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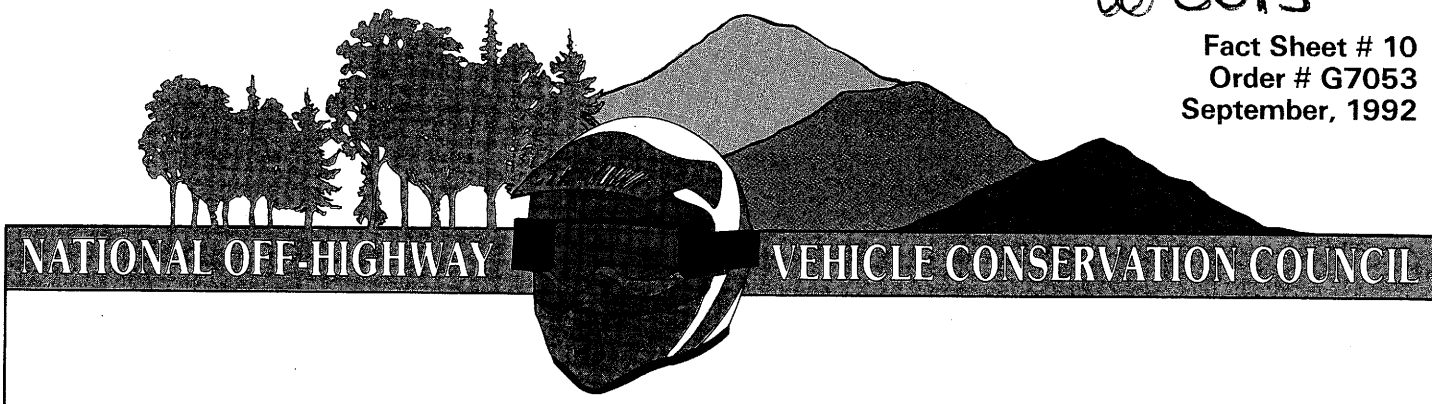

How Off-Highway Vehicles Affect Deer

by Michael E. Laing

OVERVIEW

In the past two decades, numerous topics have appeared in research papers, dissertations, theses and journals covering the effects of snowmobiles, trail bikes and other forms of off highway vehicles on our environment. These have covered many large mammals such as mountain sheep, elk, mule deer and white-tailed deer. The geographical areas include several states, predominately in the north-eastern, north-western, Rocky Mountain states, and California.

This fact sheet provides a summary of each article available for deer. Articles are divided into five-year increments. Most articles have been written about the deer family. This includes the white-tailed, black-tailed and the mule deer.

1987 TO 1992

Between 1987 and 1992, two reports were published for the California Department of Fish and Game, California Department of Parks and Recreation and the US Department of Agriculture. These addressed the Rock Creek Off-Road Vehicle Deer Study. The interim report (Jones & Stokes Associates, Inc. 1990) was finalized in 1991 and published as the final report (Jones & Stokes Associates, Inc., 1991).

The period of the study was 1990 and 1991. It covered the Rock Creek OHV area in the Eldorado National Forest. Winter recreation in this area consists of motorcycles and all-terrain vehicles. Most motorcycle use occurs between October and May. The area is also used by equestrians, mountain bikes, hikers, hunters and recreational dredgers.

The deer densities in the study area was determined to be 16 to 22 deer per square mile. Eight deer were radio-collared and their movements were recorded. Deer arrived on winter ranges between November 1 and 15, 1990. Spring migration in 1990 occurred in mid to late April. In 1991, spring migration occurred between early and late May.

Six habitats were identified; however, approximately 78% of the area is conifer forest or woodland. Browse for forage was rated low in all but the chaparral areas.

The response of the radio-collared deer to OHV use was determined by evaluating changes in the size of 2-day activity centers and foraging behavior. During low levels of OHV use, approximately 13 riders per day were in the study area; approximately 28 riders per day were present during moderate levels; and 47 riders per day were present during high levels.

No significant differences were detected in the size of 2-day activity centers or the amount of feeding time among the different levels of OHV use. It was concluded that the deer were not affected by the OHVs because no trends in the data existed to suggest otherwise. The total amount of time that deer foraged and the daily cycle of feeding periods were similar to other populations of deer that had not been disturbed by OHVs. No significant differences could be detected in the size of 2-day activity centers or the distance of deer from roads and trails for three levels of non-ORV recreation.

The study concluded that there was no evidence that deer were affected by the levels of OHV use,

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and the result was consistent with other studies that evaluated the response of deer to higher levels of vehicle disturbance.

The third article available from this period, Responses of Black-Tailed Deer to Off-Highway Vehicles in Hollister Hills State Vehicular Recreation Area (Ferris and Kutilek, 1989), was an unpublished report to the OHV Division of the California Department of Parks and Recreation and the U.S. Department of Agriculture. It consisted of a study of the responses of black-tailed deer to OHV traffic at Hollister Hills State Vehicular Recreation Area in central California.

Fourteen female deer were captured and equipped with radio-collars. Movements, habitat use, and activity levels were recorded for a one year period and compared with OHV use levels. The dominate vegetation in the area was chaparral. The deer movements and activities were monitored an average of two days per week for a period of one year. Visual confirmations of locations were made. A total of 1773 locations were recorded for all radio-collared and visibly identified animals. There were 210 visual sightings and the rest of the locations were gathered via triangulation. .

There was no statistical correlation between vehicle traffic levels and the amount of activity of deer. The deer showed a definite pattern of avoidance behavior with increasing levels of OHV use. It was determined that deer were not more sensitive to traffic during fawning season or less sensitive during the rut. The authors found no relationship between home range size and OHV use. Also, it was determined that deer did not increase the duration of their active periods in response to OHVs nor did they increase their activity peaks while vehicles were absent. The investigators found no evidence that deer changed their habitat utilization because of traffic levels.

As a final statement, the authors commented that OHV use on public lands is an emotional and controversial issue. It seems intuitive that deer, with their well-developed hearing and other adaptations as a prey species, would be strongly affected by OHV activity. The data, however, generally did not support this conclusion.

1982 TO 1987

Responses of Mule Deer to Disturbance by Persons Afoot and Snowmobiles (Freddy, Bronaugh and Fowler, 1986) is the only article available for the period 1982 to 1987. This article was published in the Wildlife Society Bulletin. It outlined a study into the effects of human disturbance on mule deer from mid January until early March 1979 and 1980 within a portion of Junction Butte State Wildlife Area in northern-central California.

The deer were visually monitored reacting to human disturbance. Eighteen female deer were equipped with telemetry-collars or neckbands. This allowed easy location of the animals. The deer were exposed to one to two persons on foot, using snowshoes, and one to two persons riding snowmobiles during disturbance trials.

There were usually two trials per day with a maximum of four. Deer were approached from various directions. Snowmobiles were driven continuously without stopping.

The results determined that deer were disturbed by persons afoot or snowmobilers during 67 trials. Distances at which deer responded differed between persons on foot and snowmobiles. Snowmobiles elicited initial low response by deer at greater distances than did persons afoot. Deer exhibited initial moderate response at similar distances for both disturbances but they displayed high response at greater distances from persons than snowmobiles.

Deer activities were interrupted more by persons on foot than by snowmobiles. Persons afoot and snowmobiles elicited high response by 80 and 24%, respectively. Deer moved greater horizontal distances when initially fleeing from persons. Responses of adult female mule deer to persons on foot were longer in duration, involved running more frequently, and were greater in estimated energy expenditure than with persons using snowmobiles.

1977 TO 1982

Between 1977 and 1982 three articles are available. Behavior Responses and Reproduction of Mule Deer, Odocoileus hemionus, Does Following Experimental Harassment with an All-terrain Vehicle (Yarmoloy, Bayer, and Geist, 1981) was published in the Canadian Field-Naturalist. Mule deer were first captured and then habituated to potentially harassing stimuli (passes by an ATV). The authors expected behavioral and reproductive changes in the deer that were subjected to experimental harassment.

The animals were selected from the deer herd on the Suffield Military Reserve in Alberta. These deer rarely saw vehicles or humans. Five female deer were captured and equipped with individually colored radio collars. Twelve weeks later the deer were subjected to the investigator riding an all-terrain vehicle along a designated truck trail.

After acclimation, three does were selected for harassment. The harassment consisted of each doe being followed by the ATV for nine minutes. The harassment began on October 1, 1981 and stopped on October 24th. Each doe was pursued for a total of 135 minutes.

The investigators expected to impose stress to disrupt normal patterns of feeding and resting and thereby affect body condition and possibly reproduction. A control was established by observation of unharassed does. The harassed does spent more time active after darkness than did the unharassed

does. Post-trial harassed deer used cover more often than did unharassed deer. The harassed deer fled ATV activity more often than did unharassed deer.

The results on harassment followed expectations in every instance. The capture and handling of the deer affected neither the habituation nor the behavior and reproduction of two control females. All deer habituated to the ATV travelling along a predictable route and ATV departures from the predictable route but not pursuit. This implies that deer will habituate to and ignore motorized traffic provided the deer are not pursued.

The three harassed females collectively raised only one fawn in the year of the trials but had normal reproduction the year before and after the trial. It was concluded that deer addressed by a harassing stimulus suffer significant disruptions in their biology.

In Snowmobile Effects on Movements of White-tailed Deer: A Case Study (Eckstein, O'Brien, Rongstad and Bollinge, 1979) published in the Environmental Conservation, the authors initiated a study to determine the effects of snowmobile traffic on the winter home-ranges, movements, and activity patterns, of white-tailed deer in northern Wisconsin. Two deer-yards, Ghost Creek and Spider Lake, located in the Chequamegon National Forest, were chosen for the study areas. The period of study was February and March 1973 (both yards) and Ghost Creek yard in February and March 1974.

A total of five adult and five fawn does from the Spider Lake area and seven adult and four fawn does from the Ghost Creek area were equipped with radio collars in 1973. In 1974 fifteen adult and three fawn does were radio-collared in the Ghost Creek area.

Locations of deer were determined by triangulation between two permanent towers at each study area. A location could be obtained every 5 to 6 minutes in 1973 and 2 to 3 minutes in 1974. Six parameters were analyzed to determine the impact of snowmobiles on the deer. These were home-range sizes, distances from the snowmobile trail, habitat use, activity periods, long-distance movements, and individual snowmobile-deer encounters. Spider Lake acted as a control.

At Ghost Creek, snowmobiles were run on Friday, Saturday, and Sunday; Thursday and Monday served as controls. Snowmobile runs were 45 minutes in duration. Individual deer were tested by having the snowmobiles circle the animal for 15 to 30 minutes. Deer were radio-tracked immediately before, during, and after the snowmobile tests. A total of 44 encounters were conducted on eight different deer. In March of 1974 a group of twenty cross-country skiers were used in the same manner as the snowmobiles. A total of 2,464 locations on 21 animals and 3,896 locations on 16 animals were obtained in 1973 and 1974, respectively. Twenty deer were determined to be the best for the analysis due to locations to the towers. Snowmobile impact on deer was significant in only two of six parameters studied.

In 1973, the investigators found an initial disturbance of deer as snowmobiles ran the trails for the first time on a specific day. Displacement from the vicinity of the snowmobile trail was not considered a serious disturbance as activity patterns and habitat uses were not altered. Some deer made long-distance moves; however, these moves were considered a common part of the animals' winter activities and not by the snowmobile presence. The authors found no significant differences in overall winter habitat use during snowmobile tests, and no indication that deer moved into thicker cover during periods of snowmobiling.

This study reported that deer were more likely to move away from people hiking or skiing than from people riding snowmobiles.

1972 TO 1977

In the final article, Response of White-tailed Deer to Snowmobiles and Snowmobile Trails in Maine (Richens and Lavigne, 1978), the authors performed a similar investigation in Maine. During the three winters of 1972-1975 the authors studied white-tailed deer use of a 17 kilometer snowmobile trail system in Somerset County, Maine. The objectives of this study were to determine the extent deer used snowmobile trails and the environmental conditions associated with such use; to assess the value of altering deer mobility by use of snowmobile trails; and to measure deer response to snowmobiles. Field tests were conducted from December 1 to April 30, 1972 through 1975. Distribution of deer was determined from weekly field observations. Deer population was estimated based on pellet-group counts. Deer use of snowmobile trails was evaluated during six periods in 1974-1975.

The results confirmed that deer tended to follow snowmobile trails farther in early and late winter than in mid-winter. Most deer used snowmobile trails for short distances, seldom following then farther than 0.2 kilometers. They tended to use snowmobile trails to connect with deer trails. Snowmobile trails were used more as the severity of winter weather increased. Deer consistently bedded near snowmobile trails and fed along them even when those trails were used for snowmobiling several times a day.

This study indicates that snowmobiles can be used to benefit white-tailed deer by easing their travel effort in snow, providing trails in nearby bushy areas and large clearings having palatable food, and inducing winter deer movement to suitable and unexploited localities within a wintering area.

From 1972 to 1977 four articles are available; one deals with black-tailed deer in California and three deal with white-tailed deer. In Some Effects of Vehicles on Wintering Deer within the Eldorado National Forest, Winter 1975-76 (Barrett, 1976), the objective of the author was to consider what conflicts, if any, exist between vehicles and wintering deer on the Eldorado National Forest.

The area of study includes the winter range for the Pacific, Grizzly Flat and Salt Springs deer herds. Within this area are approximately 200 miles of selected forest system roads that were used as study routes. The test consisted of a 4-WD pickup being driven along a number of predetermined routes and deer reactions to the vehicle were observed. Field observations were made from December 3, 1975 until March 10, 1976. One thousand, three hundred and forty-six miles were driven and 292 encounters involving 741 deer were made.

Deer were encountered at distances of 9 to 230 meters. Nearly all deer were at least alert to the approaching vehicle when first observed. Fifty-six percent of the deer encountered trotted, bound, or otherwise fled rapidly from the vicinity of the vehicle within 30 seconds after the encounter and ran for a distance of 50 meters or to cover.

In 38% of the 292 encounters the moving vehicle had no discernable effect on the encountered deer. However, when the vehicle stopped, 32% of the deer that were apparently unconcerned with the moving vehicle, displayed a urgent escape response to the stopped vehicle.

The study concluded that 50% of deer encountered by vehicle on the Eldorado in winter exhibits an urgent escape response; potentially adverse effects of vehicles are often minimized by steep terrain and heavy cover; areas of high deer concentration are susceptible to adverse impacts from vehicles, especially during the morning and evening periods; and a moving vehicle often has no detectable effect on a deer, while deer seem especially wary of a vehicle that suddenly stops.

Energy Conservation by White-tailed Deer in the Winter (Moen, 1976), printed in Ecology, described the behavior of white-tailed deer in Itasca Park, northwestern Minnesota. This paper described the distribution, movements, and activities of free-ranging deer in an effort to quantify the importance of various energy strategies used in the winter. Two responses are possible; deer may increase energy expenditure to meet the increased energy demands of winter by foraging for nutrients necessary for metabolic processes, or they may restrict their activity and conserve energy by consuming a minimum amount of forage and minimizing the rate of depletion of body fat reserves.

Weather conditions were recorded daily. The number of deer observed, their behavior, and condition were recorded from September 1973 through May 1974.

An important condition for testing the two hypotheses is that the deer be relatively undisturbed. Walking through the area on snowshoes did not seen to affect their behavior. There were no dogs in the area. Snowmobiles could have had the greatest potential impact since a designated trail coincided with one-third of the studied area. Due to the gasoline shortage, the trail was not used to any great extent.

This study indicates that energy conservation is substantial when deer are able to move at slower speeds, stay on level ground, and avoid deep snow. Unnecessary losses may be prevented by disturbing the deer as little as possible, minimizing harassment by dogs and snowmobiles, while providing natural food and cover.

Gerald Lavigne's Winter Response of Deer to Snowmobiles and Selected Natural Factors (Lavigne, 1976) addresses the response of deer to snowmobiles during the winters of 1972-73, 1973-74, and 1974-75. Field work was conducted in Hayden Brook deer wintering area, Somerset County, Maine. The objectives of this study were: to relate deer and snowmobile trails to snow characteristics and weather; to determine the requisites for favorable altering deer mobility and feeding patterns by use of snowmobile trails; and to evaluate deer reaction to snowmobiles. Three weeks were spent each month in the study area. The over-wintering deer population was estimated at 478 ±60 in 1972-73, 305 ±64 deer in 1973-74, and 389 ±69 in 1974-75.

Deer commonly used snowmobile trails as a travel route connecting deer trails. They infrequently used snowmobile trails as bedding sites and were subjected to a limited amount of disturbance by snowmobilers during the study, but effects on activity patterns appeared to be minimal. Deer consistently bedded near and fed along snowmobile trails, even when those trails were used daily.

This study found that deer home range size and activity patterns did not differ significantly between a wintering area with heavy snowmobile use and one receiving no use. Deer met on snowmobile trails usually fled immediately after seeing the snowmobile. Six deer were chased. Four of these deer remained in sight and showed signs of exhaustion after the chase. Deer response to snowmobiles differed each winter. Significantly more deer ran out of sight than stayed during the first two winters. However, during 1974-75 more deer stayed in sight.

The number of deer staying in sight increased as the winter progressed. Deer response depended on cover availability. In the open, they tended to flee. In softwoods,