Unit 19D East Wolf Predation Control Implementation Plan and Activities
Report to the Alaska Board of Game
March 2006

Background

The Unit 19D-East wolf predation control implementation plan was established 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 for 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 conduct research on predator–prey issues. 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 allow 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 Experimental Micro Management Area (EMMA).
2) Close hunting in the EMMA during predator control. Reopen hunting when intensive removal of predators ceases.
3) Remove and relocate bears from the EMMA.
4) Remove wolves from the EMMA.

Plan Implementation Activities

EXPERIMENTAL MICRO MANAGEMENT AREA (EMMA)

The EMMA was established in 2001 and is within a 20 mi 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.

MOOSE SEASON CLOSURE

Beginning in 2004, moose hunting was closed within the EMMA.

REMOVAL OF BEARS

The Department conducted a bear removal project in May 2003 and 2004. During 2003, 81 black bears (all older than 1-year old) and 9 grizzly bears (including 2 cubs-of-the-year) were captured and moved from the EMMA and surrounding area. In May 2004, the Department captured and moved 34 black bears and 1 grizzly 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 wolf removal pursuant to AS 16.05.783. The wolf control zone established for the regulatory year (RY) 2003–2004 initially encompassed 1728 mi^2, surrounding and including the EMMA (regulatory year begins on July 1 and ends June 30, e.g., RY05 = July 1, 2005–June 30, 2006). Within 2 weeks of starting control, the control zone was expanded to 3,210 mi^2 in an effort to assure that all wolves were removed from the EMMA, including wolves that existed along the boundary. The goal of the wolf control program is to remove all wolves from the EMMA each year, while maintaining a minimum of 40 wolves in Unit 19D-East.

In RY03, 28 wolf control permits were issued, and control activities were authorized during December 2003–April 30, 2004. Seventeen wolves (7 female and 10 male) were taken in the control program, and 3 additional wolves were taken illegally outside of the control zone. In RY04, 17 permits were issued (6 pilot, 11 gunner), and control activities were authorized during November 17, 2004–April 30, 2005. Fourteen wolves (7 female and 7 male) were taken from the control zone, with 2 remaining in the EMMA. In RY05, 6 permits have been issued (3 pilot, 3 gunner), and control activities have been authorized during November 19, 2005–April 30, 2006. One wolf was reported taken as of March 1, 2006.

Status of Prey and Predator Populations

Research Component

Prey–predator research in Unit 19D-East included the following objectives and results during March 2001 – December 2005.

OBJECTIVE 1A: Estimate moose numbers and population composition in Unit 19D East.

Results of the 2001, 2003, 2004, and 2005 surveys indicate that moose densities within the EMMA are approximately 1.0 moose/mi^2 and are likely increasing slowly (Table 1). 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 1). The ratio of bulls per 100 cows is lower within the EMMA, likely the result of higher hunting pressure in that area, but should begin to increase as a result of the hunting closure within the area. Moose numbers and population composition are summarized in Table 1.

Table 1. Results of 2001, 2003, 2004, and 2005 moose surveys in the EMMA, the remainder of 19D-East MSA, and combined results for the 19D-East MSA total. The three values given are the lower 90% confidence interval, the estimate, and the upper 90% confidence interval.

Year	Area (mi^2)	Population estimate[abd]	Calves:100 Cows	Bulls:100 Cows	Yearling bulls:100 cows
2001	EMMA (528)	479,531,605	29,34,40	15,18,21	2,5,8
2003	EMMA (528)	457,580,736	39,57,79	12,19,28	6,8,9
2004	EMMA (528)	634	63	13	6
2005	EMMA (528)	553, 621, 713	51	18	9
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] Based upon radiocollared moose sightings during surveys, sightability correction factors of 1.19, 1.33, and 1.29 were applied to population estimates in 2001, 2003, and 2005 respectively. Because collared moose were not radiolocated during the 2004 survey, a sightability correction factor of 1.20 (a conservative combination of the 2001 and 2003 data) was used to estimate population size in 2004.

[b] During 2001, 2004, and 2005, 100% of the sample units were surveyed within the EMMA, in effect a census within that area with a sightability correction factor added to create and estimated number of moose. Approximately 50% of the sample units were surveyed within the EMMA in 2003.

[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.

[d] Moose surveys were completed only within the EMMA in 2005.

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 grizzly 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 grizzly 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 grizzly 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 grizzly 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 November 2005 was 56% (28 of 50 lived, Figure 3). We attributed 12 deaths (55%) to black bears, 3 deaths to grizzly bears (14%), 2 deaths (9%) to wolves, and 5 deaths (23%) to nonpredation causes.

The highest annual survival of calves was experienced by the 2003 cohort which coincides with department removal bears from the EMMA that same spring. Calves from that cohort as well as the 2004 experienced considerably less early summer mortality. This ultimately translated into more calves surviving to 1 year-of-life in the 2003 cohort. However, the extremely deep snow experienced by the 2004 cohort of calves during their first winter resulted in large numbers of calves dying from nonpredation causes during that winter. Ultimately the overall survivorship of the 2004 cohort was approximately 10% more than the 2001 and 2002 cohort experienced prior to department bear 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, 2004 and 2005, 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 indicies (Table 2), movements, and mortality rates.

Table 2. Reproduction and condition indices for moose in Unit 19D East, 2001-2005.

Year	Observed rate of parturition for radiocollared cows > 2 yrs-of-age (number cows monitored)	Observed rate of parturition for radiocollared 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)	--	--

[a] Includes one fetal calf found during necropsy of cow in late May, and also includes 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 also includes one birth observed during July.
[d] Includes two births observed during July.
[e] Includes five 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 (legal hunter take is not included) survival rates varied from 74% to 94% annually during 2001–2005. The highest annual survival was experienced by the 2004 cohort which coincides with both department removal of bears from the EMMA and public wolf reduction 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 2001–2005. Wolves and nonpredation causes accounted for most mortality during these time periods, with illegal take and grizzly 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 collared and uncollared females are listed under Objective 1c (Table 2).

As of this time, we have only observed one parturient radiocollared 2-year-old moose which occurred in spring of 2005. Rates of parturition are listed for radiocollared 3-year-old moose in Table 2.

OBJECTIVE 1E: Obtain data snow depth and density within the EMMA.

Preliminary data is summarized in Table 3.

Table 3. Monthly snow depth and average daily temperature for the McGrath Alaska airport, winter 2000–2001 thru 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	-- / --	-- / --

[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.

A reconnaissance style wolf survey was completed within the Unit 19D-East MSA between 21 February and 24 February, 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 boundary wolves, and therefore 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 53 to 65 wolves occurred within the portion of Unit 19D-East we surveyed (an area slightly larger than the 19D-East MSA), with 9 of those wolves occurring within the wolf control zone.

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 grizzly 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 grizzly 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 grizzly 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.

We plotted locations of the 115 black and 10 grizzly 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 grizzly bears (grizzly bears at a much lower relative density) are dispersed throughout the entire EMMA, however, both black and grizzly 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, 2003, and 2004 will be used to formulate better estimates of bear density in the Upper Kuskokwim Area.

Management Component

Moose densities in Unit 19D-East are low at approximately 0.5 moose/mi^2 based on a survey conducted in November 2004. Densities are higher in the EMMA (1 moose /mi^2) and are increasing. The wolf population density is moderate with a pre-control (autumn 2000) population estimate of 198 wolves (23.3 wolves/1000 mi^2). The 2004 autumn wolf population estimate was 103 wolves based on the spring 2005 wolf survey, RY04 wolf harvest, and estimated number of pups. In 2005, black bears were estimated at 1,698 in

Unit 19D-East (77 black bears/1000 km^2) by extrapolating bear estimate data from an area with similar habitat (Yukon Flats, Alaska).

MOOSE HARVEST

The 5-year average reported harvest of moose in Unit 19D East under the registration permit system is 75 per year (RY01–05; Table 3). It is likely that the noticeable spike in harvest in RY02 was an effect of the summer 2002 fires that caused a temporary redistribution of some moose into the unburned riparian areas where they were more vulnerable. Another possible reason for the higher harvest is the increase in cash in the local economy from firefighting income that enabled hunters to purchase more fuel for transportation. The RY03 harvest was similar to RY01 because moose were likely more normally distributed and hunters had less cash to buy fuel than in RY02. Beginning in RY04, moose hunting was closed in the EMMA, which probably influenced the RY04 harvest as it is somewhat lower than other years. The total number of permits has been declining each year. Possible reasons could be that hunters under the age of ten are no longer allowed a permit and that the number of hunters with low expectation of hunting who come in to get a harvest permit has also decreased. Overall the registration permit system has worked to increase reporting rates and is being accepted by the Unit 19D-hunters.

Table 3. Unit 19D East registration permit hunt (RM650) results, 2001–2004.

Regulatory year	Successful	Unsuccessful	Did not hunt/ Report	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

WOLF HARVEST

The effort by trappers in Unit 19D to harvest wolves has been high. Harvest ranged from 21 to 44 during RY97–04 (Table 4). 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 desire 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 4. Reported wolf harvest in 19D, 19D-East, and EMMA; RY97–04. Includes wolves taken in wolf control program beginning in RY03.

Regulatory	Wolf harvest			% 19D-East harvest
year	19D	19D East	EMMA	in 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	33[a]	30	7	23%
2004–2005	34[b]	30	17	57%
Total	269	236	107	45%
8-year mean	34	30	13	43%

[a] Seventeen of the 33 wolves were taken in the wolf control program.
[b] Fourteen of the 34 wolves were taken in the wolf control program.

BLACK AND BROWN BEAR HARVEST

During RY01–04, 18 black bears were reported taken by the public in Unit 19D. Twelve of the 18 bears were harvested in 19D-East. No fall baiting permits have been issued since they became available in RY01. During RY01–04, 15 brown bears were harvested in Unit 19D, of which 10 were taken in Unit 19D-East. Harvest averaged 2 per year prior to implementation of the brown bear resident tag fee exemption in 1998.

WILDFIRES

As a result of 2 major wildfires during summer 2002, moose habitat within Unit 19D will improve as early succession plant species replace spruce forests that were burned in the fires. One fire south of McGrath covered 209,000 acres and primarily burned in 19D-East south of the EMMA. The second fire was north of Medfra and covered 31,000 acres. A few fires that burned near McGrath in 2005 may also improve moose habitat.

Plans for 2006

Plans for 2006 include the continuation of the ongoing moose research project and the wolf control program. The principal research activities for 2006 will be monthly monitoring of radiocollared moose, capture and processing of short-yearling moose in March, a calf mortality study starting in May, and moose surveys in fall. In addition, the number of black bears within the EMMA will be estimated using a mark recapture technique.