

**Interim Report to the Alaska Board of Game
on Intensive Management for Moose
with Wolf, Black Bear, and Grizzly Bear Predation
Control in Game Management Unit 19D (East)**

**Prepared by the Division of Wildlife Conservation
August 2013**



1) **Description of IM Program¹**

- A) This report is an interim evaluation for a predation control program authorized by the Alaska Board of Game (Board) under 5 AAC 92.123
- B) Month this report was submitted by the Department to the Board:
February ___ (annual report) August X (interim annual update) Year 2013
- C) Program name: Unit 19D East wolf and bear predation control program (Fig. 1)
- D) Existing program does not have an associated Operational Plan
- E) Game Management Unit(s) fully or partly included in IM program area: Unit 19D (East)
- F) IM objectives for moose population size 6000 – 8000 harvest 400 – 600
- G) Month and year the current predation control program was originally authorized by the Board: Fall 1995. Indicate date(s) if renewed: January 2000, March 2003, January 2006, May 2006, March 2009
- H) Predation control is currently active in this IM area.
- I) If active, month and year the current predation control program began: December 2003
- J) A habitat management program funded by the Department or from other sources is currently active in this IM area: No
- K) Size of IM program area (square miles) and geographic description: Unit 19D East - 8,513 mi²
- L) Size and geographic description of area for assessing ungulate abundance: Upper Kuskokwim Villages Moose Management Area (MMA) -1,118 mi²
- M) Size and geographic description of area for ungulate harvest reporting: MMA-1,118 mi²
- N) Size and geographic description of area for assessing predator abundance: Wolf Control Focus Area (WCFA)-4,484 mi²; Bear Control Focus Area (BCFA)-528 mi²
- O) Size and geographic description of predation control area: WCFA - 4,484 mi²; BCFA - 528 mi²
- P) Criteria for evaluating progress toward IM objectives: Moose abundance and harvest

¹ For purpose and context of this report format, see *Intensive Management Protocol, section on Tools for Program Implementation and Assessment*

Q) **Criteria for success with this program:** MMA abundance=2500 moose and MMA harvest=100 moose

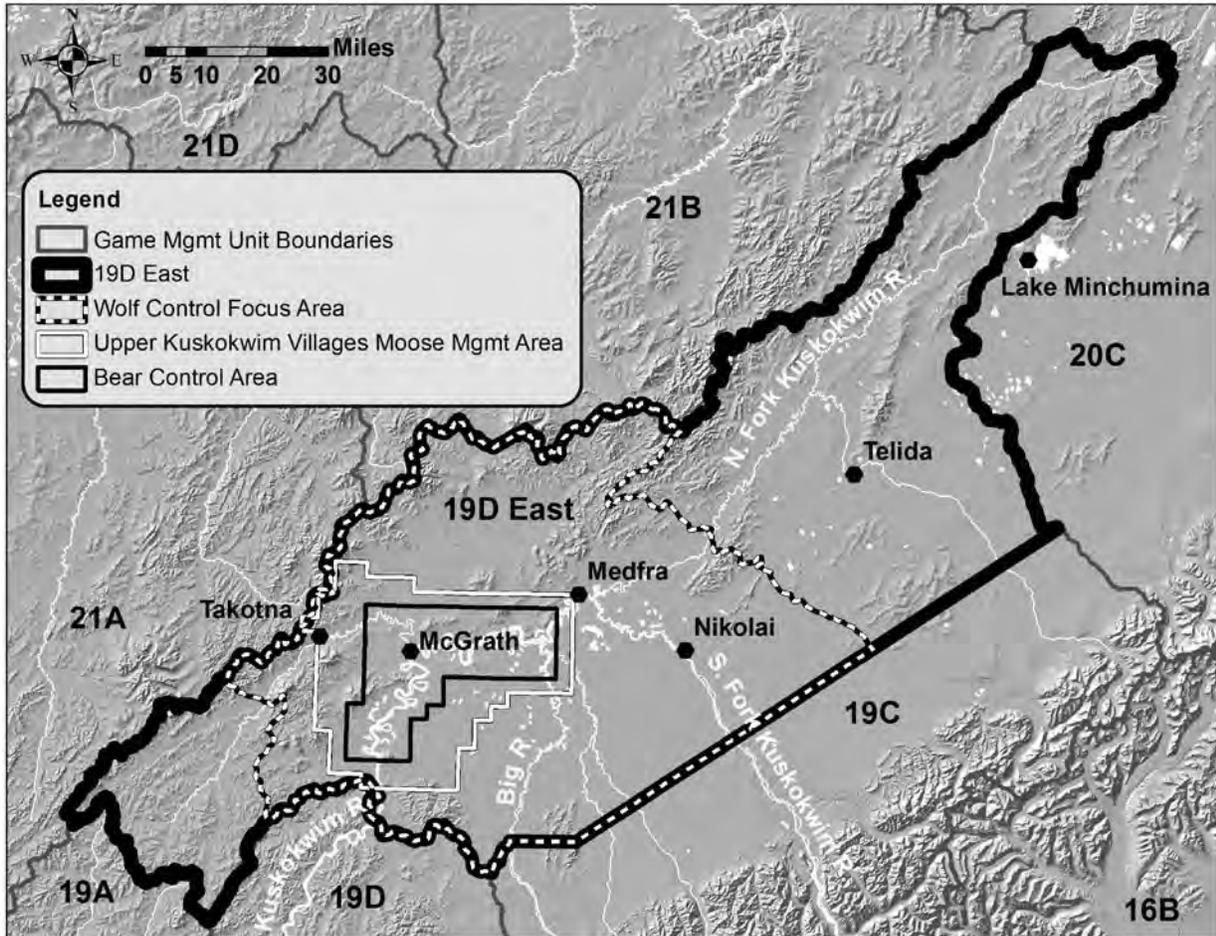


Figure 1. Unit 19D (East) intensive management area.

2) Prey data

Date(s) and method of most recent abundance assessment for moose: Nov 2012-goespatial moose population estimate (GSPE) in MMA

Compared to IM area, was a similar trend and magnitude of difference in abundance observed in nearby non-treatment area(s) since program inception: Non-treatment area not established

Date(s) of most recent age and sex composition survey (if statistical variation available, describe method here and show result in Table 1): Nov 2012-goespatial moose population estimate in MMA

Compared to IM area, was a similar composition trend and magnitude of difference in composition observed in nearby non-treatment area(s) since program inception:
Non-treatment area not established

Table 1. Moose abundance, age and sex composition in Upper Kuskokwim Villages Moose Management Area (MMA) since program implementation in year 1 to year 12. Regulatory year is 1 July to 30 June (e.g, RY 2012 is 1 July 2012 to 30 June 2013).

| Period | RY | Abundance ^a (90% CI) | Composition (number per 100 Cows) | | | |
|----------------------|------|------------------------------------|-----------------------------------|----------------------------|-------------------|----------------|
| | | | Calves (90% CI) | Yearling Bulls (90% CI) | Bulls (90% CI) | Total <i>n</i> |
| Year 1 | 2001 | 868(+147) | 36(+10) | 8(+3) | 21(+6) | 455 |
| Year 2 | 2002 | -- | -- | -- | -- | -- |
| Year 3 | 2003 | -- | -- | -- | -- | -- |
| Year 4 | 2004 | 1192(+228) | 66(+18) | 8(+4) | 18(+6) | 578 |
| Year 5 | 2005 | -- | -- | -- | -- | -- |
| Year 6 | 2006 | 1308(+174) | 55(+10) | 12(+3) | 30(+8) | 762 |
| Year 7 | 2007 | 1720(+306) | 53(+14) | 15(+4) | 36(+10) | 844 |
| Year 8 | 2008 | 1718(+352) | 44(+12) | 14(+5) | 40(+11) | 678 |
| Year 9 | 2009 | 1820(+323) | 38(+10) | 11(+4) | 40(+11) | 711 |
| Year 10 | 2010 | 1796(+312) | 43(+11) | 16(+5) | 49(+13) | 712 |
| Year 11 | 2011 | 1647(+296) | 42(+11) | 10(+3) | 33(+10) | 639 |
| Year 12 ^b | 2012 | 1337(+199) | 35(+11) | 7(+2) | 38(+5) | 650 |

^a Estimate with sightability correction applied

^b Preliminary data

Describe trend in abundance or composition: Results of a RY 2001-2009 trend analysis indicate a statistically significant increasing linear trend in abundance within the MMA (115 moose/year, SE=19.2, P=0.004). Midpoints of estimates since 2009 have been lower.

Table 2. Moose harvest in Upper Kuskokwim Villages Moose Management Area (MMA) since program implementation in year 1 to year 12. Regulatory year is 1 July to 30 June (e.g, RY 2012 is 1 July 2012 to 30 June 2013). Methods for estimating unreported harvest are described in Survey and Inventory reports.

| Period | RY | Reported | | Other mortality ^a | Total |
|--------|------|----------|--------|------------------------------|-------|
| | | Male | Female | | |
| Year 1 | 2001 | 29 | 0 | - ^b | 29 |
| Year 2 | 2002 | 23 | 0 | - ^b | 23 |
| Year 3 | 2003 | 32 | 0 | - ^b | 32 |
| Year 4 | 2004 | 7 | 0 | - ^b | 7 |
| Year 5 | 2005 | 14 | 0 | - ^b | 14 |
| Year 6 | 2006 | 12 | 0 | 3 | 15 |
| Year 7 | 2007 | 25 | 0 | 1 | 26 |

| Period | RY | Reported | | Other mortality ^a | Total |
|---------|------|----------|--------|------------------------------|-------|
| | | Male | Female | | |
| Year 8 | 2008 | 61 | 0 | 1 | 62 |
| Year 9 | 2009 | 56 | 0 | 2 | 58 |
| Year 10 | 2010 | 50 | 0 | 2 | 52 |
| Year 11 | 2011 | 100 | 0 | 1 | 101 |
| Year 12 | 2012 | 69 | 0 | 1 | 70 |

^a Mortuary harvest

^b Records destroyed by fire

Describe trend in harvest: General increase in harvest since 2001.

Describe any other harvest related trend if appropriate: None

3) Predator data

Wolves

Date(s) and method of most recent spring abundance assessment for wolves in the WCFA:
April 2013-private pilot interviews and state pilot observations

Date(s) and method of most recent fall abundance assessment for wolves in the WCFA:
April 2013- calculated for fall 2012 by subtracting total removal from WCFA from spring 2013 abundance estimate

Other research or evidence of trend or abundance status in wolves:

Keech, M. A., M. S. Lindberg, R. D. Boertje, P. Valkenburg, B. D. Taras, T. A. Boudreau, K. B. Beckmen. 2011. Effects of Predator Treatments, Individual Traits, and Environment on Moose Survival in Alaska. The Journal of Wildlife Management 75(6):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-#, Grants W-33-4 through W-33-10, Project 1.62, Juneau, Alaska

Table 3. Wolf abundance objectives and removal in Wolf Control Focus Area (WCFA) since program implementation in year 1 to year 12. Removal objectives are to reduce wolf numbers as low as possible in the WCFA and to maintain a minimum of 40 wolves in all of Unit 19D East to ensure wolves persist in the unit. The Spring RY 2011 modeled wolf population estimate for all of Unit 19D (East) was 63. The WCFA was established in RY 2010. Prior to RY 2010, control was conducted in various different geographic areas. All values listed are for the current WCFA. Regulatory year is 1 July to 30 June (e.g, RY 2012 is 1 July 2012 to 30 June 2013).

| Period | RY | Fall abundance ^a | Harvest removal | | Dept. control removal | Public control removal ^b | Total removal | Spring abundance |
|---------|------|-----------------------------|-----------------|------|-----------------------|-------------------------------------|---------------|--------------------|
| | | | Trap | Hunt | | | | |
| Year 1 | 2001 | 89 | 19 | 3 | 0 | N/A | 22 | 67 ^c |
| Year 2 | 2002 | -- | 28 | 5 | 0 | N/A | 33 | -- |
| Year 3 | 2003 | -- | 9 | 1 | 0 | 17 | 27 | -- |
| Year 4 | 2004 | -- | 12 | 2 | 0 | 12 | 26 | -- |
| Year 5 | 2005 | 26 | 9 | 1 | 0 | 3 | 13 | 13 ^c |
| Year 6 | 2006 | 29 | 13 | 1 | 0 | 2 | 16 | 13 ^c |
| Year 7 | 2007 | -- | 6 | 2 | 0 | 19 | 27 | -- |
| Year 8 | 2008 | -- | 4 | 3 | 0 | 19 | 26 | -- |
| Year 9 | 2009 | 37 | 7 | 4 | 0 | 4 | 15 | 22 ^c |
| Year 10 | 2010 | -- | 4 | 2 | 0 | 13 | 19 | -- |
| Year 11 | 2011 | 55--57 | 11 | 0 | 0 | 22 | 33 | 22-24 ^d |
| Year 12 | 2012 | 33 | 5 | 0 | 0 | 8 | 13 | 20 ^d |

^aCalculated by subtracting total removal from WCFA spring abundance during each RY.

^bPublic control removal began in RY 2003

^cCalculated by extrapolating density within a 3,210 mi² aerial reconnaissance survey area within the WCFA to the entire WCFA

^dAbundance based on private and department pilot observations.

Black Bears

Date(s) and method of most recent spring abundance assessment for black bears in the BCFA: May 2010 -mark/recapture estimator

Date(s) and method of most recent fall abundance assessment for black bears in the BCFA: November 2009 -calculated by subtracting total removal from May 2010 abundance estimate

Other research or evidence of trend or abundance status in black bears:

Keech, M. A., M. S. Lindberg, R. D. Boertje, P. Valkenburg, B. D. Taras, T. A. Boudreau, K. B. Beckmen. 2011. Effects of Predator Treatments, Individual Traits, and Environment on Moose Survival in Alaska. The Journal of Wildlife Management 75(6):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-#, Grants W-33-4 through W-33-10, Project 1.62, Juneau, Alaska.

Table 4. Black bear abundance and removal in Bear Control Focus Area (BCFA) since program implementation in year 1 to year 12. Removal objective is to reduce bear numbers as low as possible within the BCFA. The May 2004 estimated black bear population for all of Unit 19D (East) was approximately 1,700. The regulatory year is 1 July to 30 June (e.g, RY 2012 is 1 July 2012 to 30 June 2013).

| Period | RY | Spring abundance ^a (95% CI) | Harvest removal | | Dept. control removal | | Public control removal | | Total removal | Fall abundance ^{a,b} |
|---------|------|---|-----------------|------------------|-----------------------|-----------------|------------------------|----|---------------|-------------------------------|
| | | | FA ^c | SPR ^d | FA | SP | FA | SP | | |
| Year 1 | 2001 | -- | 1 | 0 | 0 | 0 | 0 | 0 | 1 | -- |
| Year 2 | 2002 | 96(+13) ^e | 4 | 0 | 0 | 67 ^f | 0 | 0 | 73 | -- |
| Year 3 | 2003 | 30(+9) ^e | 1 | 5 | 0 | 26 ^f | 0 | 0 | 32 | 23 |
| Year 4 | 2004 | -- | 0 | 1 | 0 | 0 | 0 | 0 | 1 | Near 0 |
| Year 5 | 2005 | -- | 1 | 5 | 0 | 0 | 0 | 0 | 6 | -- |
| Year 6 | 2006 | 70(+14) ^g | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 7 | 2007 | -- | 1 | 7 | 0 | 0 | 0 | 0 | 8 | 70 |
| Year 8 | 2008 | -- | 1 | 5 | 0 | 0 | 0 | 0 | 9 | -- |
| Year 9 | 2009 | 123(96–162) ^g | 4 | 0 | 0 | 0 | 0 | 6 | 10 | -- |
| Year 10 | 2010 | -- | 1 | 3 | 0 | 0 | 4 | 13 | 21 | 113 |
| Year 11 | 2011 | -- | 7 | 1 | 0 | 0 | 1 | 2 | 11 | -- |
| Year 12 | 2012 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |

^aDoes not include cubs

^bCalculated by subtracting total removal from spring abundance estimate in the previous RY

^cFall

^dSpring

^eRemoval estimator

^fNon-lethal removal

^gMark/recapture estimator

Brown Bears

Date(s) and method of most recent spring abundance assessment for brown bears in the BCFA: May 2004-Estimated by extrapolation from BCFA

Date(s) and method of most recent fall abundance assessment for brown bears in the BCFA: November 2003-Calculated by subtracting total removal from May 2004 abundance estimate.

Other research or evidence of trend or abundance status in brown bears:

Keech, M. A., M. S. Lindberg, R. D. Boertje, P. Valkenburg, B. D. Taras, T. A. Boudreau, K. B. Beckmen. 2011. Effects of Predator Treatments, Individual Traits, and Environment on Moose Survival in Alaska. The Journal of Wildlife Management 75(6):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-#, Grants W-33-4 through W-33-10, Project 1.62, Juneau, Alaska.

Table 5. Brown bear abundance and removal in Bear Control Focus Area (BCFA) since program implementation in year 1 to year 12. Removal objective is to reduce bear numbers as low as possible within the BCFA. The May 2004 estimated brown bear population for all of Unit 19D (East) was approximately 128. The regulatory year is 1 July to 30 June (e.g, RY 2012 is 1 July 2012 to 30 June 2013).

| Period | RY | Spring abundance ^a | Harvest removal | | Dept. control removal | | Public control removal | | Total removal | Fall abundance ^{a,b} |
|---------|------|-------------------------------|-----------------|-----------------|-----------------------|----------------|------------------------|----|---------------|-------------------------------|
| | | | FA ^c | SP ^d | FA | SP | FA | SP | | |
| Year 1 | 2001 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 2 | 2002 | 12 ^e | 0 | 0 | 0 | 6 ^f | 0 | 0 | 6 | -- |
| Year 3 | 2003 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Year 4 | 2004 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 5 | 2005 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 6 | 2006 | -- | 0 | 2 | 0 | 0 | 0 | 0 | 2 | -- |
| Year 7 | 2007 | -- | 0 | 2 | 0 | 0 | 0 | 0 | 2 | -- |
| Year 8 | 2008 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 9 | 2009 | -- | 2 | 0 | 0 | 0 | 0 | 0 | 2 | -- |
| Year 10 | 2010 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 11 | 2011 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| Year 12 | 2012 | -- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- |

^aDoes not include cubs

^bCalculated by subtracting total removal from spring abundance estimate in the previous RY

^cFall

^dSpring

^eEstimated by using density extrapolated from other areas of Interior Alaska with comparable habitat

^fNon-lethal removal

4) Habitat data and nutritional condition of prey species

Where active habitat enhancement is occurring or was recommended in the Operational Plan, describe progress toward objectives: No active habitat enhancement occurring.

Table 6. Nutritional indicators for moose in Upper Kuskokwim Villages Moose Management Area (MMA) since program implementation in year 1 to year 12. Regulatory year is 1 July to 30 June (e.g, RY 2011 is 1 July 2011 to 30 June 2012).

| Period | RY | Twinning Rate for Radiocollared cows >2 yrs (n) | Twinning Rate uncollared cows (n) |
|--------|------|---|-----------------------------------|
| Year 1 | 2001 | 59% (22) | 39% (46) |
| Year 2 | 2002 | 24% (25) | 36% (39) |
| Year 3 | 2003 | 32% (31) | 39% (31) |
| Year 4 | 2004 | 44% (45) | 50% (40) |

| Period | R Y | Twinning Rate for Radiocollared cows >2 yrs (n) | Twinning Rate uncollared cows (n) |
|---------|------|---|-----------------------------------|
| Year 5 | 2005 | 40% (60) | 35% (29) |
| Year 6 | 2006 | 52% (56) | 50% (30) |
| Year 7 | 2007 | 55% (51) | -- |
| Year 8 | 2008 | 33% (43) | 26% (87) |
| Year 9 | 2009 | 33% (40) | 29% (45) |
| Year 10 | 2010 | -- | 37% (38) |
| Year 11 | 2011 | -- | 34% (47) |
| Year 12 | 2012 | -- | -- |

5) Costs specific to implementing Intensive Management

Table 7. Cost (\$1000 = 1.0) of agency salary based on estimate of proportional time of field level staff and cost of operations for intensive management activities (e.g., predator control or habitat enhancement beyond normal Survey and Inventory work) performed by personnel in the Department or work by other state agencies (e.g., Division of Forestry) or contractors in Unit 19D (East). Fiscal year (FY) is also 1 July to 30 June but the year is one greater than the comparable RY (e.g, FY 2010 is 1 July 2009 to 30 June 2010).

| Period | FY | Predation control ^a | | Other IM activities | | Total IM cost | Research cost ^d |
|---------|------|--------------------------------|-------------------|---------------------|------|---------------|----------------------------|
| | | Time ^b | Cost ^c | Time | Cost | | |
| Year 10 | 2011 | 0.4 | 3.5 | 0.4 | 5.0 | 8.5 | 56.0 |
| Year 11 | 2012 | 1.2 | 7.3 | 4.0 | 43.6 | 50.9 | 39.0 |
| Year 12 | 2013 | 2.3 | 22.1 | 2.0 | 44.2 | 66.3 | 119.3 |

^aState or private funds only.

^bPerson-months (22 days per month)

^cSalary plus operations

^dSeparate from implementing IM program but beneficial for understanding of ecological or human response to management treatment (scientific approach that is not unique to IM).