



TIJERAS CANYON SAFE PASSAGE COALITION



Summer 2007

Highlights:

- Congratulations! Tijeras Canyon Project Completed
- Elements of Wildlife-Vehicle Safety
- Members' Corner
- Will It Work? Plan for Monitoring Success
- Membership Form
- General Meeting

Congratulations New Mexico! Motorists and Wildlife Protected in Tijeras Canyon

I was delighted to represent TCSPC at the ribbon-cutting ceremony for the Tijeras Canyon GRIP project on July 27. It was a day of celebration – both for improved traffic flow and for a landmark project to protect motorists and wildlife. Lt. Governor Diane Denish spoke of her commitment to New Mexico's small communities, environment and wildlife. Both Denish and Tijeras Mayor Gloria Chavez praised NMDOT for a job well done.

This project is a milestone in New Mexico. It is the first project to include so many elements designed to keep animals off the highway and also allow them to pass safely beneath it. Hopefully, it also represents a new way of doing business for the New Mexico Department of Transportation.

In 2003, NM House Joint Memorial 3 directed NMDOT and New Mexico Game and Fish to reduce wildlife-vehicle collisions in the state. The first project to

do so was on Highway 550 between Aztec and Colorado. That project consists of fencing and enlarged culverts, primarily for deer.

The Tijeras Canyon project began with a study of the area to determine how to keep wildlife off roads and to create passages for them. DOT accepted the findings of the study and, at a cost of \$750,000, has built a system that includes two kinds of fencing, escape ramps, electric mats, and a variety of passages. Much of this newsletter is dedicated to explaining the elements included in the project.

This is a great beginning, but there is more to be done. Because this project is truly "cutting edge", it must be carefully monitored and modified as needed to achieve its goals. The project must also be watched for problems such as gaps in fencing or blocked passages. Call NMDOT at 270-9236 if you see fence problems and

NMG&F at (505) 476-8115 to report road killed animals. **So let's celebrate! Join us Tuesday, Sept. 11, 6:00 PM,**



Lt. Governor Denish speaking at the ribbon-cutting ceremony

at Los Vecinos Community Center in Tijeras for a tour of the project. Join us also in making a commitment to see this work through. Help us extend safe passage through the rest of Tijeras Canyon – and make environmental considerations standard operating procedure in New Mexico.

—Susan Smith
TCSPC Secretary

The Science of Safe Passage: Elements of Wildlife-Vehicle Safety

Element I: Fencing

Wildlife-proof fencing is the first critical element in reducing large game animal-vehicle collisions on I-40 through Tijeras Canyon. Eight-foot tall deer-proof fencing has been used extensively across



Eight foot chain link fence in Tijeras Canyon.

the U.S. and has been proven effective at precluding larger animals such as deer and elk from entering highways, orchards and alfalfa fields. Currently the only other highway project in New Mexico that uses this type of fencing is on

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Safe Passage Notes Summer 2007

Safe Passage Notes is a semi-annual newsletter published by the Tijeras Canyon Safe Passage Coalition. Members may receive Safe Passage Notes electronically or in hard copy.

Financial support for TCSPC is provided by The Wildlands Project; by Animal Protection of New Mexico, which provides web page support; and by dues and contributions from individuals and organizations.

Monthly working meetings are open to the public and are held the second Tuesday of every month from 6:00 to 8:00 PM at the Village of Tijeras Visitor Center/ East Mountain Chamber of Commerce in Tijeras, next to the library. The annual general meeting is held in September.

Steering Committee:

Kurt Menke, Co-Chairperson
Luella Roberts, Co-Chairperson
Macario Griego
Kerri Lathrop
Jon Schwedler
Michael Scialdone
Susan Smith, Secretary
Kim Vacariu
Jeannie Wagner-Greven, Treasurer

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Matt Clark, Southwest Representative, Defenders of Wildlife

I support safe passage because it makes sense, both for wildlife and for motorists like you and me. I grew up rambling in the Sandia Mountain foothills and gained an early appreciation for the wild animals that still reside there: mule deer, black bear, bobcats, coyote, mountain lion and more.

As an adult, I was alerted by one of my mentors, Dave Foreman, that I-40/Route 66 through Tijeras Canyon was one of the most significant barriers to wildlife movement in the state. I coordinated the creation of the New Mexico Highlands Conservation Vision, which identified Tijeras Canyon as a top-priority impaired wildlife corridor in need of conservation and restoration action. The statewide Critical Mass Workshop also named Tijeras Canyon as one of the four top barriers to wildlife movement in New Mexico.

The importance of Tijeras Canyon as a wildlife linkage is highlighted by the fact that two genetically distinct regional mountain lion populations intermingle at this precise location! Safe passages, if properly designed, can facilitate critical genetic exchange between populations that would otherwise be artificially isolated.

I also continue to support safe passage initiatives, both here and elsewhere, because human safety considerations are front and center when wildlife corridors intersect our own travel corridors. I once narrowly missed a deer on Route 66 near Deadman's Curve – a close call like that is enough to get your attention! In addition, I have a friend whose brother lost a dear friend and his mother to two different car accidents involving deer in Tijeras Canyon. I continue to support safe passage because taking action *now* and implementing ready solutions will ultimately save lives in the future.



The Albuquerque Wildlife Federation (AWF) supports the efforts of the Tijeras Canyon Safe Passage Coalition (TCSPC) to reduce human and animal mortality and improve wildlife movement and connectivity along I-40 in the Canyon. Habitat loss and declining habitat quality pose significant threats to native biodiversity,

especially wildlife populations. Suburban sprawl, recreation, and increased road construction exacerbate the challenges that our State's wildlife confront.

Between 1990 and 2000 New Mexico's population experienced a 20% increase, ranking us 12th in the nation for population growth. By 2025, New Mexico's population is projected to reach 2.6 million, largely due to the rapid growth of the Albuquerque metropolitan area. I-40 not only bisects two significant mountain ranges, it also traverses the fastest growing counties in the state. This growth, and the resulting encroachment on wilderness and prime habitat, indicate that safe passage efforts throughout the state will be increasingly critical to give wildlife a lasting stronghold.

AWF feels the time is right for ecological and natural life support systems to be more fully integrated into the planning process of our transportation system. Such collaboration will benefit both the man-made and natural environments, and address the safer transit and welfare of human and wild populations alike. The success of TCSPC is essential to providing safe movement for wildlife between the Sandia and Manzano Mountain ranges. The dedicated efforts of volunteers, agencies and individuals from Tijeras, Albuquerque and surrounding communities to make New Mexico a little more wildlife friendly, are truly inspirational. AWF is proud to be one of the many conservation organizations in support of these noble efforts.

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U.S. 550 between Aztec and the Colorado border, where the fencing directs abundant mule deer to three enlarged underpasses for safe passage beneath the busy four-lane highway.

During the initial analysis conducted by the Feasibility Study for the I-40 project through Tijeras Canyon, it was determined that the existing 6-foot chain link fence through the Village of Carnuel was effectively keeping wildlife off of I-40 in this section. Only one deer-vehicle accident was documented there, and this animal appeared to have come up onto the freeway from below a bridge over Tijeras Creek. Therefore, it was decided not to replace the 6-foot chain link fence with taller fence.

NMDOT decided to install 8-foot chain link and 7-foot high Electrobraided electric fence (manufactured and installed by the Electrobraided Fence Company of New Brunswick, Canada) along the remainder of the project area. The 8-foot chain link is too tall for most animals to scale, and is being installed in locations where electric fence would be more likely to be vandalized.

The Electrobraided fence uses an electric charge to stop animals and teach them to avoid it. The Electrobraided fence delivers a 6,000 to 7,000 volt, 4 milliamps shock for only 3/10,000 of a second. Electrobraided fences have been tested



Electrobraided fence in Tijeras Canyon

thoroughly on whitetail deer at a U.S. Department of Agriculture testing facility. They are currently being tested on mule deer and elk on Arizona Highway 260, from Payson to Heber, where many elk-vehicle collisions have occurred historically.

The Electrobraided fence will be monitored remotely for breakage in the electrical current by transmission of satellite data to the company in Canada. Any breakage in the current will allow monitors to dispatch a local maintenance person to do repairs.

“Electro-mats”, also from Electrobraided, are built into roads and act like electrical cattle guards, preventing wildlife from crossing that strip of road. Five Electro-mats are located along NM 333 (Old Route 66) to create two designated wildlife crossings -- one at Deadman’s Curve and one at Public School Road. Two more Electro-mats are installed at the I-40 off- and on-ramps at Tijeras to stop wildlife from going up the ramps and getting trapped on the freeway.

Pedestrians will be able to safely walk across the Electro-mats as long as they have shoes on, and bicyclists will also be able to cross without any problem. However, dogs will get shocked, so will need to be carried across if they are accompanying a pedestrian or cyclist. Horses will also not be able to cross.

The three types of fencing and Electro-mats tie together along the outside of the I-40 corridor to greatly reduce the potential for wildlife, particularly larger game animals such as mule deer and black bears, from getting onto I-40 and colliding with vehicles.

Element II: Escape Ramps

Ten escape ramps have been constructed within the approximately four miles of wildlife exclusion fencing along I-40 in this project, five escape ramps for each side of the highway. As the name suggests, the purpose of the escape ramps is to allow wildlife that inadvertently become trapped inside the fencing along I-40 to escape.

Escape ramps are made from gabion baskets, which are large wire baskets filled with rocks. Gabion baskets are



Escape ramps direct animals running along the fence up the slope to the opening.

stacked vertically, and then dirt is piled against the baskets to form a ramp. Ramps are placed against the chain link or Electrobraided fence, preferably with a downward slope on the outside (escape side) of the fencing. Escape ramps are built approximately 6-foot high, with the fencing reduced to 6-foot height where it meets the top edge of the escape ramp.

Previous research, conducted primarily in Utah on Interstate 15, shows that

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NMDOT Project Manager Ted Barela (center) explains the Electro-mat system

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mule deer that manage to get inside the wildlife exclusion fencing and become trapped on the highway will usually move along the fence line, and often will use an escape ramp to exit the right-of-way. Because the ramps are ideally placed above a downward slope, deer can jump downslope to escape the fenced highway. However deer moving along the fenceline *outside* of the fence cannot jump up onto the ramp from below because the downward slope makes the effective height approximately 8 feet, too tall to jump.

Utah research and monitoring has shown that mule deer are 8-11 times more likely to use escape ramps than one-way gates, such as those that were used on the U.S. Highway 550 project



NMDOT Project Manager Ted Barela shows that the drop on the outside of the escape ramp will keep wildlife from going back up onto I-40.

north of Bloomfield between the Animas River Bridge and the Colorado border. We will be able to monitor use of escape ramps by checking for tracks on the ramps and below outside of the fence, where animals will jump to escape entrapment along the highway.

Escape ramps will only be needed on the (hopefully) rare occasions that wildlife do get inside the fencing and become trapped along the highway. Regular patrolling and maintenance of the

fence line should ensure that holes are not created by arroyos cutting under the fence, allowing animals to get through. Escape ramps are one more component of the Tijeras Canyon Safe Passage project that will benefit the functioning of the entire system to reduce the potential for wildlife-vehicle collisions.

Element III: Animal Detection System

New Mexico received its first Animal Detection System (ADS) with implementation of two experimental wildlife crossings, one at the west side of Deadman’s Curve, and the other at Public School Road, both on New Mexico Highway 333 (Old Route 66). ADSs have been used experimentally with some success for several years both in Europe and several locations within the U.S., such as Yellowstone National Park.

There are many different types and designs, depending on the equipment selected for use. For the Tijeras Canyon ADS, Econolite cameras, such as those mounted at intersections in Albuquerque to detect drivers running red lights, are mounted on standard 30-foot tall poles at the two designated wildlife crossing locations. These cameras are aimed in both directions that wildlife will be crossing (north and south). Using light in both the visible and infra-red spectrums, they detect wildlife movement from dusk until dawn, the activity period when wildlife-vehicle accidents most often occur.

The cameras are linked to deer crossing signs with blinking yellow lights. Once wildlife is detected by the cameras, radio signals are sent to the flashing signs, immediately warning drivers to slow down. Cameras and warning signs are on NM 333 on both ends of Deadman’s Curve as NM 333 goes beneath I-40. Both signs are linked by radio signals, so



These lights flash if an animal is detected crossing Route 66 from dusk until dawn.

if an animal is detected on one side of the curve, motorists moving in both directions will be warned to slow down by the blinking lights. Another warning system covers NM 333 at Public School Road.

The Electro-mats described above are a critical component of this system. They serve two purposes: 1) to keep wildlife within the designated crossing area, so they can be detected by the warning system and activate the lights; and 2) to preclude the potential for wildlife to make a right-angle turn as they are crossing NM 33 and move into oncoming traffic.

Element IV: Passages



Signs alert drivers to upcoming wildlife crossings.

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Fencing, escape ramps and Electro-mats all work to keep animals off the highway. Passages allow animals to cross safely beneath – or in some cases over – roads. This project employs many strategies to create passages – and thus preserve the crucial habitat connection between the Sandia and Manzano mountains.

The most visible passages are those created over Highway 333 (Route 66) at Deadman's Curve in Carnuel and Public School Road in Tijeras. In Carnuel, wildlife follows a natural funnel from the Sandias to access Tijeras Creek and pass under I-40 to the Manzanos. However, Highway 333 intersects their route. Electro-mats and fencing now limit the part of 333 they can cross to a narrow corridor, and the animal detection system warns motorists of their presence.

In Tijeras, wildlife descends from the oasis of Carlito Springs to the north and is directed by both topography and fencing to the Public School Road underpass under I-40. This underpass has been modified to be more attractive to wildlife. The guardrails have been moved in to enlarge the shoulder areas outside the traffic flow. These shoulder areas have been "baffled" to trap sediment and create a more animal-friendly



Open span bridge in Carnuel after brush-clearing.

substrate. Wildlife is again funneled to a crossing of 333 with an animal detection system.

Other passages under I-40 include underpasses and culverts. TCSPC has taken charge of clearing brush under the three open span bridges of I-40 in Carnuel. Before this project, all three underpasses were choked with brush. Pre-construction monitoring showed very little to no deer activity under these bridges. Deer, relying on sight and flight for defense, will not use passages they cannot see through. Once cleared, these underpasses became wide open corridors.

Culverts serve as passages for a variety of animals depending on their "openness". Openness is determined by multiplying height times width and dividing by length. Animals such as cougar and black bear will use small culverts, with openness factors as low as 0.5. Large predators like bears don't worry much about openness – they just need culverts big enough to get through. Deer and other prey animals, however, need more openness to venture into a culvert. The only culvert in the project area that may have enough openness

for deer is a large trapezoidal culvert at Deadman's Curve. Tijeras Creek flows through this culvert and into a plunge pool, which makes it impossible for deer to access the culvert from below. To make it more usable for deer, DOT installed a ramp to allow deer to access the culvert, and baffles inside the culvert to trap sediment and produce a more natural substrate for wildlife to use.

Monitoring of wildlife use of these passages will determine if they have succeeded in increasing access to Tijeras Creek and between the Sandias and Manzanos. These passages represent Phase I of strategies recommended in DOT's study of Tijeras Canyon. If they prove to be inadequate, Phase II and III call for more passages, possibly even a land bridge over I-40.



Culvert at Deadman's Curve.

Taken together, the many elements of this project create a system of safer wildlife passage across NM 333 in two locations and under I-40 in multiple locations. With monitoring and, if needed, modification, this project WILL greatly reduce the potential for wildlife-vehicle collisions in Tijeras Canyon and reconnect Sandia and Manzano Mountain wildlife habitats.

–Mark Watson
and Susan Smith



The widened and baffled shoulder will trap sediment for a better substrate at the Public School Road underpass.

Will It Work? Monitoring Component is Critical to Success

The monitoring portion of the Interstate 40 Tijeras Canyon Safe Passage Project is critical to determine the success of the individual mitigation components (game-proof fencing, Animal Detection Systems, Electromats, escape ramps, etc.), and for determining the overall success in both reducing wildlife-vehicle collisions in Tijeras Canyon and promoting successful wildlife passage between the Sandia and Manzano Mountains. Monitoring will take several forms, including 1) pre-treatment monitoring to determine baseline conditions; 2) implementation monitoring; and 3) success monitoring.

Pre-treatment Monitoring

Pre-treatment monitoring determined the “baseline” situation of wildlife use of the existing underpasses before Safe Passage wildlife mitigation components such as fencing were completed. Approximately 20 pretreatment monitoring visits were conducted by NMDGF and TCSPC volunteers to document wildlife passage through the three major underpasses under I-40 using wildlife tracking techniques.

Mule deer were chosen as the target



Milagro, a mule deer fawn orphaned in a traffic accident on I-25

species for this project because they are the animals most likely to be involved in serious wildlife-vehicle collisions in Tijeras Canyon. Many other species will benefit from the efforts to move deer safely beneath I-40, so mule deer will act as an “umbrella species” for other wildlife. For example, black bears, cougars, raccoons and coyotes, as well as domestic dogs and cats, will generally also be forced by the fencing to go under I-40 at multiple culverts or underpasses. Over the course of almost two years, pre-treatment monitoring has documented mule deer moving successfully through all three large underpasses beneath I-40 in the project area, but these movements are infrequent.

Determining the “pre-treatment” relative frequency of mule deer use of the existing underpasses acts as an index against which to measure success of the Safe Passage mitigation components. Documenting more mule deer passages through the underpasses post-construction will suggest fewer mule deer are being hit on I-40, and possibly that a more successful habitat connection has been established between the Sandia and Manzano Mountains.

Implementation Monitoring

Implementation monitoring will be conducted to determine the effectiveness of the individual Safe Passage wildlife mitigation components, and how well they interact as a system to meet the overall strategy of reducing wildlife-vehicle collisions. For example, the fencing will need to be pa-

trilled on a regular basis to ensure that no breaks occur that could allow wildlife to access I-40. When mule deer try to cross I-40 and are stopped by the fence, they will move

Ultimately, long-term, permanent success of the Tijeras Canyon Safe Passage Project will require an awareness of the system by informed and concerned citizens and an expectation that the functionality of this experimental system ... will be maintained into perpetuity.

**--Mark Watson
NM Game and Fish**

parallel to the fence line until they find a place to cross. Arroyos eroding beneath the fence could allow mule deer or other animals to access I-40 and become trapped within the fenced right-of-way, causing an accident.

Fence line monitoring will also need to be conducted regularly to ensure that mule deer are crossing at the designated wildlife crossings, and not at unintended locations. These two designated wildlife crossings will be armed with Animal Detection Systems, which will warn drivers of impending crossings. A series of 10 escape ramps will allow animals to escape by jumping out of the right-of-way should they become trapped. These escape ramps will also be monitored for tracks to determine if animals are getting inside of the fence and using the ramps to escape.

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Success Monitoring

Ultimately, success of the Safe Passage wildlife mitigation “system” and project will be determined by analyzing the “post-treatment” frequency of wildlife-vehicle collisions in Tijeras Canyon and comparing it to “pre-treatment” conditions using large game animal-vehicle accident reports and other road kill data. Success will also be determined by the numbers of animals using the passages to move between the Sandia and Manzano Mountains — the more the better. Reporting to NMDOT will occur after the system has been allowed to operate for a period of time, but the data used to determine success will be collected continually and as long as necessary to determine success.

We anticipate a large reduction in wildlife-vehicle collisions on I-40 due to: 1) the reduced potential for access by larger wildlife and domestic animal species from the extensive fencing effort; and 2) increased wildlife movement through the underpasses and culverts that fencing

will force most animals to use. Should NM 333 become a hotspot for increased frequencies of large game animal-vehicle



Mark Watson monitoring wildlife movement under I-40.

collisions, additional analyses will need to be conducted to recommend alternatives to meet the overall strategy of reducing wildlife-vehicle collisions.

The availability of mitigation technology to reduce wildlife-vehicle collisions has come a long way in the last few decades, primarily because of experimental testing of what works and what doesn't, and dissemination of information through conferences, workshops, and publication of results in technical journals and books.

The Tijeras Canyon Safe Passage Project is implementing cutting edge techniques to reduce wildlife-vehicle collisions, the first project of its kind for New Mexico and other neighboring states (except Arizona's Highway 260 project). However, government agency priorities and personnel change over time. Ultimately, long-term, permanent success of the Tijeras Canyon Safe Passage Project will require an awareness of the system by informed and concerned citizens and an expectation that the functionality of this experimental system to reduce wildlife-vehicle collisions will be maintained into perpetuity.

*—Mark Watson, Terrestrial Habitat Specialist
New Mexico Game and Fish Department*

Join the Tijeras Canyon Safe Passage Coalition! **Membership Form**

Name: _____

Address: _____

Phone: _____ E-mail: _____

Signature: _____

Date: _____

Please make checks payable to: "Tijeras Canyon Safe Passage Coalition" .

Please return this membership form and voluntary dues of \$10.00 (\$5.00 seniors and students) to:

Tijeras Canyon Safe Passage Coalition
PO Box 1793
Tijeras. NM 87059

