

**Annual Report to the Alaska Board of Game on  
Intensive Management for Moose  
with Wolf, Black Bear, and Brown Bear Predation  
Control  
in Game Management Unit 16**

**Prepared by the Division of Wildlife Conservation  
February 2019**



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 92.122**

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

**February (annual report)                      Year 2019**

C) **Program name: Unit 16 Predation Control Area**

D) **Existing program does have an associated Operational Plan**

E) **Game Management Unit fully or partly included in IM program area:**  
Unit 16

F) **IM objectives for moose population size 6,500–7,500 harvest 310–600**

G) **Month and year the current predation control program was originally authorized by the Board: March 2004. Indicate date(s) if renewed: May 2006; March 2011, 2013, and 2015.**

H) **Predation control is currently suspended in this IM area.**

I) **If active, month and year the current predation control program began:**

- The wolf control program in Unit 16B was originally authorized in March 2004 and implemented during regulatory year (RY) 2004 (RY2004 = 1 July 2004 through 30 June 2005).
- The wolf control program was reauthorized in May 2006 to include part of Unit 16A, and the modifications were implemented during RY2005.
- The predator control program was modified to include black bear predation control in March 2007, and the modifications were implemented during RY2008.
- The predation control program was reauthorized for six years and modified to include brown bear predation control in March 2011. The modifications were implemented during RY2011.
- The predator control program was reauthorized for six years and included an Operational Plan for Intensive Management of Moose in February 2015.
- The wolf control areas were reduced to north of the Skwentna and Yentna rivers in Unit 16B for RY2013 and were suspended completely beginning in RY2014.
- Bear control was suspended on 1 January 2017.

J) **A habitat management program funded by the Department or from other sources is**

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

currently active in this IM area (Y/N) N

**K) Size of IM program area (square miles) and geographic description:** All non-federal lands in Unit 16B and the western half of Unit 16A (11,105 mi<sup>2</sup> total).

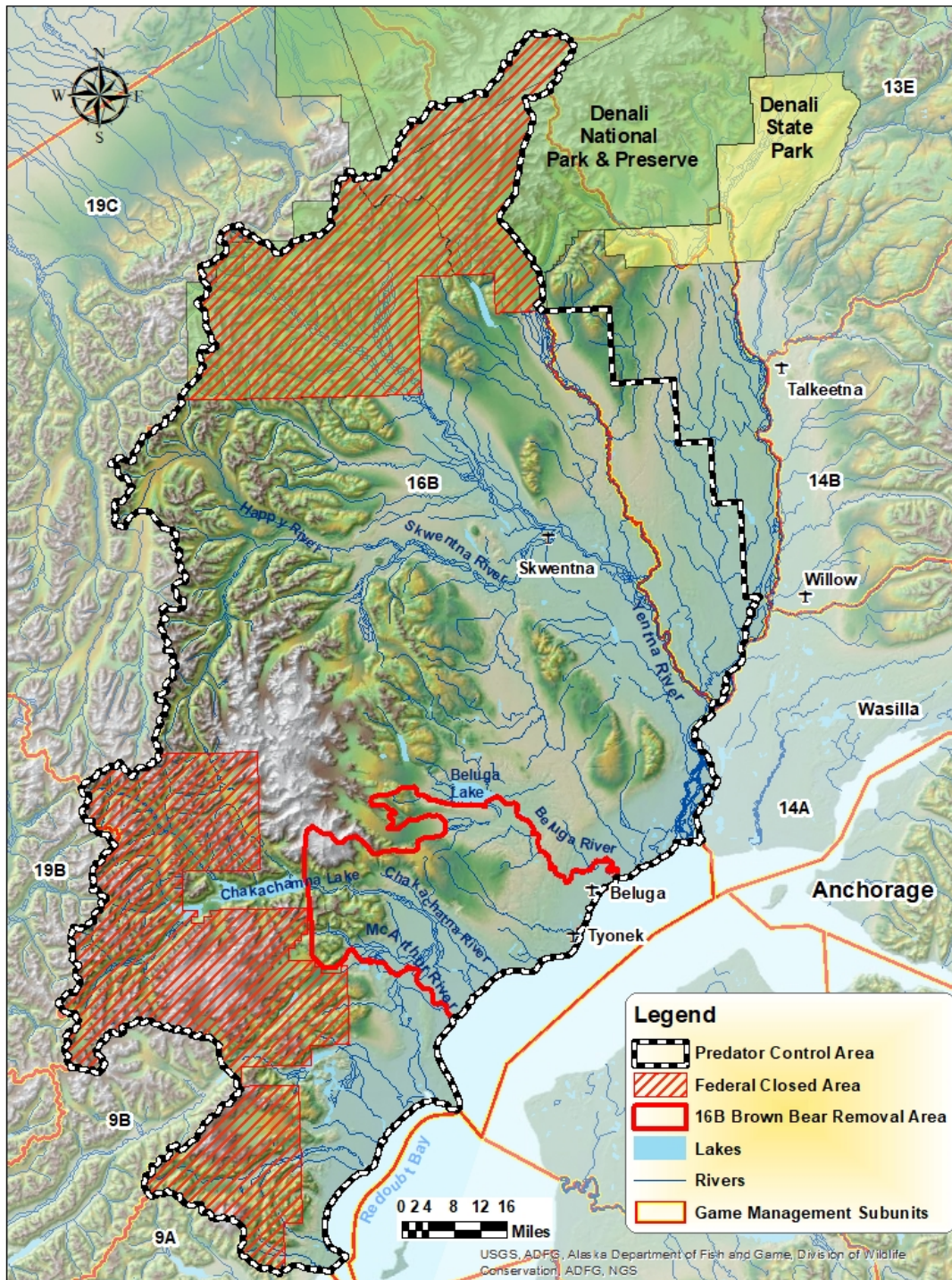


Figure 1. Intensive Management area for moose on all non-federal lands in Unit 16.

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

All available moose habitat in Unit 16B below 3,500 ft. elevation including park and preserve land (6,358 mi<sup>2</sup> total).

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

Mainland Unit 16B including park and preserve land (10,298 mi<sup>2</sup> total).

**N) Size and geographic description of area for assessing predator abundance: Mainland Unit 16B including park and preserve land (10,298 mi<sup>2</sup> total).**

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

The predation control area includes all non-federal lands in mainland Unit 16B and the western portion of Unit 16A. Area available for control is 7,792 mi<sup>2</sup> for black bears and 7,707 mi<sup>2</sup> for wolves. Wolf control areas include buffers around local airstrips. Area available for brown bear predation control is a 960 mi<sup>2</sup> area in the southern portion of Unit 16B.

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

- Moose population in Unit 16B between 6,500–7,500 animals.
- Harvest between 310 and 600 moose.

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

The program will be considered successful when the mid-points of the moose population and harvest objectives can be reasonably maintained at 7,000 and 455 respectively.

**R) Department recommendation for IM program in this reporting period: Continue with suspension of program (details provided in sections 6 or 7)**

**Refer to one or more scaled maps in the Operational Plan for areas described in this section**

*See Operational Plan for Intensive Management of Moose in Unit 16.*

**2) Prey data**

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

28 February – March 13, 2018. Population estimation surveys were conducted using the GeoSpatial Population Estimator (GSPE). A sightability correction factor was applied to the GSPE estimate to account for unobserved moose in sample units and provides a refined population estimate corrected for sightability.

**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/A and in the last year N/A? Describe comparison if necessary:**

Not applicable; no comparison exists for the wolf control portion of the program. No control was available for Unit 16B bear treatments. However, bear harvest rates varied annually among UCUs within the unit. Annual harvest rate of black bear has ranged from 2–16% of the estimated 2007 population among UCUs, and calf survival was not related to harvest rate of bears ( $P > 0.186$ ) except in 2008, when UCUs with a low black bear harvest had higher calf survival. This is the opposite of what would be predicted if the bear harvest is expected to improve calf survival.

**Date(s) of most recent age and sex composition survey (if statistical variation available, describe method here and show result in Table 1):**

Moose surveys are funded and scheduled to occur annually but are not conducted when the required survey conditions do not exist (i.e., complete snow cover, favorable weather for survey flights, etc.). The most recent age and sex composition surveys completed for each survey area is: 16B-South, 13–18 November 2010; 16B-Middle, 20–26 November 2011; 16B-North 6–11 December 2014.

**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 N/A and in the last year N/A? Describe comparison if necessary:**

Not Applicable: No comparison exists for the wolf control portion of the program and no control is available for Unit 16B bear treatments. However, bear harvest rates varied annually among UCUs within the unit. Annual harvest rate of brown bears has ranged from 1–17% of the estimated 2007 population among UCUs, and calf survival was not related to harvest rate of brown bears ( $P > 0.238$ ) in any year, 2005–2011.

**Table 1. Moose abundance, age and sex composition in assessment area (L) since program implementation in year 1 (2005) to reauthorization review in year 2013 in the Unit 16 Predation Control Area. Regulatory year is 1 July to 30 June (e.g., RY 2010 is 1 July 2010 to 30 June 2011).**

The following tables provide moose survey results that correspond to Unit 16B moose survey areas.

*16B-North*

Period	RY	Abundance (variation)	Composition (number per 100 females)			
			Young	Yearlings	Bulls	Sample size
Year 1	2004	982 ± 184	16	14	33	326
Year 2	2005	Not surveyed				
Year 3	2006	Not surveyed				
Year 4	2007	Not surveyed				
Year 5	2008	834 ± 188	11	32	60	340
Year 6	2009	Not surveyed				

Year 7	2010	Not surveyed				
Year 8	2011	Not surveyed				
Year 9	2012	Not surveyed				
Year 10	2013	Not Surveyed				
Year 11	2014	1,587 ± 152	34	34	60	835
Year 12	2015	Not surveyed				
Year 13	2016	Not surveyed				
Year 14	2017	Not surveyed				

*16B-Middle*

Period	RY	Abundance (variation)	Composition (number per 100 cows)			
			Calves	Yearlings	Bulls	Sample size
Year 1	2004	Not surveyed				
Year 2	2005	1,714 ± 218	14	8	29	628
Year 3	2006	Not surveyed				
Year 4	2007	Not surveyed				
Year 5	2008	2,446 ± 724	21	22	54	678
Year 6	2009	Composition Survey	19		39	359
Year 7	2010	Not surveyed				
Year 8	2011	3,458 ± 541	24	18	46	825
Year 9	2012	Not surveyed				
Year 10	2013	Not surveyed				
Year 11	2014	Not surveyed				
Year 12	2015	Not surveyed				
Year 13	2016	Not surveyed				
Year 14	2017	5,339 ± 972				1,875

*16B-South*

Period	RY	Abundance (variation)	Composition (number per 100 cows)			
			Calves	Yearlings	Bulls	Sample size
Year 1	2004		23	Na	23	604
Year 2	2005	Not surveyed				
Year 3	2006	Not surveyed				
Year 4	2007	Not surveyed				
Year 5	2008		18	25	78	247
Year 6	2009	Not surveyed				
Year 7	2010	2,372 ± 421	18	30	52	703
Year 8	2011	Not surveyed				
Year 9	2012	Not surveyed				
Year 10	2013	Not surveyed				
Year 11	2014	Not surveyed				
Year 12	2015	Not surveyed				
Year 13	2016	Not surveyed				

Year 14	2017	3,074 ± 541				1,106
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**Describe trend in abundance or composition:**

The 2018 population estimate in 16B-Middle was greater than the 2011 estimate and suggested an increase of approximately 8% per year. The lack of available composition data precludes determining which segments of the population are increasing however continued good calf survival indicates that the all segments of the population are experiencing increases.

The 2018 population estimate in the southern portion of 16B was greater than the 2010 estimate (3,074 vs. 2,372) and suggested an increase of approximately 3.7% annual growth. The current population estimate for Unit 16B is 10,000 ± 1,665 which is above the upper end of the population objective. The estimated moose sex ratio of 60 bulls:100 cows was unchanged from the last survey however a substantial increase in the number of calves observed with a calf to cow ratio of 34 calves:100 cows. Although Unit 16B appears to be within population objective, Unit 16B-North is at 81% recovery to the population objective midpoint.

**Table 2. 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	Unknown	Unreported	Illegal			
Year 1	2004	184	34	0	15	25	258	0	258
Year 2	2005	139	0	0	10	25	174	0	174
Year 3	2006	106	0	0	7	25	138	0	138
Year 4	2007	102	1	0	7	25	135	0	135
Year 5	2008	117	0	0	8	25	150	0	150
Year 6	2009	181	0	4	13	25	223	0	223
Year 7	2010	199	1	0	14	25	239	0	239
Year 8	2011	196	1	2	14	25	238	1	239
Year 9	2012	173	1	3	12	25	214	0	214
Year 10	2013	228	0	3	16	25	272	0	272
Year 11	2014	247	0	1	17	25	290	0	290
Year 12	2015	351	2	0	25	25	403	0	403
Year 13	2016	343	0	0	24	25	392	0	392
Year 14	2017	413	0	0	29	25	467	0	467

<sup>a</sup> Clarify (vehicle mortality, Defense of Life and Property, ceremonial, etc.).

**Describe trend in harvest:**

Harvests of bull moose are generally increasing and have surpassed the lower limit of the harvest objective. This is likely due to an increasing liberalization of the harvest regulations that began in RY2009 and an increase in the bull segment of the population that primarily resulted from the closure of the Tier I resident season from RY2006 through RY2008. The decrease in harvest in 2012 is presumed to be due to the poor weather conditions in the hunt areas similar to other areas. Increases in harvest are also attributed to two 'any bull' draw hunt opportunities that began in the fall of 2014 (DM540 and YM541). In RY2014, 200 permits were issued, and 400 permits were issued in RY2015–2017.

**Describe any other harvest related trend if appropriate:** None

**3) Predator data**

**Date(s) and method of most recent spring abundance assessment for wolves (if statistical variation available, describe method here and list in Table 3):**

A minimum wolf count (MWC) and radio collaring project was initiated in February 2017. Four out of five wolves sighted were captured and fitted with VHF or GPS radio collars in order to determine pack size and distribution. Additional wolf tracks were observed during the MWC, however poor survey conditions prevented survey completion and an adequate sample to estimate a population size. Additional surveys and collaring efforts are expected to take place as time and resources allow.

**Date(s) and method of most recent fall abundance assessment for wolves (if statistical variation available, describe method here and list in Table 2):**

The fall abundance estimate in 2003 was based on a wolf study conducted during the winter of 1999. A minimum number of wolves was established in 1999 based on the number of wolves caught during a study designed to evaluate the prevalence of louse in Unit 16 and experimentally treat wolves infested with louse. This estimate was refined in 2014, and information in this document reflects the corrected 2004 estimate of 175–180 wolves.

**Other research or evidence of trend or abundance status in wolves:** A wolf collaring effort and MWC or Sample Unit Probability Estimator survey will occur as resources and environmental conditions allow.

**Table 3. Wolf abundance objectives and removal in wolf assessment area (N) of the Unit 16 Predation Control Area. Removal objective is 73–80 % of pre-control fall abundance in year 1 of wolf predation control program, so estimated or confirmed number remaining by spring (30 April) each RY in the wolf assessment area (N) must be at least 35. If non-lethal predation control methods used by Department personnel, clarify with footnote in control removal tally.**



*Unit 16A*

Period	RY	Harvest removal		Dept. control removal	Public control removal	Total removal <sup>a</sup>	Spring abundance (variation)
		Trap	Hunt				
Year 1 <sup>b</sup>	2004	10	2	0	0	12	
Year 2 <sup>b</sup>	2005	15	4	0	0	19	
Year 3	2006	6	0	0	10	16	
Year 4	2007	6	1	0	1	8	
Year 5	2008	7	1	0	1	9	
Year 6	2009	2	0	0	1	3	
Year 7	2010	0	0	0	0	0	
Year 8	2011	0	2	0	0	2	
Year 9	2012	0	0	0	0	0	
Year 10	2013	0	0	0	0	0	
Year 11	2014	0	0	0	0	0	
Year 12	2015	1	0	0	0	1	
Year 13	2016	2	2	0	0	4	
Year 14	2017	1	0	0	0	1	

*Unit 16B*

Period	RY	Harvest removal		Dept. control removal	Public control removal	Total removal <sup>a</sup>	Spring abundance (variation)
		Trap	Hunt				
Year 1 <sup>b</sup>	2004	13	12	0	91	116	
Year 2 <sup>b</sup>	2005	18	2	0	23	43	
Year 3	2006	8	5	0	22	35	
Year 4	2007	1	3	0	20	24	
Year 5	2008	12	3	0	20	35	
Year 6	2009	0	3	0	2	5	
Year 7	2010	7	1	0	9	17	
Year 8	2011	2	0	0	15	17	
Year 9	2012	0	0	0	2	2	28-41
Year 10	2013	1	2	0	0	3	
Year 11	2014	1	5	0	0	6	
Year 12	2015	2	1	0	0	3	
Year 13	2016	4	2	0	0	6	
Year 14	2017	3	2	0	0	5	

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

<sup>b</sup> The RY04 and RY 05 removal objective was to reduce the population to a minimum of 22 wolves. In spring of 2006 the BOG increased the area for predator control to include the western portion of 16A.

**Date(s) and method of most recent spring abundance assessment for black bears (if statistical variation available, describe method here and list in Table 3.**

May 2007. Black bear densities were estimated for Unit 16B with a line-transect sampling method (E. Becker, ADF&G, unpublished data), and the density estimates obtained (187.3 black bears/1,000 km<sup>2</sup>) were extrapolated to all bear habitat in Unit 16B.

**Date(s) and method of most recent fall abundance assessment for brown bears (if statistical variation available, describe method here and list in in Table 3)**

May 2007. Brown bear densities estimated for portions of 16B-Middle and 16B-North were developed using the line-transect sampling method (E. Becker, ADF&G, unpublished data), except the estimate of brown bear density also integrated a density continuum from Units 9 and 13. The average brown bear density for these areas was 40.6 brown bears/1,000 km<sup>2</sup>.

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

An analysis of black and brown bear harvest rates predicts that the bear removal efforts have not reduced bear abundance. Similarly, analyses indicate that moose calf survival is not higher in areas with high bear harvest intensity, suggesting that the bear removal efforts have not increased moose calf survival.

**Table 4. Black bear abundance objectives and removal in the black bear assessment area (N) of the Unit 16 Predation Control Area. Removal objective is 60-80 % of pre-control spring abundance in year 1 of bear predation control program, so estimated or confirmed number remaining by fall (31 October) each RY in the bear assessment area defined in (N) must be at least 700. If non-lethal predation control methods used by Department personnel, clarify with footnote in control removal tally.**

*Unit 16A*

Period	RY	Spring abundance (variation) in area N	Harvest removal from area N		Dept. control removal from area O		Public control removal from area O		Total removal from area N <sup>a</sup>	Fall abundance (variation) in area N
			FA	SP	FA	SP	FA	SP		
Year 1	2004		21	53	---	---	---	---	75	
Year 2	2005		18	54	---	---	---	---	72	
Year 3	2006		21	73	---	---	---	---	94	
Year 4 <sup>b</sup>	2007		18	81	0	0	0	10	109	
Year 5	2008		24	77	0	0	0	15	116	
Year 6	2009		20	61	0	0	0	19	100	
Year 7	2010		67	50	0	0	6	0	123	
Year 8	2011		17	48	0	0	0	3	68	
Year 9	2012		13	30	0	0	2	1	46	
Year 10	2013		54	42	0	0	8	8	112	
Year 11	2014		20	42	0	0	7	6	75	
Year 12	2015		8	27	0	0	0	4	39	
Year 13	2016		20	40	0	0	2	0	62	
Year 14	2017		22	23	0	0	0	0	45	

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

<sup>b</sup> Year 4 (RY 2007) was the first year of the black bear control program.

*Unit 16B*

Period	RY	Spring abundance (variation) in area N	Harvest removal from area N		Dept. control removal from area O		Public control removal from area O		Total removal from area N <sup>a</sup>	Fall abundance (variation) in area N
			FA	SP	FA	SP	FA	SP		
Year 1	2004		26	126	---	---	---	---	152	
Year 2	2005		52	111	---	---	---	---	163	
Year 3	2006		75	251	---	---	---	---	326	
Year 4 <sup>b</sup>	2007	3,500±300	73	210	0	0	1	106	390	
Year 5	2008		69	188	0	0	32	108	397	
Year 6	2009		43	106	0	0	58	131	338	
Year 7	2010		83	104	1	0	136	107	431	
Year 8	2011		26	93	0	0	40	74	233	
Year 9	2012		32	53	0	0	18	60	163	
Year 10	2013		58	76	0	0	13	40	187	
Year 11	2014		46	107	0	0	63	63	279	
Year 12	2015		24	100	0	0	16	41	181	
Year 13	2016		36	139	0	0	5	0	180	
Year 14	2017		40	97	0	0	0	0	137	

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

<sup>b</sup> Year 4 (RY 2007) was the first year of the black bear control program.

While no surveys to estimate black bear abundance have been conducted in recent years, the population is above the minimum population objective based an analysis of harvests and incidental observations by biologists. Black bear harvests in Unit 16B show a strong increasing trend from an average of 130 during RY 2000–RY 2004 to 340 during RY 2005–RY 2010. Based on extrapolated densities from the 2007 population estimate, the proportion of the black bear population harvested has ranged from 2–16% in relevant UCUs, well below levels necessary to achieve an 80% population reduction.

**Table 5. Brown bear abundance objectives and removal in black bear assessment area (N) of the Unit 16 Predation Control Area. Removal objective is 60% of pre-control spring abundance in year 1 of bear predation control program, so estimated or confirmed number remaining by fall (31 October) each RY in the bear assessment area defined in (N) must be at least 375. If non-lethal predation control methods used by Department personnel, clarify with footnote in control removal tally.**

Unit 16B

Period	RY	Spring abundance (variation) in area N	Harvest removal from area N		Dept. control removal from area O		Public control removal from area O		Total removal from area N <sup>a</sup>	Fall abundance (variation) in area N
			FA	SP	FA	SP	FA	SP		
Year 1	2004		44	42	---	---	---	---	89	
Year 2	2005		64	69	---	---	---	---	133	
Year 3	2006		56	51	---	---	---	---	107	
Year 4	2007	937 ± 313	64	36	---	---	---	---	100	
Year 5	2008		84	28	3	---	---	---	115	
Year 6	2009		34	35	---	---	---	---	69	
Year 7	2010		93	26	---	2	---	27	148	
Year 8 <sup>c</sup>	2011		63	36	0	2	3	5	109	
Year 9	2012		36	42	0	0	0	3	81	
Year 10	2013		47	37	0	0	0	7	91	
Year 11	2014		55	44	0	1	0	3	103	
Year 12	2015		29	58	0	1	3	3	94	
Year 13	2016		36	36	0	0	3	0	75	
Year 14	2017		33	29	0	0	0	0	62	

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

<sup>b</sup> Year 8 (RY 2011) was the first full year of the brown bear control program.

#### 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):** Not Applicable

**Area treated and method:** Not Applicable

**Observation on treatment response:** Not Applicable

**Evidence of progress toward objective(s) (choose one: Apparent Statistical)**  
Not Applicable

**Similar trend in nearby non-treatment areas:** Not Applicable

Describe any substantial change in habitat not caused by active program: None

**Table 6. Nutritional indicators for moose in assessment area (L) of the Unit 16 Predation Control Area.**

Period	RY	Pregnancy rate of radio-collared cows <sup>a</sup>	Twinning rate of radio-collared cows <sup>b</sup>	Average rump fat on lactating females in the Fall (cm) <sup>c</sup>
Year 1	2004	71%	51%	--
Year 2	2005	83%	45%	3.7
Year 3	2006	80%	50%	2.4
Year 4	2007	71%	48%	1.8
Year 5	2008	79%	59%	--
Year 6	2009	84%	47%	--
Year 7	2010	72%	54%	--
Year 8	2011	81%	48%	--
Year 9	2012	91%	67%	--
Year 10	2013	89%	69%	--
Year 11	2014	91%	47%	--
Year 12	2015	87%	59%	--
Year 13	2016	83%	42%	--
Year 14	2017	76%	62%	--

<sup>a</sup> Apparent pregnancy rate based on field observations of calves born to radiocollared cows. The reported values likely underestimate calf production in cases where calves were born but lost before they could be observed by biologists.

<sup>b</sup> Apparent twinning rate is based on field observations of the number of calves born to individual radio collared cows. The reported values likely underestimate twinning in cases where twins were born, but one or both were lost before they could be observed.

<sup>c</sup> Rump fat measurements are collected using ultrasonography during the fall capture of adult cow moose.

**Where objectives on nutritional condition were listed in the Operational Plan, describe trend in condition indices since inception of (a) habitat enhancement or (b) enhanced harvest:**

Not Applicable

**Evidence of trend:** Not Applicable

**Similar trend in nearby non-treatment areas?** Not Applicable

## 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 the Unit 16 Predator 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	Cost		
Year 10	2013	0.0	0.0	1.0	7.9	7.9	126.5
Year 11	2014	0.0	0.0	1.0	8.8	8.8	54.8
Year 12	2015	0.0	0.0	1.0	8.8	8.8	51.1
Year 13	2016	0.0	0.0	1.0	8.8	8.8	34.8
Year 14	2017	0.0	0.0	0.5	4.4	4.4	111.5
Year 15	2018	0.0	0.0	0.5	4.4	4.4	59.9

<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 16 Predation Control Area —skip in final year and go to section 7**

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

There has been an increase in moose (primarily bull) abundance since 2005. Recent survey data also identifies an increase in the calf-to-cow ratios. Moose calf survival during the past three years has been greater than 29% and the survival trend had increased annually by 3% between 2005 and 2015. Calf survival to fall decreased since 2016 however it is well above the amount needed to ensure continued population growth. A GSPE survey of Unit 16A, adjacent to Unit 16B, was completed in the fall of 2017. The total population estimate for the Unit was 8,654, more than twice the estimate of the population from the 2009 survey of 2,574. The calf-to-cow ratio was 36 – indicating an expanding population. Winter surveys of the middle and southern portions of Unit 16B in RY17 place the population at 10,000 moose which is 2,500 moose above the upper end of the population objective.

**Has achievement of success criteria occurred?**

Population estimates indicates that the moose population is well above the midpoint of

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<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.

the population objective of 7,000 moose. Harvest is also within objectives and is approaching the midpoint of the range.

**Recommendation for IM practices (predation control):** Continue Modify **Suspend** Terminate

The decision framework to suspend predator control activities is based on achieving predator reduction objectives and reasonably maintaining the moose population and harvest at or above the midpoint of their IM objectives. The moose population in the assessment area is estimated at 10,000 ( $\pm$  1,665) which is above the midpoint of the population objective. Currently, moose in 16B-South are at 183% of the midpoint of the objective, 16B-Middle is at 159% of the midpoint of the objective, and 16B-North is at 81% of the midpoint of the objective. Calf-to-cow ratios and calf survival also have improved. The moose harvest is within the IM objective and approaching the midpoint of the range.

Accumulated information on wolf abundance suggests that reduction objectives were likely achieved in spring 2013, and the department suspended wolf control in 2015. Additional population information is needed to ascertain current abundance for wolves. A wolf collaring effort began in 2017 and will continue in the spring of 2019 to assist in enumeration. A wolf survey is also planned for the spring/winter of 2019.

To date, bear removal has not approached levels necessary to reach reduction goals (remove 60% of the brown bear population and 80% of the black bear population). Because the level of participation and the resulting harvest observed since inception is inadequate to meet these objectives, the department suspended bear control efforts on January 1, 2017.

**7) Evaluation (1 February) for program renewal (following final Year 18 [RY2021]) and Department recommendations for the Unit 16 Predator Control Area**

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

**Has achievement of success criteria occurred (describe)?**

**Recommendation for IM program:** Continue Modify Suspend Terminate

**Rationale for recommendation on overall program:**

**Other recommendations (if continuation is recommended, specific actions on individual practices):** \_\_\_\_\_

