



PARK SCIENCE

A RESOURCES MANAGEMENT BULLETIN

NATIONAL PARK SERVICE
U.S. DEPARTMENT OF THE INTERIOR

VOLUME 2 – NUMBER 1

FALL 1981



Cover Photo: Team effort is required to handle and mark adult deer at Craters of the Moon National Monument. Seasonal Park Ranger Mary Laspina and Park Ranger Neil King assist Research Biologist Brad Griffith in attaching radio collar to adult doe.

Mule Deer Study Provides Needed Baseline Data

By Brad Griffith

Historically, Craters of the Moon National Monument area was inhabited by grizzly bears, bighorn sheep, and mule deer. After the turn of the century, domestic grazing and subsistence hunting by local miners created pressures that severely depressed the populations of these three large native mammals. Establishment of the monument in 1924 eliminated these pressures but the grizzly bear and bighorn sheep never recovered and now are extinct within the monument.

The mule deer were a different story. They not only survived, but increased in numbers. In 1967 the total population was estimated to be about 350 animals and the population now totals 500 to 600 animals.

By the late 1970s, deer were being killed regularly while crossing the highway, were feeding extensively on residence lawns, and were using forested areas heavily for bedding. Park managers became concerned that protection from hunting and lack of competition from other ungulates would allow a population increase that could result in range deterioration. Accordingly, they requested some kind of long term deer population and habitat monitoring systems that could be carried out through routine park operations. They also asked for estimates of population levels and productivity and for an evaluation of deer usage of the wilderness areas so that impacts on deer habitat of a proposed fire management plan could be evaluated.

Field research designed to satisfy management requests began in May 1980, and has continued through November 1981. Morning and evening deer census routes and monitoring procedures were implemented and four clusters of line-intercept transects were established to monitor long term trends in deer habitat. Seasonal classification counts were used to estimate productivity; wilderness area utilization was determined from relocations of 18 radio-collared and 55 ear-tagged deer. From the proportion of marked deer observed on regular censuses, the population level was estimated. Sources and magnitudes of mortality also were investigated to identify factors limiting the herd size.

Study results indicate that the Craters deer herd is extremely productive and experiences little fawn mortality related to nutrition. In addition, it was found that the deer use two distinct summer home ranges within the monument and suffer a greater degree of hunting mortality than might be expected. Together, these factors identify a herd with fascinating, complex characteristics.

Because of excessive snow depths, mule deer are residents of the monument only in summer. The study has shown the Craters herd to be composed of deer from at least two separate winter ranges on BLM and private lands. Approximately half of the current population (500-600) winters 40 miles to the south and the other half winters 20 miles to the northwest.

Deer begin arriving on the monument summer range in early April; by late April they are distributed throughout the monument's 35 square miles of deer habitat. Approximately 70 percent of the range is within the wilderness portion of the monument, where little, if any, free water is available. Permanent water sources are limited to melting ice in lava tubes – water not accessible to the deer. Currently, it is assumed that in spring and early summer deer using the wilderness obtain their moisture from temporary water sources (such as rain puddles) and from consumed vegetation.

As the summer progresses, vegetation becomes too dry to satisfy deer moisture requirements. When

this occurs (in late July, as indicated by depressed fuel moisture readings from fire weather stations), wilderness deer migrate 5 to 10 miles north to ranges in the north portion of the monument. Free water from two creeks is available there. The deer occupy the new dry season home ranges during August and September. When fall rains green up the wilderness vegetation, the deer migrate back to the same wilderness home ranges they occupied in the spring and early summer, remaining there until December when they migrate to winter ranges.

The mid-summer northward migration causes a temporary four-fold increase in deer density for the northern non-wilderness portion of the monument. From April through July, when uniformly distributed throughout the monument, deer densities average 15 per square mile – a normal density for intermountain mule deer on good summer range. In August and September, however, densities in the northern portion of the monument approach 60 per square mile, accounting for the large numbers of deer observed by park personnel. Censuses conducted in 1981 commonly revealed 40 deer per mile of census route.

An average summer density of 60 per square mile, as observed in northern portions of the monument, is unusual. Were the densities not transitory, range deterioration certainly would occur. To date, forage communities in the northern part of the monument deer habitat do not show signs of excessive use.

Forage communities in the wilderness portion of the monument, where 70 percent of the fawning occurs, show even less utilization than in the northern part. Bitterbrush is widespread, abundant, and in excellent condition. Native bunch grasses are plentiful, the forb community is diverse, and limber pine stands provide excellent fawning cover. The forage communities provide excellent nutrition for does during the critical last one-third of pregnancy.

As a result of the high quality nutrition available, initial productivity in June is high. Nearly all does have twins, and triplets are not uncommon. On the average the herd produces at least 200 fawns per 100 adult does. This level approaches the maximum biological potential for free ranging mule deer.

Craters herd fawns have a high survival rate during the first six months of life. By August, less than 20 percent have died and 165 fawns per 100 adult does remain. Fawns experience little additional mortality from September through November.

Over-winter fawn survival also is high. By Sep-

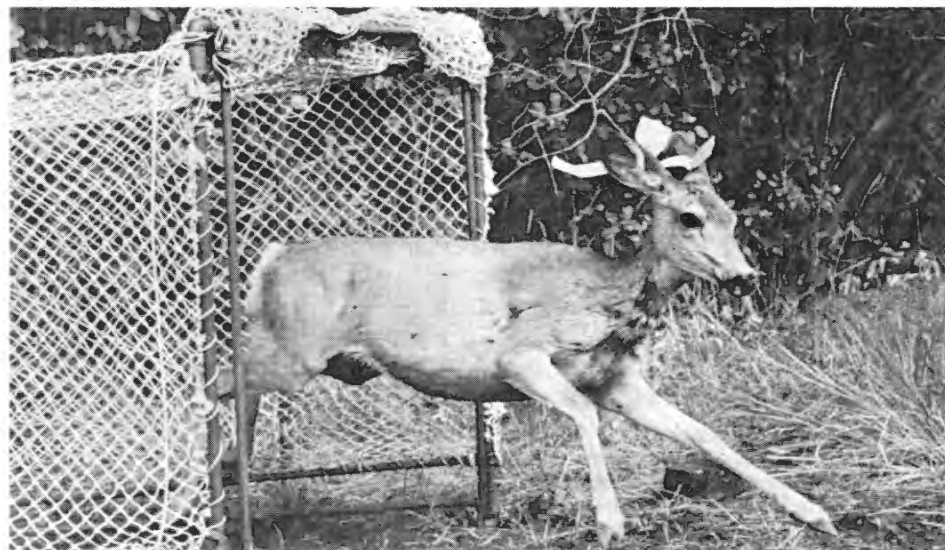
tember fawns typically have fat deposits on all key indicator areas of the body and arrive on adequate winter ranges in excellent condition. As a result, mortality on winter ranges in 1979 and 1980 was not substantial. In the spring of 1980 the Craters herd was characterized by 75 yearlings per 100 adult does and in 1981 the spring ratio was 125 yearlings per 100 adult does. Few, if any, mule deer herds have spring age ratios this good.

With such high productivity and survival figures the Craters herd would be expected to grow rapidly and noticeably impact its summer range. Since this has not occurred, limiting factors must be acting to slow the growth rate of the population. Some factors that may limit the growth rate are predation, disease, periodic severe winters, dispersal, and hunting mortality. Evaluation of the importance of severe winters and dispersal will require several years. Disease of significant magnitude to limit the population level has not been observed thus far, and predator densities in the monument are low compared to surrounding areas. Preliminary evidence suggests that hunting mortality may be an important limiting factor. Areas adjacent to the northern boundaries of the monument are accessible and receive heavy hunting pressure. Deer move freely across the boundary and, as a result, the Craters herd does not receive complete protection from hunting. In the fall of 1980, 10 to 20 percent of the known herd of 500 to 600 animals was killed by hunters. Adult females were harvested at a higher rate (15 to 30 percent were killed) than the population at large. Since adult females are the key to recruit numbers and growth rate, hunter removal of them may serve to suppress the population growth rate.

Based on the findings of high productivity, low natural mortality, and unusual home range utilization, research on the Craters herd will continue. The long term research goal will be to identify and evaluate factors limiting the population. Future emphasis will include refinement of hunting mortality estimates, food habits, the role of dispersal and weather patterns in population regulation, and the influence of winter range conditions on herd dynamics. The deer population and habitat monitoring systems devised will facilitate long term documentation of the interaction between the deer population and the forage community.

As demands for consumptive use of public lands increase, the value of national parks and monuments as baseline natural areas becomes more evident.

The long term studies at Craters of the Moon will



Off and away! Adult doe marked with an individual color combination of ear tags and streamers leaves a trap. Salt is an effective bait during hot dry weather.

help identify the population characteristics that can be expected of an intermountain mule deer herd not limited by food. A complex relationship between the Craters deer and their unique volcanic habitat has been documented by current studies. As further understanding of the Craters herd develops, more precise park management direction can be defined.

Griffith is a PNR roving research biologist, assigned to parks in the Region as the need arises. Photos are by David R. Clark.