in Unit 19A, outside of LMVA, it is 175–225.

G. *Use of Nontreatment Comparisons:*

A similar adjacent nontreatment area is not available and no direct comparisons will be made. However, results of routine surveys in western Unit 19A and research planned in Unit 19D East will provide useful moose population size, trend, composition and mortality data for comparisons to help evaluate treatment.

H. *Other Mortality Factors:*

Deep snow years in excess of 31 inches (Keech 2012) were shown to be a factor that may lower recruitment during some years in Unit 19D East, and deep snow in some years may also be a factor in the Unit 19A WCFA as well.

III. EVALUATION CRITERIA AND STUDY DESIGN TO DOCUMENT TREATMENT RESPONSE

Adaptive management with the intent to increase harvestable surplus of prey requires evaluating the biological response and achievable harvest after treatments are implemented (Walters 1986). Evaluation will be reported to board on 1 February each year.

A. *Predator Abundance and Potential for Return to Pre-treatment Abundance:*

The pre-control wolf population in Unit 19A of 150 wolves or 15 wolves/1000 mi^2 was estimated in March 2006 based on a minimum count reconnaissance style wolf survey within the unit (Stephenson 1978). Pre-control estimates within the WCFA (75 wolves) were based on this estimate.

A February 2019 wolf survey in the WCFA revealed 60 wolves (15.9 wolves/1000 mi^2). Based on immigration and reproductive success, it is anticipated numbers in the WCFA will recover to pre-control levels in 3–5 years if control is suspended.

An estimated 2,500–3,000 black bears exist in Unit 19A, including approximately 135–160 bears within the BCFA. Also based on an extrapolation of densities from other areas, an estimated 180–210 brown bears exist in Unit 19A, including approximately 10–15 within the BCFA. Bears were fully recovered 6 years after bear control in Unit 19D East (Keech et al. 2012). It is anticipated that bears are fully recovered from bear reductions in the Unit 19A BCFA.

B. *Habitat and Forage Condition:*

A baseline browse survey was conducted in March 2006 (Paragi et al. 2008). While no forage assessment studies are currently scheduled for this program, studies may be conducted if we detect declines in twinning rates below 20%. Browse removal is a measure of competition for food by moose that is inversely correlated to nutritional condition (Seaton et al. 2011).

C. *Prey Abundance, Age and Sex Composition, and Nutritional Condition:*

An abundance objective of 1.0 moose/mi^2 (approximately 3,905 moose) is established within the WCFA. Achieving this objective will contribute to achieving our IM population objective of 7,600–9,300 moose in all of Unit 19A.

Density is expected to be unequal across the WCFA because of variations in habitat quality and past focused management of bear predation in the BCFA. We will continue to assess moose abundance in the WCFA as the primary response metric with Geospatial Population Estimator (GSPE) surveys conducted in late winter. We intend to estimate a sightability correction factor

(SCF) with each GSPE using radiomarked moose (Gasaway et al. 1986) or other appropriate techniques. We will design a survey that includes a high proportion of sample units in the BCFA, but also includes sampling of GSPE cells in the WCFA.

We will assess composition data in November within the BCFA. The nutritional condition of moose will be primarily monitored through twinning rates using radiocollared and non-collared females observed annually during late May surveys, also within the BCFA. The twinning rate will be calculated as the proportion of cows with twins or triplets from the sample of all cows with calves.

D. *Prey Harvest:*

The IM harvest objective for Unit 19A is 400–550 moose. Hunter access is limited over much of the unit, therefore the IM harvest objective may not achievable. However, moose harvest within the BCFA and WCFA will contribute to the overall Unit 19A IM harvest objective.

IV. DECISION FRAMEWORK TO IMPLEMENT OR SUSPEND A TREATMENT

A. *Predation Control:*

1. Prey Abundance.

The decision-making framework to initiate or suspend predator control will be based upon estimates of moose density in the WCFA and BCFA, and moose twinning rates in the BCFA.

The density objective for the WCFA is 1.0 moose/mi^2 (approximately 3,905 moose). If a moose GSPE point estimate is higher than the objective, wolf control may continue or be suspended after considering harvest and other biological factors such as twinning rates. If the GSPE point estimate is below the density objective wolf control may continue or be conducted if it has been suspended.

To remain proactive and ensure densities do not fall too low, a 1 to 2-year department conducted bear control effort may be conducted if a GSPE point estimate in the BCFA indicates the density is <1.2 moose/mi^2 and the 2-year average twinning rate is >20%. All GSPE surveys will be designed to achieve precision of at least $\pm$20% at the 90% confidence interval, but actual precision will vary with survey conditions and funding.

Twinning rates are an important indicator of moose nutritional status. If the 2-year average twinning rate is >20% we will continue to promote growth. When the 2-year average twinning rate is 15–20% moose density will be stabilized through harvest. If the 2-year average twinning rate is <15% moose density will be reduced through harvest. Predator control will be suspended if harvest alone is insufficient to stabilize or reduce abundance. Utilizing twinning rates will ensures that the moose density is appropriate for the amount of food available on the landscape.

2. <u>Prey Harvest Catch Per Unit Effort (CPUE)</u>.

CPUE will not be used to trigger management actions because many factors influence the number of days it takes for hunters to harvest a moose. These include, but are not limited to weather, water levels, fuel cost, the day of the week the season opens, reporting habits, as well as moose numbers and their distribution.

B. *Habitat Enhancement:*

We will not be using any habitat indices to initiate enhancement activities during this program period.

C. *Prey Harvest Strategy:*

1. <u>Prey Harvest</u>.

There are currently 2 tier II hunts and a registration permit hunt in Unit 19A. All hunts are for residents only and all require harvest reporting.

2. <u>Prey Nutritional Index</u>.

Twinning rates are an important indicator of nutritional status in moose. We will monitor twinning within the BCFA and use 2-year average twinning rates in our decision-making framework. We will also consider any additional information available on nutrition such as calf weights, age of first reproduction, and age-specific pregnancy.

V. PUBLIC INVOLVEMENT

A. *Continued Outreach by Department:*

The department will accomplish outreach through the state fish and game advisory committee and board processes. Local advisory committees have been actively involved in moose management in Unit 19A and serve as good platforms for public education. Input from all committees will be encouraged.

B. *Continued Engagement to Confirm Criteria Chosen for Evaluating Success:*

We will continue to engage the advisory committees, board and ADF&G staff to evaluate the success of this program. One of the objectives of this operational plan is to increase moose harvest in the WCFA.

C. *Participation in Prey and Predator Harvest or Predator Control:*

Public aerial wolf control was successful in reducing wolves through the spring of 2015. Since that time low pilot availability and poor snow conditions have hampered control efforts and wolf numbers have recovered substantially. While public aerial control will continue to be the primary method of wolf reductions, the department may need to use helicopters in order to meet the objective of at least a 60–80% removal in the WCFA.

Bear removal was conducted by the department within the BCFA during May 2013 and 2014. Public bear control has not been effective in Unit 19 and if conducted in the future it will only be done by the department.

Local hunters and trappers will be encouraged to continue to harvest wolves and bears through broad seasons and bag limits.

D. *Monitoring and Mitigation of Hunting Conflict:*

Advisory committee and board processes will be used to monitor and mitigate user conflict. Communication between committees and other stakeholders will be encouraged.

VI. OTHER CONSIDERATIONS

The bear control conducted in 2013 and 2014 required considerable resources including both financial and department staff time. This will be a major consideration in the future if additional bear control efforts are necessary. Additionally, a significant hurdle to bear control activities involved gaining access to critical private lands. Without this access in the future, bear control would likely be ineffective. Finally, if public permittees are not successful in reducing wolf numbers below the objectives within the WCFA, department-conducted wolf control should be considered. As with bear control, access to private lands would be important.

LITERATURE CITED

ADF&G (ALASKA DEPARTMENT OF FISH AND GAME). 2011. Intensive management protocol. Juneau, Alaska. https://www.adfg.alaska.gov/static/research/programs/intensivemanagement/pdfs/intensive_management_protocol.pdf (Accessed 17 January 2020).

BOERTJE, R.D., M. A. Keech, D. D. Young, K. A. Kellie, and C. T. Seaton. 2009. Managing for elevated yield of moose in interior Alaska. Journal of Wildlife Management 73:314–327.

GASAWAY, W.C., S.D. DUBOIS, D.J. REED, AND S.J. HARBO. 1986. Estimating moose population parameters from aerial surveys. Biological Papers of the University of Alaska 22:1–108.

KEECH, M. A., M. S. LINDBERG, R. D. BOERTJE, P. VALKENBURG, B. D. TARAS, T. A. BOUDREAU, AND K. B. BECKMEN. 2011. Effects of predator treatments, individual traits, and environment on moose survival in Alaska. Journal of Wildlife Management 75:1361–1380.

KEECH, M.A. 2012. Response of moose and their predators to wolf reduction and short-term bear removal in a portion of Unit 19D. Alaska Department of Fish and Game, Federal Aid in Wildlife Restoration, Final Wildlife Research Report ADF&G/DWC/WRR-2012-7, Grants W-33-4 through W-33-10, Project 1.62. Fairbanks, Alaska.

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., C.T. SEATON, AND K.A. KELLIE. 2008. Identifying and evaluating techniques for wildlife habitat management in Interior Alaska: moose range assessment. Alaska Department of Fish and Game, Division of Wildlife Conservation. Final Research Technical Report. Grants W-33-4, 5, 6 & 7. Project 5.10. Juneau, Alaska.

STEPHENSON, R. O. 1978. Characteristics of exploited wolf populations. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Final Research Report. Projects W-17-3 through W-17-8. Job 14.3R. Juneau, Alaska, USA.

WALTERS, C.J. 1986. Adaptive management of renewable resources. Blackburn Press, Caldwell, New Jersey. 374 p.

APPENDIX A. Summary of supporting information for Unit 19A.

Geographic Area and Land Status	
Management area(s)	Prey abundance assessment (3,905 mi^2), prey harvest assessment (3,905 mi^2), predator abundance assessment (3,905 mi^2), predator control focus areas (wolves 3,905 mi^2 and bears 534 mi^2) – see Figure 1
Land status	Federal, State and Private
Biological and Management Situation	
Prey population	Unit 19A IM population objective: 7,600–9,300 moose Unit 19A estimate in 2017: 6,300 moose
Prey harvest (human use)	Unit 19A IM harvest objectives: 400–550 170 moose harvested in Unit 19A in 2018 Unit 19A outside of LVMA amount necessary for subsistence 175–225 LVMA amount necessary for subsistence 30–40
Feasibility of access for harvest	There are extensive native corporation lands along most of the major drainages within Unit 19A. Fuel is available in Aniak and Sleetmute, but the cost is high. There are very few trails and no roads, so access is limited to river travel. Due to these factors access is primarily limited to shareholders of local native corporations and other residents along the Kuskokwim River.
Nutritional condition	Twinning rate in BCFA was 65% in 2018.
Habitat status and enhancement potential	Browse biomass removal was 10% (95% CI: 6–18%) in 2006. Twinning rates are high, and no habitat enhancement is anticipated.
Predator(s) abundance	WCFA estimated in 2019: Wolves 60, BCFA estimated in 2005: Black bears 135–160, Grizzly bears 10–15
Predator(s) harvest	Reported harvest in the BCFA RY18: Grizzly bear 0, Black bear 0. Reported harvest in the WCFA RY18: Wolves 3

Evidence of predation effects	Keech et al. 2011 demonstrated in a 3 predator, 1 large prey system, substantial predator treatments within a small area was an effective way to increase moose survival and population size
Feasibility of predation control	Keech et al. 2011 demonstrated in a 3 predator, 1 large prey system, substantial predator treatments within a small area was an effective way to increase moose survival and population size
Other mortality	Deep snow winters