



*American Wildlands*

# *Safe Passages*

**Making Bozeman Pass Safer  
for Wildlife and People**

## **American Wildlands: Keeping the U.S. Northern Rockies ecologically connected**

*The Greater Yellowstone Ecosystem.*

*Glacier National Park and the Bob Marshall Wilderness.*

*The Selway-Bitterroot Wilderness area of central Idaho.*

*The Cabinet-Yaak Ecosystem of northwest Montana.*

These are some of America's most iconic, and most revered, public lands. They represent the best of our nation's commitment to protecting and conserving our natural heritage—our land, water and wildlife. Without these lands, we Montanans would not have the abundant elk, bears, moose, bighorn sheep, lynx, wolverines, wolves and other magnificent wildlife we have in our “backyard” wild lands.

Yet, as grand as these places are, conservation biology tells us that, by themselves, they are not big enough. In order to maintain all of their wildlife and natural functions, these places must be connected to other wild country.

American Wildlands is committed to keeping the world-renowned U.S. Northern Rockies ecologically intact by restoring and maintaining connections between key habitats for healthy populations of native wildlife—linking the “string of pearls” of the region's best habitats.

For 30 years, American Wildlands has used science, respectful advocacy and community engagement to pursue our vision of a region with abundant wildlife, wild lands and rural landscapes. Ultimately, our success will be measured by the ability for wildlife to migrate and live throughout the Northern Rockies, and for local people to make deliberate choices about managing their land in a manner that conserves these natural values.





Photo by Lloyd Dorsey.

## **Safe Passages: *Making highways safer for wildlife and people***

*"Why did the chicken cross the road? To get to the other side, of course."*

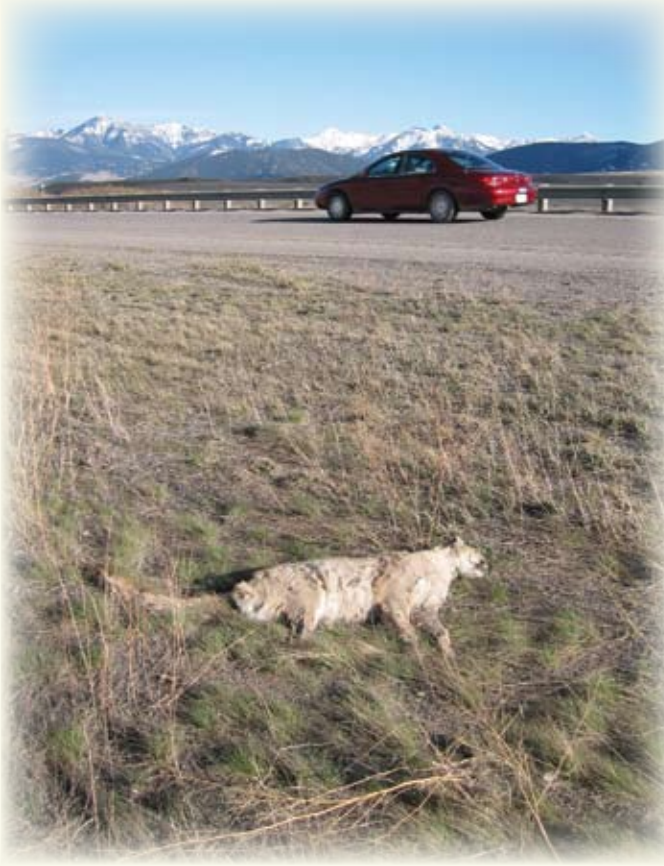
This well known one-liner is also appropriate for deer, elk, moose, bears, cougars and other wildlife as they move about the landscape from habitat to habitat. Just as people must be able to safely travel from one town to another to meet our needs, wide ranging animals must be able to safely travel between important habitats to meet their needs—whether it be across public lands, private lands or busy highways.

As communities in western Montana continue to grow, our busiest highways are becoming an increasing threat to wildlife. American Wildlands established our *Safe Passages* program to protect the thousands of wild animals that end up as road kill every year, while making these highways safer for people, too.

American Wildlands works with the state transportation department, biologists, research institutes, landowners, local businesses, and others to promote the economic, ecological and human safety benefits of wildlife safe passages; advance the latest research and best management practices for these measures; improve state and federal safe passage laws and policies; and increase the public's understanding of, and support for, highway safe passages for wildlife.

We are striving to make Montana (and the U.S. Northern Rockies) a national showcase for how highways can be designed or re-constructed to allow for the migratory needs of wildlife while providing increased safety for people.





## The Problem

The numbers can be a little overwhelming. Nationwide, more than a million wild animals are killed each year on our highways and byways. Closer to home, the Craighead Environmental Research Institute found that more than 1,300 wild animals were killed on the 28-mile stretch of Interstate 90's Bozeman Pass between 2001 and 2005.

These accidents wreak havoc on local and migrating wildlife populations. Many of these accidents occur on highways located in important wildlife movement corridors, thus hindering wildlife from being able to safely travel between prime habitat areas. Bozeman Pass is a

critical north-south wildlife movement corridor. The more than 1,300 animals killed on the Pass included 650 deer, 48 coyotes, 42 owls and raptors, 34 elk, 18 black bears, 8 cougars, 4 moose, and 1 wolf.

These accidents also come with a high societal cost, as they can result in death, injury and millions of dollars in property damage for people. The Montana State University-based Western Transportation Institute found that the average societal cost (loss of wildlife, carcass removal, vehicle repair, medical, police, ambulance, etc.) of hitting a deer is \$8,000, hitting an elk is \$18,000, and hitting a moose is up to \$30,000.

Clearly, the intersection between human transportation corridors and wildlife movement corridors is a problem for both people and critters. The remedy to this threat is simple—make highways safer for wildlife to cross and people to drive.

## The Solutions

Almost everyone has a story to tell about the unpleasant and unfortunate experience of hitting wildlife with their car. Understandably, most Americans are interested in reducing collisions with wildlife. Fortunately, the new science of road ecology has given highway safe passage practitioners a new set of tools to do just that.

At its most basic level, this entails providing wildlife with safe passage structures (overpasses, underpasses, etc.) across highways, as well as innovative animal detection systems and other information to help drivers know where and how to avoid collisions with wildlife.

This can be as simple as providing motorists with highway warning signs and animal-on-road detection signs. It can also include the more involved retrofitting of existing road structures (culverts, railroad underpasses, etc.) to serve as safe passage structures, as well as the construction of new overpasses and underpasses specifically for wildlife.

Montana is a hotspot for this type of road ecology work because of its abundance of large wildlife (in size and population numbers) and corresponding high incidence of dangerous animal-vehicle collisions. American Wildlands is working with the state transportation department, state wildlife agency, and others to secure these safe passage measures on our busy local highways.

*Deb Wambach, of the Montana Department of Transportation, discusses the Bozeman Pass fencing project during an American Wildlands field trip.*



# Helping Drivers Avoid Wildlife Collisions

While the ultimate solution to providing wildlife with safe passages across highways is to build under and overpasses for them, there is another helpful measure that is easier (and less expensive) to implement: highway signs that help drivers know where and how to avoid collisions with wildlife. The premise is simple: if drivers knew where and when wildlife are on our roads, there would be fewer collisions.

Most of us have seen a yellow highway sign similar to “Deer Next 20 Miles.” While these “static signs” certainly have some value, the common belief among safe passage practitioners is that these signs soon become ineffective—in part because drivers become desensitized to a constant and not very captivating message, and in part because these signs announce a threat in too broad an area. Safe passage practitioners believe that when highway signs warn motorists of wildlife on a shorter section of road, these “specific signs” do a better job of heightening driver’s awareness.

## **VARIABLE MESSAGING SIGNS (CHANGEABLE ELECTRONIC MESSAGE BOARDS)**



An obvious solution to motorists becoming desensitized to static signs is to use signs with changing messages and locations. These “variable message signs” can be permanent or portable. They can be set up to display a message during wildlife’s most active times of the day

(dawn, dusk, and night), or during seasons when wildlife are most present—thus raising driver awareness at the most critical times.

Two recent studies by the Western Transportation Institute found that these changeable signs are more effective than traditional signs at causing drivers to reduce their speed, and to respond more quickly to wildlife on the road.

### **ANIMAL-ON-ROAD DETECTION SYSTEMS**

Another solution is the animal-on-road detection systems. You may have noticed these while driving on Highway 191 in the northwest corner of Yellowstone National Park. There are lights above a sign displaying a large elk with the words: "WHEN FLASHING" and "NEXT 1 MILE."

When the lights blink yellow, chances are there is a large animal on the road, such as an elk. As these animals enter the roadway, they break one of a series of microwave beams that parallel both sides of this one-mile stretch of road, setting off the flashing signs at both ends of the area. Other animal detection systems use radar, such as a system in Switzerland that has successfully reduced collisions with deer by 80 percent.

Through our *Safe Passages* program, American Wildlands actively supports the increased use of driver information technologies such as specific signs, variable message signs, and animal-on-road detection systems.



Photo by Marcel Huijser, Western Transportation Institute.

*Animal-on-road detection systems are catching on in the United States. This break-the-beam system in Yellowstone National Park is triggered when large animals cross the road.*



# Helping Wildlife Avoid Vehicle Collisions

Providing wildlife with structures they can use to cross highways without getting hit by vehicles is the best safe passages solution, and the best way to do that is to build wildlife underpasses or overpasses large enough to be used by all sizes of wildlife. These are the “Cadillac” options for reducing wildlife/vehicle collisions on places like the Bozeman Pass stretch of Interstate 90.

However, as with many things in life, the most effective solution comes with the highest price tag. Given that these larger structures are more difficult to fund, we can start with less expensive options such as “retrofitting” existing highway structures or building smaller new crossing structures. Retrofitting refers to the addition of new features to existing structures, such as adding fencing to funnel wildlife under a bridge.

## RETROFITTING EXISTING HIGHWAY STRUCTURES

Research and eye-witnesses have shown that wildlife will use pre-existing structures to cross highways that were never intended for that purpose. These structures range in size from three-foot pipe culverts to large highway bridges over rivers, ravines, or railroads. The most commonly used existing structures are round or elliptical culverts constructed for draining water beneath highways. Foxes, pine marten, and other small animals commonly use these small culverts. Larger round, elliptical, or box culverts that channel creeks beneath highways



Rocky Creek culvert. Photo by Craighead Environmental Research Institute.

are often used by black bear and other medium-sized animals. The still larger “underpasses” beneath highway bridges allow for all sizes of wildlife to pass beneath them.

Often an existing highway structure can be retrofitted so that it better serves as a wildlife crossing structure. Retrofitting includes creating a more natural appearance by planting vegetation similar to the surrounding habitat, by removing obstacles that keep

animals away from the structure, or adding fencing along the highway to funnel wildlife to that existing structure (see “On the Ground Successes” later in this publication).





*Wildlife overpasses such as this one in Banff National Park, Canada, cost a lot but are crucial for providing wildlife safe passages in the Northern Rockies.*

### **“MADE FOR WILDLIFE” CROSSING STRUCTURES: BUILDING NEW UNDERPASSES AND OVERPASSES**

While pre-existing highway structures can go a long way toward reducing accidents between wildlife and people, they do have limitations. Many of the structures previously mentioned are not big enough to be used by larger wildlife (deer, elk, moose, etc.). Additionally, there may not be enough pre-existing structures to provide safe passages for wildlife over a longer stretch of highway.

In these situations, the best thing we can do to protect wildlife and motorists is to build a number of overpass or underpass crossing structures that are big enough for all wildlife to use. “Made for wildlife” crossing structures, such as the ones in Canada’s Banff National Park or on Highway 93 north of Missoula, are the most effective because they accommodate the broadest range of species. With the addition of highway crossing structures on the Trans-Canada Highway, collisions with moose, elk, deer, and bighorn sheep have been reduced by 96 percent.

American Wildlands supports using both pre-existing highway structures and building new wildlife crossing structures, because we believe it is a strategy that will work best in making our highways safer for wildlife and motorists alike.

# The Benefits of Safe Passages

There are many ecological, economic and human safety benefits to be gained from increased wildlife safe passages on our highways.

With a decrease in wildlife/vehicle accidents, we would have more wildlife, fewer people ending up in the hospital (or worse), fewer vehicles needing to be repaired, and fewer costs to our communities in terms of police, ambulances and fire departments needing to respond to these accidents.

Although the cost of safe passages measures—particularly wildlife overpasses and underpasses—can still seem high, American Wildlands believes that if we invest in safe passages measures now, we will likely save money down the road.

Between 2001 and 2005, more than 1,300 animals were killed on Bozeman Pass; 763 of these animals were large enough to cause damage to the vehicle. Based on the estimated costs of hitting wildlife (*see chart below*), the societal cost of these 763 wildlife/vehicle collisions was approximately \$7.5 million:

$\$10,000 \text{ (approx. cost/collision)} \times 763 \text{ (large animals hit on Bozeman Pass during a 5-year period)} = \$7.63 \text{ million (cost of wildlife-vehicle collisions over 5 years).}$  Construction of an overpass for wildlife costs between \$1.5 and \$3 million, which includes landscaping to make the structure more suitable for wildlife.

While investing that money in safe passage measures wouldn't eliminate the problem, it would reduce the number of collisions on Bozeman Pass. If, as a society, we commit to investing in more safe passages measures, our wildlife, our communities, our pocketbooks, and our own safety will all benefit.

## Costs to Society Associated with Wildlife/Vehicle Collisions

Description	Deer	Elk	Moose
Vehicle repair costs/collision	\$1,840	\$3,000	\$4,000
Human injuries/collision	\$2,702	\$5,403	\$10,807
Human fatalities/collision	\$1,671	\$6,683	\$13,366
Towing, accident attend., investigation	\$125	\$375	\$500
Monetary value animal/collision	\$2,000	\$3,000	\$2,000
Carcass removal & disposal/collision	\$50	\$100	\$100
<b>TOTAL COST PER COLLISION</b>	<b>\$8,388</b>	<b>\$18,561</b>	<b>\$30,773</b>

## On-the-Ground Successes to Date....

As a leader in helping advance on-the-ground safe passage projects in Montana, American Wildlands has recently worked on four successful projects.

► **I-90 OVER BOZEMAN PASS:** Working with Montana Department of Transportation (MDT), Western Transportation Institute, Craighead Environmental Research Institute and others during the last two years, American Wildlands helped secure federal funding to construct two miles of fencing just east of the Bear Canyon exit to keep wildlife off I-90 by funneling animals through a railroad underpass (*as shown in photos*).



AWL photo library.



AWL photo library.

► **HIGHWAY 206, SOUTH OF GLACIER NATIONAL PARK:** AWL partnered with MDT and landowners to find funds for a wildlife/livestock underpass that links elk, bear, and moose habitat in the Flathead Valley. American Wildlands helped create a coalition of conservation groups to raise \$27,000 to complete the project. Financial support came from individuals, local conservation groups, land trusts, state wildlife agencies, developers, and the local county commission.

► **HIGHWAY 200, NEAR THOMPSON FALLS:** American Wildlands again partnered with MDT, the Foundation for North American Wild Sheep, and Montana Fish, Wildlife and Parks to purchase electronic signs warning drivers about the high number of bighorn sheep killed on a deadly stretch of that highway.

► **NINEMILE AREA, NORTHWEST OF MISSOULA:** American Wildlands worked with the citizen-led "Ninemile Wildlife Workgroup" to erect eight motorist warning signs ("Watch for Wildlife") in key wildlife crossing locations on county roads in the Ninemile Valley.



## Bozeman Pass Demonstration Project

American Wildlands has initiated a safe passages “demonstration” project for Bozeman Pass, to show how communities can come together to implement successful safe passage measures on nearby highways with a high number of wildlife/vehicle collisions. Our objective is to establish ample local support for the concept and implementation of wildlife safe passages on Bozeman Pass, which we believe will give community leaders and Montana’s transportation department the backing they need to secure funding for more safe passage measures on this 28 mile stretch of highway.



Google Earth image.

To establish public support within Gallatin and Park counties for increased wildlife safe passages, American Wildlands is engaging all age groups in a public discussion about the [1] ecological, economic and human safety benefits of increased safe passages, and [2] various ways we can reduce wildlife/vehicle collisions on Bozeman Pass.

This project will be successful if [1] motorists on Bozeman Pass have the advantage of innovative animal detection systems and highway warning signs to help them know where and how to avoid collisions with wildlife, and [2] wildlife have increased opportunities to safely cross the highway. We believe this project will soon be able to serve as a model for similar efforts elsewhere in Montana, the Northern Rockies and beyond.

## Children's Art Contest

We began the Bozeman Pass project by working with the youngest age group. American Wildlands invited students in grades K-8 from Park and Gallatin counties to participate in an art contest—helping us illustrate safer passages for people and wildlife. Students from 18 schools participated, and American Wildlands received 265 entries.

Given the tremendous number of submissions and the fact that many students put a significant amount of time and effort into their drawings, we needed a top-notch panel of judges to choose the six winners. We found that panel in Senator Max Baucus (D-MT) and Congressman Dennis Rehberg (R-MT).



American Wildlands will incorporate these winning illustrations into an informational message to be placed on billboards along Bozeman Pass. Meanwhile, all of the children's artwork is being displayed in various local businesses throughout April, May, and June of 2008.

American Wildlands is pleased to know that the students gained as much from this project as we did from their artwork. According to Jill Holyszko, art teacher at Arrowhead Elementary in Pray, Montana: "I am so happy Arrowhead students have had the opportunity to experience such an outstanding organization as American Wildlands! The lessons they will learn from this are far reaching. Thank you for all you have done and continue to do."

*The six winners in the Children's Art Contest are (upper right, top to bottom): Abbie Blevins, Bailey Butts, Hope Christensen, (lower left, top to bottom) Bettina Diaz, Emma Edmisten, and Karlissa Dagel.*



## High School Monitoring Project

Next up the age ladder, American Wildlands is helping connect students from Bozeman High School's wildlife management class with the Craighead Environmental Research Institute, as the Institute continues its multi-year evaluation of the effectiveness of crossing structures and road kill monitoring projects on Bozeman Pass.

By participating in this project students will have the opportunity to work alongside distinguished wildlife biologist Dr. Lance Craighead, while learning research methods for data collection.

In addition to organizing this collaboration, American Wildlands will support the students by providing information about wildlife/vehicle collisions, safe passages mitigation measures and other aspects of the science of road ecology.



## I-SPY on the Pass

American Wildlands has also launched our *I-SPY on the Pass* program to give motorists who regularly drive Bozeman Pass the opportunity to help identify where wildlife are located on the Pass. *I-SPY on the Pass* is a web-based program motorists can use to record which wildlife they observed on the Pass, and where and when they observed the animals.

Anyone can join American Wildlands as a citizen scientist. You simply need to provide observations of wildlife you have seen on Interstate 90 between Bozeman and Livingston. You don't need any degrees or special credentials to participate. All you need is a vehicle to



commute a segment of I-90, and an eye for wildlife. You can be on the lookout anytime you travel the pass—on your way to work, play, or simply running errands back and forth. To participate in the *I-SPY on the Pass* program, visit [www.wildlands.org/bozemanpass](http://www.wildlands.org/bozemanpass).

Over time, this data will create patterns that can help determine the “hotspots” for wildlife highway crossings. This information will help the Montana Department of Transportation determine where to place new motorist warning signs and other highway safety remedies to make Bozeman Pass a safer place for both people and wildlife.

## Community Advisory Group

Finally, American Wildlands is establishing a community advisory group consisting of local citizens, community leaders, business owners, and agency personnel. This group will help American Wildlands identify and secure safe passage opportunities on Bozeman Pass.

American Wildlands is already working with the Montana Department of Transportation, Montana Fish, Wildlife and Parks, Western Transportation Institute and the Craighead Environmental Research Institute. We will also engage representatives from a local school district, insurance company, auto dealership, and others who have applicable expertise.



AWL photo library.

*American Wildlands works with state transportation department personnel to identify the best highway safe passage measures.*



For more information on American Wildlands' *Safe Passages* program,  
and how you can help make Bozeman Pass safer for wildlife and people,  
visit our web site at [www.wildlands.org/bozemanpass](http://www.wildlands.org/bozemanpass)  
or contact Jessica Hann at [jhann@wildlands.org](mailto:jhann@wildlands.org)



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