

# **Annual Report to the Alaska Board of Game on Intensive Management for Moose with Wolf Predation Control in Unit 13**

**Prepared by the Division of Wildlife Conservation  
February 2020**



**1) Description of IM Program<sup>1</sup> and Department recommendation for reporting period.**

**A) This report is an annual evaluation for a predation control program authorized by the Alaska Board of Game (Board) under 5 AAC 92.121**

**B) Month this report was submitted by the Department to the Board:**

**February** (annual report)                      **Year** 2020

**C) Program name:** Unit 13 Wolf Predation Control Area

**D) Existing program has an associated Operational Plan and does have a detailed Intensive Management Plan in regulation (5 AAC 92.121).**

**E) Game Management Unit(s) fully or partly included in IM program area:**

Units 13A, 13B, 13C, and 13E.

**F) IM objectives for moose:**

- Population objective for Unit 13 is 17,000–21,400 moose (including Unit 13D).
- Harvest objective for Unit 13 is 1,050–2,180 moose (including Unit 13D).

For those units within the Unit 13 wolf predation control area, population and harvest objectives are identified in Table 1.

**Table 1. Population and harvest objectives for moose in the Unit 13 wolf predation control area.**

Population	Population Objective	Harvest Objective
Unit 13A	3,500–4,200	210–420
Unit 13B	5,300–6,300	310–620
Unit 13C	2,000–3,000	155–350
Unit 13E	5,000–6,000	300–600

**G) Month and year the current predation control program was originally authorized by the Board: March 2000 Indicate date(s) if renewed:**

- March 2005 - IM area increased to include Unit 13C.
- October 2010 - Plan renewed through 2016.
- February 2016 - Plan renewed through 2027

**H) Predation control is active in this IM area.**

The suspension of predation control for regulatory year (RY) 2017 (RY17 = 1 July 2017

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<sup>1</sup> For purpose and context of this report format, see *Agency Protocol for Intensive Management of Big Game in Alaska*.

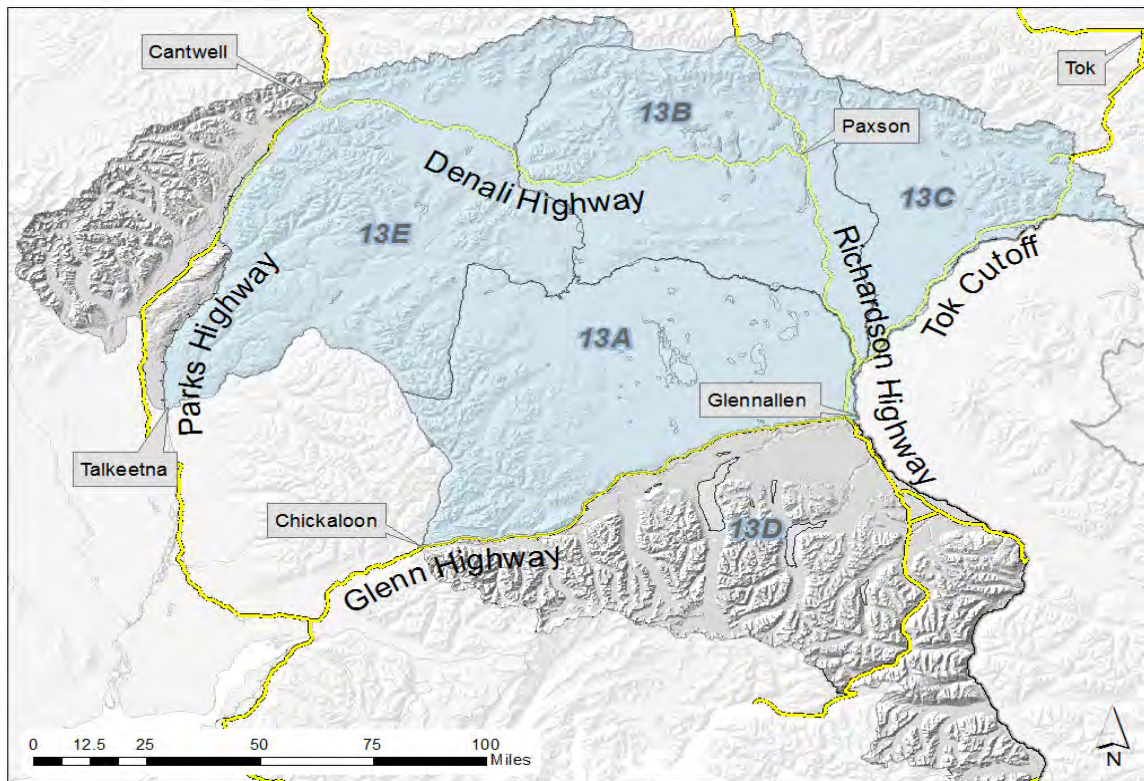
through 30 June 2018) was in response to an undetermined spring wolf estimate in RY13, a RY14 spring wolf estimate below the minimum intensive management objective, a RY15 spring wolf estimate below the minimum intensive management objective, and an undetermined spring wolf estimate in RY26. The activation of predation control for RY 18 was in response to a spring RY17 wolf estimate above the maximum intensive management objective. Predation control was activated for RY19 only in subunit 13B, as spring wolf estimates were borderline within the intensive management objective, and moose abundance was above moose population objectives for other subunits.

**I) If active, month and year the current predation control program began: March 2000.**  
The program was suspended in RY12, RY15–17 because spring wolf population estimates were below the intensive management objective. The predator control plan was reauthorized for 10 years in February 2016. The program was activated again in RY18. Predation control was suspended in subunits 13A, 13C, and 13E for RY19.

**J) A habitat management program funded by the Department or from other sources is currently active in this IM area: Yes**  
The Alphabet Hills Prescribed Burn plan is being updated and will be implemented when finalized and prescription conditions are met.

**K) Size of IM program area (square miles) and geographic description:**

- 15,416 miles<sup>2</sup> (Figure 1).



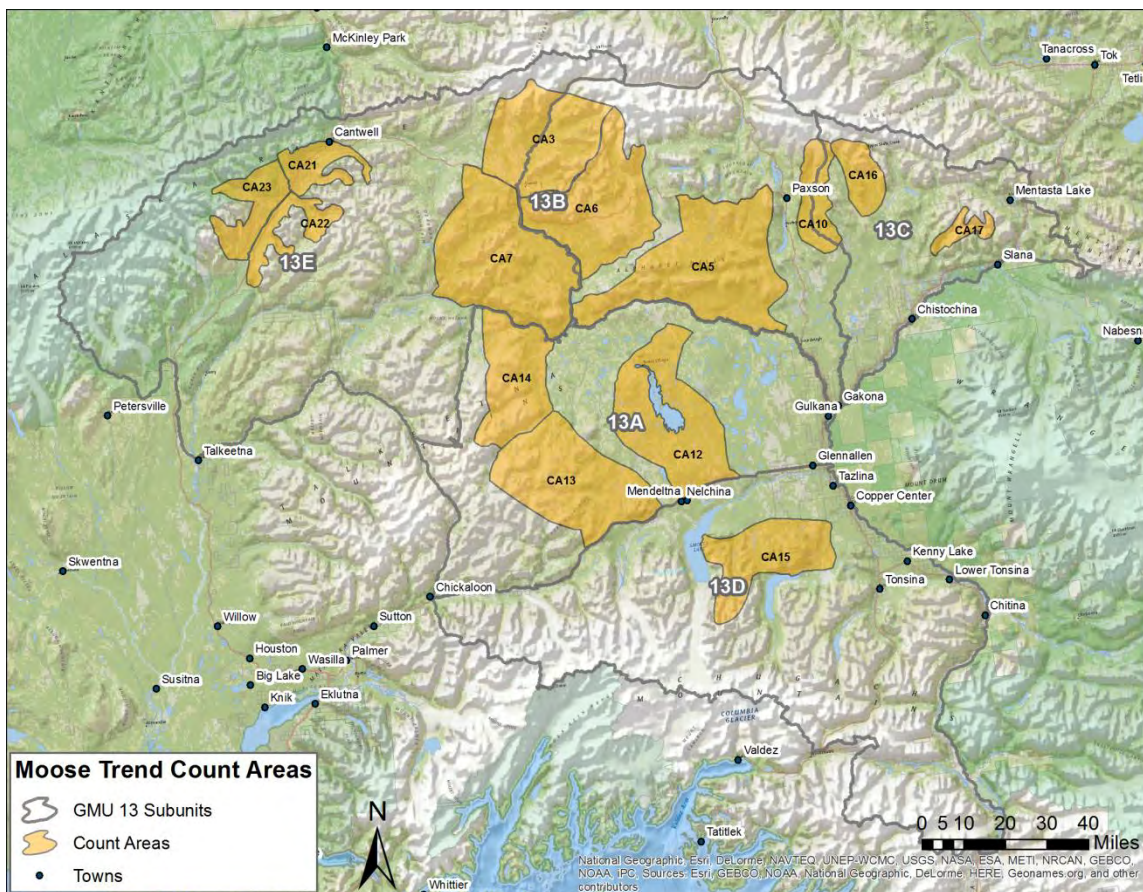


**Figure 1.** Area under intensive management for moose in Unit 13.

**L) Size and geographic description of area for assessing ungulate abundance within the IM area:**

Unit 13 – approximately 23,367 miles<sup>2</sup>.

Seven continuous moose count areas (CA) 3, 5, 6, 10, 13, 14, and 16 across Unit 13 encompass a total of 3,219 miles<sup>2</sup> (Figure 2). Periodic surveys are also flown in CA 7, 12, 17, 21, 22, and 23, encompassing an additional 2,146 miles<sup>2</sup>. Periodic surveys help to refine estimates of abundance. (CA 21, 22, and 23 are on the border of the IM area.)



**Figure 2.** Location of moose trend count areas (CA) in Unit 13.

**M) Size and geographic description of area for assessing predator abundance:**

Unit 13 – approximately 23,367 miles<sup>2</sup>.

**N) Size and geographic description of area for ungulate harvest reporting:**

Unit 13 – approximately 23,367 miles<sup>2</sup>.

**O) Size and geographic description of predation control area:**

14,188 miles<sup>2</sup> were open to predation control in RY13; closures include populated areas and federal lands where same-day-airborne take of wildlife is not allowed.

**P) Criteria for evaluating progress toward IM objectives:**

- Population abundance
- Moose harvest
- Calf-to-cow ratios
- Bull-to-cow ratios

**Q) Criteria for success with this program:**

- Achieve population and harvest objectives (F)
- Maintain a minimum of 25 bulls:100 cows for Unit 13
- Maintain a minimum of 30 calves:100 cows for Units 13B, 13C, and 13E, and a minimum of 25 calves:100 cows for Unit 13A.

**R) Department recommendation for IM program in this reporting period:**

The Department recommends temporary suspension of the program. See Section 6 of this report.

**S) IM Annual Report data and information inclusion date:**

February X (annual report) Year 2019

**2) Prey data**

**Date(s) and method of most recent fall abundance assessment for moose in Unit 13 (if statistical variation available, describe method here and show result in Table 1):**

Fall trend count surveys are conducted annually November–December to determine sex and age composition of moose. The most recent surveys were conducted in November 2019 (FY19). Trend count data were extrapolated to estimate unit-wide population abundance.

**Compared to IM area, was a similar trend and magnitude of difference in abundance observed in nearby non-treatment area(s) since program inception N [Y/N] and in the last year N [Y/N]? Describe comparison if necessary:**

Moose abundance in CAs receiving control treatment has increased or stabilized whereas abundance in the adjacent non-treatment areas (CA 15 in Unit 13D) has suggested a slight decline over the past few years.

**Table 2a. Moose abundance, age and sex composition in assessment area (L) since program implementation in Year 10 (not exclusively limited to inception of predation control) to Year 17. Regulatory year is 1 July to 30 June (e.g, RY2012 is 1 July 2012 to 30 June 2013).**

Period	RY	Estimated Abundance <sup>a</sup>	Composition (number per 100 cows)			Total observed (n)
			Calves	Yearling Males	Males	
Year 8	2008	17,040	19	12	35	4,481
Year 9	2009	18,812	24	10	33	5,355
Year 10	2010	19,720	22	10	31	5,847
Year 11	2011	20,350	23	10	33	5,614
Year 12	2012	20,575	16	7	32	6,468
Year 13	2013	20,634	27	6	34	6,837
Year 14	2014	20,492	16	11	35	2,213
Year 15	2015	21,090	25	7	32	5,558
Year 16	2016	20,402	19	8	32	3,848
Year 17	2017	17,746	20	6	30	3,992
Year 18	2018	18,633	13	5	29	4,219
Year 19	2019	18,997	16	4	28	4,153

<sup>a</sup> Abundance estimates were reevaluated in 2015 to take advantage of modern mapping technology and provide a more accurate extrapolation based on annual survey data.

**Describe trend in abundance or composition:**

Moose across the Unit 13 treatment area generally increased after IM program inception, although current data indicates that moose abundance may have peaked in 2015.

Composition ratios have remained fairly stable. Based on extrapolation of fall count area densities, moose population estimates were calculated by subunit for 2010 at: 4,081 moose in Unit 13A, 5,460 moose in Unit 13B, 3,000 moose in Unit 13C, and 5,041 moose in Unit 13E. Moose population estimates by subunit in 2019 were: 3,968 moose in Unit 13A, 3,845 moose in Unit 13B, 3,588 moose in Unit 13C, and 6,394 moose in Unit 13E.

**Table 2b. Moose abundance, age and sex composition in comparison area, Unit 13(D), CA15.**

Period	RY	Estimated Abundance	Composition (number per 100 cows)			Total Observed (n)
			Calves	Yearling Males	Males	
Year 8	2008	1,818	17	15	79	171
Year 9	2009	-	-	-	-	-

Year 10	2010	2,137	23	12	72	201
Year 11	2011	1,829	10	7	62	172
Year 12	2012	1,829	14	2	67	172
Year 13	2013	1,414	12	3	89	133
Year 14	2014	1,605	17	9	69	151
Year 15	2015 <sup>a</sup>	1,063	8	7	58	100
Year 16	2016	1,403	21	18	89	132
Year 17	2017	-	-	-	-	-
Year 18	2018	-	-	-	-	-
Year 19	2019	1,201	18	3	70	113

<sup>a</sup> 2015 survey conducted in December, and after seasonal migration from count area.

**Table 3. Moose harvest in assessment area (M). Methods for estimating unreported harvest are described in Survey and Inventory reports.**

Period	RY	Reported		Estimated		Total harvest	Other mortality <sup>a</sup>	Total
		Male	Female	Unreported	Illegal			
Year 8	2008	730	1	25	25	781	75	856
Year 9	2009	861	2	25	25	913	75	988
Year 10	2010	945	1	25	25	996	75	1,071
Year 11	2011	951	1	25	25	1,002	100	1,102
Year 12	2012	712	5	25	30	772	75	847
Year 13	2013	721	2	25	30	778	75	853
Year 14	2014	928	4	25	30	987	75	1,062
Year 15	2015	1,050	8	25	30	1,113	75	1,188
Year 16	2016	1,079	7	25	30	1,141	75	1,216
Year 17	2017	993	7	25	30	1,055	75	1,130
Year 18	2018	782	7	25	30	844	75	919
Year 19	2019	840	7	25	30	902	75	977

<sup>a</sup> Vehicle/train mortality.

**Describe trend in harvest:** Moose harvests increased in the treated area of Unit 13 through 2011, declined in 2012 and 2013, and returned to a higher level in 2014–2016. Total harvest dropped slightly in 2017 from levels observed in 2016, and harvest dropped again in 2018. Preliminary reports show that harvest increased slightly in 2019, but not to the levels observed from 2014–2017. Harvest has been variable, but relatively stable in Unit 13(D) which is not part of the treatment area. Hunting pressure has increased in the treatment area since 2009, due to regulatory changes providing additional harvest opportunities; the lower threshold of the Unit 13 harvest objective was reached in RY15 and RY16. Harvest has since been below the objective range.

### 3) Predator data

**Date(s) and method of most recent spring abundance assessment for wolves:**

The most recent spring abundance estimate of 168 wolves in Unit 13 (RY18; spring of

2019) was derived from observations of wolves by ADF&G staff, hunters, trappers, and pilots minus the documented harvest.

**Date(s) and method of most recent fall abundance assessment for wolves:**

The most recent fall abundance assessment for Unit 13 of approximately 260 wolves (RY2019; fall of 2019) was derived by estimating pup production and survival for packs observed by ADF&G staff, hunters, trappers, and pilots.

**Table 4. Wolf abundance objectives and removal in wolf assessment area (N) of the Unit 13 Wolf Predation Control Area. The annual removal objective in Unit 13 depends on the fall wolf abundance. The goal is to reduce the number of wolves in the predation control area (O) to meet the spring wolf objective, so estimated or confirmed number remaining in the wolf assessment area (N) by spring (30 April) each RY is 135–165.**

Period	RY	Fall abundance in area N	Harvest removal from area N		Dept. control removal from area O	Public control removal from area O	Total removal <sup>a</sup> from area N (% from area O)	Spring abundance in area N
			Trap	Hunt				
Year 8	2008	273	38	26	0	55	121 (76%)	144
Year 9	2009	272	42	18	0	23	83 (67%)	180
Year 10	2010	314	46	10	0	103	159 (92%)	146
Year 11	2011	204	16	35	0	40	91 (80%)	104
Year 12	2012	266	37	21	0	0	59 (69%)	191
Year 13	2013	320	26	16	0	60	102 (89%)	-
Year 14	2014	-	35	18	0	0	53 (83%)	84
Year 15	2015	-	40	16	0	0	56 (89%)	-
Year 16	2016	-	76	16	0	0	92 (89%)	-
Year 17	2017	-	52	37	0	0	89 (89%)	250
Year 18	2018	400	66	31	0	118	235 (90%)	168

<sup>a</sup> Additional removal may be Defense of Life and Property, vehicle kill, etc.

**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:**

**Objective(s):** No objectives have been specified.

**Area treated and method:** No area was treated during this report period.

**Observation on treatment response:**

The only large-scale habitat improvement project that has occurred recently in Unit 13 is the 41,000 acre<sup>2</sup> Alphabet Hills Prescribed Burn in 2003 and 2004 on the border of Unit 13(A) and 13(B). Further burning under this plan is still being pursued, though it is



contingent upon meeting burn prescriptions and having available suppression resources.

**Table 5. Moose abundance, age and sex composition in habitat improvement area, Unit 13(A) Alphabet Hills Prescribed Burn count area (65 square miles).**

Period	RY	Composition (number per 100 cows)			
		Moose observed	Calves	Yearling bulls	Males
Year 8	2008	116	14	21	51
Year 9	2009	209	29	6	62
Year 10	2010	186	24	24	88
Year 11	2011	109	24	8	94
Year 12	2012	136	13	5	107
Year 13	2013	122	26	7	71
Year 14	2014	-	-	-	-
Year 15	2015	135	18	10	97
Year 16	2016	-	-	-	-
Year 17	2017	241	17	13	101
Year 18	2018	166	9	4	62
Year 19	2019	245	15	5	83

**Similar trend in nearby non-treatment areas?**

The habitat improvement area is a small burn, and composition is based on a small count area (65 miles<sup>2</sup>). Annual variability is high. The nearest adjacent count area is CA 5, which is substantially larger (846 miles<sup>2</sup>) and contains more variable moose habitat. Because these areas are adjacent, moose in western CA 5 may be experiencing some benefit from the habitat improvement area. Moose density in the treatment area was 3.8 moose per square mile in 2019, which is the highest density observed to date; previously the highest density observed in the treatment area was 3.2 moose per square mile in 2009, though the highest density observed for CA 5 was 2.1 moose per square mile in 2010, 2012, and 2013, and 1.6 moose per square mile were observed in CA5 in 2019. In 2019 the bull-to-cow ratio in CA 5 dropped to 29, which is the lowest observed since 2004. From 2007 through 2018 the bull-to-cow ratio in CA5 was fairly stable with an average of 41 bulls:100 cows). Bull ratios are higher in the treatment area likely due to the relative inaccessibility of the small burn area. Ratios reached a high of 107 bulls:100 cows in 2012. The ratio of 57 bulls:100 cows observed in the treatment area in 2019 was the lowest observed since 2008. Calf-to-cow ratios for both areas were 10 calves:100 cows in 2018, which was the lowest observed in the treatment area since 2007 and the lowest observed in CA5 since 2000. The calf-to-cow ratio in CA5 increased to 19 calves:100 cows in 2019 while the calf-to-cow ratio in the treatment area remained 10 calves:100 cows, which coincides with a declining trend in calf-to-cow ratios in both areas since 2013.

**Describe any substantial change in habitat not caused by active program:** No major habitat changes have occurred in this area in recent years.

**Table 6. Nutritional indicators for moose in assessment area (L).**

Period	RY	Twinning Rate (radiocollared parturient cows <sup>a</sup> )	Twinning rates (random parturient cows) Prior to 1 June
Year 8	2008	25% in 13A west (n=32)	28% in 13A west (n=79); 50% in 13E (n=unk)
Year 9	2009	38% in 13A west (n=24)	13% in 13A west (n=24)
Year 10	2010	33% in 13A west (n=18)	-
Year 11 <sup>b</sup>	2011	33% in 13A west (n=12); 11% in 13B (n=9)	-
Year 12	2012	30% in 13A northwest & 13E south (n=44); 18% in 13B (n=17)	20% in 13A northwest & 13E south (n=40)
Year 13	2013	44% in 13B (n=18) 46% in northwest Unit 13 (n=34)	19% in 13A west (n=32); 42% in 13C (n=24)
Year 14	2014	20% in 13B (n=20) 46% in northwest Unit 13 (n=35)	26% in 13A west (n=50); 30% in 13C (n=10); 25% in 13E (n=28)
Year 15	2015	29% in 13B (n=21)	22% in 13A (n=9) 28% in 13B (n=32)
Year 16	2016	59% in 13B (n=29)	29% in 13A (n=7) 41% in 13B (n=34)
Year 17	2017	50% in 13B (n=30)	4% in 13A (n=48)
Year 18	2018	23% in 13A (n=18); 21% in 13B (n=39); 56% in 13E (n=30)	-

<sup>a</sup> Only cows three years of age and older were monitored.

<sup>b</sup> Only four flights were conducted in RY2011 (spring 2012), and some twins may have been missed.

No objectives on nutritional condition were identified in the *Intensive Management Plan*

**Evidence of trend:** There was an apparent increase in twinning rates during the first several years of the intensive management program, possibly a result of an increased likelihood of surveys detecting more obvious cows with twins before predation events. Flights were increased in RY2012–RY2018 to improve the likelihood of documenting twins. The low twinning rate detected among random parturient cows in 2017 is likely due to the late timing of the flight (June 4). Overall, twinning rates in 13B have been fluctuating in recent years while twinning rates in 13A remain relatively low and twinning rates in 13E are generally at medium to high levels. Twinning rates in 13A and

13B suggest that browse surveys should be conducted to further investigate nutritional availability for moose in those subunits and evaluate nutritional availability in relation to current moose abundance objectives.

**Similar trend in nearby non-treatment areas:** Unknown

**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 13 Wolf Predation Control Area. 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 <sup>a</sup>		Other IM activities		Total IM cost	Research cost <sup>d</sup>
		Time <sup>b</sup>	Cost <sup>c</sup>	Time <sup>b</sup>	Cost <sup>c</sup>		
Year 11	2012	0.0	0.0	2.5	25.0	25.0	25.6
Year 12	2013	0.0	0.0	1.75	14.3	14.3	0.0
Year 13	2014	0.0	0.0	1.0	8.9	8.9	6.0
Year 14	2015	0.0	0.0	1.0	8.9	8.9	22.0
Year 15	2016	0.0	0.0	1.0	8.9	8.9	46.0
Year 16	2017	0.0	0.0	0.5	4.4	4.4	22.4
Year 17	2018	0.0	0.0	0.5	42.5	42.5	294.9
Year 18	2019	0.0	0.0	7.4	68.6	68.6	63.1

<sup>a</sup> State or private funds only.

<sup>b</sup> Person-months (22 days per month).

<sup>c</sup> Salary plus operations.

<sup>d</sup> 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) Department recommendations<sup>2</sup> for annual evaluation (1 February) following Year 18 for Unit 13 Wolf Predation Control Area.**

**Has progress toward defined criteria been achieved?** Yes

**Has achievement of success criteria occurred?**

Population objectives were met in all treated subunits by 2010. The population estimate for Unit 13B dropped below population objective in 2013 and has remained below objective. All other subunits have remained at or above objective.

<sup>2</sup> Prior sections include primarily objective information from field surveys; Sections 6 and 7 involve professional judgment by area biologists to interpret the context of prior information for the species in the management area.

Calf-to-cow ratios in general have been below objectives in all subunits since program inception. In 2015 ratio objectives were met in Unit 13A and 13E while ratios remained below objectives in Units 13B and 13C. In 2016 calf ratios dropped below objectives in all subunits and have remained below objectives through 2018.

Bull-to-cow ratios were met in all four treated subunits through 2012. Bull-to-cow ratios declined below the minimum objective in 2013 in 13A, although ratios remained above the minimum objective in 13B, 13C, and 13E. In 2015, bull-to-cow ratios were again met in all treated subunits. The lowest ratios were observed in accessible portions of each subunit. In 2016, bull-to-cow ratios dropped below objective in 13A and remained above objective in all other subunits. In 2017, bull-to-cow ratios were above objective in all surveyed subunits except 13E. In 2018 bull-to-cow ratios dropped below objectives in 13A and 13C but were above objective in all other subunits. In 2019 bull-to-cow ratios dropped below objective in 13E and were above objective in all other surveyed subunits. The control subunit of 13D maintains the highest bull-to-cow ratio annually, with an average of 75 bulls:100 cows over the most recent five years of survey data (2013–2016, 2019).

Since RY14, harvest objectives are being met in one of four treated subunits, with the Unit 13A harvest within objective range. The harvest for Unit 13E has increased to a level not seen since RY1997 but does remain below the objective range. Harvest objectives were met in Unit 13B for the first time in RY16.

**Table 8. Unit 13 IM population and harvest objectives and estimates.**

	<b>Unit 13(A)</b>	<b>Unit 13(B)</b>	<b>Unit 13(C)</b>	<b>Unit 13(E)</b>
<b>Harvest Objective</b>	<b>210–420</b>	<b>310–620</b>	<b>155–350</b>	<b>300–600</b>
2018 harvest	249	212	60	184
<b>Population Objective</b>	<b>3,500–4,200</b>	<b>5,300–6,300</b>	<b>2,000–3,000</b>	<b>5,000–6,000</b>
2019 abundance estimate	4,121 <sup>1</sup>	3,845	3,588	6,394
<b>Calf-to-cow Ratio Obj.</b>	<b>25:100</b>	<b>30:100</b>	<b>30:100</b>	<b>30:100</b>
2019 estimate	16 <sup>1</sup>	17	11	16
<b>Bull-to-cow Ratio Obj.</b>	<b>25:100</b>	<b>25:100</b>	<b>25:100</b>	<b>25:100</b>
2019 estimate	24 <sup>1</sup>	29	26	24

<sup>1</sup>Most recent abundance and composition data is from 2018 for 13A

**Recommendation for IM practice(s):**

**Predation control: Continue Modify Suspend Terminate**  
Continue with wolf control in each subunit as necessary based on moose and wolf population/harvest guidelines identified through the Board of Game process.

**Habitat enhancement: Continue**

**Harvest strategy: Modify**

Antlerless moose (cow) harvests are necessary to meet harvest objectives and to maintain populations within abundance and composition objectives. In the case the moose population exceeds management objectives, and antlerless hunts are not approved through the Board of Game process, the IM program should be suspended in individual subunits.