

**CRATERS OF THE MOON NATIONAL MONUMENT
AND PRESERVE DEER SURVEY 2005**

2005 Mule Deer 1



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Mule deer surveys were performed during the spring and fall of 2005. These included unstructured spring surveys as well as the systematic fall surveys in the north end of the monument. Systematic road surveys were continued on the loop road in addition to the usual informal count during May and June.

The number of does continued to decline from the previous three year period. Numbers were about a third of the 15 year average. Yearlings were also down with numbers about a third of the 15 year average. Over-winter survival of fawns was not calculated and reported due a very small and statistically skewed sample size.

The fall survey recorded numbers that were half or less the of 15 year average for all age classes. The fawn to adult ratio increased following a major decline that started in 2000. This may indicates a slight increase birth rates or an increase in early fawn survival. The total population estimate also showed a continued decline with estimates less than half of the 15 year average. This is likely a result of drought conditions continuing through most of the last five years.

When the data was averaged into three year intervals the deer population shows a general pattern of decline since the mid 1980s and reaching its lowest point in the current year. The numbers of all age/sex classes have continued a decline started in 2000.

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Introduction

Monitoring of the mule deer population began in 1980 when Griffith initiated a study on the population dynamics and habitat use of the monument's deer herd (Griffith, B. 1983. Ecological characteristics of mule deer: Craters of the Moon National Monument, Idaho. Report B-83 2. Coop. Park Studies Unit. Univ. of Idaho, Moscow 109 pp.). As a result of this study Griffith developed site specific Standard Operating Procedures (SOP) for the continued monitoring of the deer population using an annual spring and late summer deer survey. These surveys were first performed in 1984 and have been conducted each year since. This document reports data collected from 2002 to 2004.

Moose were first observed in Little Cottonwood Creek in June of 1999. Observations since that time suggest that the population may be increasing. Observations were recorded of moose and entered in to the wildlife observations database.

Methods

In accordance with the monument's Standard Operating Procedures (SOP) informal spring surveys were conducted from late April until 30 June. During this period the monument staff was requested to record any mule deer sighted. Most of these observations were made while in the field conducting other duties such as ranger patrols or other wildlife monitoring. Deer sighted were classified as adult males, adult females, yearlings and unknown. Starting in the spring of 1998 systematic road surveys were conducted in addition to the usual informal survey. The spring road surveys were conducted on the loop road starting at the Visitor Center and ending at the end of the one way section of the loop road. The route used included the spur road to the tree molds parking area but did not include the road to Devil's Orchard trailhead.

Late summer and early fall surveys were conducted from a vehicle along the 3.9 mile section of secondary road that runs from the North End gate off Highway 26 to the old Martin Mine site in the north end of the monument (appendix 2). Observations began 10 minutes after sunrise and were made in one direction only. Survey days were evenly distributed over the four week period, avoiding mornings with rain or winds greater than 10 mph. As with the spring surveys, all sightings were classified according to sex and age (adult, yearling, fawn). Surrounding hillsides, lava flows, and valleys along the route were carefully observed with the use of binoculars and a spotting scope. All surveys took approximately two hours to complete. Eight surveys were completed each year during the period from August 16 to September 15.

Over-winter survival rates were determined using the spring and previous year's late summer survey data. In order to get more normally distributed data for analysis the highest and lowest counts were dropped leaving the 6 middle surveys for statistical analysis. Population means, ratios and percent change estimates were calculated for all age/sex classes. Population estimates and 95% confidence intervals were calculated using data from the six late summer surveys. Standard error estimates for each age and sex class in the late summer survey were calculated and 95% confidence intervals established using the student t-test.

Results

SPRING SURVEY

The number of adult does observed in the spring surveys was 14 (table 1). The number of yearlings was 9. Over-winter fawn survival is not reported. The protocol for this survey requires a minimum spring count of 100 animals and state that 200 or more animals is preferable. The total for 2005 was 23. 2002 was the first year since this survey began in 1984 that the population statistics were not calculated due to a too small sample size. Spring observations have continued to decline since that year.

FALL SURVEY

The mean number of deer in most sex/age classes showed continued decreases from previous counts (Table 1). The only exception was adult males which showed Adult females showed an annual mean of 7.8 which was a 23% decline from 2004 (fig 1). This compares to a 15 year average of 19 and a average for the previous years of 10.6 for the previous 3 years.

Fawns showed a similar level of decrease with a mean of 5.2 or 26% decline from 2004 (fig 1). This compared to an average of 8.1 for the previous 3 years and 15 year average of 18. The total number of deer observed also showed a similar trend with an annual mean of 13.8. This compares to a mean of 21 for the previous 3 years and 15 year average of 41.

These observed changes were rather varied in size between age groups. Only the drop in yearling male numbers was statistically significant at $p < 0.05$ ($p = 0.007$). However that all age classes were down is also significant.

MOOSE

Nine individual observations of moose were recorded during 2005 thru Sept 30. These observations included a minimum population of 5 animals. A minimum of 1 adult male, 1 yearling male, two females, and a calf were observed during 2005.

Conclusions

During the 2005 surveys the sample size in the spring surveys were the smallest yet recorded. The protocol for this survey requires a minimum spring count of 100 animals and states that 200 or more animals are preferable. Samples much smaller than this will have a lot of statistical variability and many normal statistical procedures are not valid. For example the over-winter survival of fawns was clearly affected by the small sample size. When the normal calculations were tested the over-winter survival was calculated to be over 100%. Since survival greater than 100% is not possible this test was able to verify the need for larger sample sizes to accurately calculate population parameters.

The fall deer counts showed a continued decrease in all age classes except adult males. Adult males, which usually have low counts were unchanged from 2004 but still had mean count of less than one and were only about 17% of the 15 year average (table 1).

This pattern may be related to the drought conditions that predominated in the past few years. In 2005 an above average precipitation in April and May was followed the driest July and August on record. The average precipitation from the period June 1 to Sept 15 is 1.96 inches. The same period in 2005 saw only 0.08 inches of rain. This unseasonably dry summer resulted in a premature drying of forage vegetation. The lack of both water and forage in late summer likely had an affect on deer distribution although to what degree is still unknown.

By contrast the period of fall 2004 through the winter and spring of 2005 was average to above precipitation. The period from October 2004 to May 2005 saw 16.1 inches this compares to a 50 year average of 11.7 inches and an annual average of 15.3. Improved early growing season conditions likely affected the increase in the reproductive rate as measured by the fawn to doe ratio. This was 80 which was the second highest since 1998 and a 40% increase over 2004 when the F/D ratio was 62. Even if the next few years see a return to normal precipitation levels it may take several years for deer populations to rebound.

Table 3 shows survey and population statistics in 3 year intervals since surveys began in 1984. Several trends are observable in this data. One is declining numbers of does and

fawns in the fall survey since the mid 1980s. These data show that the counts of these two age classes are about one third of what they were in the mid 1980s for does and about one quarter for fawns. The most recent period (2002 to 2004) showed the lowest average count of both fawns and adult females. The current year count of does and fawns was 26 and 35 percent lower still. These declines are likely a result of climate and other factors already discussed.

Unlike females and fawns, male deer (both adults and yearlings) have always had comparatively low counts and they have not showed any consistent trends in their year to year numbers. This lack of trends is true both for spring (figure 2) and fall counts (figure 1). This accounts for large percentage fluctuations not having much significance. For example, an increase of 213% from 2003 to 2004 was less than half an animal per survey.

The total population estimates follow similar trends as the doe counts. That is declining numbers throughout the 1980s and mid 1990s with stabilizing numbers in the late 1990s. This was followed by a steady decline starting in 2000 and continuing through 2005. This trend was likely influenced by the occurrence of frequent drought years from the mid 1980s through the early 1990s. Throughout shrub lands of southern Idaho many stand replacing fires occurred during this time period. This included the 1992 Little Prairie Fire in the monument. These environmental conditions produced poor forage conditions compared with the first few years of deer monitoring in the monument. In the years since the drought, vegetation had begun to recover. This weather pattern may explain the stabilizing numbers in the late 1990s. Late summer 1999 through spring of 2004 had similar drought like conditions and the resulting poor forage. Which is likely related to the current decline in deer numbers starting in 2000.

MOOSE

A visitor reported of a moose calf in June. Later on September 13 a yearling male was seen in Little Cottonwood Creek at the Martin Mine site. This animal had one antler missing. The same animal was again observed on September 22. This time the animal was walking adjacent to Hwy 20/26 about 2 miles NE of the intersection with Blizzard Mountain Road. This suggests that the animal was dispersing. With a calf observed and yearlings leaving this may indicate the Cottonwood Creek population at Craters may become a low volume source population. Only time and additional years of observation will determine if this condition persists.

Table 1. Summaries for 2001-2005 Craters of the Moon National Monument Mule Deer Survey.

	2001	2002	2003	2004	2005	15 year Average
SPRING						
Adult Doe	74	24	28	11	14	53
Yearlings	22	23	22	1	9	32
Yearling:100 Doe	30	*	*	*	*	60
Over-winter Survival	50%	*	*	*	*	63%
Total Does	85	36	39	12	18.5	81
Adult Doe Ratio	87	68	72	96	76	74
FALL						
Mean # Adult Males	0.8	1.8	0.16	0.5	0.5	2.8
Percent change	-20%	125%	-91%	213%	0	
Mean # Yearling Male	0.5	1.7	1.5	1.7	0.3	2.8
Percent change	0.0	240%	-13%	13%	-83%	
Mean # Adult Females	17.6	12.3	9.5	10.2	7.8	18.7
Percent change	27.5%	-30.1%	-10.5%	7.3%	-23%	
Mean # Fawns	9.8	9.3	9.2	6.0	5.2	17.5
Percent change	19.5%	-4.0%	-1.1%	-34.8	-26%	
MEAN TOTAL	28.7	25.1	20.4	18.4	13.8	41.4
Fawns:100 Does	56	76	97	59	80	92.8
Fawns:100 Adult Does	64	112	135	62	87	122
FALL POP'N ESTIMATES	231	216	168	155	120	315
95% CI	177-285	198-234	145-191	106-204	64-176	

- The sample sizes were too small to calculate valid estimates for these parameters. The 15 year average excludes these numbers.

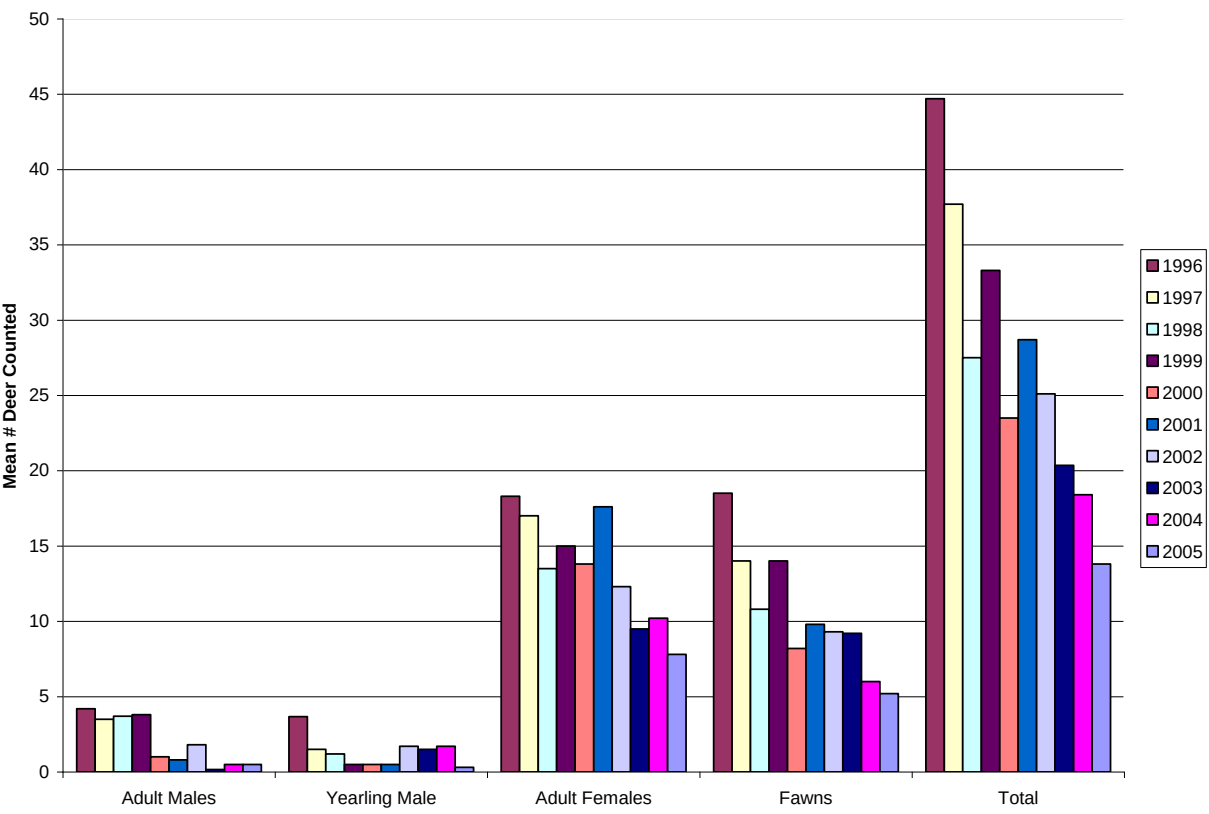


Figure 1. Mean number of mule deer counted in fall surveys 1995-2004.

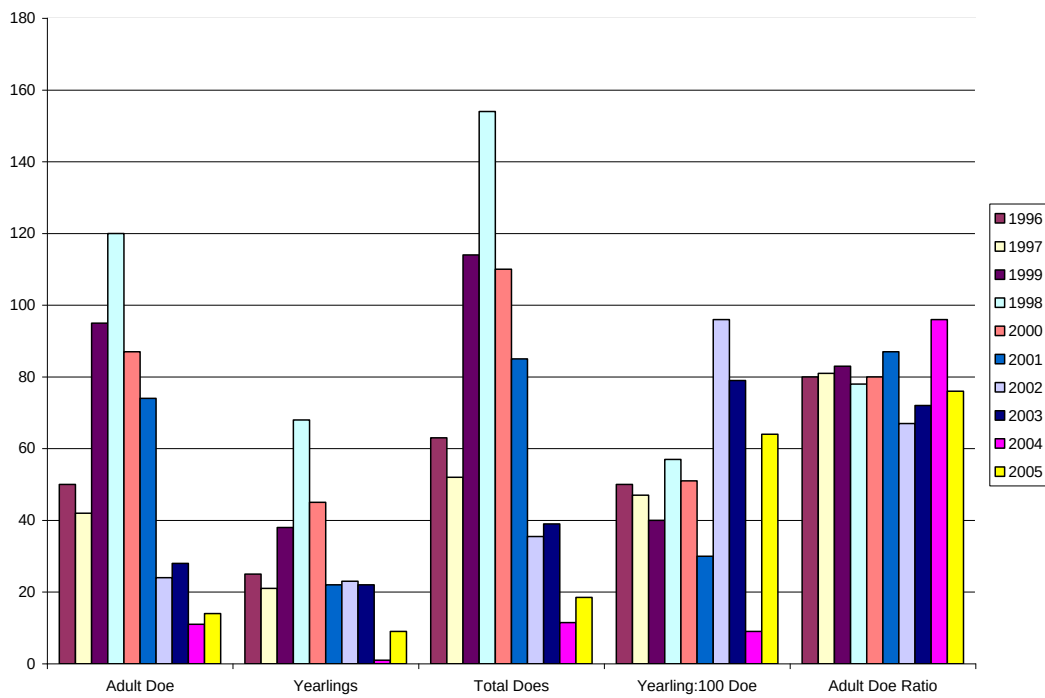


Figure 2. Number of deer counted in spring surveys 1995-2004.

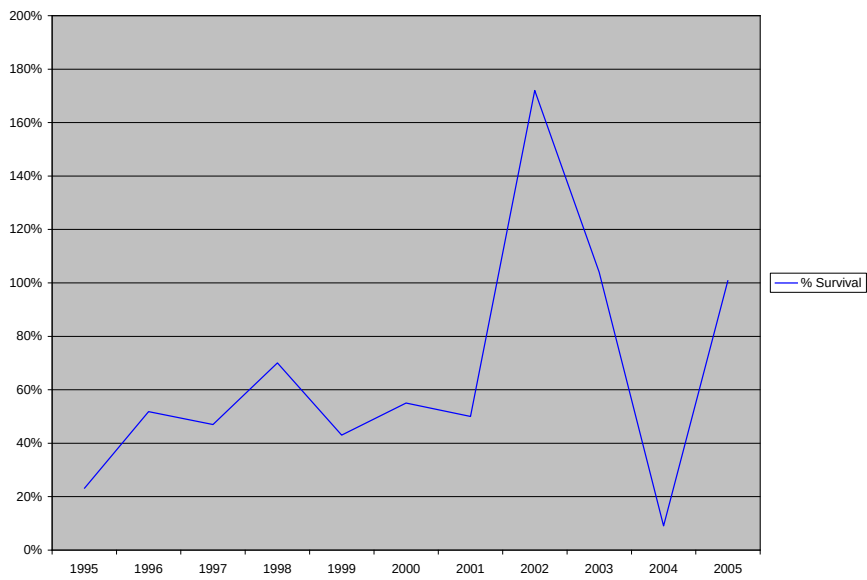


Figure 3. Percent over winter survival of fawns 1995-2004

Table 2. Daily survey totals, mean totals, and standard error figures for each class (age/sex) of deer in the 2005 Craters of the Moon National Monument Mule Deer Fall Survey.

		1st	2nd	3rd	4th	5th	6th	total	mean	SE	t-test P
Ault males	#	1.0	1.0	0.0	0.0	0.0	1.0	3.0	0.5	0.2	1.000
	ratio	0.5	0.3	0.0	0.0	0.0	0.1		0.1		
Yrlg males	#	0.0	0.0	0.0	0.0	1.0	1.0	2.0	0.3	0.2	0.007
	ratio	0.0	0.0	0.0	0.0	0.1	0.1		0.0		
Females	#	2.0	4.0	8.0	3.0	13.0	17.0	47.0	7.8	2.5	0.479
	ratio	100.0	100.0	100.0	100.0	100.0	100.0		100.0		
Fawns	#	2.0	4.0	4.0	3.0	12.0	6.0	31.0	5.2	1.5	0.682
	ratio	100.0	100.0	50.0	100.0	92.3	35.3		79.6		
Unknown		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total		5.0	9.0	12.0	6.0	26.0	25.0	83.0	13.8	3.8	0.368

Significant change is the P value from a student t-test between means for 2005 and 2004 counts

ratio = the age/sex class to adult doe ratio for a survey

Table 3. Craters of the Moon National Monument Mule Deer Survey Summaries in 3 year intervals for the period 1984-2005.

	1984-86	1987-89	1990-92	1993-95	1996-98	1999-2001	2002-2004	2005
SPRING								
Adult Doe	71	59	47	48	71	85	21	14
Yearling	62	40	41	16	38	35	18	9
Yearling:100 Doe	71	65	85	44	51	40	*	*
Over-winter Survival	68%	66%	79%	55%	56%	49%	*	*
Total Does	120	80	67	56	90	103	29	18.5
Adult Doe Ratio	0.74	0.76	0.71	0.82	0.80	0.83	0.78	76
FALL								
Mean # Adult Males	2.4	3.2	5.6	3.4	3.8	1.9	0.8	0.5
Percent Change		33%	75%	-39%	12%	-50%	-58%	-38%
Mean # Yearling Males	4.8	4.0	2.4	1.2	2.2	0.5	1.6	0.3
Percent Change		-17%	-40%	-50%	83%	-77%	220%	-81%
Mean # Adult Females	29	27	27	12	16	12.1	10.6	7.8
Percent Change		-7%	0%	-55%	27%	-25%	-12.4%	-26%
Mean # Fawns	30	22	29	12	14	10.6	8.1	5.2
Percent Change		-26%	32%	-60%	17%	-24%	-23.6%	-35%
MEAN TOTAL	66	55	64	28	37	28.5	21.3	13.8
Fawns:100 Does	106	93	105	96	92	69	77	80
Fawns:100 Adult Does	144	123	170	116	115	90	103	87
FALL POPULATION ESTIMATES	502	417	486	228	290	179	180	120

* Statistic not calculated due to very small sample size in all three.

Fall Survey Route

