Wildlife Fatalities Project (Phase I)

Report NM04ENV-03

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WILDLIFE FATALITIES PROJECT (PHASE I)

by

ATR Institute University of New Mexico

Report NM04ENV-03

A Report on Research Sponsored by

New Mexico Department of Transportation Research Bureau

in Cooperation with The U.S. Department of Transportation, Federal Highway Administration

March 2006

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PREFACE

The research reported herein describes the establishment of a Web-accessible data collection tool for wildlife road fatalities in New Mexico and recommendations for the continuation of the research project.

NOTICE

The United State Government and the State of New Mexico do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report. This information is available in alternative accessible formats. To obtain an alternative format, contact the NMDOT Research Bureau, 7500B Pan American Freeway, Albuquerque, NM 87109 (P.O. Box 94690, Albuquerque, NM 87199-4690) or by telephone (505) 841-9145.

DISCLAIMER

This report presents the results of research conducted by the author(s) and does not necessarily reflect the views of the New Mexico Department of Transportation. This report does not constitute a standard or specification.

ABSTRACT

The New Mexico 2025 Statewide Multimodal Transportation Plan, published by the New Mexico Department of Transportation (NMDOT), outlines long-range objectives for the state. Two of the long-range objectives deal specifically with wildlife-vehicle encounters: Reduce wildlife-vehicle collisions; and, improve coordination between NMDOT and the New Mexico Department of Game and Fish to identify and develop solutions at critical wildlife crossings. A standardized data reporting method and analysis are needed in the state to address the high wildlife-vehicle collision rate in New Mexico. The NMDOT Research Bureau recommended the document, WARS 1983-2002: Wildlife Accident Reporting and Mitigation in British Columbia Special Annual Report, as a successful project to use as a model for New Mexico. The eight stated goals are:

- 1) Identify accident-prone locations and accident trends;
- 2) direct cost-effective mitigation efforts;
- 3) evaluate the effectiveness of mitigation techniques;
- 4) provide data for highway planning purposes;
- 5) model and forecast accidents;
- 6) analyze traffic and climatic relationships for species-specific accident trends;
- 7) develop species-specific accident risk profiles for highway corridors; and
- 8) establish policies and strategies for accident issues and mitigation initiatives.

These goals were met with the extensive historical data collection practices in place in British Columbia (BC) and are to become the goals for New Mexico. This project initially focuses on goals one and four, with the others developing during the life of the project.

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Attachment 3 Model Minimum Uniform Crash Criteria (MMUCC), National Highway Traffic Safety Administration, US Department of Transportation, Improving Crash Data for Safer Roadways, Model Minimum Uniform Crash Criteria Guidelines, 2003, www.mmucc.us

Attachment 4 New Mexico State Highway System with Animal Crash Issues Map, 2003, from New Mexico Department of Transportation, New Mexico 2025: Statewide Multimodal Transportation Plan, page 16. www.nmshdt.state.nm.us/upload/images/ Long_Range_Planning_Section/Sguiding/Principles/FulfillingNMDOTs_GuidingPrinciples.pdf

Attachment 5 Ontario Ministry of Transportation, Watch for Wildlife Brochure, 2005, www.mto.gov.on.ca/english/safety/wildlife.htm

Attachment 6 British Columbia Ministry of Transportation, WARS 1983—2002: Wildlife Accident Reporting and Mitigation in British, Columbia, Special Annual Report, 2004, Executive Summary, www.th.gov.bc.ca/publications/eng_publications/eng_pubs.htm

Attachment 7 Animal Crossings Website (March 15, 2006)

Attachment 8 New Mexico Department of Game and Fish, Mortality and Transplant Monthly Report

Attachment 9 New Mexico State University, Fishery & Wildlife Sciences, New Mexico Furbearer Observation Record

INTRODUCTION

The New Mexico 2025 Statewide Multimodal Transportation Plan, published by the New Mexico Department of Transportation (NMDOT) in 2004, outlines long-range objectives for the state. Two long range objectives deal specifically with wildlife-vehicle encounters (Figure 1).

Long	Range Objectives
>	Coordinate environmental considerations on projects from project initiation through the construction phase(s)
>	Design transportation systems to support communities' visions, compatible with local land use policies, mobility goals, and built environments
>	Design and build with sensitivity to the impacts of transportation and transportation infrastructure on the unbuilt environment
>	Reduce the environmental impacts of increased single-occupant vehicle miles of travel
>	Provide choices of environmentally friendly, flexible, comfortable and safe means of transportation
>	Reduce wildlife-vehicle collisions
>	Improve coordination between NMDOT and the NM Department of Game and Fish (NMDG&F) to identify and develop solutions at critical wildlife crossings
>	Improve coordination between NMDOT and the NM Department of Cultural Affairs Historic Preservation Division to identify and protect New Mexico's non-renewable cultural and historic properties

FIGURE 1 The New Mexico 2025 Statewide Multimodal Transportation Plan, New Mexico Department of Transportation, Environmental Responsibility Section

To address the wildlife-vehicle collision rate in New Mexico, a standardized data

reporting method and analysis are needed in the state. The NMDOT Research Bureau

recommended the document, "WARS 1983-2002: Wildlife Accident Reporting and Mitigation in

British Columbia Special Annual Report," as a successful project to use as a model for New

Mexico. The eight goals for the British Columbia (BC) Ministry of Transportation are:

- 1) Identify accident-prone locations and accident trends;
- 2) direct cost-effective mitigation efforts;
- 3) evaluate the effectiveness of mitigation techniques;

- 4) provide data for highway planning purposes;
- 5) model and forecast accidents;
- 6) analyze traffic and climatic relationships for species-specific accident trends;
- 7) develop species-specific accident risk profiles for highway corridors; and
- 8) establish policies and strategies for accident issues and mitigation initiatives.

These goals were met with the extensive historical data collection practices in place in British Columbia and are to become goals for New Mexico. This project initially focuses on goals one and four, with the others developing during the life of the project.

ACTION PLAN BACKGROUND

The ATR Institute (ATRI) submitted to the Research Bureau of the NMDOT an Action Plan proposal for research entitled "Wildlife Road Fatalities Project" in September 2004. The FY05 Plan was approved on November 15, 2004, with funding in the amount of \$30,000. Funding was released to ATRI on December 16, 2004. The Project Plan was reviewed during the NMDOT Research Bureau Research Quality Initiative (RQI), held November 30-December 1, 2004. Limited activities were commenced in June 2005 when the Research Advisory Committee (RAC) invitation letters were sent. The Research Advisory Committee (RAC) convened in September 2005. The Action Plan Modification 1 was approved in July 2005; and the Action Plan Modification 2 was approved in <u>February 2006</u>.



FIGURE 2 Newfoundland/Maritimes road trip photos - by Oscar Voss http://www.alaskaroads.com/photos-Newfoundland.htm

LITERATURE REVIEW

This review provides an overview of various animal/vehicle collision related issues and offers recommendations for addressing wildlife fatalities in New Mexico. There is a wealth of roadkill literature available and it encompasses a myriad of themes, many of which were not pertinent to the New Mexico experience and this project. The authors of the available literature are scattered across the spectrum—federal and state government agencies, environmental groups, academic and conference papers, transportation association products, animal protection organizations, and of course, the popular press. These themes are diverse, from environmental assessments, discourses in biology, culvert designs, safety issues, sentimental accounts of dead animals, and GIS data collection (see Selected Bibliography). The review of literature was arranged around two major categories of literature:

Prevention and Mitigation

Non-Technological and Technological

Transportation Planning and the Collaborative Process GIS

InterAgency Collaboration Community Involvement

Especially valuable research can be found in the papers and presentations at www.icoet.net, the International Conference of Ecology and Transportation (ICOET) Web site. Conducted every two years, ICOET is designed to address the broad range of ecological issues related to surface transportation development, providing the most current research information and best practices in the areas of wildlife, fisheries, wetlands, water quality, overall ecosystems management, and related policy issues. ICOET is a multi-disciplinary, interagency supported event, administered by the Center for Transportation and the Environment.

PREVENTION AND MITIGATION

There is a developing body of data relating success rates of various mitigation techniques for various regions and species. There are two ways to approach reducing roadkill: (1) change the driver's behavior; or (2) change the animal's behavior. The results of various preventive measures are conflicting, but generally, the three most successful techniques appear to be:

- Wildlife fencing (changing the animal's behavior)
- Overpasses/underpasses (changing the animal's behavior)
- Reduce and enforce speed limits in "roadkill hotspots" (changing the driver's behavior)

The analysis of crash hotspots in New Mexico will assist with the selection of the best mitigation techniques. The reduction of speed in certain zones is imperative, and more success has been noted when portable signs are used. Drivers become complacent when they see a deer crossing sign at the same point every day; but by using portable animal crossing and speed limit signs, the drivers become more aware. The establishment of safety corridors and strict enforcement of speed limits will also decrease the incidence of accidents.

TRANSPORTATION PLANNING AND THE COLLABORATIVE PROCESS

As with any transportation-related issue, the coordination of resource agencies early and continuously throughout the transportation planning and project development is essential. A resource agency includes not only those with financial resources, but equally important, those with the knowledge of the situation, the problems, and the goals. In the case of New Mexico, these agencies would include the NMDOT, New Mexico Department of Game and Fish, Environment Department, Department of Public Safety, State Police, local law enforcement, and transportation entities. The introduction of local environmental and wildlife groups will also strengthen the projects due to their expertise. Community involvement in the entire process is

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necessary. The public needs to be educated about the issues and solicited for ideas and concerns at public meetings. The inter-agency collaboration and public participation may make for a slower process, but it will result in a better product with broader support and understanding.

4 million - Miles of roads in the United States.

226 million - Number of vehicles registered in the United States.

23 trillion - Vehicle miles traveled in the United States in 2002

6.3 million - Number of reported automobile accidents annually in the United States

253,000 - Number of reported animal-vehicle accidents annually

50 - Estimated percentage of vehicle-large animal collisions that go unreported.

90 - Percentage of reported animal-vehicle collisions that involve deer

\$2,000 - Average minimum cost for repairing a vehicle after a collision with a deer

1 million - Number of vertebrates run over each day in the United States.

200 - Number of reported human deaths annually resulting from vehicle-wildlife collisions.

6 - Number of bears reported killed last year by vehicles in Yellowstone National Park.

1,559 -Number of reported animals killed on Yellowstone National Park roads from 1989-2003. Figure includes 556 elk, 192 bison, 135 coyotes, 112 moose, 24 antelope, and 3 bobcats.

2,349 - Number of large animals reported killed on New Mexico roads in 2001. Figure includes 30 black bears, 160 elk and 600 deer.

51,000 - Number of vertebrates reported killed in and around Saguaro National Park by automobiles each year. Figure includes 1,400 birds, 6,500 mammals, 26,000 reptiles, and 17,000 amphibians.

25,000 - Number of Roadkill Bingo games sold by the Colorado company that invented the game.

93 - Percentage by which desert tortoise roadkill was reduced after fencing and culverts were installed on one 15-mile stretch of Mojave Desert highway.

40 - Percentage by which reported deer-vehicle collisions were reduced after installation of a deer crosswalk system in northeast Utah.

Sources: U.S. Department of Transportation, Federal Highway Administration, Wildlands CPR, Wildlife Crossings Toolkit, National Park Service, New Mexico Department of Game and Fish, Defenders of Wildlife, U.S. Humane Society

FIGURE 3 Animals and Transportation Statistics.

from High Country News, www.hcn.org/servlets/hcn.Article?article_id=15268

PROJECT DEVELOPMENT

It is estimated that one million animals die every day in animal/vehicle collisions in the United States. In 2001, it is estimated that along with over 2,100 vehicle/large animal collisions in New Mexico, thousands of other animals (such as birds and amphibians), domestic animals (cats and dogs), and farm animals are killed on New Mexico streets and roads. This results in a driver safety issue which has an economic impact to the citizens of New Mexico, as well as the further deterioration of endangered wildlife populations and their environments. There is currently little standardization in data collection for animal fatalities on roads in New Mexico and in the United States.

The Action Plan called for ATRI to design a Web-based standardized collection form for NMDOT, State Police, Department of Public Safety, Game and Fish wardens, road maintenance crews, and the public to use to report dead animals on the roadways. This would standardize reporting practices. The databases could be made searchable online and statistical and visual reports could be generated based on criteria selected by the user. New Mexico would establish standards for data collection, data sharing across agencies and municipalities, GISmapping based on the data, and web-accessible information dissemination.

The standardization of data collection would increase the validity of "roadkill" statistics and pave the way to reduce these animal/vehicle conflicts. An analysis of the animal/vehicle collisions and current wildlife habitats would identify wildlife fragmentation locations, suggest mitigation techniques (such as overpasses or culverts), and pinpoint locations to increase driver awareness and safety. The results of the pilot project would serve as a model for other regions of the United States interested in increasing the value of animal road mortality information with the overall goal of increasing safety on New Mexico highways.

6

RESEARCH ADVISORY COMMITTEE (RAC)

The NMDOT Research Bureau requires research projects to maintain a Research Advisory Committee (RAC). This Committee is composed of diverse transportation and related experts who review and make recommendations regarding the project. ATRI drafted a letter to send to selected candidates for the Project RAC. The Research Bureau approved the letter in March 2005 (Attachment 1). ATRI prepared a listing of suggested RAC members which was approved in May 2005. The following persons were selected by the Research Bureau as candidates for the RAC and a letter was mailed May 10, 2005. The mailing also included the Executive Summary of the WARS 1983 - 2002: Wildlife Accident Reporting and Mitigation in British Columbia,

Special Annual Report, 2004.

Mr. Mark Watson, Habitat Specialist New Mexico Department of Game and Fish

Ms. Debbie Bauman, Public Involvement Coordinator New Mexico Department of Transportation

Mr. Steve Reed, Environmental Program Manager New Mexico Department of Transportation

Mr. Mike Sandoval, Traffic Safety New Mexico Department of Transportation

Mr. Ron Noedel, Bureau Chief, Right of Way Bureau New Mexico Department of Transportation

Mr. Larry Velasquez, District 3 Engineer New Mexico Department of Transportation

Mark Fahey, Project Development Engineer, District Three New Mexico Department of Transportation

Ms. Katrina Hummell, Wildlife Campaigns Manager Animal Protection of New Mexico

Mr. Charlie Sanchez U.S. Fish and Wildlife Service A RAC meeting was planned for late summer pending RAC invitee appointment acceptance and scheduling concerns. The final roster of committee members included:

- Phil Horton, NMDOT Research Bureau
- Mark E. Fahey, NMDOT District Three
- Mark L. Watson, New Mexico Department of Game and Fish (NMDGF), Conservation Services Division
- Luela Roberts, U. S. Fish and Wildlife Service, Endangered Species Division
- Jeff Fredine, NMDOT
- M.S. Jawadi, NMDOT
- Leila Momenzadeh, NMDOT
- Nancy Bennett, ATR Institute
- Judith Espinosa, ATR Institute

The initial RAC meeting was held on September 29, 2005, at the Research Bureau offices. Mark Fahey, NMDOT District Three, was identified as the customer for this project. Work with the Tijeras Canyon Safe Passage Coalition (TCSPC) is a goal of the project and the addition of Kurt Menke to the RAC in 2006 will provide a solid link. The TCSPC mission statement is: TCSPC is a group of organizations, agencies, and individuals working to provide safe crossings for wildlife and safer travel for people through Tijeras Canyon. Their work contains two major components: Prevent/Mitigate Accidents and Enhance Animal/Environment Connectivity (see their Web site at www.safepassagecoalition.org.). Measurements will include the number of accidents in the "hotspots" before and after mitigation measures are put into place, as well as measurement of accidents in adjacent areas. The monitoring will be done by the New Mexico Department of Game and Fish and the Environment Division of the NM Department of Transportation. The major document published through this group is the Tijeras Canyon Safe Passage Feasibility Study by Marron and Associates released in February 2006. Their work has come to fruition with highway reconstruction work to begin in May 2006. It will include deer fencing, brush and non-native plant species removal, and motion sensor lights (Figure 4).

Wildlife Crossing in Plan

Carnuel-to-Tijeras Stretch Targeted

By MATT GOMEZ

Mountain View Telegraph

Highway reconstruction work that will include wildlife safe passages on Interstate 40 should begin in May, after a contract is awarded.

The work to rebuild the freeway also will incorporate safe wildlife crossings between Carnuel and Tijeras to reduce the number of collisions between cars and animals, said Mark Fahey, a project engineer for the New Mexico Department of Transportation.

The contract specifies that the work must be completed in 330 calendar days.

"Primarily, it will consist of game fencing which keeps the wildlife off of I-40 and then funnels them to strategic openings in the fence where drainage structures under the freeway can be used by wildlife to cross back and forth," Fahey said.

The project also involves clearing brush and non-native plant species from existing underpasses and installing ramps so animals trapped on the interstate have a way to escape.

Clearing the brush and nonnative plants will help reduce the chances that predatory animals could hide and wait for prey crossing the interstate, Fahey said.

This will help make the openings more inviting for animals needing to cross, particularly deer.

Motion sensor lights will be installed at "Dead Man's Curve," said Kurt Menke, cochair of the Tijeras Canyon Safe Passage Coalition.

The lights will flash to warn drivers of deer and other large animals on the road.

Albuquerave Soumal-ARCH 21, 2006

FIGURE 4 Tijeras Canyon Safe Passage Coalition News Article, Albuquerque Journal, March 21, 2006.

The RAC agreed that there is no centralized accident reporting in New Mexico and many

accidents with wildlife go unreported. Mark Watson, NMDGF, suggested which animals to

include in the reports and a final list was developed later. The RAC discussed whether to include

other animals, such as dogs and cattle, and although the recording of the deaths of cats and dogs

would have engaged the public in the project, it would have pulled the focus away from the core

of the project. ATRI emphasized the need for a disclaimer on the Web site to make clear that the

Web site was for data collection purposes only and not for reporting an accident with an animal

or for carcass removal.

The ATR Institute provided the following handouts at the RAC meeting:

National Center for Statistics and Analysis of the National Highway Traffic Safety Administration, US Department of Transportation Crash Forms Catalog: New Mexico www.nhtsa-tsis.net/crashforms/Pages/state/nm/NM.htm (Attachment 3)

New Mexico State Highway System with Animal Crash Issues Map, 2003, from New Mexico Department of Transportation, New Mexico 2025: Statewide Multimodal Transportation Plan, page 16. www.nmshdt.state.nm.us/upload/images/Long_Range_Planning_Section/Sguiding/ Principles/FulfillingNMDOTs_GuidingPrinciples.pdf (Attachment 4)

Ontario Ministry of Transportation Watch for Wildlife Brochure, 2005 www.mto.gov.on.ca/english/safety/wildlife.htm (Attachment 5)

British Columbia Ministry of Transportation
 WARS 1983—2002: Wildlife Accident Reporting and Mitigation in British
 Columbia, Special Annual Report, 2004
 www.th.gov.bc.ca/publications/eng_publications/eng_pubs.htm (Attachment 6)

Model Minimum Uniform Crash Criteria (MMUCC), National Highway Traffic Safety Administration, US Department of Transportation, Improving Crash Data for Safer Roadways Model Minimum Uniform Crash Criteria Guidelines, 2003 www.mmucc.us (Attachment 7)

The format for the Web-based data entry was discussed. The Committee decided that the

WARS format was a good model to use with some refinements. The Web-based data entry

system would be established and reside on the ATRI servers for the life of the project. Existing

data from various sources, such as NMDOT and NMDGF, would be entered into the database for

beta testing and to establish trends.



FIGURE 5 Frequently Asked Questions: Black Bear Biology www.mass.gov/dfwele/dfw/dfw_bear_biology_faqs.htm

WEBSITE DEVELOPMENT

The Web site domain name, animalcrossings.org, was purchased in 2005. The Web site is

hosted on the ATRI servers. A placeholder homepage was published in spring 2005 (Figure 6).



FIGURE 6 Animal Crossings Homepage, June 2005.

Using feedback from the RAC, the major goal of the Web site was to provide a Webaccessible data entry form for animal/vehicle fatalities in New Mexico. A secondary goal was to house a collection of articles, documents, and news stories relating to the project. The Web site was redesigned and beta-tested during fall 2005 (Figure 7). The animalcrossings.org pages were operable in late October 2005 (Attachment 7).



FIGURE 7 Animal Crossings Homepage, November 2005.

Design Web-Based Standardized Data Collection Form

The design of the Web-based data collection form was discussed at the September RAC meeting. The document, *WARS 1983-2002: Wildlife Accident Reporting and Mitigation in British Columbia, Special Annual Report*, was chosen to be used as a model for New Mexico data collection and reporting (Figure 8).

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FIGURE 8 Monthly Wildlife Accident Report, WARS 1983-2002: Wildlife Accident Reporting and Mitigation in British Columbia.

The New Mexico Web-based data collection form is directly modeled on the above

WARS form. It was redesigned to be easy to read and complete on the Web site. The Web form

was distributed to the RAC for comment. Version 1 was completed and testing began in

December, 2005 (Figure 9).

) Animal Crossings: Wildlife Fatality - Mozilla Firefox							
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	Animal:	Other 🔽					
Galleries	If OTHER, Please Specify:						
NMWILD	Species:						
Home	Gender:	Female 💌					
	Age Class:	Adult					
	Highway/Route Number/Street Name:						
	Mile Marker Number - VERY IMPORTANT:	0					
	Road Direction:	East					
	Posted Speed Limit:	0					
	UTM:						
	Latitude:						
and the second sec	Longitude:						
	Nearest Town:						
	County:	Bernalillo 💌					
	Intersection/Landmark:						
	Comments:						
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FIGURE 9 Wildlife Fatality Report Webpage.

Mr. Watson (NMDGF) provided a list of wild animals to be included in the data collection (see Table 1). The species that far and above all other wildlife species are involved in the most accidents that cause vehicle damage and injury to drivers are: deer (mule deer or whitetail), elk, pronghorn, black bears, and cougars (Mark Watson email, dated October 3, 2005). Mr. Watson points out that the public may have problems in identifying some of the animals; but by including the coatimundi, javelina, pine marten, and ringtail, the accumulated roadkill records of these species could provide direction for conservation actions.

Name of Animal
antelope, pronghorn
badger
beaver
bighorn sheep
black bear
bobcat
coatimundi
cougar
deer
deer, mule
deer, whitetail
eagle
elk
fox
hawk
javelina
lynx
owl
pine marten
prairie dog
ringtail
turtles
unknown
wolf, Mexican

TABLE 1 Animals Identified for Data Collection Purposes

The University of New Mexico, Division of Government Research maintains some state crash records; however, ATRI must obtain approvals through the NMDOT before data is released. ATRI is currently working with NMDOT to obtain historical animal/vehicle crash data for entry into the database. In January 2006, Mr. Watson supplied raw data to be used for test purposes. The paper-based data came primarily from the following sources:

- New Mexico Department of Game and Fish, Mortality and Transplant Monthly Report (Attachment 8)
- New Mexico Department of Game and Fish, Bear and Lion Pelt Tagging Report
- New Mexico State University, Fishery and Wildlife Sciences, New Mexico Furbearer Observation Record (Attachment 9)
- Department of the Interior, US Fish and Wildlife Service, Roadkill: Big Game

• Various written notes and emails

As information was entered, there were some data fields added to the database, such as Game Management Unit (GMU) number. A brief table of explanations was developed for users who are not familiar with the terms GMU or UTM (Universal Transverse Mercator) (Table 2).

Date Sited – Required
Time of Day Sited – dawn/day/dusk/night
Animal - select from dropdown list
If OTHER: type in animal
Species - if known
Gender - unknown/female/male
Age Class - unknown/adult/young
Highway/Route Numbers/Street Name
Mile Marker Number
Road Direction - select from dropdown menu
Posted Speed Limit
UTM (Universal Transverse Mercator)
GMU (NM Game Management Units)
Latitude
Longitude
Nearest Town
County - select from dropdown menu
Latitude
Intersection/landmark
Comments - (limited to 255 characters)
Reported by - select from dropdown menu
ID number (if state employee)

TABLE 2Web Site Data Entry Tips

OTHER WEB SITE FEATURES

The Web site sitemap follows (Figure 10). Several of the pages are under construction—for example, the gallery of animal crossing signs and fatalities photographs. Since these are not within the scope of the plan, these two specific pages will be maintained by volunteer assistance.

HOMEPAGE
About Us
News Headlines
Search News Headlines Archive
Documents and Databases
Search Documents (Animal Road Fatalities Index) (under construction)
Search News Headlines
Search state crash reporting forms
Animal crossing signs (under construction)
Animal fatalities gallery (under construction)
Links of interest
Galleries
Animal crossing signs (under construction)
Animal fatalities gallery (under construction)
NMWILD
New Mexico Wildlife Fatality Reporting Form

FIGURE 10 Sitemap of animalcrossings.org.

A volunteer with ATRI searched the drivers' manuals for all 50 states for guidance about driving when animals were present on the road. Only 23 states specifically mention animals on the roadway with directions on what to do if the driver, for example, sees a deer, or what to do if the driver hits an animal. The information was entered into a database which will be searchable on the Web site. A "Crash" Web page links to the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration state information pages. A user clicks the

desired state and it links to the accident reporting guides, contacts, forms and other pertinent state information (Figures 11 and 12).



FIGURE 11 State Accident Reporting Information Web Page.



FIGURE 12 State of New Mexico Information, National Highway Traffic Safety Administration Web Site.

The bibliographic and news database was refined throughout the course of the first six

months. The data entry form is shown as Figure 13.

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		-	February 11, 2005			
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			Stirling, Ontarion, Canad	a		
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publication_number	sudoc_number	dewey		agency_type	•	
isbn_number	issn_number	lc_number		<mark>language</mark> English	•	
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keywords_2	keywords_7	-	state	animals_2	-	
keywords_3	keywords_8		national_park	animals_3		
keywords_4	keywords_9	-	NOTES			
	keywords 10	-				
keywords 5	-	-				
keywords_5			data h			

FIGURE 13 Data Entry Form for Bibliographic Database.

Descriptions of the data fields with examples follow (Figure 14).

KEY NUMBER automat PUBLICATION TYPE (I BUCKET (DROPDOWN URL EXTERNAL URL INTERNAL	ically ass DROPDO) link to the link to a	igned by database WN) book, video, newspaper broad category of the item he document at external location copy residing on the internal server					
First Author	Brown,	Sam					
Other authors	Barb Ru	ssell, Loretta Whitman					
Title of article	Animals	s under the wheels: changes in driver education programs					
Journal name	Journal	of Road Topography					
Journal volume		8					
Journal number		16					
Journal date		November 2003 (could be 4/6/2000 or spring 2002)					
Journal pages		17-55					
Book name		Roads that Kill: Through the American Wilds					
Year of publication if boo	k	1999					
Publisher		University of Chicago Press					
Publisher location		Chicago, IL					
First Author affiliation		University of Chicago					
Publication number		EPA/99-092-1					
ISBN number		standard number on books					
ISSN number		standard number on serials					
Total number of pages		23					
Agency type (DROPDOW	VN)	Federal					
MEDIA (DROPDOWN)		book					
PRIMARY ABSTRACT		paragraph (no abstract if newspaper article)					
Highlights		one sentence					
Primary focus (DROP DC	OWN)						
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Language (DROPDOWN) English						
Geographic information:							
Country (DROPI	JOWN)	United States					
State (DROPDO	WN)	Indiana					
National Park (D	ROP DO	WN)					
ibliggenety?	-Does the	e item nave:					
bibliography?							
maps?							
illustrations?							
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Copy housed at A	ATR						
Check your area	library						
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Figure 14 Explanation of Bibliographic Data Entry Form.

News alerts were set up in Yahoo! News and Google News Alerts to notify staff of current news articles regarding the project subject maintained. Search terms and phrases included:

- animal fatalities
- deer
- wildlife crash
- wildlife mortality
- roadkill
- wild animal death
- game and road

- animal and vehicle
- road ecology
- elk
- wildlife and roads
- elk and car
- moose and car
- bear and car

Relevant current news items were downloaded and added to the documents database. There are at least ten national or international headline stories every day, ranging from "Kangaroo Collision" to "Arizona's Roads Being Redesigned to Protect Wildlife." The Web site maintains a searchable News Headline page with current headlines posted from the database and

an archive of older stories.

The news stories are converted to PDFs and stored locally for availability after the originating Web site archives the story. ATRI can access these archived stories quickly by having them reside on a local server. ATRI can also use the University of New Mexico library system to locate relevant news stories that researchers or the public may request. This feature will be updated weekly by student staff or volunteers. For the month of October 2005, there were approximately 150 news headlines entered with a majority of the articles about deer collisions because of the seasonal aspects. Other animals included: moose, opossum, tree kangaroo, bobcat, coyotes, cows, pheasants, raccoons, squirrels, chipmunks, turkeys, elk, horses, goats, bullfrogs, general livestock, birds, bears, javelinas, armadillos, pigs, dogs, and bobcats.

In order to eliminate record sharing conflicts in the various databases, the databases were ported to a Microsoft SQL Server. A Microsoft SQL server provides a central location for all data collected by the animalcrossings.org Web site and includes transactional record logging.

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This ensures that data can be recovered in the unlikely event of a database failure. Microsoft SQL Server is also scalable and provides open reporting mechanisms. The performance of the database is further enhanced because a Database Server at ATRI is dedicated to this function. ATRI also developed a process to maintain version control of the Web site and implemented a deployment scheme as revisions occur.

FUTURE RESEARCH

Further research is required to reach the NMDOT Long Range Objectives to (1) Reduce wildlifevehicle collisions, and (2) Improve coordination between NMDOT and the New Mexico Department of Game and Fish to identify and develop solutions at critical wildlife crossings. The implementation of the standardized Web-based data collection form will assist with this goal because it increases the validity and value of animal road mortality information.

The Research Project should continue to collect and analyze vehicle/wildlife collisions. The Web-based "Roadkill" form was developed for DOT, State Police, Department of Public Safety, road maintenance crews, and the public to use to report dead animals. The use of this form will standardize reporting practices. ATRI recommends developing a marketing plan to alert state and local agencies and motorists of the availability of the online data collection form and its goals. Promotion may include media releases, distribution of brochures, and/or postcards.

The reporting function of the Web-based data collection form will be readied for GIS mapping capabilities and reporting software will be implemented. Availability of maps will enhance the site and show the public and agencies the problem areas in the state. To better assess the current data collection and mapping practices of state agencies, a phone or mail survey will be conducted to locate other states or agencies that have implemented data collection processes. The final data collection product and GIS reports will help the State of New Mexico, as well as public groups and other interested parties, know where the animal road mortality "hotspots" exist. This information can assist transportation planners, legislators, and environmental groups to enable funding for appropriate accident reduction techniques. Environmental and transportation planners will use the data in their ecological resource protection planning. The continuation of the Research Advisory Committee (RAC) is vital to the success of this project. Meetings should be held regularly, including conference calls since several RAC members are not located in Albuquerque.

Collaboration between state and local agencies is imperative. Departments such as NMDOT, NMGFD, and New Mexico Public Safety must work together—possibly with a formal Memorandum of Understanding. This cooperation will enhance the data collection process; enable sharing of that data among agencies, as well as share resources (money, staff, and knowledge). Public education and awareness must be included in any preventive program that is established. It is not only the animals who are in danger every day on every road, but it is the public, too, who are in danger every time they drive on New Mexico roads.

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