

Annual Report to the Alaska Board of Game on Intensive Management for Moose with Wolf Predation Control in Game Management Unit 24B

**Prepared by the Division of Wildlife Conservation
February 2018**



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 92.124(c)

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

February (annual report) Year 2018

C) Program name: Unit 24B wolf predation control program (Fig. 1)

D) Existing program has an associated Operational Plan: Version 1 - February 2012

E) Game Management Unit(s) fully or partly included in IM program area:
Unit 24B

F) IM objectives for moose: population size of 4,000-4,500 and harvest of 150-250 moose.

G) Month and year the current predation control program was originally authorized by the Board: March 2012. Indicate date(s) if renewed: No renewals

H) Predation control is currently inactive in this IM area, and the plan will expire June 30, 2018. There are no plans to reactivate predation control at this time.

I) If active, month and year the current predation control program began: March 2012

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 24B is 13,523 mi²

L) Size and geographic description of area for assessing ungulate abundance: Upper Koyukuk Management Area (UKMA) is 1,360 mi²

M) Size and geographic description of area for ungulate harvest reporting: (1) Allakaket and Alatna Residents, (2) 24B is 13,523 mi², and (3) UKMA is 1,360 mi²,

N) Size and geographic description of area for assessing predator abundance: UKMA is 1,360 mi²

O) Size and geographic description of predation control area: UKMA is 1,360 mi²

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

- P) Criteria for evaluating progress toward IM objectives:** Calf:cow ratios, yearling bull:cow ratios, moose abundance, collared calf survival, collared yearling survival, harvest reporting on report cards, days hunted on report cards, harvest reporting from Household Surveys, Catch-per-unit-effort from Household Surveys (hours/hunt trip, miles traveled/hunt trip, cost/hunt trip, etc.)
- Q) Criteria for success with this program:** Harvest of 35-40 moose in UKMA.
- R) Department recommendation for IM program in this reporting period:** Continue monitoring of program. (details provided in section 6)

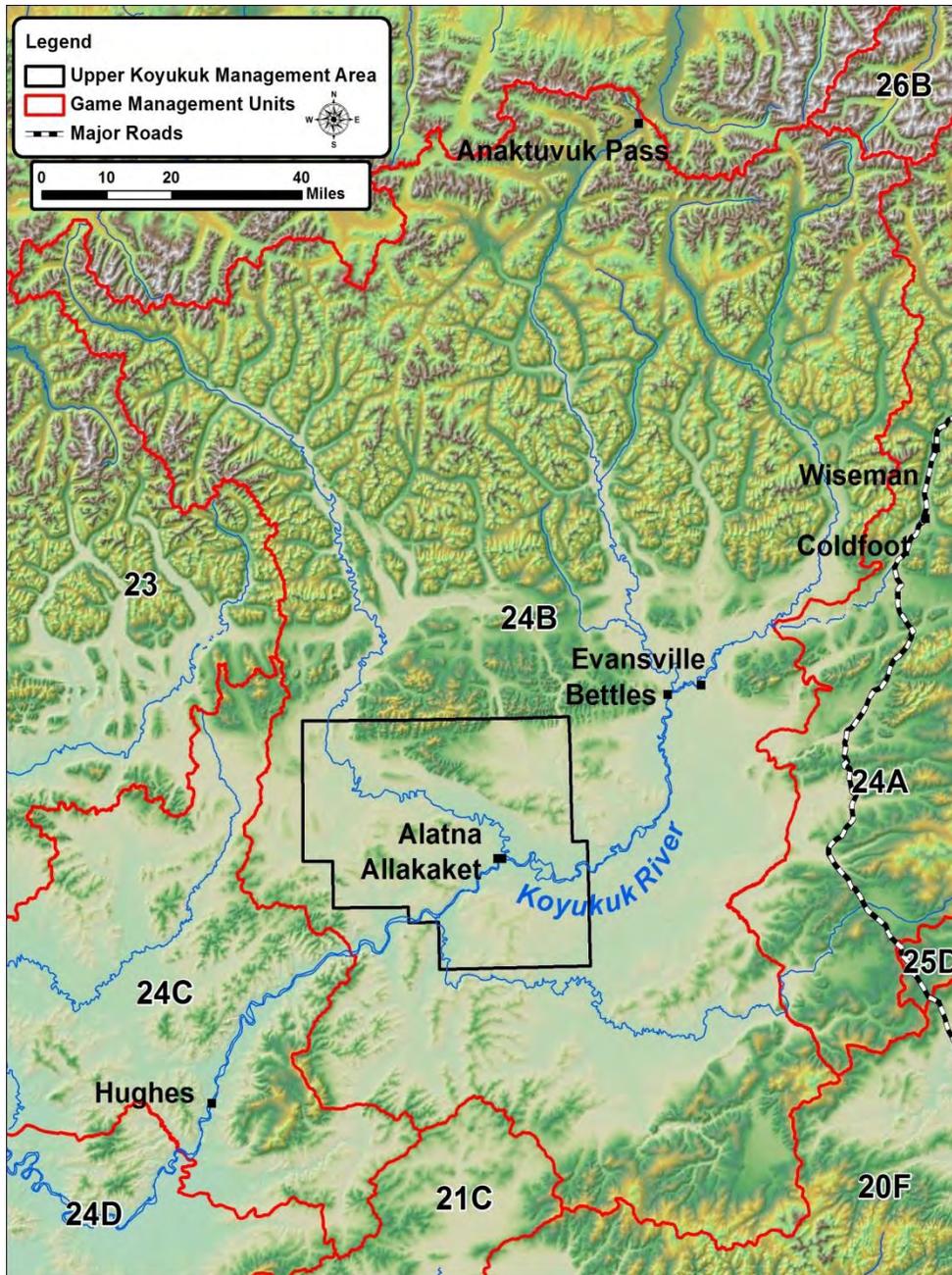


Figure 1. Upper Koyukuk Management Area (1,360 mi²) in Game Management Unit 24B (13,523 mi²).

2) Prey data

Date(s) and method of most recent fall abundance assessment for moose: November, 2017
Geospatial Population Estimator (GSPE) (Table 1)

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 for abundance comparisons

Date(s) of most recent age and sex composition survey (if statistical variation available, describe method here and show result in Table 1): November, 2017 GSPE (Table 1)

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 established only for survival rate comparisons among radiocollared moose (Table 2).

Table 1. Moose abundance, age and sex composition since one year before program implementation in year 0 (wolf control began in year 2) in Upper Koyukuk Management Area (UKMA). Regulatory year (RY) is 1 July to 30 June (e.g., RY 2010 is 1 July 2010 to 30 June 2011).

Upper Koyukuk Management Area						
Period	RY	Abundance (variation) ^a	Composition (number per 100 females)			
			Calves	Yearling males	Males	Total <i>n</i> ^b
Year 0	2010	405 (±23.7%; 90% C.I.)	34	8	52	-
Year 1	2011	324 (±29.0%; 90% C.I.)	49	8	103	-
Year 2	2012	-	-	-	-	-
Year 3	2013	300 (±31.4%; 90% C.I.)	37	11	67	-
Year 4	2014	-	-	-	-	-
Year 5	2015	509 (±26.9%; 90% C.I.)	54	13	78	-
Year 6	2016	-	-	-	-	-
Year 7	2017	631 (±22.8%; 90% C.I.)	49	18	84	-

^aNovember Geospatial Population Estimator (GSPE) surveys (observed moose, not corrected for sightability).

^bComposition estimated from GSPE surveys.

Describe trend in abundance or composition: A multiplicative mixed effects model was fit using Bayesian methods (JAGS) to estimate population growth for the UKMA. This model is parameterized as a simple exponential growth model with a random effect to account for inter-annual variation while incorporating intra-survey variance. The mean of the posterior distribution of Lambda was 1.0914 (SE=0.0542). A 90% credible interval for the posterior distribution of Lambda is (1.0178, 1.1667) indicating that there is evidence of population growth. Taking the natural logarithm of the posterior mean exponential growth rate, Lambda, results in an average annual growth of 8.75%.

Bayesian Multiplicative Model Fit GSPE Total Moose Estimates

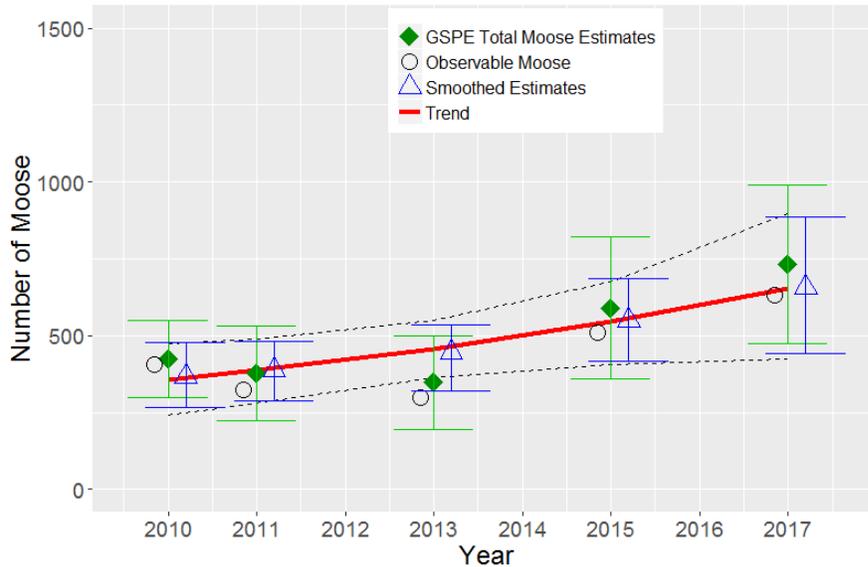


Table 2. Radiocollared moose survival rates since implementation in year 1 (wolf control began in year 2) in Upper Koyukuk Management Area (UKMA) and experimental non-treatment area. Survival rate calculated from date of collaring to May 31 of the regulatory year (normalized birthdate). Regulatory year is 1 July to 30 June (e.g., RY 2011 is 1 July 2010 to 30 June 2012).

Upper Koyukuk Management Area (UKMA)							
Period	RY	Collared calves (n)	Survival (%)	# of months cohort monitored	Collared yearlings (n)	Survival (%)	# of months cohort monitored
Year 1	2011	21	100	2	-	-	-
Year 2	2012	30	97	7	21	81	12
Year 3	2013	30	73	7	29	72	12
Year 4	2014	25	84	7	22	55	12
Year 5	2015	30	77	7	21	62	12
Year 6	2016	-	-	-	23	52	12
experimental non-treatment area							
Period	RY	Collared calves (n)	Survival (%)	# of months cohort monitored	Collared yearlings (n)	Survival (%)	# of months cohort monitored
Year 1	2011	20	80	2	-	-	-
Year 2	2012	30	73	7	16	56	12
Year 3	2013	30	63	7	15	93	12
Year 4	2014	25	68	7	19	68	12
Year 5	2015	30	83	7	17	59	12
Year 6	2016	-	-	-	25	84	12

Table 3. Moose harvest beginning in year 1 (wolf control began in year 2) in (1) Allakaket and Alatna using Household Survey data collected by Subsistence Division, (2) Unit 24B using harvest reporting data collected by Wildlife Conservation Division, and (3) UKMA. Regulatory year is 1 July to 30 June (e.g., RY 2011 is 1 July 2011 to 30 June 2012).

Period	RY	(1) Allakaket/Alatna Household Surveys ^a				(2) Harvest Reports ^b			(3) UKMA Calculated Harvest ^c
		"Catch-per-unit-effort"			Estimated Harvest ^c	Allakaket /Alatna harvest ^c	24B Harvest (all other hunters)	24B Total Harvest ^d	
		Miles per Trip	Cost per Trip	Hours per Trip					
Year 1	2011	61.8	\$93.60	12.9	16.2	4	28	31	16
Year 2	2012	60.6	\$97.30	14.8	18.7	13	24	33	16
Year 3	2013	64.5	\$102.30	17.6	11.8	3	24	27	10
Year 4	2014	62.7	\$118.80	15.9	20.0	12	37	49	14
Year 5	2015	37.8	\$164.77	15.9	18.3	7	27	34	n/a
Year 6	2016	57.2	\$95.98	17.1	20.7	12	20	30	n/a
Year 7	2017 ^f	n/a	n/a	n/a	18.0	10	26	36	n/a

^aAlatna and Allakaket weighted averages.

^bUnit 24B total reported harvest, equals sum of previous two columns minus Allakaket/Alatna harvest outside of Unit 24B.

^cIncludes some harvest from outside of Unit 24B.

^dAn unknown amount of moose harvest occurs on federal harvest reporting mechanisms.

^eUsing Uniform Coding Unit (UCU) location information, calculated harvest includes a portion of the Household Survey harvest determined to be from within the UKMA and a portion of the 24B total harvest from within the UKMA.

^fPreliminary data

Describe trend in harvest: Additional data collection is needed to analyze for trend

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 2): March 2017 observations during aerial surveys

Date(s) and method of most recent fall abundance assessment for wolves (if statistical variation available, describe method here and list in Table 2): May 2015, calculated by adding total removal from UKMA to wolves estimated remaining post-control.

Other research or evidence of trend or abundance status in wolves: Pre-control wolf abundance in the UKMA was estimated at 25-60 wolves.

Table 4. Wolf abundance objectives and removal in Upper Koyukuk Management Area (UKMA) in year 1 to year 2 (wolf control began in year 2). Removal objective is to reduce wolf numbers as low as possible in the UKMA and to maintain 100-140 in all of Unit 24B to ensure wolves persist in the unit. The fall 2008 modeled wolf population estimate for all of Unit 24B was 202-284. Regulatory year is 1 July to 30 June (e.g., regulatory year 2011 is 1 July 2011 to 30 June 2012).

Period	RY	Pre-control abundance	Harvest removal by		Dept. control removal	Public control removal	Total removal ^a	Post-control abundance
			Trap	Hunt				
Year 1	2011	25–60	0	2	0	n/a	2	23–58
Year 2	2012	36–37	0	0	23	n/a	23	13–14
Year 3	2013	21–25	0	0	0	n/a	0	21–25
Year 4	2014	28–29	0	0	26	n/a	26	2–3
Year 5	2015	10–15	0	0	10	n/a	10	2–3
Year 6	2016	2-3	0	0	0	n/a	0	10–15
Year 7	2017	10–15	0	0	0	n/a	0	9–16

^aAdditional 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: No active habitat enhancement

Describe any substantial change in habitat not caused by active program: A wildfire in summer 2013, occurred in Siruk Creek drainage with a fire perimeter of 20,363 acres in the UKMA. A wildlife in summer 2013, occurred in Prospect Creek drainage with a fire perimeter of 64,078 acres partially (Approx. 70%) within experimental non-treatment area.

Table 5. Nutritional indicators for moose in Unit 24B and a portion of Unit 24A. Regulatory year is 1 July to 30 June (e.g., regulatory year 2011 is 1 July 2011 to 30 June 2012).

Period	Regulatory Year	Twinning Rate (n)
Year 0	2010	37% (54)
Year 1	2011	52% (52)
Year 2	2012	43% (49)
Year 3	2013	42% (45)
Year 4	2014	n/a
Year 5	2015	n/a
Year 6	2016	n/a
Year 7	2017	n/a

5) Costs specific to implementing Intensive Management

Table 6. Unit 24B 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 24B. Fiscal year (FY) is also 1 July to 30 June but the year is one greater than the comparable RY (e.g, Fiscal Year 2012 is 1 July 2012 to 30 June 2013).

Period	Fiscal Year ^a	Predation control ^b		Other IM activities		Total IM cost	Research cost ^e
		Time ^c	Cost ^d	Time	Cost ^d		
Year 1	2012	0.0	0.0	5.0	137.5	137.5	0.0
Year 2	2013	2.1	43.3	6.0	150.8	194.1	0.0
Year 3	2014	0.6	8.5	4.0	100.8	109.3	0.0
Year 4	2015	0.4	50.7	4.0	130.6	181.0	0.0
Year 5	2016	0.4	16.0	4.0	23.0	39.0	0.0
Year 6	2017	0.0	0.0	4.0	23.0	39.0	0.0
Year 7	2018 ^f	0.0	0.0	4.0	23.0	30.5	0.0

^aFiscal year (FY) begins July 1 and ends on June 31, for example FY2012 begins July 1, 2011 and ends June 30, 2012.

^bState or private funds only.

^cPerson-months (22 days per month)

^dSalary plus operations

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

^fProjected amounts.

6) Department recommendations for annual evaluation (February 2018) following Year 7 for Unit 24B

Has progress toward defined criteria been achieved? Yes

Has achievement of success criteria occurred? No

Recommendation for IM practice(s): Predator control activities have been suspended in Unit 24B, and the department recommends that this program remain inactive. We will continue monitoring the results of the program through moose harvest estimates and periodic population surveys.