Unit 19D-East Predation Control Implementation Plan and Activities
Division of Wildlife Conservation Report to the Alaska Board of Game
March 2009

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 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 wolf predation control program began in regulatory year (RY) 2003 (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, deleted 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.

NON-LETHAL 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 was closed to moose hunting. The expanded area includes all of Unit 19D-East, west of a north-south line near Telida ($153^{\circ}\ 20'\ 0.00''$ west longitude).

In RY07, the control program began on November 1, 2007 and continued through April 30, 2008. Wolf control pilots took 29 wolves, and we estimated that 46–74 wolves needed to be taken to reach the control objective of leaving no fewer than 40 wolves in Unit 19D-East post treatment as specified in the May 2006 plan.

In RY08 as of February 17, 2009, we received 37 applications and issued 7 pilot and 7 gunner permits. To date, these permittees have taken 10 wolves from Unit 19D East (Table 1). We estimate that 35–59 wolves need to be taken to reach the control objective.

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
RY07	Nov. 1, 2007–Apr. 30, 2008	9	15	13	16	29

[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 may 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 RY07, we issued 5 black bear control permits and 1 black bear control baiting permit. We also issued 4 brown bear control permits and 1 brown bear control baiting permit. No black or brown bears were reported taken. Tags and permits were issued to hunters to allow sale of hides and skulls when requested.

In RY08, as of February 17, 2009, we have issued 7 black bear control permits and 9 black bear control baiting permits. Also, we have issued 7 grizzly bear control permits and 11 grizzly bear control baiting. Generally, the same individuals holding black bear permits held grizzly bear permits and monitored the same bait stations. Three grizzly bears and no black bears were taken using bear control permits.

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.

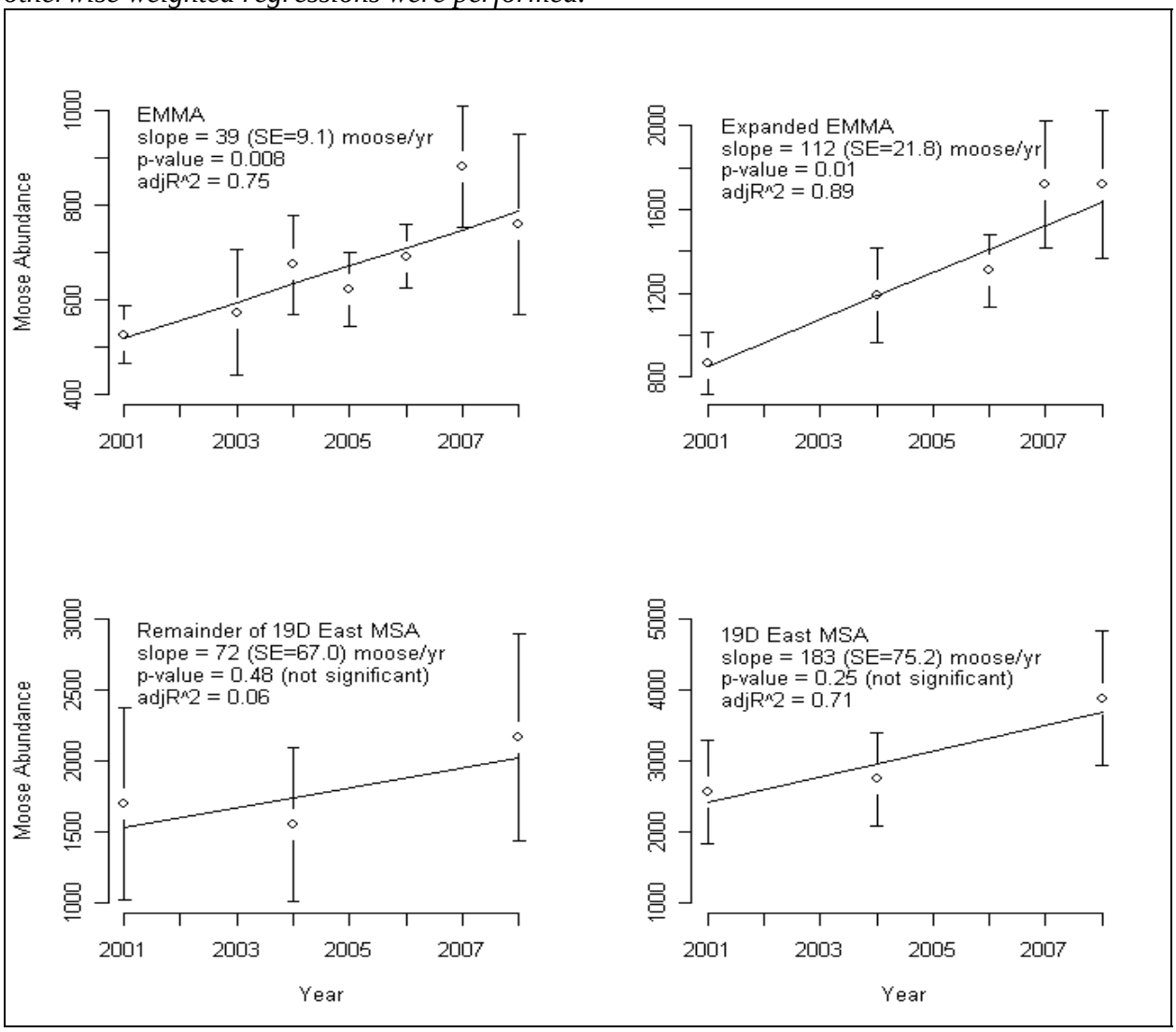
Objective 1a: Estimate moose numbers and population composition in Unit 19D-East.

Since 2001 we have conducted 3 surveys to estimate moose numbers in the entire 19D East Moose Survey Area (MSA) which comprises approximately 5,313mi^2 of Unit 19D East. We have also conducted surveys within the portions of the 19D East MSA

comprised of the EMMA (528mi^2) and expanded EMMA (1,118mi^2) on a more frequent basis. In addition, we have calculated the estimated moose population within the portion of the 19D East MSA excluding the EMMA and expanded EMMA (the remainder of the 19D East, 4,195mi^2) in 2001, 2004, and 2008. Population estimates as well as trend lines for these four areas are shown in Fig. 1.

Estimates taken from trend lines presented in Fig. 1 indicate that the estimated population within the EMMA has increased by several hundred moose since intensive surveys began in the area (517 in 2001 to 787 in 2008) and that a larger increase from 854 moose in 2001 to 1636 moose in 2008 occurred in the expanded EMMA. The significant slope of trend lines for both the EMMA and expanded EMMA indicate that these population increases are significant. In the remainder of the 19D East MSA we observed an increase in point estimates from 1,696 in 2001 to 2,171 in 2008. However, the 90% CIs for these point estimates overlap substantially, providing virtually no evidence of a population change. The non-significant slope obtained through trend analysis verifies this conclusion. We also calculated population estimates for the entire 5,313 mi^2 19D East MSA. In the 19D East MSA, we observed an increase in point estimates from 2,564 in 2001 to 2,744 moose in 2004 to 3,889 moose in 2008. Although the slope of the trend line is substantial (183 moose/year) and the adjusted R^2 was similar to that for the EMMA, we are unable to conclude that there has been a statistically significant population change in the entire 19D East MSA at the 90% confidence level. The p-value of 0.25 indicates the slope is significantly different than zero at only the 75% confidence level.

Fig. 1. Survey estimates and their 90% confidence limits are presented along with the trend line for each of four survey areas of interest: the EMMA, expanded EMMA, remainder of the 19D East MSA, and the 19D East MSA. Linear mixed effects models were used for areas having more than 5 years of data (EMMA and the expanded EMMA), otherwise weighted regressions were performed.



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 their first year of life was 35% (18 of 51 lived). We attributed 7 deaths (21%) to black bears, 14 deaths to brown bears (42%), 6 deaths (18%) to wolves, 4 deaths (12%) to nonpredation causes, and 2 (6%) deaths to unknown causes.

No newborns were captured during 2008.

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 (2003-2007) experienced considerably less early summer mortality than those from 2001 and 2002. This ultimately translated into 16% higher survival to 1 year of life following predator removal than prior to removal (30% and 46% average annual survival pre vs. post predator removal, respectively).

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 to May 2003–2008, 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, during 2008 no weights were not taken), 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)	--	--
2008	88%[h] (59)	63% (8)	55% (51)	--	--	--

[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.
[h] Cows monitored on a weekly basis in 2008, birth dates not estimated.

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 2001–2008. 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 2001–2008. 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 (^{o}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
2007-08	5 / 25.3	12 / 14.9	21 / -0.8	32 / -4.7	24 / -4.6	24 / 14.0	12 / 25.5

[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. In addition, using data collected during the 2001 survey we retrospectively estimated 48 occupied the 3,210 mi^2 control area that was implemented in 2004.

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 and an additional 6 wolves that likely reside periodically in the 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 and an additional 2 wolves that likely reside periodically in the control zone.

No wolf surveys were conducted during 2007 or 2008.

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 to inhabit the EMMA during that time that were not captured, we estimated that there were approximately 95 black bears/1000km^2 (130 black bears) in the EMMA prior to reduction efforts beginning in 2003. During May 2007, we conducted an aerial black bear survey and estimated 72 independent black bears (60 – 91 95%CI) in the EMMA. 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 likely reflect the distribution and relative abundance of bears within the EMMA during the time of moose calving, since we searched all portions of the EMMA for bears during these years. 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, they seem to 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.

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).

We estimate the current (2008) population of moose in Unit 19D-East at approximately 5,481 moose or 0.61 moose/mi^2. Because we have not surveyed the entire area of Unit 19D-East, this estimate, similar to previous population estimates for all of Unit 19D-East is based upon the addition of two estimates: 1) the population estimate (1,636 moose) within the expanded EMMA (a 1,118 mi^2 area near McGrath where predation control efforts were focused and moose densities are higher at 1.5 moose/mi^2 – an area that is not comparable to the remainder of 19D-East for these reasons), and 2) an extrapolated population estimate (3,845 moose) for the 7,395 mi^2 of the remainder of Unit 19D-East based upon a density of 0.52 moose/mi^2 in this area. A density of 0.52 moose/mi^2 is assumed in the remainder of 19D-East, because 4,195 mi^2 of this 7,395 mi^2 area was surveyed during 2008 and we believe habitat and moose numbers are similar throughout the entire area.

The 2008 Unit 19D East moose population estimate of 5,481 moose is below our intensive management objective of 6,000–8,000.

Moose Harvest. The RY01–RY08 average reported harvest of moose in Unit 19D-East under the registration permit system currently in place is 79 per year (range 60–103; 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
2008–2009	103	114	74	291

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 and the 2008 autumn wolf population was 87 wolves based on previous population estimates, previous harvest, productivity, survival and immigration.

Wolf Harvest. The effort by trappers in Unit 19D to harvest wolves has been high. Harvest was 15–44 during RY97–RY07 (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.

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.

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%
2007–2008	38[e]	38	5	13%

[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.
[e] 29 of these wolves were taken in the wolf control program.

Black and Brown Bear Harvest. During RY01–RY08, 46 black bears were reported taken by the public in Unit 19D (average = 6/year). 46 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, 38 black bears were reported harvested in the unit, (average = 6/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–RY08, 45 brown bears (average = 6/year) were harvested in Unit 19D, 23 of which were killed in 19D-East (average = 3/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 for all black and brown bears in Unit 19D East throughout this period.

Regulatory Year	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	16	0	3	0
2008–09[a]	2	0	2	3

[a] preliminary data

Recommendations to Achieve Plan Objectives

We recommend reauthorizing wolf and bear control for an additional 5 years beginning on July 1, 2009. We also recommend establishing an Upper Kuskokwim Villages Moose Management Area (MMA) within the Unit 19(D) East Predation Control Area. The MMA would encompass approximately 1,118 mi^2, surrounding the village of McGrath, and adjacent to Takotna and Medfra. The purpose of the MMA would be to designate an area where moose numbers are closely monitored and objectives for number of moose and moose harvest can be applied; the department requests the discretion to adjust the size and shape of the MMA; The bear predation control area is contained within the MMA.

We also recommend the following additional methods for taking black and brown bears within the bear control area because current control methods are not effective:

1) legal animal is any black bear, including sows and cubs,
2) no bag limit,
3) same-day-airborne taking of black bears if the permitee is at least 300 feet from the aircraft,
4) sale of unmounted, tanned black bear hides if the sale tag remains attached, and
5) use of foot snares.