Unit 19D-East Predation Control Implementation Plan and Activities
Division of Wildlife Conservation Report to the Alaska Board of Game
March 2008

Background

The Unit 19D-East wolf predation control implementation plan was first adopted by the Board of Game in fall 1995. In January 2000, the Board made a finding of emergency regarding the Unit 19D-East situation and extended the Commissioner's authority to reduce wolves during 2000–2005. In March 2001, the Board supported recommendations from the Adaptive Wildlife Management Team (AWMT) by adopting several regulations to begin implementing predator control.

Incorporating the recommendations from the AWMT, the Department established the Experimental Micro Management Area (EMMA) to focus predator control and associated management efforts in a relatively small area and to conduct research on the efficacy of the program. The concept of the EMMA was a change from previous approaches dealing with predator management because it focused predator management around a village to provide more moose for subsistence needs. In March 2003 the Board re-evaluated the Unit 19D-East wolf predation control program and issued comprehensive new board findings. The Board endorsed the EMMA concept and allowed the department discretion to change the size of the control area to provide for adaptive management. Thus, the 19D-East wolf predation control implementation plan involves both research and management components. The Board also recommended the department implement the Unit 19D-East experimental management program according to specific guidelines.

There were 4 key guidelines for the Unit 19D-East Experimental Predator Management program:

1) Establish the EMMA.
2) Close hunting in the EMMA during predator control, and reopen hunting when intensive removal of predators ceases.
3) Remove bears from the EMMA.
4) Remove wolves from the EMMA.

The wolf predation control program began in regulatory year (RY) 2003–2004 (regulatory year begins on July 1 and ends June 30, e.g., RY03 = July 1, 2003–June 30, 2004). In January 2006, the Board adopted a revised implementation plan in the form of an emergency regulation. The emergency regulation clarified and updated key components of the implementation plan that included: wildlife population and human use information, predator and prey population levels and objectives, plan justifications, methods and means, time frame for updates and evaluations, and miscellaneous specifications.

In May 2006, the Board further modified the emergency regulation, added black and brown bear predation control within the EMMA, deleated the link between the hunting closure in the EMMA and intensive removal of predators, and adopted a final predator control implementation plan. The plan was approved for 5 years, beginning on July 1,

2004. The following prey and predator population levels and population objectives for Unit 19D-East are included in the final regulation.

- 2004 moose population: 3,444–5,281 (0.5 moose/mi^2)
- Moose population objective: 6,000–8,000
- Moose harvest objective: 400–600
- Fall 2000 pre-control wolf population estimate: 198
- Wolf population control objective:
    - As low as possible in EMMA
    - No less than 40 in 19D-East
- Pre-control black bear population estimate:
    - 1,700 in 19D-East
    - 130 in EMMA
- Black bear population control objective:
    - As low as possible in EMMA
    - Maintain as a viable part of natural ecosystem in 19D-East
- Pre-control brown bear population estimate:
    - 128 in 19D-East
    - 9 in EMMA
- Brown bear population control objective:
    - As low as possible in EMMA
    - Maintain as a viable part of natural ecosystem in 19D-East

Plan Implementation Activities

EXPERIMENTAL MICRO MANAGEMENT AREA (EMMA)

The EMMA was established in 2001 and is within a 20 mile radius of McGrath (528 mi^2). This area encompasses the highest density of moose in 19D-East and was established as a treatment area where predator population manipulations and other management actions could be tested. Beginning in 2004, moose hunting was closed within the EMMA.

REMOVAL OF BEARS

We conducted a non-lethal bear removal project in May 2003 and 2004. During 2003, 81 black bears (all older than 1-year old) and 9 brown bears (including 2 cubs-of-the-year) were captured and moved from the EMMA and surrounding area. In 2004, we captured and moved 34 black bears and 1 brown bear (all older than 1-year old) from the EMMA.

WOLF CONTROL

The Board authorized the commissioner to issue public aerial shooting or land and shoot permits as the method of lethal wolf removal pursuant to AS 16.05.783. We exercised discretion to adjust the size of the area where wolf predation control activities would occur within the Unit 19D-East Wolf Predation Control Area. The wolf control zone established when control efforts began in RY03 initially encompassed 1728 mi^2, surrounding and

including the EMMA. Within 2 weeks, we expanded to 3,210 mi^2 to allow permittees to take wolves that used the EMMA but were frequently located outside its boarders. In RY06, we expanded the wolf control zone to 6,245 mi^2 to provide local residents with more moose available for harvest by hunters displaced from the EMMA, which is closed to moose hunting. The expanded area includes all of Unit 19D-East, west of a north-south line near Telida (153° 20' 0.00" west longitude).

In RY06, the control program began on November 1, 2006 and continued through April 30, 2007. We issued 9 control permits (5 pilot, 3 gunner), and 2 wolves were taken (Table 1). In RY07, the control program began on November 1, 2007 and will continue until April 30, 2008 or until the wolf population in Unit 19D-East is reduced to the control objective of 40 wolves specified in the May 2006 plan. We estimated that 46–74 wolves will need to be taken in order to reach the control objective. We have issued 24 control permits (9 pilot, 15 gunner), and 14 wolves have been reported taken as of February 21, 2008.

Table 1. Wolf control dates, control permits issued and wolves killed.

		Permits issued		Wolves killed		
Year	Authorized dates	Pilot	Gunner	F	M	Total
RY03	Dec. 2003–Apr. 30, 2004	28[a]		7	10	17[b]
RY04	Nov. 17, 2004–Apr. 30, 2005	6	11	7	7	14[c]
RY05	Dec. 3, 2005–Apr. 30, 2006[d]	3	3	3	1	4
RY06	Nov. 1, 2006–Apr. 30, 2007	5	3	2	0	2

[a]Record of number of pilots vs. gunners was lost, some permittees had multiple permits.
[b]Three additional wolves were taken illegally outside the control zone.
[c]Two wolves remained in the EMMA.
[d]The wolf control program was closed January 18–27, 2006 due to a court injunction.

BLACK BEAR AND BROWN BEAR CONTROL

The board approved black bear and brown bear control within the EMMA beginning in RY06. We began issuing control permits on September 1, 2006 and continued until June 30 of each regulatory year. Requirements and restrictions for the take of black and brown bears included in the Alaska Hunting Regulations apply to the permittees, except that permittees do not have an individual kill limit and they may set out 10 additional bait stations for black bears, may bait brown bears and take brown bears same-day-airborne at bait stations if the bait stations are registered with the McGrath office. In addition, hunting regulations allow permittees to bait black bears, take black bears same-day-airborne at bait stations and sell the raw hide and skull of both black and brown bears if they obtain a department sale tag and permit.

In RY06, we issued no black bear control permits or black bear control baiting permits. We issued 4 brown bear control permits, no brown bear baiting permits and no bait sites were established. No black or brown bears were reported taken. Tags and permits were issued to hunters to allow sale of hides and skulls when requested.

To date in RY07, we have issued 2 black bear control permits and 1 black bear control baiting permit and 2 sites were established by 1 of the permittees. We issued 2 brown

bear control permits, and 1 brown bear baiting permit and the permittee established 2 bait sites (the black bear and brown bear bait sites were the same). No black or brown bears were reported taken. Tags and permits were issued to hunters to allow sale of hides and skulls when requested.

Status of Prey and Predator Populations

RESEARCH COMPONENT

Prey–predator research in Unit 19D-East included the following objectives and results during March 2001–January 2008.

Objective 1a: Estimate moose numbers and population composition in Unit 19D-East.

Results of 2001 and 2003–2007 surveys indicate that the moose density within the EMMA was approximately 1.0 moose/mi^2 in 2001 and increased to approximately 1.7 moose/mi^2 in 2007 (Table 2). Moose densities in the remainder of the 19D-East moose survey area (19D-East MSA) are approximately 0.4 moose/mi^2, with no clear trend given the variability in the estimates (Table 3). The bull/cow ratio has started to increase in the EMMA as a result of the hunting closure within the area and increasing population. Moose numbers and population composition are summarized in Tables 2 and 3.

Table 2. Results of 2001–2007 moose surveys in the 528 mi^2 EMMA. Included are the actual number of moose observed, SCFs (sightability correction factor — based upon observations of radiocollared moose during the survey) calculated for each year, and the estimated number of moose in the area based upon the multiplication of observed moose and the SCF. Ratios are based only on observable moose.

Year	Area	Number of moose observed[a]	SCF	Estimate with SCF applied	Calves: 100 Cows	Bulls:100 Cows	Yearling bulls:100 cows
2001	EMMA	440	1.19 (32/38)	524	34	18	8
2003	EMMA	237	1.33 (21/28)	580[c]	55	18	5
2004	EMMA	531	1.25[b]	664	63	13	6
2005	EMMA	479	1.29 (38/49)	618	51	18	9
2006	EMMA	591	1.17 (42/49)	691	58	25	14
2007	EMMA	662	1.32 (31/41)	874	56	39	16

[a]All 87 units within the EMMA were counted in 2001, 2004, 2005, 2006, and 2007, in effect a population census. Only 52% (45) of the 87 EMMA units were counted during the 2003 survey.
[b]Sightability of radioed moose was not recorded in 2004, therefore, the SCF for 2004 is a combination of the 2001, 2003, 2005, and 2006 SCFs.
[c]In 2003 only 52% of the SUs within the EMMA were counted, and the estimate with SCF applied is based upon 1.33 x the GeoSpatial population estimate for the EMMA of 393 moose.

Table 3. Results of 2001–2004 moose surveys in the remainder of 19D-East moose survey area (MSA) (that portion of the 19D-East MSA excluding the EMMA) and combined results for the EMMA and the remainder of 19D-East MSA (19D-East MSA). No surveys were conducted in the remainder of 19D-East in 2005, 2006, or 2007.

Year	Area (mi^2)	Population estimate[a,b]	Calves:100 Cows	Bulls:100 Cows	Yearling bulls:100 cows
2001	Remainder 19D-East MSA (4,676)	1135,2005,2912	10,24,45	20,47,88	1,7,15
2003	Remainder 19D-East MSA (4,676)[c]	692,1084,1528	21,53,99	5,29,60	0,2,4
2004	Remainder 19D-East MSA (4,676)	1652,2190,2728	43,55,67	24,35,45	8,14,21
2001	19D-East MSA (5,204)	1652,2536,3469	14,25,42	19,39,66	3,7,13
2003	19D-East MSA (5,204)	1219,1664,2195	30,53,84	13,23,37	0,3,13
2004	19D-East MSA (5,204)	2287,2825,3464	47,56,66	22,30,37	7,12,17

[a]The three values given are the lower 90% confidence interval, the estimate, and the upper 90% confidence interval.
[b]Based upon radiocollared moose sightings during surveys, sightability correction factors of 1.19 and 1.33 were applied to population estimates in 2001 and 2003, respectively. Because radiocollared moose were not radiolocated during the 2004 survey, a sightability correction factor of 1.25 (a combination of the 2001 thru 2006 sightability data) was used to estimate population size in 2004.
[c]Because of poor weather conditions, only 7% (52) of the sample units in the remainder of the 19D-East MSA were surveyed, therefore, caution needs to be used when interpreting the 2003 survey results for the 19D-East MSA.

Objective 1b: Determine primary causes of mortality of moose calves.

In May 2001 we captured and radiocollared 67 newborn moose calves in Unit 19D-East, 51 of those were captured within or near the EMMA. We monitored those calves through their first year of life and investigated causes of mortality. The overall survival rate for our collared sample of calves was 26% (17 of 66 lived). We attributed 18 deaths (37%) to black bears, 17 deaths (35%) to brown bears, 12 deaths (24%) to wolves, 1 (2%) death to drowning, and 1 death (2%) to an unknown cause. The survival rate for only those calves captured within or near the EMMA was 33% (17 of 51 lived). Within the EMMA we attributed 18 deaths (53%) to black bears, 5 deaths (15%) to brown bears, 9 deaths (26%) to wolves, 1 (3%) nonpredation cause, and 1 death (3%) to an unknown cause.

In May 2002 we captured and radiocollared 81 newborn moose calves, and visually monitored an additional 4 calves, within and near the EMMA. Survival for those calves through their first year of life was 27% (22 of 85 lived). We attributed 21 deaths (33%) to black bears, 12 deaths (19%) to brown bears, 28 deaths (44%) to wolves, and 2 deaths (3%) to nonpredation cause.

In May 2003 we captured and radiocollared 53 newborn moose calves within or near the EMMA. Survival for those calves through their first year of life was 52% (26 of 53 lived, 2 calves were censored from the study in mid-summer). We attributed 8 deaths (32%) to black bears, 4 deaths (16%) to brown bears, 9 deaths (36%) to wolves, 3 deaths (12%) to nonpredation causes, and 1 death (4%) to an unknown cause.

In May 2004 we captured and radiocollared 52 newborn moose calves within or near the EMMA. Survival for those calves through their first year of life was 40% (21 of 52 lived). We attributed 3 deaths (10%) to black bears, 8 deaths (26%) to wolves, 19 deaths (61%) to nonpredation causes, and 1 death (3%) to illegal take.

In May 2005 we captured and radiocollared 50 newborn moose calves within or near the EMMA. Survival for those calves through their first year of life was 42% (21 of 50 lived). We attributed 12 deaths (41%) to black bears, 3 deaths to brown bears (10%), 3 deaths (10%) to wolves, 10 deaths (34%) to nonpredation causes, and 1 (3%) death to unknown cause.

In May 2006 we captured and radiocollared 51 newborn moose calves within or near the EMMA. Survival for those calves through their first year of life was 63% (32 of 51 lived). We attributed 6 deaths (32%) to black bears, 3 deaths to brown bears (16%), 3 deaths (16%) to wolves, 6 deaths (32%) to nonpredation causes, and 1 (5%) death to unknown cause.

In May 2007 we captured and radiocollared 51 newborn moose calves within or near the EMMA. Survival for those calves through January 2008 was 43% (22 of 51 lived). We attributed 7 deaths (24%) to black bears, 14 deaths to brown bears (48%), 5 deaths (17%) to wolves, 2 deaths (7%) to nonpredation causes, and 1 (3%) death to unknown cause.

The highest annual survival of calves was experienced by those cohorts that were born following removal of predators from the EMMA Calves from these cohorts (2003-2006) experienced considerably less early summer mortality than those from 2001 and 2002. This ultimately translated into 20% more calves on average surviving to 1 year of life following predator removal than prior to removal.*Objective 1c:* Determine condition, movements, and mortality rates of yearling and adult moose.

In March 2001 we captured 25 adult and 15 short-yearling moose within the study area. In March 2002 we captured 15 adult and 15 short-yearling moose, and in March and April 2003–2007, we captured 15 short-yearling moose each year. During processing, moose had a blood sample taken, a tooth pulled (adults only), morphometric measurements obtained, rump fat determined via ultrasound (adults only in 2001 and 2002), weight taken (yearlings only), and a radio collar affixed. These collared individuals were then monitored to determine reproductive indices and condition indices (Table 4), movements, and mortality rates.

Table 4. Reproduction and condition indices for moose in Unit 19D-East, 2001–2006.

Year	Observed rate of parturition for radiocollared cows > 2 yrs-of-age (number cows monitored)	Observed rate of parturition for radio-collared cows 3 yrs-of-age (number of cows monitored)	Observed rate of twinning for radiocollared cows > 2 yrs-of-age (n)	Observed rate of twinning for uncollared cows (n)	Average maximum adult rumpfat depth in cm (n)	Median maximum adult rumpfat depth in cm (n)
2001	73%[a] (22)	100% (3)	25% (16)	--	0.71 (25)	0.55 (25)
2002	88%[b] (25)	0% (1)	59% (22)	39% (46)	1.51 (15)	1.58 (15)
2003	84%[c] (31)	56% (9)	24% (25)	36% (39)	--	--
2004	80%[d] (40)	70% (10)	32% (31)	39% (31)	--	--
2005	92%[e] (51)	100% (11)	44% (45)	50% (40)	--	--
2006	97% [f] (62)	100% (13)	40% (60)	35% (29)	--	--
2007	95%[g] (59)	71% (7)	52% (56)	50% (30)	--	--

[a] Includes one fetal calf found during necropsy of cow in late May, and two births observed during June.
[b] Includes three births observed during June.
[c] Includes one cow considered to have given birth because placenta was observed but no calf was seen, and one birth observed during July.
[d] Includes two births observed during July.
[e] Includes five births observed during June.
[f] Includes one birth observed during June.
[g] Includes six births observed during June.

Monthly locations of study animals indicated that moose within the EMMA are relatively nonmigratory, and no discernable large-scale movement pattern was evident. However, some moose that reside in the Pitka Flats (east of the EMMA) during calving season are apparently migratory, spending spring and summer in the Pitka Flats and then moving to the Farewell Burn/Alaska Range foothills in fall and winter.

Yearling natural survival rates (legal hunter take is not included) varied from 74% to 96% annually during 2001–2007. The highest annual survival was experienced by the 2004 and 2005 cohorts which coincides with both department removal of bears from the EMMA and public wolf control efforts. We attributed the largest proportion of radio-collared yearling mortalities to wolves, with black bears and non-predation mortality accounting for some deaths. Hunters also legally harvested 4 male yearlings, 2 during 2002 and 2 during 2003.

Adult annual survival rates varied from 86% to 100% during 2001–2007. Wolves and nonpredation causes accounted for most mortality during these time periods, with illegal take and brown bears also accounting for some mortality.

Objective 1d: Determine twinning rates and age at first reproduction of moose in Unit 19D-East.

Twinning rates for radiocollared and uncollared females are listed under Objective 1c (Table 4).

We have observed three parturient radiocollared 2-year-old moose, one each during spring 2005, 2006, and 2007. Rates of parturition are listed for radiocollared 3-year-old moose in Table 4.

Objective 1e: Obtain data snow depth and density within the EMMA.

Preliminary data is summarized in Table 5.

Table 5. Monthly snow depth and average daily temperature for the McGrath Alaska airport, winter 2000–2001 through winter 2004–2005.

Depth of snow in inches on last day of month / average daily temperature (°F)[a]							
Winter	October	November	December	January	February	March	April
2000–01	11 / 23.3	19 / 12.6	17 / 4.0	17 / 10.1	29 / 11.8	29 / 11.1	14 / 31.2
2001–02	7 / 21.8	8 / -4.0	10 / -12.9	32 / 4.5	22 / 5.8	21 / 14.1	5 / 25.5
2002–03	3 / 32.1	3 / 20	8 / 5.0	10 / -5.2	19 / 15.8	14 / 12.2	0 / 32.3
2003–04	0 / 32.7	12 / 13.9	16 / -9.3	18 / -14.1	21 / 6.4	20 / 8.2	0 / 35.7
2004–05	3 / 33.0	18 / 15.0	31 / -1.2	41 / -7.6	41 / -0.4	42 / 16.0	14 / 26.2
2005-06	1 / 28.6	11 / -6.3	14 / 5.2	16 / -22.3	22 / 10.9	20 / 6.5	11 / 26.1
2006-07	0 / 35.0	3 / 1.2	12 / -5.2	18 / -5.7	17 / -1.4	16 / -3.7	0 / 38.8

[a] Data obtained from the National Oceanic and Atmospheric Administration (NOAA).

Objective 2: Characterize winter moose browse in Unit 19D-East.

Browse surveys were conducted in March 2003 via helicopter and snowmobile throughout the EMMA. A total of 39 locations and 236 plants were sampled within the area. Browse biomass removal in the EMMA was 20%, which falls between the range seen in areas of high moose browse use and low moose browse use. Birch, poplar, and willow species were all present in the survey area, although willow species tend to be the most preferred winter browse species in the EMMA. This is similar to most areas in Interior Alaska.

Objective 3a: Estimate wolf numbers in Unit 19D-East and identify wolf packs that hunt moose within the EMMA.

We conducted a reconnaissance style wolf survey within the Unit 19D-East moose survey area (MSA) during February 21–February 24, 2001. During that survey, 103 wolves were estimated to occur in the 19D-East MSA, 47 of which were believed to be permanent residents in the survey area. The remainder were considered to be wolves that likely did not reside within the survey area at all times.

During March 17–19, 2005, we conducted another reconnaissance style wolf survey in Unit 19D-East, focusing primarily on the wolf control zone within Unit 19D-East (a 3,210 mi^2 area encompassing the EMMA). During that survey, we estimated 82 wolves occurred within Unit 19D-East, with 9 of those wolves occurring within the wolf control zone.

During March 14–17, 2006, we conducted a reconnaissance style wolf survey in Unit 19D-East, focusing primarily on the wolf control zone within Unit19D-East. During that

survey, we estimated 53–65 wolves occurred within the portion of Unit 19D-East we surveyed (an area slightly larger than the 19D-East MSA), with 13 of those wolves occurring within the wolf control zone.

No wolf survey was conducted during 2007.

Objective 3b: Determine reproductive rates and condition of wolves in Unit 19D and compare rates with other wolf populations in Alaska.

We purchased 25 hunter- and trapper-killed wolf carcasses for necropsy between June 2001 and July 2003. Necropsies were performed in spring 2002 and 2003. Data collected from carcasses and reproductive tracts indicate wolves from Unit 19D have normal condition parameters.

Objective 4: Document the distribution of black bear and brown bears numbers within and adjacent to the EMMA and characterize bear predation on moose calves.

In a collaborative project with Pennsylvania State University, we captured and radiocollared 20 black bears during May and June 2002 within the study area. Preliminary analysis of data obtained by monitoring these bears indicates that most black bears use riparian areas within the central portion of the study area in spring and summer and move to higher elevations in fall. Most of these bears also denned in back spruce forests near the areas where they spent time in the fall.

During May 2003, we captured and moved 81 black bears (all older than 1 year old) and 9 brown bears (including 2 cubs-of-the-year) from the EMMA and surrounding area. During May 2004 we captured and moved 34 black bears and 1 brown bear (all older than 1-year old) from the EMMA. Bears were captured using both helicopter darting and ground based snaring, and translocated using fixed-winged aircraft to areas at least 150 miles from McGrath. Of the bears captured in May 2004, 7 were black bears that had been captured and removed during 2003 and had returned to the area, indicating a low rate of return in the first year. Of the 7 recaptured bears, 6 were adult males and 1 was an adult female.

Base upon bears that were captured and moved during 2003 and 2004 and bears that were known the inhabit the EMMA during that time that were not captured, we estimated that there were approximately 95 black bears/1000km^2 (130 black bears not including cubs) in the EMMA prior to the removal project. During spring 2007 we estimated that there were 53 black bears/1000km^2 (72 black bears not including cubs) within the EMMA by using replicated mark-resight techniques. These results indicate that the black bear population is still lower than pre-removal levels, however, it is rebounding relatively quickly.

We plotted locations of the 115 black and 10 brown bears captured during 2003 and 2004. These locations best reflect the distribution and relative abundance of bears within the EMMA during the time of moose calving. Plotting these locations indicated that both black bears and brown bears (brown bears at a much lower relative density) are dispersed throughout the entire EMMA, however, both black and brown bears are concentrated

along the main riparian corridors of the Kuskokwim and Takotna rivers. This is similar to distribution of radiocollared black bears in 2002, as mentioned above. In the near future, the bear capture and observation data gathered during 2002–2004 will be used to formulate better estimates of bear density in the Upper Kuskokwim Area.

MANAGEMENT COMPONENT

Moose Population Size. In fall 2001, we estimated 3,959 moose in Unit 19D-East (0.46 moose/mi^2), based on extrapolation of a survey conducted in a 5,204 mi^2 portion of the unit. Using similar techniques in 2004, we estimated 4,374 moose in Unit 19D-East (0.5 moose/mi^2). These population estimates are well below our objective of 6,000–8,000.

Moose density was higher in the EMMA (1 moose/mi^2) in 2001 than in Unit 19D-East as a whole, and density in the EMMA increased to 1.7 moose/mi^2 by fall 2007. Calf and yearling survival in the EMMA increased during most years when bears and wolves were removed.

Moose Harvest. The RY01–RY07 average reported harvest of moose in Unit 19D-East under the registration permit system currently in place is 75 per year (range 60–98; Table 6). This harvest is well below our objective of 400–600 moose annually.

Table 6. Unit 19D-East moose registration permit hunt (RM650) results, 2001–2007.

Regulatory year	Successful	Unsuccessful	Did not hunt	Total permits issued
2001–2002	73	137	83	293
2002–2003	98	127	50	275
2003–2004	75	115	66	256
2004–2005	60	109	73	242
2005–2006	71	115	51	237
2006–2007	62	112	74	248
2007–2008	86	99	68	253

Wolf Population Size. The wolf population density was moderate, with an autumn 2000 pre-control population estimate of 198 wolves (23.3 wolves/1000 mi^2). We estimated the 2004 autumn wolf population was 103 wolves based on the spring 2005 wolf survey, RY04 wolf harvest, and estimated number of pups. No surveys were completed during winter 2006–2007 because of unsuitable survey conditions. However, we estimated the autumn 2006 population at 85–110 wolves using our PredPrey model. A survey planned for March 2007 was not completed due to poor survey conditions. We estimated the 2007 autumn wolf population was 86–114 wolves based on previous population estimates, RY06 harvest, productivity, survival and immigration.

Wolf Harvest. The effort by trappers in Unit 19D to harvest wolves has been high. Harvest ranged from 11 to 44 during RY97–RY06 (Table 7). The majority of the Unit 19D harvest has been in Unit 19D-East and has been variable within the EMMA. Pelt quality of most 19D-East wolves is low, which reduces the financial returns from the sale of hides. In RY04, one wolf from Unit 19D was confirmed as having lice. The desires of

local trappers to help reduce predation on moose and a private wolf harvest incentive program have helped to maintain a relatively high level of trapping effort.

Table 7. Reported wolf harvest in 19D, 19D-East, and EMMA; RY97–RY05. Includes wolves taken in wolf control program beginning in RY03.

Regulatory year	Wolf harvest			% 19D-East harvest in EMMA
	19D	19D-East	EMMA	
1997–1998	30	29	22	76%
1998–1999	21	14	3	21%
1999–2000	40	34	12	35%
2000–2001	37	36	17	47%
2001–2002	30	24	7	29%
2002–2003	44	39	22	56%
2003–2004	35[a]	27	7	26%
2004–2005	32[b]	29	15	52%
2005–2006	15[c]	15	7	47%
2006–2007	24[d]	19	5	21%
Total	308	266	117	38%
10-year mean	31	27	12	41%

[a] 17 of these wolves were taken in the wolf control program.
[b] 14 of these wolves were taken in the wolf control program.
[c] 4 of these wolves were taken in the wolf control program.
[d] 2 of these wolves were taken in the wolf control program.

Black and Brown Bear Population Size. In 2005, we estimated the pre-control black bear population at 1,700 in Unit 19D-East by using data from the bear removal program as well as extrapolating bear estimate data from areas with similar habitat. We estimated the brown bear pre-control population at 128 in Unit 19D-East by extrapolating brown bear data from bear removal in the EMMA, as well as extrapolating bear estimate data from areas with similar habitat.

During May 2007, we conducted an aerial black bear survey and estimated 72 independent black bears (60 – 91 95%CI) in the EMMA.

Black and Brown Bear Harvest. During RY01–RY07, 36 black bears were reported taken by the public in Unit 19D (average = 5/year). 29 of these bears were taken in Unit 19D East. As of RY03, all black bears taken in Unit 19D East were required to be sealed and since then, 21 black bears were reported harvested in 19D East, (average = 4/year; Table 8). No fall baiting permits have been issued under hunting regulations since they became available in RY01. In RY03–RY05, registration hunt permits were available for hunters to take 2 additional black bears per year in 19D-East. However, no permits were issued. In RY06, the black bear bag limit was changed from 3 to 5 under general hunting regulations. The maximum number any hunter harvested since RY01 was 2 black bears per year.

During RY01–RY07, 27 brown bears (average = 4/year) were harvested in Unit 19D, 15 of which were killed in 19D-East (average = 2.5/year). Harvest averaged 2/year prior to implementation of the brown bear resident tag fee exemption in 1998.

Table 8. Reported Black and Brown Bear harvest in Unit 19D East RY01–RY07. Sealing required in Unit 19 for all black and brown bears in Unit 19D East throughout this period.

RegulatoryYear	Black bear Hunting	Control	Brown Bear Hunting	Control
2001–02	2		4	
2002–03	6		0	
2003–04	8		1	
2004–05	3		4	
2005–06	8		2	
2006–07	1	0	4	0
2007–08[a]	1	0	0	0

[a] preliminary data

Recommendations to Achieve Plan Objectives

We recommend continuing wolf and brown bear control activities as approved by the Board.

Wolf reduction objectives have not been achieved for all of Unit 19D East for a variety of reasons, including lack of snow cover for tracking wolves and landing aircraft, dense tree cover in parts of the control area, and the high price of aircraft fuel. However, progress is being made, particularly within the EMMA, and the program should be continued to allow operations during more favorable snow conditions.

Black and brown bear reduction objectives have also not been achieved. Control methods currently authorized have not been effective, and more extreme methods such as trapping and snaring are not supported by the department. However, the bear program should continue an additional year so that a more complete evaluation can be made.