DEER CROSSING STRUCTURES FOR HIGHSPEED MULTILANE HIGHWAYS

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Abstract. During the past 12 years highway construction has continued at a rapid pace. When the Forest Service was notified that a segment of Highway 50 was to be upgraded to freeway standards, the Forest Supervisor of the Eldorado National Forest appointed an interdisciplinary task force to study the impacts to the 7.1 miles of National forest lands. A significant impact would be made on the deer of the Pacific deer herd unless measures were taken for their protection. The decision was made to recommend undercrossings to allow deer (California mule deer, Odocoileus hemionus californicus) to move freely across the highway during spring and fall migrations. A search was made for information pertaining to necessary specifications for crossing structures. A report by the Colorado Game, Fish and Parks Department was most helpful. Other State and Federal agencies were contacted for additional information. The task force evaluated this information and recommended underpass structures with an opening of about 20' high, 30' wide and the structure not be over 125' long. There is also a need for migration corridors across private lands to insure the future access to the crossing structures.

INTRODUCTION

During the past 12 years this country has been constructing a vast network of Interstate Highways extending some 41,000 miles. In addition to the Interstate system, other highways here in California were being upgraded to freeway standards. In January of 1970 the Eldorado National Forest was notified that the California Division of Highways was beginning preliminary design for construction to freeway standards of Highway 50. Highway 50 is a major trans-Sierra route between Sacramento and Lake Tahoe. The project consists of construction of approximately 9.4 miles of freeway from Riverton to Kyburz. All construction would be on a new alignment and would be entirely above the existing two-land road. The project would cross 7.1 miles of National forest land, and would require 600 acres of National forest land for right-of-way.

The Task Force

TASK FORCE

Since this type of project creates a complex impact to National forest resources and aesthetic values, the Forest Supervisor appointed an interdisciplinary task force to study the proposal. The disciplines represented on the task force were an impact survey specialist and a district ranger who are both foresters, an engineer, a landscape architect, a soil scientist and a wildlife biologist.

The Task

Early in the task force study it became evident that the Pacific deer herd could suffer considerable adverse effects unless exceptional measures were taken for its protection. The Pacific deer herd is a resource that we cannot afford to lose. This migratory deer herd has a minimum population of approximately 8,000 animals. About half of this herd summers on the south side of Highway 50 and must cross the present highway to reach its winter range. Five primary highway crossings on the migration route were identified in the study. Two of these crossings are on private land. These migration routes were identified with the assistance of the California Department of Fish and Game. Throughout the task force study we maintained a close liaison with the Fish and Game Department. They were very active consultants and made many contributions to the total report.

Deer-auto collisions were occurring each year with resulting property damage and the danger of injury or death to motorist. We were sure the new highway would increase the incidence of automobile-deer collisions unless a better method than roadway crossing was used for migrating deer. But what type of structure, how large should it be, and how long could it be, were questions that had to be answered.

RECOMMENDATIONS

Should we make only those recommendations that we thought the Division of Highways would accept, or should we recommend what we believe was necessary to protect the deer herd? We decided the deer herd needed maximum protection, if the cost was high, we would fight that out later. One bit of information from a member of the California Department of Fish and Game gave us reason not to be too concerned about cost. After the completion of I-80, a trans-Sierra crossing 50 miles north of Highway 50, approximately 1000 deer a year were being killed between Auburn and the California State line. This would represent a minimum of $300,000 worth of property damage to autos a year. I'm sure this figure would become much larger if items were included such as; hospital costs, time lost on the job, vacations interrupted, and who can put a cost on a human life.

After studying the available data, we eliminated some possible solutions. The deer migration routes are in canyon bottoms or nearly flat areas where it would be nearly impossible to build tunnels to put the highway underground. Overpasses were eliminated for the same reason. Underpass structures were the only choice we had that would be compatible with the terrain. Furthermore, we found that the success of a crossing structure depended upon placing the structure as close to the existing migration trail as possible. Nevada, Colorado and Wyoming found that drift fences could not be used to move deer very far from their regular migration routes.

When we first began looking for data on deer crossings there seemed to be a lack of existing information dealing with this subject. After a frustrating time, I found some badly needed help from a friend I met at The Wildlife Society Meeting in Fresno. He sent me a report from the Colorado Game, Fish and Parks Department showing the results of a questionnaire on this subject that had been sent to 16 western States. From the Colorado Department of Game, Fish and Parks (unpublished report 1967), we learned five of the 14 States replying had made some efforts to investigate the use of undercrossings by deer. Arizona, California, Colorado, Nevada and Utah reported 6' to 8' steel culverts were not acceptable to deer. However, Utah said that a concrete box culvert 12' high and 14' wide was used by deer. Further contacts with Utah people indicated they were completing negotiations with their State Highway Department for underpass type structures with an opening 14' high by 28' wide.

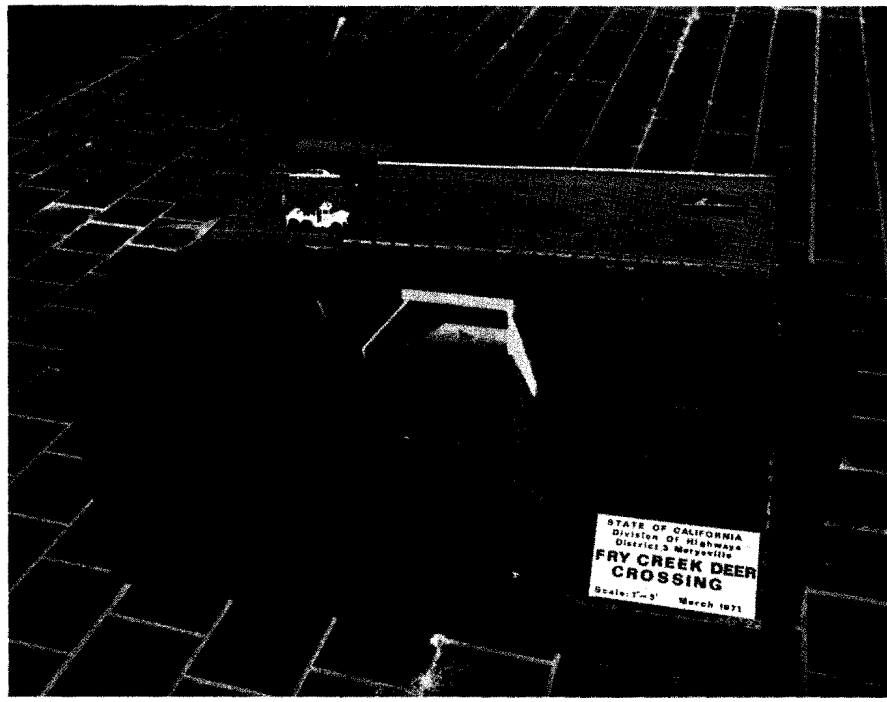

FIGURE 1. CROSSING STRUCTURES BUILT TO THE SPECIFICATION OF THIS MODEL WILL BE ACCEPTED AND USED BY DEER

Nevada has experimented with a 10' high, 12' wide and 24' long artificial underpass constructed on a migration route. Wyoming has recommended to their Highway Department an underpass type structure that would have an opening 14' high and 25' wide. Colorado is recommending concrete underpasses, but no sizes were mentioned in their report.

Several structures were investigated in northern California, one was a culvert about five feet in diameter located under the northbound land of I-5 north of Shasta Lake. There was no evidence this culvert had ever been used. The disadvantage of the tunneling effect was very noticeable. Two culverts on State Routes 36 and 44 west of Susanville were installed as deer undercrossings. Seven foot cyclone fences were installed to force the deer to use these culverts. No evidence was found that these culverts had ever been used. South of Susanville, on U.S. 395, there is a large steel multiplate pipe with an opening 13 feet high, 15 feet wide and 75 feet long that is being used by deer. This crossing was installed as a vehicle underpass for farm use. What made this more interesting was the deer had to jump two fences to reach the mouth of the underpass. Possibly this herd had seen too many of their fellows slaughtered by cars. One report (Zelle, M., B. Harris, S. Parker, J. Kirschenman, J. Anderson, and W. Kelly. 1970. Impact survey U.S. Highway 50 construction to freeway standards. Forest Service, Placerville, Calif. 45 p.), indicated that deer would use underpasses with large openings if the structures were not very long.

To keep the tunneling effect to a minimum we recommended that underpasses for deer must be 20' high by 30' wide and not be over 125' long. These underpasses could cost at least $50,000 each but do not represent a large addition to a $40 million project.

Another consideration we believed necessary was to recommend to the California Division of Highways, to obtain easements or purchase land to insure an unfenced migration corridor across private lands to two of the crossing structures. The crossing structures would be of little value if their approaches were obstructed by subdivisions or fences. These corridors would extend from the present highway through the new construction.

In January of 1971, we received comments from the California Division of Highways on our task force report. They suggested the specifications for the underpasses be changed to 15' high by 30' wide. This was acceptable to us. We did not feel that this reduction in height would cause additional tunneling effect which would make the underpass unacceptable to the deer. Their comment on the migration corridors was they did not have the authority to condemn lands for non-highway uses. We feel this problem can be solved. One possibility is the California Division of Highways and the Forest Service can acquire scenic easements which would satisfy the need. Regardless of who provides this deer corridor; it is needed. Our feeling is this is a project-induced need and is, therefore, a California Division of Highways responsibility. We will continue to pursue this with the California Division of Highways. When we first started this task force study the California Division of Highways was proposing a split level highway with each roadway graded to three-lanes but only paved to two. There would be a 200 foot median strip between roadways. Since then the California Division of Highways has altered their proposals and are now proposing a four-lane highway with a narrow divider strip between roadways.

On May 7, 1971, at a meeting with the California Division of Highways, they presented us with a scale model of a deer underpass as it would look with the four-lane highway. An actual underpass built to these specifications would be 15' high, 30' wide and 94' long. At present we do not feel that our task force report proposals would be altered significantly by the change in highway design. However, sometime this winter, the task force will reevaluate all of the report's recommendations to determine if they are compatible with the new highway design and if changes are deemed necessary, they will be made.

The task force report was the second of its kind for the Eldorado Forest. We believed we put together an excellent report that was comprehensive and timely. That its recommendation when put into action, will provide the protection necessary to the welfare of this deer herd.

Post Script: The latest information from the California Division of Highways (March 1972) indicates the highway will not be built.