

## ACKNOWLEDGEMENTS

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## **Disclaimer**

The information presented in this document was compiled by Marron and Associates to provide an understanding of the extent of the problem of wildlife/vehicle collisions in the Tijeras Canyon Study Area, and develop recommendations to address this issue. This report by itself is not a commitment to implement the recommended actions, rather this material has been provided to the New Mexico Department of Transportation for their review and analysis.

## EXECUTIVE SUMMARY

Vehicle collisions with wildlife are an on-going problem on many of the nations roadways. Wildlife related vehicle collisions can impact wildlife populations and result in human injuries and fatalities. Interstate 40 (I-40) through Tijeras Canyon in New Mexico experiences frequent wildlife/vehicle collisions. In 2004, the New Mexico Department of Transportation (NMDOT) contracted with Marron and Associates, Inc., (Marron) to conduct a wildlife feasibility study to develop ways to facilitate safe wildlife crossings through a five-mile segment of I-40 corridor in Tijeras Canyon, just one-mile east of Albuquerque, New Mexico. Tijeras Canyon is a major divide that separates the Sandia Mountains (located north of the canyon) from the Manzano Mountains (located to the south). Tijeras Canyon provides a corridor through which wildlife can move back and forth between these two mountain ranges. These two mountain ranges are part of a chain of ranges extending on a north/south axis from Colorado southward through New Mexico. I-40 is a major east/west arterial that is constructed through Tijeras Canyon and runs parallel to old Route 66, which pre-dated the construction of the interstate roadway system. Major roadways have traversed the canyon for over 50 years. The presence of I-40 throughout the length of the canyon forms a barrier to the movement of wildlife between the mountain ranges, as well as local movement of wildlife from upland feeding areas to the water provided by Tijeras Creek located in the bottom of the canyon. The principal purpose of this project is to understand where, when, and what kinds of wildlife are moving through Tijeras Canyon and to develop ways of facilitating this movement while at the same time reducing the presence of wildlife on the I-40 roadway.

The study was divided into three phases. The first phase (Phase A) focused on gathering data within the general project area and developing measures to facilitate wildlife movement through the I-40 corridor. Phase B focused on developing measures to reduce vehicle impacts with wildlife and facilitate wildlife movement across New Mexico State Highway 333 (old Route 66), an arterial that parallels I-40 in Tijeras Canyon. Phase C is a more wide-reaching ongoing study of the regional movement of wildlife between the Manzano and Sandia mountain ranges. The Tijeras Canyon project area forms only a small portion of a much broader corridor of wildlife movement across I-40 that begins at the east side of Albuquerque at the western base of the Sandia Mountains and extends eastward for nearly 18 miles to near the town of Edgewood on the east side of the mountains.

### Recorded Data

At the beginning of Phase A, a review was completed of all reported crash data involving wildlife within the project limits. Surprisingly, it was found that over the last five years, fewer than 20 records of wildlife collision with vehicles had been reported in the NMDOT Crash Database. There was a general understanding among the residents of the area that wildlife/vehicle impacts were far more common than reported. Consequently, the first part of this study was devoted to an intensive effort to compile all sources of data on wildlife movement in the project area beyond the limited reported crash data that was

available. The New Mexico Department of Game and Fish (NMDGF) had been collecting data on reported roadkills within Tijeras Canyon for several years. Some of this data overlapped with the NMDOT crash data, but most was distinct. The NMDGF data added an additional 15 records to the incidence of wildlife/vehicle collisions in Tijeras Canyon.

### Field Acquired Data

Once the existing data on documented wildlife/vehicle collisions was compiled, the next step in the data gathering operation was a field survey of the entire project corridor. This study began with the documentation of the general habitat conditions and plant communities found in the project area. Significant features such as streams, waterholes, and known wildlife feeding areas were also mapped. Next, a detailed ground survey was initiated and, utilizing GPS technology, all game trails adjacent to I-40 within the project area were mapped. Sixty-three game trails were found within the study area. Concurrent with the mapping of the game trails, a survey for wildlife skeletal material was completed. The skeletal remains of wildlife that were found within the project area adjacent to I-40 were mapped, and the material was collected for identification as well as a determination of age and sex of the animals. Twenty-three skeletal remains were recovered. Of these, seven proved to be domestic animals and one (a bobcat) which was previously observed and reported and appears in the anecdotal data section of this report. The remaining 15 skeletons found in the study area were principally mule deer.

As a result of the field studies conducted in the late summer and fall of 2004 a total of 63 game trails were mapped, and the skeletal remains of 15 wildlife (believed to be killed in collisions with vehicles) were documented.

### Anecdotal Data

Additional sources of data were still available, and Marron conducted interviews with project-area residents as well as the daily commuters that pass through the corridor. Results indicated that the general public had developed a considerable knowledge of the movement of wildlife in Tijeras Canyon. In order to record this data, a two-pronged public involvement program was developed. The first part of the program involved interviewing NMDOT maintenance crews, police that patrol the area, local gas station attendants, and a local taxidermist who collects roadkill wildlife from the canyon. The second part of the public involvement program solicited data from the general public, particularly residents within the canyon. A questionnaire was developed for circulation among the general public that included a data sheet as well as three aerial photo sheets depicting the extent of the project area. Prominent landmarks were marked on the photo sheets, as well as mileposts along I-40. The public was requested to record the location of any deer, bear, mountain lion, coyote, bobcat, or other large mammals they observed crossing I-40. Additionally, the public was also asked to document their observations of any of these animals struck by vehicles along I-40. Two hundred questionnaires were circulated and distributed to the public through libraries and post offices. As a result of this public participation, 78 anecdotal observations were recorded of either

wildlife/vehicle collisions, or wildlife moving through the canyon area. Nearly 40% of these observations were of wildlife/vehicle impact. It was noted that some of these observations might overlap with the State Police crash data, the NMDGF data, the Earth Data Analysis Center (EDAC) data, and/or skeletal material data; however, after review of the information, it was found that most of these observations were geographically distinct from the other data sets.

As a result of the compilation of the existing data, the completion of field studies, and the recording of anecdotal data, a total of 127 records of wildlife crossings or wildlife/vehicle impacts were recorded within the study area. From the data gathered during these studies, a picture emerged as to where wildlife were moving in Tijeras Canyon and more specifically, where they were crossing I-40. One interesting finding was the identification of a gap in reported wildlife/vehicle collisions that occurred along more than 1.5 miles of the project corridor. This gap corresponds exactly with the location of an existing six-foot tall chain-link fence. Although the fence was not as tall as generally recommended to preclude wildlife from entering the roadway, it apparently was high enough to restrict wildlife movement in the Tijeras Canyon project area.

#### Permeability Points in the Tijeras Canyon Project Area

With an understanding of the movement of wildlife in Tijeras Canyon, the next step was to develop means to keep the wildlife from entering I-40, while at the same time facilitating their movement through the corridor. During the field study of the project area, 12 points of permeability were identified along I-40 within the project area. These included five existing bridges, one large culvert, and six smaller culverts. One of these bridges occurs at Dead Man's Curve where I-40 crosses over NM 333. This bridge was not considered a viable permeability point because of the difficulty of moving wildlife parallel to the active traffic under the bridge. All of the remaining four bridges had openness factors of greater than 5:1. The one large culvert in the project area had an openness factor of greater than one, but the six smaller culverts (most over 300 feet in length) had openness factors generally less than 0.25:1. Although all of the bridges in the project area had high openness factors, there was very little movement of deer beneath them. Rather, the existing deer trails approach to the bridges indicated that the deer, upon reaching the bridges, would abruptly divert up the slopes of the road prism, circumvent the bridges, and cross over the roadway. During the course of the field surveys, monitoring transects were installed under three of the existing bridges in order to document the tracks of wildlife moving under the bridges (the fourth bridge spans and existing paved roadway). These transects were placed across open ground under the bridges. Additionally, the loose soil on the floor of the channel (within the transect) was raked in order to eliminate past tracks and record new ones. Although there were numerous tracks of small mammals (rabbits, raccoon, and skunk) as well as medium-sized mammals (coyote and bobcat), there were no tracks of ungulates such as deer under two of the bridges, and only a few deer tracks under the third bridge.

## Recommended Measures

With the identification of suitable wildlife permeability points, a system of fences that incorporated escape ramps, crossovers, and signing was designed to direct the movement of wildlife to the twelve permeability points within the project area. The proposed fence system would tie into the existing fences that already lined the western half of the project area. As part of the long-term maintenance of this system, the existing shrubby vegetation located under three of the four bridges in the project area would be removed. The removal of this vegetation was recommended to afford an open field of view under the bridges for ungulates that would utilize these passages. The large culvert in the project area just west of Dead Man's Curve has a substantial openness factor, but there is a deep plunge pool at the outlet of the culvert that precludes the movement of animals through the culvert. In order to access this culvert, an approach ramp was designed to allow entrance into the culvert around the plunge pool.

The six smaller culverts that are scattered throughout the project area were found to have frequent use by small- and medium-sized mammals, and at least one of these culverts is being utilized by black bears. However, there was no indication that these culverts were used by mule deer. The enlarging of these culverts to facilitate deer passage was considered, but in order to increase the openness factor to 2:1, it was estimated that they would have to be enlarged to at least 20 feet by 30 feet. The landowners at these locations were not in favor of such structures and there was insufficient height available from the bottom of the channel bed of the drainages within these culverts to the road surface of the interstate to allow such construction without considerable modification of the interstate corridor. Consequently this option was not considered feasible within the scope of the proposed project. By enhancing the access and the visibility of the existing bridges and culverts, and incorporating a system of fences to direct wildlife to them, the proposed system should provide eleven points of wildlife conductivity through the five-mile long portion of the I-40 corridor in Tijeras Canyon. All eleven of these permeability points will provide corridors for small and medium-sized mammals and both small and large-sized carnivores. Five of these points will provide passages for ungulates such as mule deer.

The NMDOT has committed to long-term maintenance of this system and the NMDGF has committed to monitoring the effectiveness of the system. The additional actions proposed in Phases B and C of this project will extend this system to the adjacent roadways, and eventually throughout the entire wildlife corridor that exists between the Sandia and the Manzano mountains.