

**Annual 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
February 2017**



1) **Description of IM Program¹**

A) This report is an **annual** 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:

Annual Report, February 2017

C) Program name: Unit 19D East wolf and bear predation control program (Fig. 1)

D) Existing program has an associated Operational Plan

E) Game Management Unit fully or partly included in IM program area: Unit 19D (East)

F) IM objectives for moose population size 6,000–8,000 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, February 2014

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 is 8,513 mi²

L) Size and geographic description of area for assessing ungulate abundance: Wolf Control Focus Area (WCFA) is 4,484 mi²; Bear Control Focus Area (BCFA) is 528 mi²

M) Size and geographic description of area for ungulate harvest reporting: WCFA is 4,484 mi²

N) Size and geographic description of area for assessing predator abundance: WCFA is 4,484 mi²; BCFA is 528 mi²

O) Size and geographic description of predation control area: WCFA is 4,484 mi²; BCFA is 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: BCFA abundance=2.0 moose/mi² (~1,100 moose) moose and WCFA harvest=180 moose

R) Department recommendation for IM program in this reporting period: Continue program (details provided in section 6)

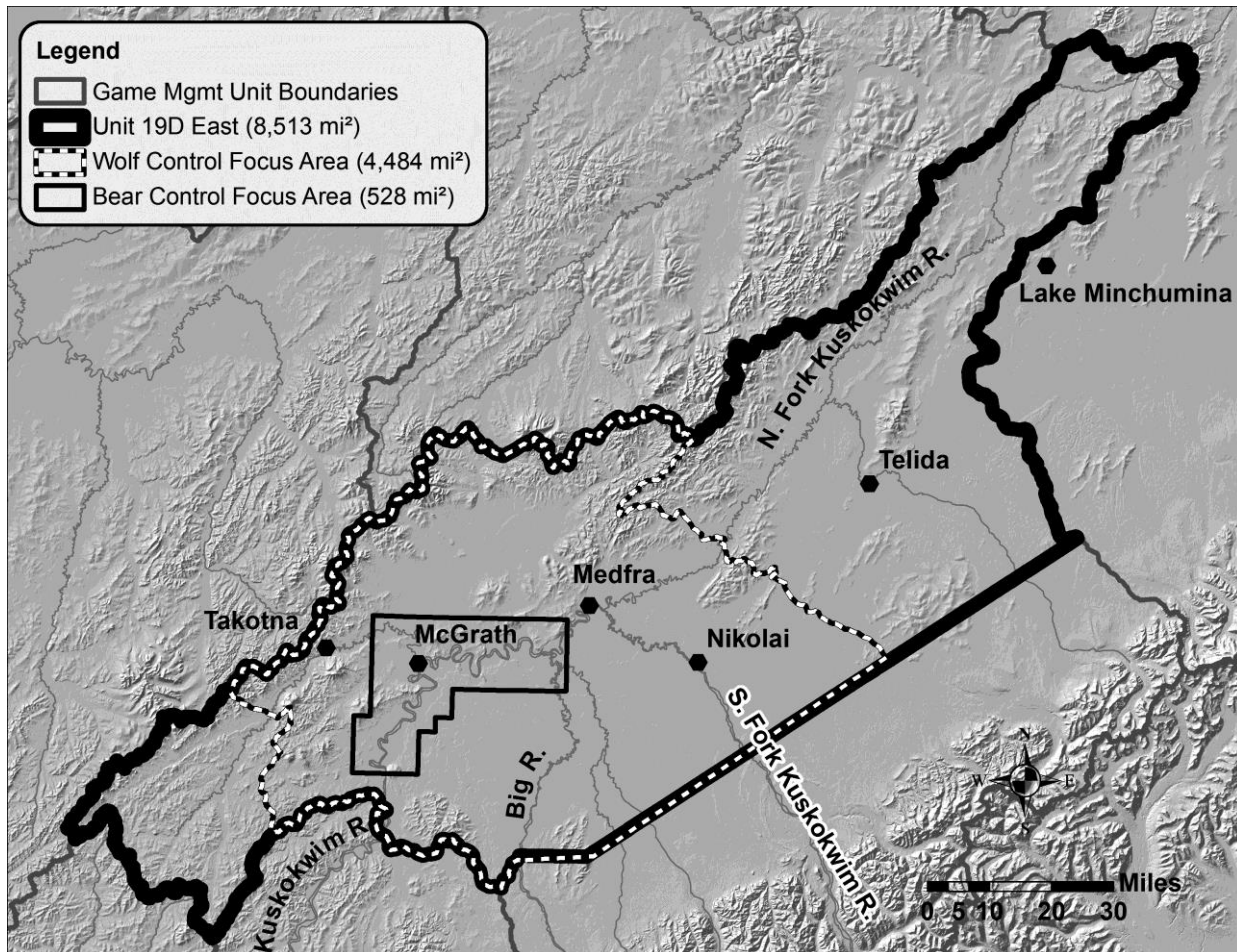


Figure 1. Unit 19D (East) intensive management area.

2) Prey data

Date(s) and method of most recent abundance assessment for moose: November 2015 Geospatial Population Estimator (GSPE) in a 1,118 mi² area surrounding the BCFA (preliminary estimate).

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: November 2015 Geospatial Population Estimator in a 1,118 mi² area surrounding the BCFA (preliminary estimate).

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 a 1,118 mi² area surrounding the BCFA since program implementation in year 1 to year 15. Regulatory year (RY) is 1 July to 30 June (e.g., RY 2015 is 1 July 2015 to 30 June 2016).

Period	RY	Abundance ^a (90% CI)	Composition (number per 100 Cows)			Total <i>n</i>
			Calves (90% CI)	Yearling Bulls (90% CI)	Bulls (90% CI)	
Year 1	2001	868(±147)	36(±10)	8(±3)	21(±6)	455
Year 2	2002	--	--	--	--	--
Year 3	2003	--	--	--	--	--
Year 4	2004	1,192(±228)	66(±18)	8(±4)	18(±6)	578
Year 5	2005	--	--	--	--	--
Year 6	2006	1,308(±174)	55(±10)	12(±3)	30(±8)	762
Year 7	2007	1,720(±306)	53(±14)	15(±4)	36(±10)	844
Year 8	2008	1,718(±352)	44(±12)	14(±5)	40(±11)	678
Year 9	2009	1,820(±323)	38(±10)	11(±4)	40(±11)	711
Year 10	2010	1,796(±312)	43(±11)	16(±5)	49(±13)	712
Year 11	2011	1,647(±296)	42(±11)	10(±3)	33(±10)	639
Year 12	2012	1,337(±199)	35(±11)	7(±2)	38(±5)	650
Year 13	2013	--	--	--	--	--
Year 14	2014	--	--	--	--	--
Year 15	2015	2,014(±398)	41(±12)	--	36(±11)	811
Year 16	2016	--	--	--	--	--

^a Estimate with sightability correction applied

^b preliminary data

Describe trend in abundance or composition: Results of an RY 2001–2009 trend analysis indicate a statistically significant increasing linear trend in abundance within a 1,118 mi² area surrounding the BCFA (115 moose/year, SE=19.2, P=0.004). Midpoints of subsequent estimates varied, but are currently high.

Table 2. Moose harvest from a 1,118 mi² area surrounding the BCFA since program implementation in year 1 through year 12. Moose harvest from WCFA (4,484 mi²) since year 13. Regulatory year is 1 July to 30 June (e.g., RY 2015 is 1 July 2015 to 30 June 2016).

Period	RY	Reported		Other	Total
		Male	Female	mortality ^a	
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
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	73	0	1	74
Year 13	2013	100	1	2	103
Year 14	2014	131	0	3	134
Year 15	2015	131	1	2	134
Year 16	2016 ^c	108	0	1	109

^a Mortuary harvest

^b Records destroyed by fire

^c Preliminary data

Describe trend in harvest: General increase in harvest since 2001. Comparing harvest from equivalent areas, during year 1 through year 5, an average of 69 moose was taken and during the most recent 5 years, an average of 108 moose was taken from the WCFA.

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 2015, private pilot interviews and state biologist observations from aircraft.

Date(s) and method of most recent fall abundance assessment for wolves in the WCFA:
April 2015, calculated for fall 2014 by adding total removal from WCFA to spring 2014 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. 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 (RY) is 1 July to 30 June (e.g, RY 2015 is 1 July 2015 to 30 June 2016).

Period	Regulatory Year	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
Year 13	2013	27	9	0	0	9	18	9 ^d
Year 14	2014	42	13	0	0	10	23	19 ^d
Year 15	2015	--	18	1	0	12	31	--

^aCalculated by adding total removal to WCFA spring abundance during each regulatory year.

^bPublic control removal began in regulatory year 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 pilot and department biologist observations.

Black Bears

Date(s) and method of most recent spring abundance assessment for black bears in the BCFA: May 2014, mark-recapture estimator

Date(s) and method of most recent fall abundance assessment for black bears in the BCFA:
August 2014, calculated for fall 2014 by subtracting total removal in RY13 from May 2014 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 15. Public bear control ended in RY14. 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 2015 is 1 July 2015 to 30 June 2016).

Period	Regulatory Year	Spring abundance ^a (95% CI)	Harvest removal		Dept. control removal		Public control removal		Total removal	Fall abundance ^{a,d}
			FA ^b	SP ^c	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	--
Year 13	2013	113(89–149) ^g	1	1	0	0	4	0	6	107
Year 14	2014	--	13	2	0	0	0	0	13	--
Year 15	2015	--	2	1	0	0	0	0	3	--

^aDoes not include cubs of the year

^bFall

^cSpring

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

^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. Removal objective is to reduce bear numbers as low as possible within the BCFA. Public bear control ended in RY14. The May 2004 estimated brown bear population for all of Unit 19D (East) was approximately 128. The regulatory year (RY) is 1 July to 30 June (e.g, RY 2015 is 1 July 2014 to 30 June 2015).

Period	Regulatory Year	Spring abundance ^a	Harvest removal		Dept. control removal		Public control removal		Total removal	Fall abundance ^{a,d}
			FA ^b	SP ^c	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	--
Year 13	2013	--	0	0	0	0	0	0	0	--
Year 14	2014	--	1	1	0	0	0	0	2	--
Year 15	2015	--	2	0	0	0	0	0	2	--

^aDoes not include cubs

^bFall

^cSpring

^dCalculated by subtracting total removal from spring abundance estimate in the previous regulatory year

^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 a 1,118 mi² area surrounding the BCFA since program implementation in year 1. Regulatory year (RY) is 1 July to 30 June (e.g, RY 2015 is 1 July 2015 to 30 June 2016).

Period	Regulatory Year	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)
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	--	21% (51)
Year 13	2013	--	--
Year 14	2014	--	49% (45)
Year 15	2015	--	47% (36)

5) Costs specific to implementing Intensive Management

Table 7. Unit 19D East program cost (\$1,000 = 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) during years 10-15. Fiscal year (FY) is also 1 July to 30 June but the year is one greater than the comparable regulatory year (e.g, FY 2011 is 1 July 2010 to 30 June 2011).

Period	Fiscal Year	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	1.3	8.0	2.0	44.2	52.2	119.3
Year 13	2014	1.0	11.3	0.4	5.0	16.3	256
Year 14	2015	1.4	11.5	0.4	5.0	16.5	0
Year 15	2016	1.4	9.5	0.4	5.0	14.5	242.2

^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).

6) Evaluation (Feb 2017) for program renewal following Year 16 and Department recommendations for Unit 19D (East)

Has progress toward defined criteria been achieved? Yes. Moose population and harvest have increased compared to precontrol.

Has achievement of success criteria occurred? No. Harvest and population objectives have not been achieved.

Recommendation for IM program: Continue program

Rationale for recommendation on overall program: Progress toward population and harvest objectives has occurred, but the objectives have not been achieved. Program was modified during the Feb 2014 Board meeting by eliminating the public bear control program due to insufficient bear removal; providing option for department bear control; continuing public wolf control; establishing population criteria of 2.0 moose/mi² within the BCFA; establishing harvest criteria of 180 moose from within the WCFA; and evaluating harvest from within the WCFA.