INTERCEPT FEEDING

Intercept feeding is the practice of strategically placing food to lure animals into desired areas (e.g., away from roadways), and/or stop animals with food before they cross a roadway. Documentation for one study was found that explored the use of this practice as a possible method to deter deer from the roadway area (*1*). It was hypothesized that intercept feeding could be used to keep deer away from a roadway right-of-way, and consequently reduce deer-vehicle crashes (DVCs).

Literature Summary

Study Design

During the winter months of 1985 and 1986 (January to mid-March) researchers at Utah State University conducted an investigation to test the effectiveness of intercept feeding on diverting mule deer from a highway right-of-way. Counts of roadside deer carcasses and live deer were completed to accomplish this objective.

Three highway segments along three different state highways were considered in the study (*1*). The study site along each roadway was divided into treatment (i.e., intercept feed was provided) and control (i.e., no intercept feed was provided) segments of equal length, and a 3-mile buffer segment between the two (*1*). Two of the study sites had 6-mile treatment and control segments, and at the other site these were 5 miles long (*1*). The buffer areas at each site remained unchanged, and were intended to remove any extraneous effects that the intercept feeding within the treatment segment might have on the defined control segment. After the first year of the experiment the treatment and control locations were interchanged.

Intercept feeding stations were provided in each treatment segment and spaced as evenly as possible within the existing landscape features that funneled mule deer toward the roadway (e.g., canyon entrances). These stations were placed approximately 1,300, 2,600 and 3,900 feet away from Utah State Highways 6, 28 and 89, respectively (*1*). The food provided was primarily alfalfa hay supplemented with balanced-ration deer pellets and

apple mash. The quantity of food at each site was adjusted during the experiment to accommodate the number of mule deer apparently using it.

The researchers recorded the date, location, sex, and age class (e.g., fawn, yearling, or adult) of all the deer carcasses along the highway segments during the study months. In addition, they conducted spotlight surveys (i.e., night observations made with hand-held spotlights from a vehicle) along Utah State Highway 28 to investigate the distribution and location of live deer along the highway right-of-way with respect to the control and treatment zones, and the deer carcasses observed.

In general, the researchers also made two assumptions when evaluating the data they had collected (*1*). First, they assumed that without the intercept feeding the deer killed along the treatment and control roadway segments (e.g., the number of DVCs) would be equally distributed (*1*). Actual deer carcass or DVC patterns before the project started were not investigated. Second, the researchers assumed that the number of fatally wounded deer that wandered off the right-of-way before they were able to make their observations were proportionally distributed along the segments of interest, and that the inability to include this data in the analysis did not impact their conclusions (*1*).

Study Results/Discussion

During the first year of the study the investigators found that number of deer carcasses in the three treatment segments was not significantly lower than those observed in the control segments (See Table 1) (*1*). In addition, in 1986 (the second year of the study), after the treatment and control segments were reversed, one of the study sites (Utah State Highway 6) experienced more deer carcasses in its treatment segment than its control segment (See Table 1). Theoretically, the number of deer carcasses observed should be equal (i.e., a ratio of 1:1) in the treatment and control segments if the intercept feeding has no impact. Some of the reasons for the results in Table 1 are explained in the following paragraph.

TABLE 1 January to Mid-March Numbers of Deer Carcasses (*1*)

	Site Segment Deer Carcasses				
Year	**Control***	**Buffer***	**Treatment***	**Total**	**Control:Treatment Ratio**
Utah State Highway 28 Site					
1985	31	13	19	63	1.6:1
1986	89	41	38	168	2.3:1
Utah State Highway 89 Site					
1985	29	12	19	60	1.5:1
1986	59	21	34	114	1.7:1
Utah State Highway 6 Site					
1985	14	5	8	27	1.7:1
1986	13	8	31	52	0.4:1

*Control = Segments where intercept feeding was not provided (about 17 miles), Buffer = Segments separating control and treatment segments (about 9 miles), and Treatment = Segments where intercept feeding was provided (about 17 miles).

The investigators recognized that there were several factors, other than the presence of the intercept feeding, that may have influenced the number of deer killed along the roadway segments considered (*1*). The study site along Utah State Highway 6, for example, produced results that in one case appeared to contradict those from the other sites. Difficult road conditions at that site, however, had precluded the transport of the feed farther than about 1,300 feet from the highway, and the feed stations at the other two sites were 2,600 feet and 3,900 feet away from the roadway. The presence of elk at some of the feeding stations along Utah State Highway 6 may also have reduced and/or negated their use by mule deer. The researchers also suggested that the deer movement along Utah State Highway 6 was more parallel than perpendicular to the roadway, and they surmised that the deer movement patterns along Utah State Highway 6 in 1986 might have been less susceptible to the impact of intercept feeding stations than in 1985 (*1*).

As previously mentioned, live deer counts were also completed by spotlight surveys at the Utah State Highway 28 study site (the other study sites did not offer enough room to allow these counts to be done safely). Overall, 51 spotlight counts were completed at about 25 miles per hour in 1985 and 31 counts in 1986. In general, significantly more deer were observed in the control segment than the treatment segment, and 47 percent more deer were counted in 1986 than 1985. The ratios of deer in the control and

treatment segments, however, were approximately equal each year (i.e., 2.2:1 for 1985 and 2.3:1 for 1986). The researchers concluded that these results, combined with the deer carcass numbers, supported their hypothesis that intercept feeding kept deer away from the roadway.

One interesting and possibly confounding result, however, was also introduced by the spotlight counts. From 1985 to 1986 the researchers found a decrease in the difference between the numbers of deer carcasses in the control and treatment segments, but an increase in the difference in the number of live deer counted between these two segments. In theory, it would be expected that the number of carcasses would increase with the number of live deer exposed to the roadway, and that the ratios of carcasses and deer counted should be approximately equal. The results appear to indicate that the number of live deer counted at night along each roadway segment was not proportional to the number of deer hit by vehicles in that segment. The researchers speculated that if counts had been done throughout the night, instead of just after dusk, a comparison of the spatial patterns and movements of the live deer and roadside deer carcasses may have revealed additional information about this relationship.

Conclusions

The researchers of the study summarized here generally concluded that intercept feeding might be an effective short-term mitigation measure that could reduce DVCs by 50 percent or less (*1*). Although the described study results appear contradictory in some cases, this conclusion by the researchers is most likely based on their interpretation of the deer carcass ratios documented in Table 1. There was no documentation, however, of the number of DVCs that actually occurred along these segments before the intercept feeding stations were in operation. In addition, it was acknowledged by the researchers that the number of roadside deer carcasses counted along the segments was not proportional to the deer population, and that these populations were quite different from one segment to the next.

The researchers were of the opinion that the potential for a reduction in DVC of 50 percent or less was not sufficient enough to justify the amount of work and funding necessary for the implementation of intercept feeding. This conclusion was reached by them despite the fact that their cost-benefit analysis results indicated that the potential benefits from the DVC reductions were expected to exceed the feeding (or feed) costs. The researchers did recognize, however, that this was a significant reduction when compared to their opinion of the potential reduction from other DVC countermeasures. It was suggest that intercept feeding might be combined with other countermeasures to increase its effectiveness.

The results of this study, although showing some promise, are also weakened by the number of locations considered, short data collection time period, and the variability in the approach by study site. A true comparison of DVCs, deer population exposures to a roadway, and roadside deer carcass ratios would also require a more comprehensive data collection approach (e.g., time and location). This type of study, however, would be a significant undertaking, and encounter the same physical challenges the researchers encountered in the study summarized. The challenges encountered in the field would be expected to require variability in feeding stations installations at different study sites. Controlling or accounting for this variation is a key to the proper analysis of study results. The challenges encountered by the authors of the study summarized here also indicate that the widespread application of this approach (versus a focused and short-term installation and analysis) may not be possible.

Two other problems that might occur with this type of application is that deer may become dependent on the food supply and more deer than typical might be drawn to the general vicinity of the roadway and the general area. In addition, the appearance of chronic wasting disease in some states may result in a ban on deer feeding (to reduce nose-to-nose contact – a potential transmitter of the disease) and may remove this measure, even in a short-term focused manner, as a DVC mitigation.

Reference

1. Wood, P., and M.L. Wolfe. *Intercept Feeding as a Means of Reducing Deer-Vehicle Collisions*. Department of Fisheries and Wildlife, Utah State University, Logan, UT, 1988.