



**American Wildlands**

# *Safe Passages E-Bulletin*

**A Resource for Practitioners Using the Latest Applied Science and Best Management Practices for Wildlife Safe Passages Across Highways**

- ▶ **An introduction to this new publication**
- ▶ **A success story on Montana's Highway 93**
- ▶ **Electric crosswalks for wildlife**

**A Quarterly Electronic Bulletin from American Wildlands' Safe Passages Program  
Volume I, Number 1, Spring 2007**

**T**hrough our *Safe Passages* program, American Wildlands is striving to make the U.S. Northern Rockies a showcase for safe passage projects that demonstrate how highways can be designed or re-constructed to allow for the migratory needs of wildlife, while providing increased safety for the people who drive these highways. The program's primary objective is to help establish a regional culture that supports the concept and implementation of highway safe passages for wildlife. We believe that if the region's elected officials, agency decision-makers and general public support the concept of safe passages, then the practitioners of this increasingly important aspect of wildlife management will have an easier time developing safe passage structures and other mitigation measures.



by Joshua Burnim, Safe Passages Program Coordinator

To support practitioners of wildlife safe passages (most of the people receiving this publication), we also want to help promote the latest applied science and best management practices emerging from your on-the-ground work. This quarterly electronic bulletin is our most visible commitment to assisting practitioners, and we hope the information helps increase your effectiveness in making highways safer for wildlife and people.

In this and future electronic bulletins, we will address what we see as the two overarching categories of safe passage techniques: providing safe passage structures across highways for wildlife, and providing information that helps drivers know where and how they can reduce the likelihood of hitting wildlife. The bulletin will consist of five regular features:

- 1) Innovative Research (*page 3*): Reviewing the most innovative research regarding highway/wildlife mitigation measures.
- 2) Techniques of the Trade (*page 4*): Presenting some of the latest techniques to reduce animal-vehicle collisions and promote wildlife habitat connectivity.
- 3) Resources and Tools (*page 5*): A summary of papers, reports, websites, public opinion research, or other useful tools for safe passage practitioners.
- 4) Safe Passages Policies and News (*page 6*): A presentation of a timely public planning process, policies, or news.
- 5) Feature Story (*page 7*): A story on a state-of-the-art wildlife-highway mitigation project, or informative success story.
- 6) Upcoming Events (*page 8*): Announcements of timely conference, workshops, courses, and the like.

Finally, we hope you find this bulletin useful to your work. To that end, please consider helping us help you by sharing your thoughts about the following: (1) how we can make this publication more useful/valuable to you and others; (2) article ideas for future issues of the bulletin; and (3) other people you think may be interested in, or would do well to receive, this publication—so we can add them to our “mailing list.”

Thanks, and here's to more safe passages for all of us.

#### PHOTO CREDITS

Cover: A Bighorn sheep crosses Highway 200 in NW Montana, by Kerry Foresman.

Page bottoms: Elk crossing U.S. 287/26 east of Grand Teton National Park, by Lloyd Dorsey.

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## Using DNA to Assess Wildlife Crossing Structures

Michael Sawaya, Western Transportation Institute

Until now, research on wildlife crossing structures has not addressed how well the structures actually provide for wildlife habitat connectivity. In Banff National Park, Alberta, between 1996-2006 researchers led by Tony Clevenger of the Western Transportation Institute recorded more than 348 grizzly bear and

Photo by Tony Clevenger, WTI



A grizzly bear climbs through a barbed wire hair sampling system on a wildlife overpass in Banff National Park.

1041 black bear passages across the 24 wildlife crossings along the Trans-Canada Highway (TCH). However, the number of unique individuals and their sexes remain unknown. A recent pilot study addressed this issue by using a barbed wire hair sampling system to obtain bear DNA samples at two of the crossings. Genetic analysis revealed that 5 grizzly bears (3 females, 2 males) and 4 black bears (2 females, 2 males) used the two underpasses in 2005. Encouraged, in 2006 researchers installed hair sampling systems at 22 of the crossing structures, and also used hair snares and rub tree surveys to sample the population surrounding the TCH. The genetic results from the first field season are pending. Video of

bears, elk, cougar and deer using some of the structures is currently available [here](http://www.coe.montana.edu/wti/road_ecology/whats%20new.php) (www.coe.montana.edu/wti/road\_ecology/whats%20new.php).

## Bears Help Unravel Transportation Puzzle

Waller and Servheen (Journal of Wildlife Management 69(3):985-1000; 2005) evaluated the movement of 42 collared grizzly bears in the vicinity of Montana's U.S. Highway 2 and parallel railroad tracks near the southern boundary of Glacier National Park, between 1998 and 2001. Important findings: (1) Grizzlies avoided the transportation corridor; (2) most crossings (85%) "occurred at night when highway traffic volume was lowest but when railroad traffic was highest," which correlated with the number of grizzlies hit in the study area between 1980 and 2002: 23 by trains and 2 by vehicles; (3) the authors hypothesized a threshold volume of 100 vehicles/hour beyond which highways in general become significant barriers to grizzly bear movement. [Click here](http://www.forestry.umn.edu/research/MFCES/programs/GrizzlyBearRecovery/Waller%20and%20Servheen%202005.pdf) (www.forestry.umn.edu/research/MFCES/programs/GrizzlyBearRecovery/Waller%20and%20Servheen%202005.pdf).

## Highway Animal Detection Systems in Montana

Marcel Huijser, Western Transportation Institute

Inspired by an 82% reduction on average in wildlife-vehicle collisions by animal detection systems in Switzerland, the Western Transportation Institute at Montana State University (WTI) installed and set out to research an animal detection system in Yellowstone National Park in 2002. This system

uses microwave beams, that when broken by a large animal crossing the road, cause lights to flash on road-side warning signs. During the first two years, WTI and the system's manufacturer, Sensor Technologies & Systems (STS) of Scottsdale, Arizona, addressed technological problems. Over the next two years, using wildlife snow tracking data, WTI identified "blind spots" where elk could approach the road undetected. STS fixed these problems by rearranging the position of the stations with sensors and the system has been in full operation since December 2006. WTI is currently focusing on the effect of animal detection systems on vehicle speed, driver opinions and experiences,



Photo by Marcel Huijser, WTI

Animal-detection system on U.S. Highway 191 in Yellowstone National Park.

and the potential reduction in collisions with large animals. A 2006 report for the lead funding agency, Oregon Department of Transportation, is located [here](http://www.oregon.gov/ODOT/TP_TP_RES/docs/Reports/AnimalVehicle.pdf) (www.oregon.gov/ODOT/TP\_TP\_RES/docs/Reports/AnimalVehicle.pdf). WTI is also evaluating the reliability of 8 animal detection systems in a controlled access environment near Lewistown, Montana.

## Arizona's First Electric Crosswalk for Wildlife

by Norris Dodd, Arizona Game & Fish

Traditionally, wildlife fencing has been used to funnel animals under or over highways through wildlife crossing structures. However, in Arizona, state workers, in conjunction with Electro Braid Fence, have recently installed the state's first "electric wildlife crosswalk" in an area where an underpass was not feasible. The crosswalk, located at the end of a section of fencing, uses high-resolution, thermal infrared cameras and sophisticated computer software to monitor and determine if objects approaching a road are large wildlife that pose a danger to motorists. An elk or deer, for instance, would cause the computers to activate message signs placed in advance of the crosswalk and flashing warning signs at the crosswalk, alerting drivers from both directions to the presence of wildlife on the road. This crosswalk is unique because it is designed to influence both wildlife behavior (via the fencing) and driver behavior (via the warning signs) to improve wildlife permeability and motorist safety. Studies monitoring the effectiveness of this crosswalk are ongoing. If successful, this technique may provide a cost-effective alternative to multi-million dollar wildlife crossing structures. A link specific to the project is being developed regarding the electric wildlife crosswalk. [Click here](http://www.azgfd.gov/w_c/research_why_elk_cross.shtml) (www.azgfd.gov/w\_c/research\_why\_elk\_cross.shtml) for a link to the larger State Route 260 project.

## Critter Crawls

by Dr. Kerry R. Foresman

Dr. Kerry R. Foresman, a biologist at the University of Montana, has developed a unique modification to culverts that allows small mammals to safely traverse roadways. These "Critter Crawls" consist of shelving placed within culverts to provide a safe pathway above water flow for species ranging in size from mice to raccoons, skunks, and porcupines. The shelving was developed in conjunction with Roscoe Steel & Culvert Co., which



Photo by Joshua Burnim

Dr. Kerry Foresman points out the benefits of "Critter Crawls" under US 93.

now markets them. A unique "vole tube" is also incorporated into the frame and accommodates species that require a more protected environment. Three years of tests have shown daily use by a large number of species. These shelf structures are also designed so that existing culverts can be retrofitted to accommodate them. A large number

have already been installed along Highway 93 in western Montana. Additional information is available online [here](http://dbs.umt.edu/research_labs/foresmanlab/documents/MontanaOutdoorsarticle2006.pdf) (http://dbs.umt.edu/research\_labs/foresmanlab/documents/MontanaOutdoorsarticle2006.pdf).

## Roadkill Observations Collection System

by Rob Ament, Western Transportation Institute

Most data regarding wildlife-vehicle collisions is still collected sporadically using pen and paper. This data is often difficult to analyze because of limited standardization and inconsistent or poor spatial resolution. In response, the Western Transportation Institute at Montana State University has developed and is field testing a tool to help streamline and standardize data collection of wildlife-vehicle collision occurrences. This tool integrates a hand-held computer or personal data assistant with a global positioning system, supported by customized software, to create an easy, spatially accurate and consistent data collection system. Once stored on a computer, users can easily analyze and interpret this wildlife-vehicle collision data for better highway management and wildlife mitigation planning. These rugged hand-held data collectors are currently being field tested in VA, WA, MT, CA, and Alberta. They can survive full submersion in water and falls of up to four feet. [Click here](http://www.coe.montana.edu/wti/wti/display.php?id=250) (www.coe.montana.edu/wti/wti/display.php?id=250).

## Priorities for Transportation and Wildlife Research and Practice

by Patricia Cramer, Utah State University

The top research, management, and policy priorities for promoting landscape permeability for wildlife in the roaded landscape were recently rated by 444 professionals. Participants with expertise in transportation and wildlife management rated 25 priorities in a web-based survey. The top 5 priorities were: 1) incorporate wildlife mitigation needs early in transportation planning; 2) a better understanding of how animals use mitigation structures; 3) combine mitigation methods such as crossings, fences and escape structures; 4) use conservation plans and connectivity analyses in transportation planning; and 5) develop alternative cost-effective wildlife crossing designs. This collective wisdom can be used to identify needed research and action on projects or policy issues. This priorities survey was part of a larger project for the Transportation Research Board (TRB) of the National Academies.

To view the priorities survey, [click here](http://www.trb.org/trbnet/projectdisplay.asp?projectid=762) (www.trb.org/trbnet/projectdisplay.asp?projectid=762) then scroll down to the bottom of the page to link to the latest TRB project report that contains a section on “Priorities in Research and Practice.”

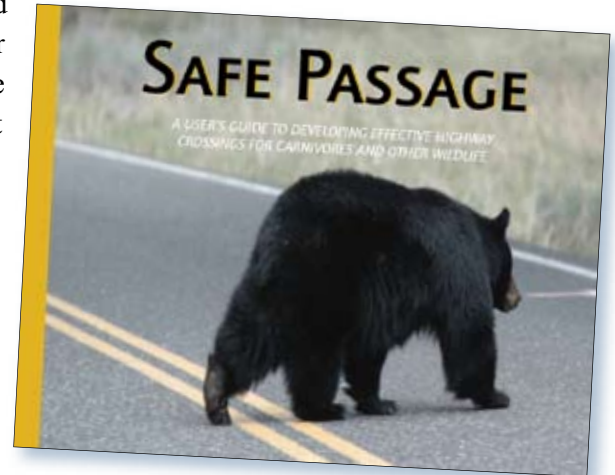
## “Safe Passage: A User’s Guide to Developing Effective Highway Crossings For Carnivores and Other Wildlife”

If you want a well-written summary of the do’s and don’t’s of crossing structures and connectivity planning, this is your guide. Former USDA Forest Service Road Ecology Program Leader Bill Ruediger wrote “Safe Passage” with the support of a talented conservation group, the Southern Rockies Ecosystem Project. The acknowledgement section reads like the who’s who of Safe Passages Practitioners, including professionals from departments of transportation, the Federal Highway Administration, federal and state wildlife and land management agencies, non-profit conservation groups, and academic institutions. What’s more, this document was based on the recommendations of biologists, engineers, and conservationists at the 2005 Southwest Carnivore Committee Conference.

Available here as a website ([www.carnivoresafepassage.org](http://www.carnivoresafepassage.org)) and document, “Safe Passage” presents six basic tools for habitat connectivity planning. American Wildlands believes that habitat connectivity planning at a statewide or regional level is a crucial step towards a better future for both our wildlife resources and our

highway infrastructure (and thus our safety as motorists). This guide will help you get started.

Perhaps most useful, this user’s guide can help Safe Passage Practitioners choose ecologically effective and economically efficient solutions. Instead of starting at “Cadillac” solutions such as wildlife overpasses that



are relatively expensive, the guide begins with “Volkswagen” methods such as signs and small metal culverts. Illustrated with useful pictures, the guide describes the type of structures and how to design structures to be effective for the suite of carnivores and other wildlife in Western North America. A table at the back provides broad guidelines for type, height, and width of structures effective for each species.

American Wildlands strongly suggests the publication as a good introduction, a good review, and a good reminder of the potential for highway safe passages to benefit wildlife and people alike.

## An Opportunity: Long-Range Statewide Transportation Planning

As a result of a new federal rule, for the first time state transportation departments are required to include resource agencies and conservation considerations in long-range statewide transportation planning (20+ year planning documents). This revision of regulations governing state transportation plans and programs responds to the new federal transportation bill, SAFETEA-LU (August 2005). Starting this July, when a state “amends” or “updates” its long-range statewide transportation plans, the new plan must include consultation with resource agencies, a comparison of transportation plans to state and tribal conservation plans or maps, and a discussion of potential environmental mitigation activities. The following is an overview of the three new requirements.

### Consultation with Resource Agencies

While amending or updating long-range statewide transportation plans, states must “consult with federal, state, tribal, and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation.” It is generally understood that the more one engages diverse interests in an upfront planning process, the easier it is to implement that plan down the road because buy-

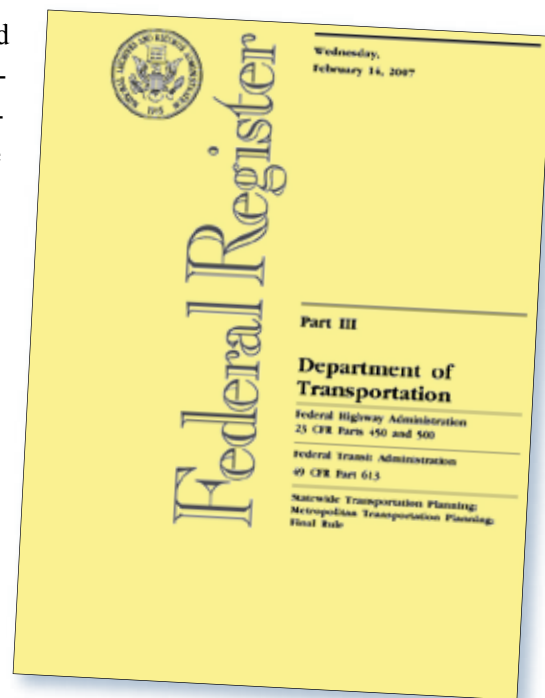
in has already been established and “project delivery” is streamlined. The article on page 7 highlights how project delivery can be streamlined when this planning approach is adopted.

### Comparison of Conservation Plans or Maps

The new rule also requires that state highway departments compare their updated transportation plans with those of the state and tribal conservation plans or maps, as well as inventories of natural or historic resources. This comparison exercise will likely reveal potential conflicts between the proposed transportation projects and important conservation and natural areas, allowing agencies to avoid conflicts and streamline resolution at an early stage. For detailed information on any of the 50 state wildlife conservation, or “action” plans, [click here](http://www.teaming.com/state_pages.htm) (www.teaming.com/state\_pages.htm). State natural heritage programs would be able to provide inventories of natural resources. We are not sure where to send you for inventories of historic resources (any suggestions would be greatly appreciated).

### A Discussion of Potential Environmental Mitigation Activities

Finally, the new rule requires long-range statewide transportation plans include “a discussion of potential environmental mitigation activities and



potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions” affected by the plan. This part of the transportation plan must be developed in consultation with federal, state, and tribal land management, wildlife, and regulatory agencies.

This new rule acknowledges the importance of incorporating wildlife considerations into long-range statewide transportation planning. American Wildlands commends this new development in highway planning, given the public’s interest in protecting both human safety and wildlife on our highways.

To view the rule [click here](http://www.fhwa.dot.gov/planning/index.htm) (www.fhwa.dot.gov/planning/index.htm) and scroll down to “Sec. 6001: Transportation Planning.”

## “Spirit of Place” on Montana’s U.S. Highway 93

How do you retain and respect an area’s unique “spirit of place” in the face of increasing traffic, vehicle speeds, and highway reconstruction? After years of disagreements, a unique collaboration between federal, state, and tribal authorities answered that question through construction of what will soon be one of North America’s premier wildlife-friendlier highways.

In the mid 1980s, the Montana Department of Transportation (MDT) began planning reconstruction of 56 miles of U.S. Highway 93 along the Flathead Indian Reservation, north of Missoula between the towns of Evaro and Polson. MDT’s preferred alternative was a four lane divided highway, but the Confederated Salish Kootenai Tribe of the Flathead Nation (CSKT) desired a highway that respected a “spirit of place”—described as the “the surrounding mountains, plains, hills, forest, valley, and sky, and the paths of waters, glaciers, winds, plants, animals, and native peoples.”

This conflict resulted in the Federal Highway Administration (FHWA) initially withholding funding, and the project was stalled until late 1999. Then three governments—state (MDT), federal (FHWA), and tribal (CSKT)—established a negotiating team that soon reached consensus regarding this reconstruction project, and in December 2000 signed a Memorandum of Agreement (MOA) that honors the “spirit of place” concept.

The MOA led to the negotiating team researching what type of crossing structures would best provide for a “spirit of place.” MDT’s Chief Engineer Loran Frazier recalls that “Montana had had some experience on U.S. 2 with mountain goat underpasses by Glacier Park,

but really this was new for Montana.” At the time, Mr. Frazier was MDT’s Missoula District Administrator. He and the rest of the negotiating team traveled to Banff National Park to learn about the wildlife crossing structures on the Trans-Canada Highway (see *Using DNA* on page 3). The group also looked at roadkill data, wildlife tracking information, and consulted wildlife specialists to identify habitat areas, migration patterns, and potential highway crossing areas. With this information, the group chose locations for 42 wildlife crossing structures on the 56 miles of U.S. 93.

The total cost for constructing these crossing structures is \$16 million, 9.5% of the \$169 million for the overall highway reconstruction. When complete, the highway will contain 6 open-span bridges, 2 multi-span bridges, one large wildlife over-



Photo by Pat Basting, MDT

US 93 will include 23 wildlife underpasses similar to this one as well as ten smaller versions and nine larger wildlife structures.

pass, and more than 30 metal elliptical or concrete box culvert underpasses. Sixteen structures have already been built, sixteen more are being built and the remaining ten are slated for construction in the near future.

“For me the most exciting part of the MOA,” said Frazier, “is the first few pages, where we decide how we’re going to work together and how we’re going to resolve disputes.” Disputes have only risen three times in seven years, a sign that the process is working. American Wildlands commends this work, both for its commitment to building consensus and wildlife crossing. We look forward to reporting on other such success stories.

[The MOA is available [here](http://www.skillings.com/Web-Page/0000MOA.html) (www.skillings.com//Web-Page/0000MOA.html).]



Grizzly bear on wildlife overpass in Banff National Park.

## Road Ecology for Conservationists Workshop

Held March 28-30, 2007 in Bozeman, Montana

Experts and biologists from across the region converged on Montana State University (MSU) to teach the non-profit community about the latest in highway wildlife mitigation science, the successes of public-private partnerships, and recent innovations in road ecology. The 26 presenters included six road ecologists from MSU's Western Transportation Institute and Dr. Jodi Hilty of the Wildlife Conservation Society. The one and a half day workshop hosted by American Wildlands, the Wildlife Conservation Society, and the Yellowstone to Yukon Conservation Initiative (Y2Y) brought together 75 participants from northern British Columbia to Arizona

to Maine. In mid-May, most of these presentations will be available on our website, [www.wildlands.org](http://www.wildlands.org).

## International Conference on Ecology and Transportation (ICOET)

May 20-25, 2007 in Little Rock, Arkansas

Held 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, inter-agency supported event, administered by the Center for Transportation and the Environment. The theme of ICOET 2007

is "Bridging the Gaps, Naturally." This year's program involves the participation of 14 countries and features more than 150 technical presentations, poster displays, and exhibits. ICOET 2007 will be hosted by the Arkansas State Highway and Transportation Department. Registration is underway at [www.icoet.net](http://www.icoet.net).

## Innovative Approaches to Wildlife/Highway Interactions

July 10-12, 2007 in Madison, Wisconsin

Enrollment is open to federal, state, and private applicants for a class taught by the U.S. Fish & Wildlife Service, in cooperation with the U.S. Forest Service Pacific Southwest Research Station. Designed for both resource biologists and engineers, this class will give an overview of wildlife issues relative to pre-existing highways and future highway planning, differences in impacts and solutions between low volume and high volume roads, structural and nonstructural solutions to wildlife mortality and habitat connectivity, and an introduction to current resources on wildlife/highway crossings and interactions. This course will include a field trip to discuss barriers and crossing structures. Instructors are Sandra Jacobson (Wildlife Biologist) and Terry Brennan (Forest Engineer), who are known nationally for their training work in wildlife/highway interactions. To apply, [click here](#) and search for "TEC7189" (<http://doilearn.doi.gov/coursecatalog>).

For more information on the class, call 304-876-7456 or [mailto:Glenn\\_Gravatt@fws.gov](mailto:Glenn_Gravatt@fws.gov).