



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

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An Electronic Bulletin from American Wildlands' Safe Passages Program
Volume 2, Number 1, March 2008

Dear Highway Safe Passages Practitioner,

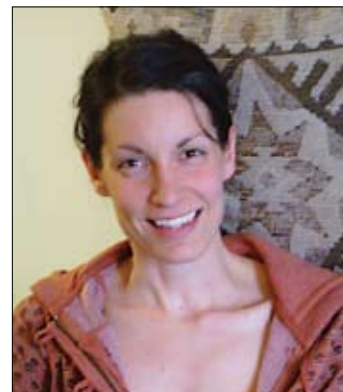
This is the second edition of our new *Safe Passages E-Bulletin*, established to support practitioners of wildlife safe passages. In this and future electronic bulletins, we address what American Wildlands sees as the two overarching categories of safe passage techniques: [1] providing safe passage structures across highways for wildlife, and [2] providing information that helps drivers know how they can reduce the likelihood of hitting wildlife.

American Wildlands encourages you to take the five steps detailed below to help us make this publication the most valuable resource it can be:

- 1) [Read the first issue](#) of our *Safe Passages E-Bulletin*;
- 2) [Provide AWL with feedback](#) on how to make this quarterly bulletin more valuable to you and other safe passage practitioners;
- 3) [Send us names and email addresses](#) of people you think would like to receive, or would benefit from receiving, this publication. We will send an announcement to them, but will not sign them up for anything until they tell us of their interest in receiving future publications.
- 4) [Contact American Wildlands](#) with topic ideas for future issues of the *Safe Passages E-Bulletin*. We would greatly appreciate your help as we track the latest and greatest ideas and information coming out of the safe passages and road ecology circles — whether it is your own work, or that of others. Please, help keep the “article” ideas coming.

American Wildlands thanks the many researchers, agency personnel, inventors and others who helped make this second issue possible. We have collectively established a strong standard for the type of new and important information American Wildlands hopes to provide with each future issue. We at American Wildlands hope you find this bulletin informative and useful, and we hope it motivates you to participate in helping us improve the content and expand the reach of this publication.

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



by Jessica Hann, Safe Passages Associate (above) and Elizabeth Williamson, Safe Passages Program Coordinator (below)



PHOTO CREDITS

Cover: Elk on roadside, by Kerry Foresman.

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

Editor: Jessica Hann; Assistant Editor: Elizabeth Williamson;
Designer: Amy Kelley

Safe Passage E-Bulletin is a publication of American Wildlands' Safe Passages Program. For more information, contact Jessica Hann, Safe Passages Program Associate:

321 E. Main Street, Suite 418, Bozeman, MT 59715

phone: (406) 586-8175

e-mail: jhann@wildlands.org

Safety and Survival across the Median

Sometimes we sacrifice one life to save another, but could innovation save both lives?

Seventeen percent of accidents where a vehicle crosses the highway median result in death. Installation of median barriers, which direct vehicles away from the median and oncoming traffic, could prevent many of these fatalities. These barriers save human lives: but at what cost? They pose a deadly threat to wildlife by inhibiting movement and trapping wildlife on the road. This, coupled with the physical and financial damage trapped animals pose to drivers, provides strong motivation to find an alternative solution. Innovative barrier designs could be that solution.

A study performed by Dr. Tony Clevenger at the Western Transportation Institute found that existing data supports a relationship between median barriers, decreased wildlife movement and increased wildlife mortality. With animal-vehicle collisions on the rise, the study concluded that further research is required to determine the full effect of barriers on wildlife and human safety as well as the mitigative potential for innovative barriers including rumble strips, cable barriers, scuppers and cut-outs. Click here to request a copy of this report: www.coe.montana.edu/wti/wti/display.php?id=238



Photo by A.P. Clevenger

Median barrier on Highway 1 near San Luis Obispo, California, with openings for small animal passage.

Bozeman Pass Variable Message Sign (VMS) Driver Survey and Speed Study

Amanda Hardy, formerly with the Western Transportation Institute—MSU

The Western Transportation Institute, based at Montana State University in Bozeman Montana, performed a study investigating the affects of three VMS on driver speed and awareness on Interstate 90 (I-90) between Bozeman and Livingston, Montana. Two of the signs were permanent with one placed westbound leaving Livingston and the other placed eastbound leaving Bozeman. The third was a portable VMS placed west of Bozeman within the highest animal-vehicle collision area.

Based on survey responses and speed guns, researchers found that drivers were more likely to decrease their speed and be more alert when the VMS warned of increasing animal-vehicle collisions (AVC), especially after seeing two warnings in the westbound lane where VMS were spaced 10-15 miles apart.

This study was important because it showed in a quantifiable way that

drivers reduced their speeds and reported increased awareness of their surroundings after seeing warnings about the threat of wildlife on I-90. Click here for more information and to request a copy of this report: www.coe.montana.edu/wti/wti/display.php?id=161

Wanted: Thorough Pre and Post Mitigation Monitoring

The reconstruction of US Highway 93 (US 93) in Montana includes an unprecedented 42 wildlife crossing structures and 15 miles of wildlife fencing. How do we determine the effectiveness of these structures? How do we know if the gains are worth the investment?

Thorough pre and post monitoring studies provide us with answers to these questions. Unfortunately, these studies are not commonly performed at this point, but the renovation of US 93 may change that. The US 93 Memorandum of Agreement includes a commitment to pre and post monitoring to determine the affect of fencing and crossing structures on animal-vehicle collision frequency and habitat connectivity. This landmark reconstruction effort will serve as a guide for future highway restoration and wildlife mitigation projects.

The Western Transportation Institute, contracted to perform the pre and post monitoring analyses, released their first report with preconstruction data results and recommendations which can be accessed at: www.coe.montana.edu/wti/wti/pdf/426402_final_report.pdf

Variable Message Signs in Teton County

The Jackson Hole Wildlife Foundation

As daily traffic counts continue to rise in Jackson Hole, the Jackson Hole Wildlife Foundation continues its ardent campaign to prevent wildlife roadkills by putting three new portable variable message signs to work in Jackson Hole, Wyoming. These dynamic signs will be moved around the valley to display various messages, alerting drivers of wildlife hotspots.

Two of the new variable message trailers will be donated from the Jackson Hole Wildlife Foundation to Grand Teton National Park where, according to park records, roadkill numbers increased steadily during recent years. The third trailer will be used in and around the town of Jackson.

The Jackson Hole Wildlife Foundation has formed a unique partnership with Grand Teton National Park — both are focusing on ways to prevent additional wildlife-vehicle collisions. The park agreement follows another unique and first-of-its kind partnership formed between the Jackson Hole Wildlife Foundation and Wyoming Department of Transportation (WYDOT) to mitigate accelerating roadkill numbers in Jackson Hole, beyond park roadways.

Many things influence roadkill numbers including seasonal wildlife movements, wildlife population numbers, weather, traffic volumes and human driving behavior. These message signs attempt to affect human



Photo by Mike Gocke.

Variable message sign near Jackson Hole.

driving behavior. While these diverse influencing factors make it difficult to understand the variable message signs' effects on roadkill numbers, preliminary data shows a substantial decrease in roadkill numbers in the Jackson area since the inception of two similar signs in July of 2006. Each year, the Jackson Hole Wildlife Foundation collects roadkill data in collaboration with WYDOT, Grand Teton National Park and the Wyoming Game and Fish Department. So far, roadkill numbers for ungulates including elk, moose and deer are down in 2007, as compared to 2006.

Click here for more information on this project: www.jhwildlife.org/roadkill.html

Road Watch in the Pass, a model for engaging citizens in wildlife conservation

Tracy Lee, Miistakis Institute

Road Watch is an innovative model for connecting researchers, citizen volunteers and decision makers through a community based monitoring project to address wildlife conservation issues in the Crowsnest

Pass of southwestern, Alberta, Canada. Road Watch enables citizens to enter their wildlife observations along a major transportation route running east west through the Canadian Rocky Mountains using an interactive Web-based mapping tool (www.rockies.ca/roadwatch). Road Watch was developed to accomplish two key goals: 1) to create a valuable data set for decision makers and the community of where large mammals cross Highway 3, and 2) to foster a learning environment where citizens can learn and share knowledge about local wildlife and conservation issues.

The project has successfully generated a large dataset of wildlife observations (over 3500) along the highway that has been used in land-use planning processes. Road Watch has also provided a rich opportunity for scientists, citizens and decision makers to work collaboratively and learn together about wildlife movement across Highway 3. Ultimately, this approach will increase a citizen's knowledge on wildlife movement as well as promote a community informed on wildlife conservation.

Wildlife-Vehicle Collision Mitigation Toolbox

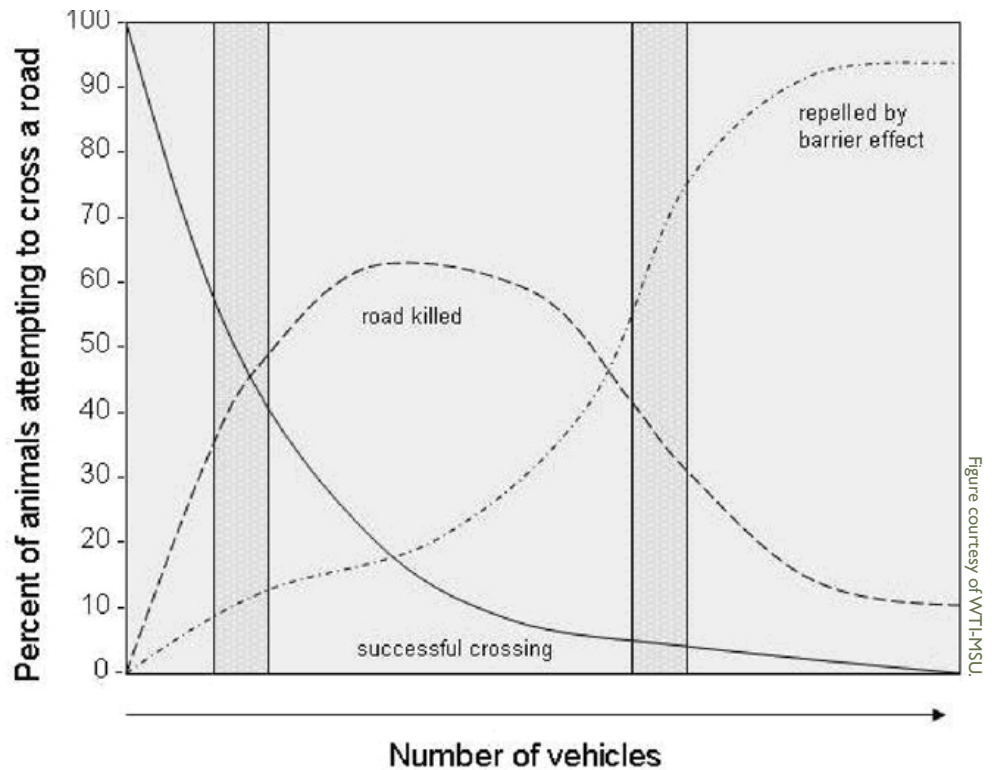
In the United States, animal-vehicle collisions result in hundreds of human fatalities, tens of thousands of human injuries and billions of dollars in property damage each year, not to mention the impact they have on wildlife. With significant increases in animal-vehicle collisions over previous decades, roads have become a significant barrier to wildlife movement, and mitigation measures grow increasingly important (see figure this page).

Because of this, the Montana Department of Transportation requested that the Western Transportation Institute provide an overview of mitigation measures that reduce animal-vehicle collisions. The report addresses the pros and cons of each measure, as well as effectiveness, ability to increase safety and habitat connectivity and overall costs of construction and maintenance.

This report will serve as an invaluable tool during the planning process of road construction or reconstruction. Click here to access the full report: www.mdt.mt.gov/research/docs/research_proj/wildlife_crossing_mitigation/final_report.pdf.

GUTS: A Book Review

The American daydream of freedom and open roads is giving way to a complex web of ever expanding road systems and traffic jams. Unfortunately, the



Conceptual relationship between traffic volume, road mortality, and the barrier effect. Figure adapted from Seiler (2003).

urban development that inevitably follows all road construction also creates sprawling cities and a loss of natural spaces. As the cycle of road building and urban sprawl continues, conservationists, transportation experts, city planners, developers, politicians and citizens look for new ways to manage urban America, forging relationships that defy tradition.

“Getting up to Speed,” (GUTS) a comprehensive publication by Defenders of Wildlife provides the information needed by both novices and experts interested in the world of America’s transportation infrastructure. It offers detailed information on the legislative history and infrastructure that supports and

finances America’s transportation system, identifies wildlife and habitat issues that have arisen because of extensive road building over the last 100 years, and offers solutions to the complex issues of roadways and wildlife. It encourages the formation of nontraditional alliances, paving the way to a future where roads and nature coexist in harmony and where engineers and conservationists collaborate to build innovative transportation systems that emulate America’s diverse culture while preserving the wide open spaces of our daydreams.

GUTS is available online at: www.GettingUpToSpeed.org. American Wildlands highly encourages you to check it out.

Montana Amends Long-Range Transportation Policy Plan

Carol Strizich, Montana Department of Transportation

The Montana Department of Transportation (MDT) is performing a limited amendment of *TranPlan 21*, Montana's statewide long-range transportation policy plan. *TranPlan 21* was originally adopted in 1995 and updated in 2002.

The primary purpose of the 2007 amendment process is to ensure that *TranPlan 21* meets new requirements of the most recent federal transportation authorization act - the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

The limited amendment addresses the following areas:

- Consideration of Transportation System Security;
- Incorporation of Visualization Techniques into Public Involvement Activities;
- Integration of the Montana Comprehensive Highway Safety Plan;
- Consistency with Growth and Economic Development Plans;
- New Consultation Requirements;
- Statewide Plans/Environmental Mitigation Activities;
- Capital, Operations, and System Management Strategies, Investments, Procedures, and Other Measures

Although more limited in scope than a full plan update effort, the amendment process has included public outreach and the participation of Federal and State resource agencies.

TranPlan 21 will be available at public libraries and at www.mdt.mt.gov/pubinvolve/tranplan21_amend/ in March.

Idaho's Wildlife Linkage Assessment

The Idaho Transportation Department (ITD) is performing a statewide linkage assessment identifying locations where important wildlife habitat corridors intersect Idaho's roadways. ITD generated Geographical

Informational System (GIS) data layers for vegetation, habitat, wildlife, fish, roadkill, residential development and linkage models. ITD held workshops for biologists, nongovernmental organizations, transportation department staff and highway maintenance staff, allowing specialists the

opportunity to provide input based upon their areas of expertise.

The final report will include a description of the methodology, a listing of workshop participants and maps containing areas of interest. It will provide information regarding locations where wildlife commonly attempt to cross roadways, and will enable the identification of areas of special interest relating to wildlife habitat, development pressure and public safety during future highway development projects.

GIS data layers and workshops have been completed in all six Idaho districts. District 6 is currently the only district with a summary report of workshop proceedings. To view the summary report on District 6, click here: geodataservicesinc.com/linkage/pdf/ITD_D6_HwyLinkageReport.pdf. To view the maps for all six districts go to the Geodata website: www.geodataservicesinc.com, and click on "Wildlife Highway Linkages."

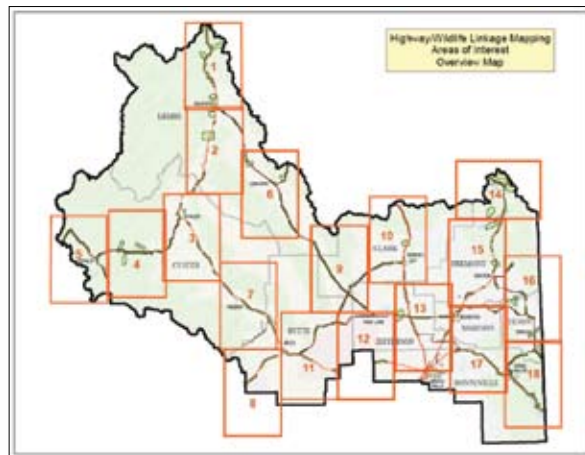
Follow-up workshops are scheduled for Districts 1 and 2. The District 2 workshop will be held on April 2nd at the IDFG Regional Office in Lewiston. The District 1 workshop is scheduled for April 3rd at the ITD District Office in Coeur d'Alene. Both workshops will begin at 8:30am. The purpose of the workshops will be to review existing linkage areas and crossings, refine boundaries and locations if necessary, add new sites if appropriate, and rank the importance of linkage areas into one of three classes based on an established set of factors.

For additional information and to participate, contact:

District 1: Don Davis (208-772-8019) or Mike Hartz (208-772-8018)

District 2: Shawn Smith (208-799-5090 Ext. 4268)

Project Information: Wayne Melquist (208-245-1948 or 208-755-7561)



Overview Map of Idaho Linkage Areas from the Idaho Transportation Department's District 6 Highway/Wildlife Linkage Final Report

Idaho's Underpasses: A Success Story

The Idaho Transportation Department (ITD) began reconstruction on US Highway 95 (US 95) in 2000, upgrading the highway from two to four lanes. The need to provide wildlife with a means to safely cross the expanded highway led to the incorporation of underpasses. At the time, wildlife crossing structures were a new concept and research did not support their effectiveness. Fortunately, teamwork and innovative thinking made the project a great success.

The reconstruction project stretched from the junction of Highway 1 and US 95 north to the Canadian border. The southern-most section of this project crossed National Forest System lands. This land provided critical winter habitat for ungulates including white-tailed deer, mule deer, elk and moose. Because of this, US Forest Service biologist Sandra Jacobson requested that ITD consider solutions allowing ungulates the ability to safely cross the planned four-lane highway. ITD and Jacobson worked together to determine the best solution to this problem. After much discussion between local, state, and federal organizations, three underpasses were determined a necessary part of the project.

Jacobson stated that there were a number of unknowns going into the project, but, "Even though we don't know everything, good biologists can come up with concepts derived from our knowledge of animal behavior and ecology which can then be applied in innovative ways to solve problems tangential to our field of experience."

Jacobson worked with the transportation engineers to create structures appealing to animals. The underpasses were built with material that dulled the sound of the passing cars overhead and provided animals with a clear view of



Copeland underpass on U .S. 95 in Northern Idaho.



Photos by Josh Burnin.

the land on the opposite side. These features were intended to encourage the use of the crossing structures while boulders were used alongside the highway to guide animals toward the underpasses. Although roadside fencing is customarily used to prevent animals from entering traffic, this project took an innovative approach. The boulders were aesthetically more pleasing than fencing and had the added benefit of little to no upkeep.

Upon completion, ITD found that elk were still entering the road despite efforts made otherwise. Mike Hartz with ITD noted, "The boulders

were not enough of an obstacle to prevent game from getting through. Elk especially found places they could circumvent and cross the road instead of using the crossing structures." With elk crossing the road, ITD decided they needed to take measures to modify the barrier. Hartz stated, "Fortification of the funnel fencing was performed using standard eight foot tall game fence wrapped around the boulders."

Now, 4 years after the construction of the underpasses and one year following the addition of fencing, preliminary data shows the success of these structures. Hartz mentioned, "Data collected over the previous few years shows routine use of the underpasses by a number of animals especially by deer."

"At the time of this project there was not a lot of information and support in the literature for mitigation measures," stated Jacobson, "But doing something with unproven results was preferable to doing nothing at all. In a decade we have learned a huge amount."

What's in a Word? Confusion, if you're not careful!

Sandy Jacobson, U.S. Forest Service

In the emerging field of transportation ecology, engineers and biologists face communication challenges because each discipline has distinct terms. Standardized terminology clarifies study results and allows greater comparison between studies.

While nobody has responsibility to standardize terminology, the 2007 International Conference on Ecology and Transportation (ICOET) recommended terminology for authors to reduce known inconsistencies.

Other efforts to standardize terminology include the National Cooperative Highway Research Program project 25-27, *Evaluating the Use and Effectiveness of Wildlife Crossing Structures* (consistent with ICOET), the European IENE COST-341 project, the *Wildlife Crossings Toolkit*, www.wildlifecrossings.info, and *Road Ecology: Science and Solutions* (Foreman et al 2003).

Recommended Terminology for ICOET 2007 Presentations, Papers and Posters

1. Describe wildlife or aquatic crossing structures from the animal's perspective rather than the driver's perspective, using the modifier 'wildlife' or 'aquatic' where appropriate to help clarify the perspective. Example: "Our study investigated the effect of vegetation at the entrances of wildlife underpasses."

2. Describe wildlife or aquatic crossing structure dimensions in a consistent format, especially in tables.

- a. Describe span (width) first, then rise (height). Span and rise are standard engineering terms that reduce perspective confusion.
- b. Label all numbers with dimension and unit. Use both metric and English units, with metric units first.
- c. Examples: "The box culvert is 6.1 m (20') span x 2.4 m (8') rise." Or "The bridge has a 6.1 m span by 3.0 m rise (20' x 10') at low water level."

3. Use the term 'length' when referring to the distance of a wildlife underpass or overpass perpendicular to the road. Example: "The elliptical culvert is divided into two lengths by the open median."

4. Describe measurements of structures of varying spans using the largest measurement. Further clarification in the text may be needed for V-shaped structures or asymmetrical shapes. Measure rises from the center of the structure. Examples: "The span of the arch culvert is 7.6 m (25')." Or "The bridge's rise varies from 2.4 m (8') at water's edge to 1 m (3.1') at the top of the abutments."

5. Carefully distinguish underpasses, culverts, bridges and fences because terminology is easily confused. The term 'underpass' is a general term that includes several structure types

such as culverts and bridges. Example: "Two types of wildlife underpasses occur in the project area: bridges and pipe-arch culverts."

6. Describe culvert shape, size and construction materials where possible because they are important for functionality of fauna passages. Examples: "I measured the effectiveness of three arch culverts and one round culvert." Or "Round corrugated metal culverts in the study area all span 1 m (39")."

7. Differentiate between right-of-way fencing and fencing designed for wildlife, and describe dimensions and materials. Example: "Wildlife fencing in the study area is 2.4 m (8') high and constructed of woven wire."

8. Define categories when using relative terms where no standard categories exist, including wildlife crossing structure sizes, traffic volume, and roadkill (carcass or crash data). Example: "Roadkill carcass data in this study were defined as high (>5 per km per year), moderate (2-5 per km per year), and low (<2 per km per year)." Or "Traffic volumes were high (>10,000 ADT) on State Route 50 within the study area."

9. Define the term 'effectiveness'. Example: "In this experiment, an effective escape ramp was defined as one that produced less than 1 minute of hesitation prior to jumping out in 50% of the animals tested."

SURVEY: Experiences with and Opinions on the Animal Detection System Along U.S. Hwy 191 in Yellowstone National Park

Marcel Huijser, Western Transportation Institute

In the fall of 2002 an animal detection system was installed along US Hwy 191 in Yellowstone National Park (at mile marker 28-29) between West Yellowstone and Big Sky, MT. The Western Transportation Institute at Montana State University (WTI-MSU) is now conducting a survey to document driver's experiences with and opinions on this system. If you have driven on the road section with the animal detection system since January 2007, WTI-MSU is interested in hearing from you through filling out the survey. The results will help decide what the minimum standards for system reliability should be and whether the system should be kept in place. Handouts with a link to the website are also distributed at various gas stations, coffee shops etc. in Big Sky and West Yellowstone.

The survey can be filled out on-line:

[www.detectionsystemsurvey.org](http://www.detectionsystemssurvey.org)

Thank you in advance for sharing your experiences and opinions!

Background information

Animal detection systems use high-tech equipment to detect large animals (e.g. deer size and larger) as they approach or cross the road. Once a large animal is detected, warning signs are activated that aim to make the driver pay more attention, reduce vehicle speed, or both. This should then lead to fewer or less severe collisions, reducing property damage and improving safety for humans. In addition, wildlife road mortality is reduced while not blocking animal movements across the road.

Prior to the installation of the system in Yellowstone National Park, an average of 5.6 elk per year were hit along this road section. After several years of testing and modifications, the system was put in full operation on January 18th, 2007. The system was manufactured by Sensor Technologies & Systems out of Scottsdale, AZ. The system is a "break-the-beam" system. Transmitters send microwave radio signals which are received by sensors on

the other end. When a large animal approaches the road, the body of the animal blocks the "beam" which then activates the warning signs.

The animal detection system project is funded by the US Department of Transportation and the Departments of Transportation of 15 states, including the Montana Department of Transportation (MDT). Yellowstone National Park and MDT are hosting the system while the Western Transportation Institute at Montana State University (WTI-MSU) evaluates the reliability and effectiveness of the system. If you are interested in learning more about animal detection systems, you can download a research report from the internet:

Huijser, M.P., P.T. McGowen, W. Camel, A. Hardy, P. Wright, A.P. Clevenger, L. Salsman & T. Wilson. 2006. Animal Vehicle Crash Mitigation Using Advanced Technology. Phase I: Review, Design and Implementation. SPR 3(076). FHWA-OR-TPF-07-01, Western Transportation Institute—Montana State University, Bozeman, MT, USA. Available from the internet: www.oregon.gov/ODOT/TD/TP_RES/ResearchReports.shtml

This report includes details on the design, operation and reliability of the system along Hwy 191 in Yellowstone National Park.

If you have questions about this survey, please contact:

Marcel P. Huijser, PhD

Research Ecologist,

Road Ecology Program

Western Transportation Institute, Montana State University (WTI-MSU)

PO Box 174250

Bozeman MT 59717-4250

Phone: 406-543-2377

E-mail: mhuijser@coe.montana.edu

www.coe.montana.edu/wti/road_ecology/home.php

Stay Up-to-Date on American Wildlands' E-Bulletin

Keep up with the latest ideas and innovations implemented nationwide in the field of transportation ecology. Sign up to receive future editions of the *Safe Passages E-Bulletin*: lists.onenw.org/lists/subscribe/safepassages.

This link takes you to a webpage of ONE/Northwest, an excellent on-line management and non-profit group American Wildlands (AWL) has worked with for years. They manage AWL's *Safe Passages E-Bulletin* list-serve.

There are two advantages to signing up for the *E-Bulletin* through ONE/Northwest: 1) You will not receive junk mail from ONE/Northwest, only the *E-Bulletin* and other irregular mailings dealing with the *E-Bulletin* that AWL may send out; and 2) Because you signed up for it, your computer will recognize our *Safe Passages E-Bulletin*. It will not end up in your SPAM folder.

Thanks for joining the list-serve and being a part of the community of practitioners that makes highways safer for both people and wildlife.

E-Bulletin Survey

Please help us provide you with a *Safe Passages E-bulletin* that is both interesting and informative by filling out our brief survey regarding your experience with this issue. The following link will take you to the survey: www.surveymonkey.com/s.aspx?sm=2b_2faOf95SBPYDfj98EPEjOA3d_3d

Thank you for your time and consideration and we look forward to hearing from you.



Road Ecology Field Course

Monique DiGiorgio, Director of Development of Communications, Southern Rockies Ecosystem Project

Registration is now available for the Washington Wildlife Crossings Field Course to be held in Hyak, Washington from Monday June 2nd to June 4th 2008.

SPACE IS LIMITED TO 130 participants, so if you are interested in attending, please register as soon as you can. We are trying to have participation from across Western North America, including the Y2Y region and Canada. So, please consider sending a representative from your region to ensure we have a diversity of attendees.

Registration, draft agenda, and lodging information is online at www.restoretherockies.org/field_course_WA.html Thank you. We look forward to seeing you in Washington!