

**Annual Report to the Alaska Board of Game on
Intensive Management for Mulchatna Caribou
with Wolf Predation Control in Game Management
Units 9B, 17B&C, and 19A&B**

**Prepared by the Division of Wildlife Conservation
February 2022**



1) Description of IM Program¹ 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 92.111²

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

February X (annual report) Year 2022

C) Program name: Mulchatna Caribou Herd Predation Management Area

D) Existing program does not have an associated Operational Plan, it does have a detailed Intensive Management Plan in regulation (5 AAC 92.111).

E) Game Management Units (Units) fully or partly included in IM program area: Units 9B, 17B&C, and 19A&B

F) IM objectives for caribou: population size 30,000–80,000 harvest 2,400–8,000.

G) Month and year the current predation control program was originally authorized by the Board:

The plan was initially authorized in March 2011 for Units 9B and 17B&C and was modified in March 2012 to include Units 19A&B.

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

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

- March 1, 2012 in Regulatory Year (RY) 2011 (RY 2011 = July 1, 2011 through June 30, 2012).
- Reauthorized in March 2017 for six more years.

J) A habitat management program funded by the Department or from other sources is currently active in this IM area (Y/N): N

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

39,683 sq. miles in Units 9B, 17B&C, and 19A&B.

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

Approximately 50,000 sq. miles and includes the range of the Mulchatna Caribou Herd, and extends beyond Units 9B&C, 17B&C, and 19A&B into Unit 18.

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

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

² [Regulatory numbers for existing IM programs formerly under 5AAC92.125 were divided into groups and given new numbers in October 2012 (see IM Plan template--Version 3, January 2013)]

³ The interim annual update may be limited only to sections that changed substantially since prior annual report [e.g., only Tables 3 and 6 in areas with a fall ungulate survey and only wolf control]

Approximately 50,000 sq. miles and includes the range of the Mulchatna Caribou Herd and extends beyond Units 9B&C, 17B&C, and 19A&B into Unit 18.

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

The area for assessing predator abundance includes all the predation control area and is described in 'O' below.

O) Size and geographic description of predation control area:

Initially the predation control area designed in RY12 was named the Mulchatna Wolf Control Area. However, this area was expanded in RY17 to include additional calving grounds and adjacent habitat used by the Mulchatna herd since RY13. Because this newly expanded area has a different starting date for SDA hunters (December 1) than the original area (February 1), we refer to these areas with different names. The initial control area was renamed, Kemuk Wolf Control Area (KWCA) while the newly added area is named Greater Mulchatna Wolf Control Area (GMWCA). Both areas combined include approximately 9,844 mi².

Kemuk Wolf Control Area:

That portion of Unit 17B south of a line between Tikchik Mountain (N 60.05, W 158.300) and Sleitat Mountain (N 60.05, W 157.067), then southeast to the Kuktuli Hills (N 59.80, W 156.300), then southwest into 17C to a point at N 59.32, W 157.066, then west to N 59.32, W 158.300, then north returning into 17B to the beginning point at Tikchik Mountain (N 60.05, W 158.300).

Greater Mulchatna Wolf Control Area:

That portion of Unit 17B east of a line between Tikchik Mountain (N 60.05, W 158.300) north to a point south of the Shotgun Hills (N 60.37, W 158.300), then east to the headwaters of Klutapak Creek (N 60.37, W 157.379), then a line northeast to a point on the Unit 17B/19B boundary (N 60.68, W 156.841) into Unit 19B northeast to a point at the junction of the S. Fork Hoholitna River and the Hoholitna River (N 60.91, W 156.243), then track east just south of the north bank of the Hoholitna River to a point at the mouth of Whitefish Lake (N 60.94, W 154.993), then a line east to a corner point at N 60.94, W 154.595, then south into Unit 17B and across the upper Mulchatna River to a point N 60.78, W 154.595, then east to N 60.77, W 154.539, south to N 60.58, W 154.539, then southwest to N 60.52, W 154.619, west to N 60.52, W 154.747 on the Unit 17B/9B boundary, then south into Unit 9B to a point N 60.42, W 154.746 and southwest crossing through a portion of Unit 9B and back into Unit 17B, crossing the Kuktuli River to the Unit 17B/9B boundary (N 59.78, W 155.566), then southwest across Unit 9B to the Unit 9B/17C boundary (N 59.33, W 156.884), then west along the drainage of Lower Klutuk Creek to the Unit 9B/17C boundary (N 59.32, W 156.988), then west to the southeast point of the Kemuk WCA boundary (N 59.32, W 157.067) then excluding the entirety of the Kemuk WCA, track northeast on the Kemuk WCA boundary to the Kuktuli Hills (N 59.80, W 156.300), northwest to Sleitat Mountain (N 60.05, W 157.067), then west returning to the starting point at Tikchik Mountain (N 60.05, W 158.300).

P) Criteria for evaluating progress toward IM objectives:

- Fall calf-to-cow ratios

- Fall bull-to-cow ratio
- Caribou abundance

Q) Criteria for success with this program:

- Fall bull-to-cow ratio can be maintained at a minimum of 35 bulls:100 cows.
- Fall calf-to-cow ratio can be sustained above 30 calves:100 cows.
- The population can grow at a sustained rate of 5% annually.
- Caribou harvest objectives are met.

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

The Department recommends continuation of the predation control program during RY2022. We will continue monitoring the Mulchatna Caribou herd to determine progress towards IM objectives (details provided in Section 6).

S) IM Annual Report data and information inclusion date:

February X (annual report) Year 2021

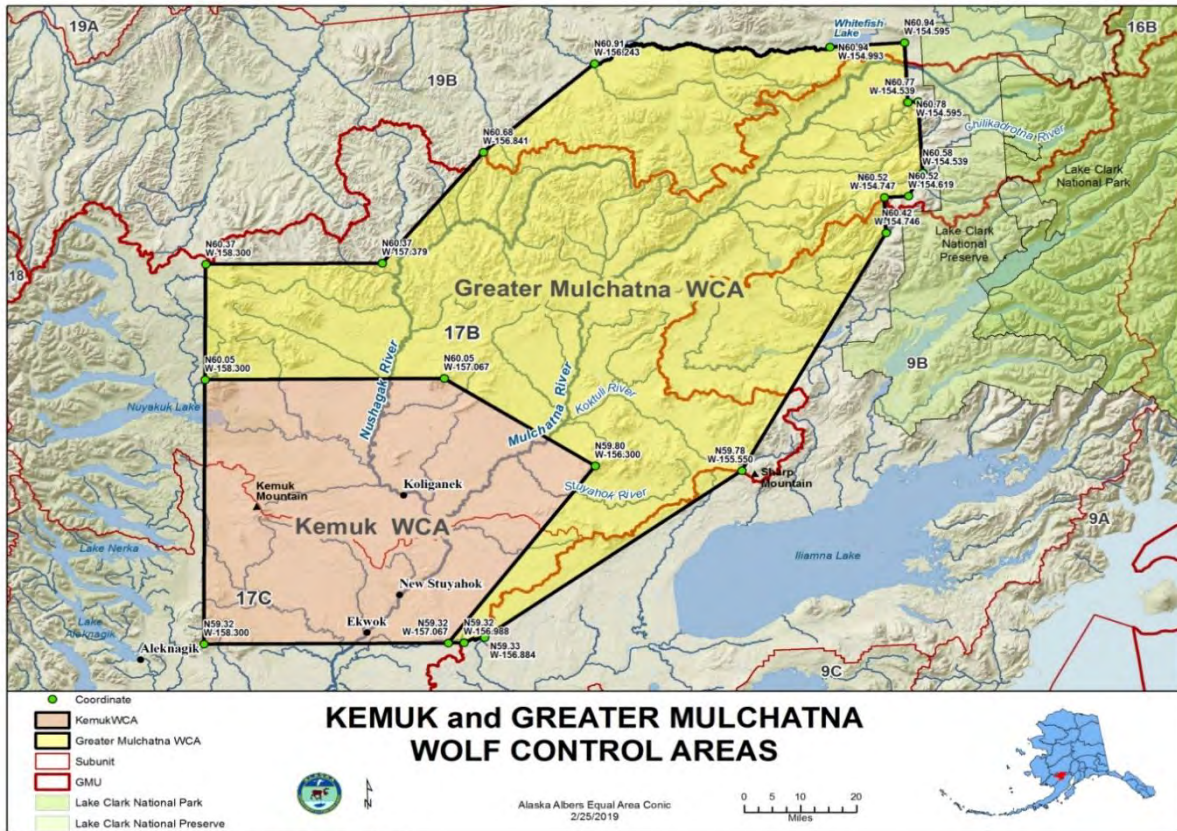


Figure 1. Location of the Kemuk and Greater Mulchatna Wolf Control Areas in Game Management Units 9B, 17B&C, and 19A.

2) Prey data

Date(s) and method of most recent summer abundance assessment for caribou (if

statistical variation available, describe method here and show result in Table 1):

The last successful photocensus of post-calving aggregation was conducted on June 27 and 28, 2021.

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:

The IM area comprises a small portion of the annual range of the Mulchatna caribou herd. The annual range of most caribou in the herd includes use of areas both within and outside of the IM area, but the spatial and temporal characteristics of movements within the IM area are variable. The Mulchatna caribou herd declined appreciably across its range since the 2016 population estimate. It is difficult to quantify trends in abundance relative to treatment and non-treatment areas.

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

October 5–6, 2020

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 (Y/N) N/A and in the last year (Y/N) N/A? Describe comparison if necessary:

The IM area comprises a small portion of the annual range of the Mulchatna caribou herd and was initially aligned closely with the calving ground of the western segment of the population (RY2011–2013), and the summer and winter grounds of the eastern segment of the population. In recent years however (RY2014–2016), this western segment of the population calved outside the wolf control area, but close enough that they still may have benefitted from any removal of wolves. Teasing out treatment and non-treatment effects was compounded by the fact that these two areas were too close spatially to really be considered independent of one another. The composition data in Table 1 suggests the caribou in the western segment of the population were most successful in rearing calves during RY2011–2013 when they were calving within the wolf removal area. During RY2017, the wolf control area was expanded to include much of the calving grounds of the eastern segment of the Mulchatna herd in the upper Mulchatna River. Both portions of the herd experienced relatively high calf ratios in fall of 2018, yet these ratios declined in 2019 (Table 1). At this point we are unable to accommodate a true experimental versus control comparison given the nearness in proximity of both calving grounds to the wolf control area.

The combined ratio of 36 calves per 100 cows is higher than last year, RY 19, and is above the 30:100 objective for the second time in the past 7 years. The ratio was 46:100 in the eastern portion of the range and 26:100 in the west. The percent calves in the herd, 21%, slightly higher than RY19 is also highest since RY10.

The combined ratio of 34 bulls per 100 cows is lower than RY19 (above objective), and lower than most of the past 7 years. Bull-to-cow ratios in the East are 51:100 and 17:100 in the West. The percent bulls in the herd, 19%, is the lowest marginally, since RY13.

Table 1. Caribou abundance, age, and sex composition in assessment area (L) since

program implementation in year 1 (not exclusively limited to inception of predation control) to 2019 in Mulchatna Caribou Herd Predation Management Area. Regulatory year is 1 July to 30 June (e.g., RY 2010 is 1 July 2010 to 30 June 2011).

Eastern Segment of the MCH

		Composition (number per 100 cows)		
Period	RY	Calves	Bulls	Total (<i>n</i>)
Year 0	2010	17	13	2,581
Year 1	2011	14	18	2,649
Year 2	2012	22	17	2,217
Year 3	2013	14	27	1,479
Year 4	2014	33	31	2,226
Year 5	2015	31	32	2,827
Year 6	2016	27	38	2,525
Year 7	2017	28	33	2,587
Year 8	2018	39	33	2,515
Year 9	2019	31	42	1,851
Year 10	2020	46	51	1,472

Western Segment of the MCH

		Composition (number per 100 cows)		
Period	RY	Calves	Bulls	Total (<i>n</i>)
Year 0	2010	23	23	2,011
Year 1	2011	28	34	1,995
Year 2	2012	38	29	2,636
Year 3	2013	23	27	1,743
Year 4	2014	27	38	2,567
Year 5	2015	27	38	2,587
Year 6	2016	18	40	2,670
Year 7	2017	18	31	2,573
Year 8	2018	29	32	2,283
Year 9	2019	18	41	1,645
Year 10	2020	26	17	1,728

All Areas Combined

		Abundance (variation)	Composition (number per 100 cows)		
Period	RY		Calves	Bulls	Total (<i>n</i>)
Year 0	2010	-	20	17	4,592

Year 1	2011	-	19	22	5,282 ^a
Year 2	2012	19,000 – 27,000 ^b	30	23	4,853
Year 3	2013	15,000 – 22,000 ^b	19	27	3,222
Year 4	2014	21,000 – 32,000	30	35	4,793
Year 5	2015	30,736 – 38,190	29	35	5,414
Year 6	2016	21,346 – 33,137	22	39	5,195
Year 7	2017	-	23	32	5,160
Year 8	2018	-	34	32	4,798
Year 9	2019	11,581 – 15,315	25	42	3,496
Year 10	2020	10,249 – 16,647	36	34	5,357
Year 11	2021	11,892-13,782	-	-	-

^a Includes caribou not assigned to the Eastern or Western Segment of the MCH.

^b Estimate of abundance based on the Rivest methodology (Rivest et al. 1998).

Describe trend in abundance or composition:

Trends in calf-to-cow ratios are variable from year to year and are still below those observed in the late 1980s–early 1990s when the herd was in a significant growth phase. Bull-to-cow ratios were on a positive trend and improved each year during RY2010–2016 but declined in RY2017 and have been variable since. Currently (Fall 2020) the calf-to-cow ratio is above objectives, and the bull-to-cow ratio is slightly below objectives. The RY2021 point estimate for abundance of 12,837 +/- 945 continues to remain below objectives.

Table 2. Caribou 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 ^a	Total
		Male	Female	Unk Sex	Unreported	Illegal			
Year 0	2010 ^b	250	220	4	Unk	Unk	470	Unk	474
Year 1	2011 ^b	242	243	9	Unk	Unk	494	Unk	494
Year 2	2012 ^b	184	173	4	Unk	Unk	361	Unk	361
Year 3	2013 ^c	70	35	1	Unk	Unk	106	Unk	106
Year 4	2014 ^c	125	52	5	Unk	Unk	182	Unk	182
Year 5	2015 ^c	159	74	2	Unk	Unk	235	Unk	235
Year 6	2016 ^c	209	119	2	Unk	Unk	330	Unk	330
Year 7	2017 ^c	250	186	4	Unk	Unk	440	Unk	440
Year 8	2018 ^c	147	90	1	Unk	Unk	238	Unk	238
Year 9	2019 ^c	84	42	1	Unk	Unk	127	Unk	127
Year 10	2020 ^c	55	0	1	Unk	Unk	56	Unk	56
Year 11 ^d	2021	0	0	0	Unk	Unk	0	Unk	0

^a Clarify (vehicle mortality, Defense of Life and Property, Mortuary, etc.).

^b Data from WinfoNet, Harvest Information, Data Download (harvest report cards).

^c Data from WinfoNet, Permitting, Hunt Statistics, General Hunt, RY, RC503.

^d No open state or federal hunting season.

Describe trend in harvest:

Reported harvest is still below objectives (2,400–8,000). Historically most harvest occurs during late winter, but this has changed in recent years due to early closures and hunt periods restricted to the fall. Most hunters are local residents (i.e., people who live within the herd's

range, primarily residents of Unit 18). Marginal snow conditions RY2013–RY2015 prevented hunters from accessing caribou with snowmachines resulting in low harvest. Improved snow conditions in RYs 2016 and 2017 enabled hunters to access caribou by snowmachine which increased hunting success. RY2018 was a poor snow year, resulting in less reported harvest than in RY2016 and 2017. In RY2019 harvest was restricted to bulls only and the season was closed in January. In RY2020, only a fall season was offered with a bag limit of 1 bull. We suspect the actual harvest is substantially higher than the reported harvest. There was no open hunting season for Mulchatna caribou in 2021. Some unreported harvest did occur.

Describe any other harvest related trend if appropriate:

NA

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):

See below

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

Other research or evidence of trend or abundance status in wolves:

In March 2017, the department initiated a study including deployment of GPS collars on wolf packs in the IM area. The objectives of the study are to map wolf pack territories, determine seasonal pack sizes, and evaluate change in wolf density relative to the wolf removal program. During the initial capture field work, wolf tracks were common and found throughout much of the MCH WCA. Seventeen wolves were collared, comprising 5 packs and multiple lone wolves. Mean minimum observed pack size was 6 wolves during spring and 9 wolves during fall 2017. A preliminary density calculation based on 7 months of GPS data and minimum observed seasonal pack sizes resulted in spring and fall 2017 wolf densities of 2.2 and 3.0 wolves per 1000 km², respectively, in the Mulchatna and lower Nushagak River drainages. The estimated fall density of 3.0 wolves calculates to a minimum of 76 wolves comprising the packs that inhabit the MCH WCA. This estimate should be viewed cautiously, as we did not have all the known packs within the WCA collared, and the estimate does not include lone wolves that are known to occur in the WCA.

In RY2017, favorable snow conditions like conditions the first year of the program, and an expanded WCA boundary facilitated the highest reported wolf harvest since the first year of the wolf control program. A total of 70 wolves were reported harvested in the WCA, including 9 of 12 (75%) remaining radiocollared wolves. The density of harvested wolves alone equals 3.1 wolves per 1,000 km² and compared to the minimum estimate of pack dwelling wolves previously mentioned, indicates a significant population reduction obtained during RY2017. Observations during wolf capture operations in April 2018 were that both the occurrence and distribution of wolf tracks was down substantially from the previous spring, and most sets of tracks encountered were of singles or pairs of wolves. During that effort we only found a total of 5 additional wolves: 1 breeding pair and 3 lone females. The

2018 mean spring pack size was 2 wolves. Three packs produced a minimum of 16 pups during the summer, and 2018 fall mean pack size was 7 wolves.

Table 3. Wolf abundance objectives and removal in the Kemuk and Greater Mulchatna Wolf Control Areas (WCAs). Removal objective is to annually remove 100 % of the wolves in the wolf control areas, so the estimated or confirmed number remaining in the control area by the May calving season each regulatory year is 0.

Period ^a	RY	Non-SDA Harvest removal from WCAs		SDA Public control removal from WCAs	Total removal ^b from WCAs	Total Removal in Units 17B & C, and Western 9B	Minimum Spring abundance (variation) WCAs
		Trap	Hunt				
Year 1	2011	14	52	11	77	102	14
Year 2	2012	17	0	0	17	35	-
Year 3	2013	0	10	0	10	26	-
Year 4	2014	0	0	0	0	6	-
Year 5	2015	19	2	0	21	27	-
Year 6	2016	26	28	3	57	67	-
Year 7	2017 ^c	30	10	30	70	86	-
Year 8	2018	12	0	11	23	29	-
Year 9	2019	3	45	28	76	82	-
Year 10	2020	20	4	28	52	104	-

^a Each respective year of data is from the ADF&G WinfoNet database: Fur Sealings, Fur Sealing Lookup.

^b Additional removal may be Defense of Life and Property (DLP), vehicle kill, etc.

^c In 2017 the Wolf Control Area was expanded to include 9,844 square miles.

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. There are no demonstrated methods to improve caribou habitat and no reason to believe that habitat is limiting the caribou population.

Area treated and method: N/A

Observation on treatment response: N/A

Evidence of progress toward objective(s) (choose one: Apparent Statistical): N/A

Similar trend in nearby non-treatment areas? N/A

Describe any substantial change in habitat not caused by active program: N/A

Table 4. Nutritional indicators for caribou in assessment area (L) of the Mulchatna Caribou herd Predation Management Area.

Period	RY	Pregnancy Females >3 yrs age ^a	Female Calf Weight ^b at 10.5 months in lbs. (n)
Year 0	2010	79%	124 (20)
Year 1	2011	76%	119 (13)
Year 2	2012	79%	127 (14)
Year 3	2013	90%	128 (14)
Year 4 ^c	2014	61%	133 (13)
Year 5	2015	83%	119 (23)
Year 6	2016	73%	120 (18)
Year 7	2017	80%	122 (15)
Year 8 ^d	2018	67%	-
Year 9 ^d	2019	76%	-
Year 10 ^d	2020	85%	-
Year 11	2021	88%	-

^a Pregnancy rate is based on known-aged animals from a collared sample. Pregnancy status is determined in May, i.e., RY 2010 pregnancy data is collected in May 2011, based on observed characteristics of pregnancy, i.e., antler retention, udder development, and/or presence of a calf at heel.

^b Calf weights are collected in March of the RY, i.e., RY 2010 female calf weight data is collected in March 2011.

^c Survey delayed due to weather which affected sample size and timing of survey.

^d No calves were captured during this RY due to logistical constraints.

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: N/A

Evidence of trend: N/A

Similar trend in nearby non-treatment areas? N/A

5) Costs specific to implementing Intensive Management

Table 5. 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 Mulchatna Caribou Herd Predation Management 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 ^a		Other IM activities		Total IM cost	Research cost ^d
		Time ^b	Cost ^c	Time ^b	Cost ^c		
Year 1	2012	0.0	0.0	1.0	36.0	36.0	415.0
Year 2	2013	0.0	0.0	0.5	6.0	6.0	421.2
Year 3	2014	0.0	0.0	0.5	6.0	6.0	215.0
Year 4	2015	0.0	0.0	0.5	6.0	6.0	0.0
Year 5	2016	0.0	0.0	0.5	6.0	6.0	0.0
Year 6	2017	0.0	0.0	1.0	13.0	13.0	230.0
Year 7	2018	0.0	0.0	1.0	223.5	223.5	321.8

Year 8	2019	0.0	0.0	7.7	117.7	117.7	26.0
Year 9	2020	0.0	0.0	5.0	112.5	112.5	344.2
Year 10	2021	0.0	0.0	3.5	158.9	158.9	345.3

^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) Department recommendations² for annual evaluation (1 February) following Year 10 (RY2020) for the Mulchatna Caribou herd Predation Management Area

Has progress toward defined criteria been achieved?

No; there are, however, positive indications of growth such as a disproportionately large, small-bull cohort and consistently high bull and calf-to-cow ratios in the eastern segment of the range. During this reporting period the combined bull:100 cow ratio declined. Calf-to-cow ratios remain variable but were above objective during this reporting period. A similar increase was observed in RY18 after high numbers of wolves were removed in the previous winter. The overall estimated population remains at less than half the minimum objective of 30,000 animals. Recently, a high prevalence of Brucella var suis 4 was detected in the MCH during routine screening. It is unclear if the outbreak has previously occurred or if it is active in the herd. Additional work will be conducted to monitor the situation.

Has achievement of success criteria occurred?

No. The bull:100 cow objective of 35:100 was met only during RY2014–RY2016 and in RY19. The calf:100 cow objective of 30:100 was met in RY2014, RY2018, and RY2021. Although the point estimates for the abundance estimates were below the lower bound of the population objective, they initially indicate growth in the herd during RY2012–2016. However, overlapping confidence intervals across these years suggest that the population could have been anywhere on the spectrum of values, and in fact could have been declining instead of growing. The harvest objective of 2,400–8,000 has not been met possibly due to lack of opportunity (i.e., poor snow, rivers failing to freeze) and a failure of hunters to report harvest.

Recommendation for IM program: Continue Modify Suspend Terminate
Continue Same-Day Airborne Wolf Control Program.

² 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.