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## WILDLIFE CROSSINGS

Roads constitute the largest human artifact on earth.<sup>1</sup> Because they are such prominent — and permanent — parts of our landscape, we need to expand methods of reducing the harm they cause to the surrounding ecosystem and make them more permeable for wildlife on the move. Solutions can range from the simple to the complex. Simple, non-structural solutions include reducing speed limits, adding cautionary signage and otherwise increasing motorist awareness of crossing wildlife. Where these methods are insufficient, a combination of fencing and underpasses or overpasses can be used to move wildlife safely from one side of a roadway to the other.

The practice of building passageways for wildlife began in Europe. In order to protect their limited remaining biodiversity, countries such as France, Germany, Switzerland and the Netherlands have long built underpasses and overpasses. In fact, provisions for habitat connectivity are often included in transportation planning to provide for ecological networks of habitats that address the needs of all species to ensure sustainable population dynamics.<sup>2</sup>

Closer to home, Canada has built 24 wildlife passages in Banff National Park. The Trans-Canada Highway (TCH) brings more than 14,000 vehicles per day through the park, and had earned the nickname, “the Meat-Eater” due to the volume of wildlife killed

upon its lanes. As the TCH was being expanded from a 2 to 4-lane highway, 22 underpasses and two overpasses were added to increase habitat connectivity and reduce roadkill. The types of underpasses constructed vary along the 28-mile stretch, ranging from open-span bridges to metal and box culverts. Wildlife exclusion fencing 95 inches in height was added in conjunction with the crossing structures to further reduce wildlife carnage.

The wildlife passageways and fencing have reduced accidents involving wildlife by 80 percent. Systematic monitoring by wildlife researcher, Anthony Clevenger has further demonstrated the success of these crossings. For over six years, year-round monitoring has recorded the following passes: 70 grizzly bear, 637 black bear, 710 cougar, 2,899 wolf, 2,801 coyote, 22,173 elk, 12,156 deer, and 2,107 sheep.

### FLORIDA

Florida was one of the first states to recognize and react to the detrimental impact that roads have on wildlife. Florida’s human population has increased rapidly, from 9.7 million in 1980, to 12.9 million in 1990 to almost 16 million in 2000.<sup>3</sup> Unfortunately, the human population grows at the expense of wildlife populations. This human increase has led to the development and expansion of roads,

greater traffic density, faster highways, and increased habitat fragmentation. According to the Florida Department of Transportation (FDOT), for the past 50 years, the state has built an average of 4.5 miles of high-speed paved road per day.

Increased traffic and habitat fragmentation has pushed the endangered Florida panther — one of the rarest mammals in the world — ever closer to extinction. With approximately 80 cats in existence, each individual killed on Florida’s highways is a devastating loss.



Between 1978 and 1994, 20 panther deaths (12 males and 8 females) and six injuries were documented from collisions with cars and trucks. Spring 2001 was especially deadly. Seven cats were killed on Florida highways in three months — as many as in all of 2000.<sup>4</sup>

When Alligator Alley, which crosses South Florida, was converted to I-75, 24 underpasses were installed to aid the crossing of panthers and other wildlife. Roadkill and radio telemetry

data were assessed to find the best locations for the new underpasses. In addition to the underpasses, an 11-foot-high chain link fence topped with three strands of outrigger barbed wire was added to prevent panthers and other species from crossing the busy highway. Although primarily constructed for the panther, the crossing structures have benefited a wide range of species such as the bobcat, deer, great blue heron, wild turkey, and alligators.

The Florida black bear is another of the state’s imperiled species that has suffered great losses on roads and highways. More than 800 bears were documented to have been killed by vehicles between 1976 and 2002. State wildlife officials said increasing human encroachment on bear habitat resulted in at least 120 black bears killed by motor vehicles in 2002 alone, up from 104 in 2001.

FDOT and the Florida Fish and Wildlife Conservation Commission teamed up to build the state’s first underpass for black bear in 1994. The underpass on State Road 46 is a dirt-floor box culvert, 47 feet long by 24 feet wide by 8 feet high. The two-lane road was elevated above the crossing to give skittish animals a clear view across to the other side. The state also planted rows of pines in the open pasture on one side of the road to guide bears to the culvert entrance. To ensure that bears could easily access the underpass from the south, the FWC purchased a 40-acre tract of land in the bears’ travel corridor — a private “inholding” within Rock Springs Run State Park.

Post-project research revealed that bears and

at least 12 other species, including bobcats, gray foxes, and whitetail deer had used the culvert. “Underpasses like this one, together with land acquisition and habitat protection, are tools we can use to minimize the impacts of highways on wide-ranging mammals,” says Terry Gilbert, an FWC biologist and member of the SR 46 crossing design team.

## A SPIRIT OF PLACE

U.S. Highway 93 which crosses the Flathead Indian Reservation in western Montana is poised to become a model in the United States, illustrating how the combined efforts of citizens, local, state, federal and tribal governments can result in an innovative plan to consider wildlife and land ethics while reconstructing highways. Fifty-six miles of the highway from Evaro to Polson is scheduled to be widened over the next decade to improve motorist safety. Thanks to the agreement between the Montana Department of Transportation, the Confederated Salish & Kootenai Tribes, and the Federal Highway Administration, the highway will be reconstructed with “a spirit of place,” and context-sensitive solutions.

As part of this goal, the project will include 42 crossing structures for wildlife. Biologists and highway architects have evaluated roadkill data and tracking information in order to determine the best locations for passageways. The structures will range from small fish culverts to an open-span overpass, and most will be built to accommodate multiple species.

Fencing will also be added to keep wildlife off the road and to funnel animals to the new structures.

## AQUATICS

Roads and highways impact not only the land, but streams, rivers, lakes and oceans, especially when roads are built in a way that blocks the natural flow of water. Often, roads



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built over streams are at-grade, rather than bridging from one bank to the other. Small culverts are installed to allow water flow, but these often present significant barriers to fish. Culverts may restrict water flow, providing too little water for fish to swim, or channelize water, making it difficult for fish to swim

against the current. Anadromous fish — species that migrate from freshwater to saltwater and back to freshwater — are the most severely impacted by fish passage barriers. Ability to migrate upstream is a critical issue for both anadromous and local fish species. Restrictions are especially troublesome to juveniles, which can't jump as high, sustain a sufficient level of energy, or tolerate the changes in water temperature and turbulence.

With developments in science and technology, biologists and engineers have designed a variety of methods to allow fish passage under

roads where they cross streams at grade.

Bridges, baffles and culverts can be designed to allow the proper water depth and velocity necessary for fish to pass under roads. Washington DOT and the state Department of Fish and Wildlife have been working together to correct more than 500 problem culverts where the water depth is too shallow, the water velocity too high, or the outfall drop too far. In Oregon, 54 fish passages have been replaced or modified and more than 130 miles of habitat have been restored or enhanced through the state DOT.

## A CROSSWALK FOR ELK

There's a place in Washington where "elk call" has taken on a whole new meaning. Residents of Sequim, Washington know the 80-head herd of Roosevelt elk is near not by the haunting sound of their bellows, but by flashing road signs that read "ELK X-ING."

In recent years, this once small town has become a popular retirement community and witnessed unprecedented growth. According to the City of Sequim, as many as 10,000 vehicles per day pass through the area during the summer travel season on the Olympic Peninsula. As development has increased, so has traffic and collisions with elk. Drivers had become accustomed to standard elk-crossing signs. Although no drivers were seriously injured, as many as nine elk were killed per year.<sup>5</sup> After improvements to Highway 101, residents feared elk mortality would grow.

Through a partnership among the Department of Fish and Wildlife, the U.S. Forest Service, Washington DOT, local tribes and conservation organizations, an inexpensive yet effective solution was developed in a crosswalk for elk. Biologists equipped several elk with radio-transmitting collars, and Washington DOT installed six radio-activated warning signs along a three-mile stretch of Highway 101 where the herd regularly crosses to reach the northern end of its range. As the herd approaches the highway, the radio collars activate the signs to warn motorists that elk are near. Because the signs light up only when elk are approaching, motorists are less likely to become habituated to their presence.

The project was funded through a \$75,000 grant under the Transportation Enhancements Program. Herding and collaring the elk cost \$13,000, the signs cost \$48,000 and radio telemetry stations cost an additional \$12,700.



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## CONCLUSION

For the last century, automobiles and the roads they require have been the dominant force shaping the modern American landscape. There are more cars per capita in the United States than in any other nation in the world. An unrivaled Interstate highway system connects major metropolitan areas and is the basis of our transportation infrastructure. Unfortunately, many roadways were not planned or designed with wildlife in mind. However, science and engineering have converged with solutions, and several states are retrofitting existing roads to protect biodiversity. While wildlife crossings are not a panacea, they can go a long way toward restoring connectivity where roads have fragmented habitat.

## RECOMMENDATIONS

- Conduct habitat connectivity studies to determine where passageways are needed. Locate structures in existing migration routes.
- Retrofit existing roads with wildlife passageways. Consider the full range of options, from at-grade, non-structural approaches to land bridges.
- When planning, designing and building wildlife crossings, ensure the future viability of habitat on either side through land acquisition or easements.
- Conduct post-construction monitoring on the effectiveness of passageways.
- Increase the use of signage to make motorists aware of wildlife in the area.
- Reduce speed limits in wildlife areas.

## RESOURCES

### **Critter Crossings: Linking Habitats and Reducing Roadkill**

<http://www.fhwa.dot.gov/environment/wildlifecrossings/>

### **Wildlife Habitat Connectivity Across European Highways, FHWA**

[http://www.international.fhwa.dot.gov/wildlife\\_web.htm](http://www.international.fhwa.dot.gov/wildlife_web.htm)

### **National Transportation Enhancements Clearinghouse** <http://www.enhancements.org/>

### **Humane Society of the United States: Safe Passage for Wildlife**

<http://www.hsus.org/ace/13409>

### **Wildlife Crossings Toolkit** <http://www.wildlifecrossings.info>

## WILDLIFE CROSSINGS AND TEA-21

Since 1991, transportation programs that receive federal aid have been required to consider environmental, cultural, economic, and social conditions in an effort to create a more balanced transportation system that provides people with choices and with a richer experience. At the heart of this effort is the Transportation Enhancements (TE) program, which provides federal reimbursement for community-based activities that are “more than asphalt, concrete, and steel.” Eligible projects include pedestrian and bicycle facilities, scenic preservation and historic restoration. When ISTEA was reauthorized in 1998, Defenders of Wildlife worked with members of Congress to include “Provision of Wildlife Connectivity” as an eligible Transportation Enhancements activity. Interest groups, local governments and state agencies can now apply for federal funding to retrofit existing roads with crossing structures for wildlife.

## OPPORTUNITIES FOR REAUTHORIZATION

- Continue funding for the Transportation Enhancements Program at current levels or higher. Encourage states to develop fair and accessible procedures for TE program fund distribution.
- Provide research funding for statewide and national habitat connectivity studies.
- Enable states to build necessary crossings even when no additional road improvements are planned in those areas.
- Create a safety grant program to encourage states to install crossings for human safety as well as habitat connectivity. See Title II, § 2003 Occupant protection incentive grant program.

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1. Richard T. T. Forman, Daniel Sperling, et al. *Road Ecology: Science and Solutions*. (Washington, DC., Island Press, 2003)

2. *Wildlife Habitat Connectivity Across European Highways*, FHWA, 2002.

3. US Census, <http://quickfacts.census.gov/qfd/states/12000.html>

4. Defenders of Wildlife, *Habitat & Highways Campaign* <http://www.defenders.org/habitat/highways>

5. Elk, *Drivers Benefit from Crossing Project*, Northwest Indian Fisheries Commission Newsletter, Summer 1999.