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 2014

1) Description of IM Program[1]

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:

February _X__ (annual report) August __ (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 mi^2

L) **Size and geographic description of area for assessing ungulate abundance:** Upper Kuskokwim Villages Moose Management Area (MMA) -1,118 mi^2

M) **Size and geographic description of area for ungulate harvest reporting:** MMA-1,118 mi^2

N) **Size and geographic description of area for assessing predator abundance:** Wolf Control Focus Area (WCFA)-4,484 mi^2; Bear Control Focus Area (BCFA)-528 mi^2

O) **Size and geographic description of predation control area:** WCFA - 4,484 mi^2; BCFA - 528 mi^2

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

R) **Department recommendation for IM program in this reporting period**: Modify and continue program **(details provided in section 6)**

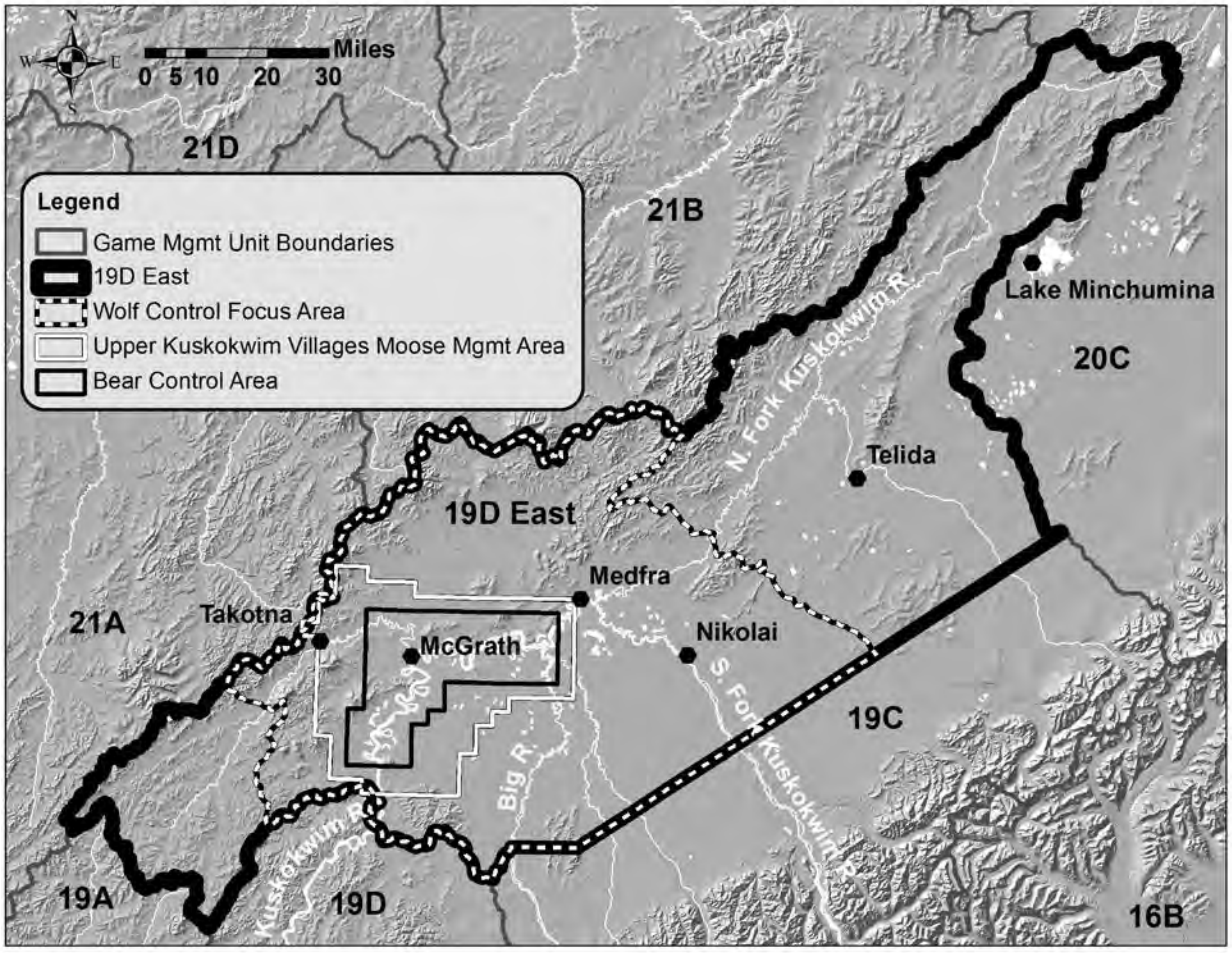

Figure 1. Unit 19D (East) intensive management area.

2) Prey data

Date(s) and method of most recent abundance assessment for moose: 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 13. Regulatory year is 1 July to 30 June (e.g., RY 2013 is 1 July 2013 to 30 June 2014).

			Composition (number per 100 Cows)			
Period	RY	Abundance [a] (90% CI)	Calves (90% CI)	Yearling Bulls (90% CI)	Bulls (90% CI)	Total *n*
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
Year 13	2013	--	--	--	--	--

[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 13. Regulatory year is 1 July to 30 June (e.g., RY 2013 is 1 July 2013 to 30 June 2014). 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

Period	RY	Reported		Other mortality[a]	Total
		Male	Female		
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[c]	2013	62	1	2	65

[a] Mortuary harvest
[b] Records destroyed by fire
[c] Preliminary data

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]

[a]Calculated by subtracting total removal from WCFA spring abundance during each RY.
[b]Public control removal began in RY 2003
[c]Calculated by extrapolating density within a 3,210 mi^2 aerial reconnaissance survey area within the WCFA to the entire WCFA
[d]Abundance 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 13. 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	--
Year 13	2013	--	3[h]	--	0	--	0	--	3	--

[a]Does not include cubs
[b]Calculated by subtracting total removal from spring abundance estimate in the previous RY
[c]Fall
[d]Spring
[e]Removal estimator
[f]Non-lethal removal
[g]Mark/recapture estimator
[h] Preliminary

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 13. 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	--
Year 13	2013	--	0	--	0	--	0	--	0	--

[a]Does not include cubs
[b]Calculated by subtracting total removal from spring abundance estimate in the previous RY
[c]Fall
[d]Spring
[e]Estimated by using density extrapolated from other areas of Interior Alaska with comparable habitat
[f]Non-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)
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)

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) during years 10-12. Fiscal year (FY) is also 1 July to 30 June but the year is one <u>greater</u> than the comparable RY (e.g, FY 2010 is 1 July 2009 to 30 June 2010).

		Predation control[a]		Other IM activities		Total IM cost	Research cost[d]
Period	FY	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

[a]State or private funds only.
[b]Person-months (22 days per month)
[c]Salary plus operations
[d]Separate 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 (February 2014) for program renewal following Year 12 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, except during RY11, when the harvest objective was achieved within the MMA.

Recommendation for IM program: Modify and Continue

Rationale for recommendation on overall program: Progress toward population and harvest objectives has occurred but these objectives have not been achieved. Modify program by eliminating the public bear control program due to insufficient removal; provide option for department bear control. Continue wolf control. Establish population criteria of 2.0 moose/mi^2 (1,100 moose) within the BCFA. Establish harvest criteria of 180 moose from within the WCFA. Evaluate harvest from within the WCFA.