

# Committee on Ecology and Transportation Newsletter

Transportation Research Board Committee ADC30

Special ICOET Edition



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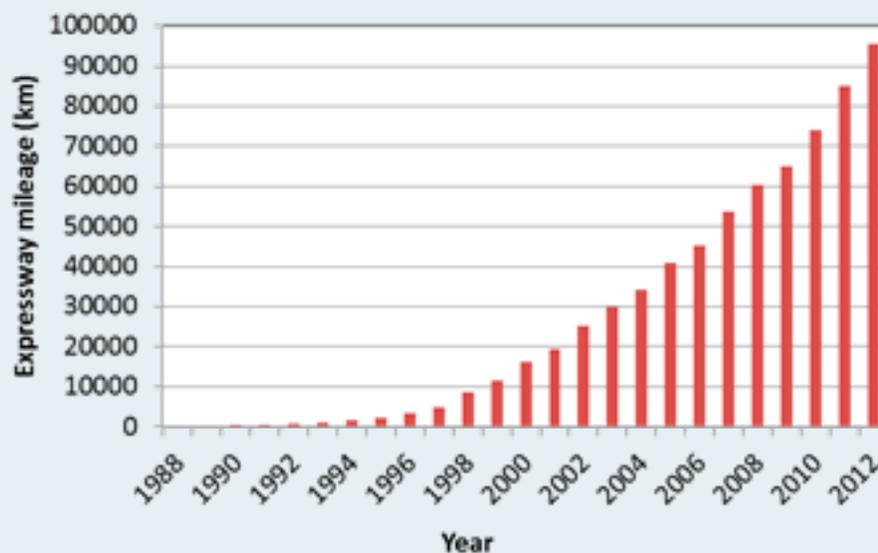
## View from the Chair

*Alex Levy, Chair Ecology and Transportation Committee*

### Development of Road Ecology in China

*By Xinjun Wang, China Academy of Transportation Sciences*

China's rapid economic development and growth have resulted in the construction of an extensive highway network in many regions. Since the first expressway was completed in China in 1988, highway construction has undergone amazingly rapid development (Figure 1). By the end of 2012, the total length of roads had reached 4.1 million km including 95,600 km of expressway. However, this rapid construction and subsequent operation of such a large road network has exacerbated China's existing environmental problems.



*Figure 1. The expressway mileage from 1988 to 2012*

To balance the need for roads and environmental protection, China's Ministry of Transport has funded many research projects to protect environment during road construction. A team composed of 70 engineers, ecologists, landscape archi-

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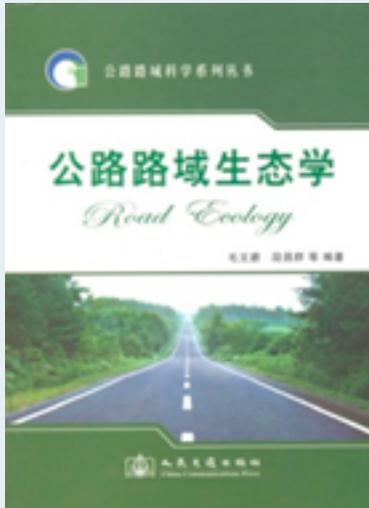


Figure 2. *Chinese Road Ecology* edited by Professor Mao Wenbi, engineer and former president of CATS

sects, planners and others in the Ministry’s Chinese Academy of Transportation Sciences (CATS) are working to implement environmental solutions, essentially from the beginning development of an expressway system. The group has published two books, *Chinese Road Ecology* (2008, Figure 2) based on Chinese national conditions and *Road Ecology: Science and Solutions*.

The group is mainly engaged in the policy and practical technology research as well as consulting services including the following:

- Vegetation Restoration in Roadside;
- Landscape Design for Highway;
- Wildlife Conservation;
- Soil and Water Conservation Planning and Monitoring;
- Environmental Impact Assessment;
- Transportation Environment Protection Strategy and Planning; and
- Transportation Safety Management and Risk Control.

Some examples of research projects include vegetation restoration in Qinghai to Tibet highway (Figure 3), landscape design for Jilin-Yanji expressway in Jilin Province (Figure 4), and wildlife conservation along Ring Changbai Mountain Scenic Highway (Figure 5).

Vegetation restoration experiments have been conducted along the Qinghai to Tibet highway. Trials were carried out simultaneously at five sites in Qinghai-Tibet Plateau from 2000 to 2002. Altitudes at these sites range from 4240 m to 5040 m. Four sites are in permafrost area and one site is in seasonally frozen ground. Results indicated that the vegetation has been growing well, but the sites had not yet achieved the original condition.

The Jilin-Yanji expressway in Jilin Province (Figure 4) illustrates how artists working in partnership with landscape scientists design a visual road landscape that is consistent with both aesthetics and efficient road construction and use. The result lets drivers and tourists travel through wonderful natural–artificial landscapes.

Scientists recorded the species and abundance of wildlife that crossed culverts and bridges along the Ring Changbai Mountain Scenic Highway from November 2009 to February 2012. The results indicated there were six medium and large sized- species using bridges and culverts to cross the Highway.



Figure 4. Landscape design for Jilin-Yanji expressway in Jilin Province.

The utilization rate of the bridges and culverts was 88% and 44.2%, respectively. The six species were Siberian weasel (*Mustela sibirica*), yellow-throated marten (*Martes flavivula*), Eurasian red squirrel (*Sciurus vulgaris*), Manchurian hare (*Lepus mandchuricus*), common pheasant (*Phasianus colchicus*) and least weasel (*Mustela nivalis*).

CATS signed a Memorandum of Understanding with Western Transportation Institute (WTI) in 2009 to strengthen cooperation in promoting international, national, and state/provincial research activities, peer exchanges, joint publications and training. CATS initially visited WTI in October 2009. A delegation of WTI researchers traveled to China in September 2010 (Figure 6). Another CATS visit in August 2011 marked the third collaboration opportunity for WTI and CATS. From February 2012 to February 2013, Dr



Figure 3. Vegetation restoration trials in Qinghai to Tibet highway. Copyright Jiding Chen.

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*Fig 5. Evidence of Siberian weasel use of a wildlife crossing culvert along Ring Changbai Mountain Scenic Highway. Copyright Yun Wang.*

Xinjun Wang from CATS worked on environmental sustainability as a visiting scholar in WTI under advisor Dr. Xianming Shi, P.E., director of WTI's Corrosion and Sustainable Infrastructure Laboratory.

One of the delegation, author Xinjun Wang, Ph.D., is associate professor working for China Academy of Transportation Sciences and member of the TRB Committee on Ecology and Transportation. He has an interdisciplinary background with diverse skills in environmental sciences, civil engineering and microbiology. His research interests are in the fields of ecology, ecological engineering, and wildlife conservation. Dr. Wang has been serving as the Principal Investigator (PI) on three research projects and Co-PI on five research projects funded by the Chinese MOT and local DOT. He has been an active member of China Highway and Transportation Society since 2010 and also a member of Chinese Overseas Transportation Association (COTA).



*Figure 6. WTI delegation with CATS' staff in CATS. Copyright Xinjun Wang*

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## Where the Deer and the Antelope Cross—Newly Completed Safe Passages Create a Conservation Connection for Wildlife

*Submitted by Amanda Hardy, PhD, Wildlife Conservation Society*

Scientists with the Wildlife Conservation Society (WCS) announced the successful use of newly constructed overpasses that

Using this information, the Wyoming Department of Transportation (WYDOT) was able to locate and build the structures as part of an effort to protect motorists and provide safe passage for migrating pronghorn and other wildlife in the Greater Yellowstone Ecosystem. Trapper's Point has historically been a "bottleneck"



*US Highway 191 Trappers Point Overpass Crossing*

provide safe passage for thousands of migrating pronghorn over U.S. Highway 191 in Trapper's Point, Wyoming, and surrounding areas. The event marks a new era of reduced risk of wildlife/vehicular collisions in the area, and the culmination of years of cooperation among conservationists, government officials, land and transportation planners, and others.

The locations of the structures completed last fall were informed by data collected by WCS, the Wyoming Cooperative Fish and Wildlife Research Unit, and the Wyoming Game and Fish Department, and identified the pronghorn's preferred migration routes and highway crossing points.

WCS has long studied an approximately 93-mile (150 km) migration of pronghorn between wintering grounds in the Upper Green River Basin and summering grounds in Grand Teton National Park (GTNP)—a migration corridor known as the "Path of the Pronghorn." WCS worked with many partners including Grand Teton National Park and Bridger-Teton National Forest to bring about the designation of the Path as the first and only federally-designated migration corridor in the United States.

As part of their research, WCS scientists used GPS tracking collars to collect information over the course of five years on the location and timing of pronghorn movements and impediments to migration such as fences, roadways, pipelines, and other energy development infrastructure.

problem area for the pronghorn each year, causing thousands of the animals to cross traffic lanes on U.S. Highway 191 and creating a perilous situation for humans and wildlife alike.

WCS Associate Conservation Scientist Jon Beckmann said, "This truly was a collaborative effort that brought together many groups with many areas of expertise to accomplish a worthy goal that benefits both wildlife and people. Congratulations to WYDOT for committing the resources to this project and seeing it through successfully."

The overpass at Trapper's Point is one of eight safe passages constructed by WYDOT along a 13-mile stretch of highway. In addition, eight-foot high barrier fencing has been placed along the highway to channel the animals to the crossing points. In all, 2 overpasses and 6 underpasses have been constructed and will accommodate not only pronghorn, but also mule deer, moose, elk and other animals. The two overpass structures were specifically located and designed to address pronghorn migration conservation needs.

"The importance of these overpasses and their use by pronghorn cannot be overstated," said WCS Conservation Scientist Joel Berger. "They eliminate the danger of collisions and will help to preserve a spectacular element of our natural heritage—the longest mammal migration in the 48 contiguous United States. This is an

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accomplishment that all Americans can celebrate.”

Pronghorn are North America’s fastest land animals. They numbered an estimated 35 million in the early 19th century. Today, about 700,000 remain and more than half of those live in Wyoming. The animals migrate to find food, mating opportunities, suitable habitat, and other resources they need to survive.

While WCS scientists study pronghorn throughout western Wyoming, those that follow the Path are of particular interest. They travel farther than the others and their continued journeys to and from GTNP ensure that the park’s ecosystem remains ecologically whole and that a 6,000 year-old migration remains a part of our national heritage.

WCS’s work on the Path of the Pronghorn has been made possible by the National Fish and Wildlife Foundation and other generous supporters.



*Pronghorn use of Trappers Point Overpass Crossing*

## TRB Committee on Ecology and Transportation (ADC 30)

### 2014 Annual Meeting Call for Papers

#### Transportation Research Board 93rd Annual Meeting:

Theme: Transportation Research: Celebrating our Legacy, Anticipating our Future

#### Topics of interest:

- Measuring our progress and looking forward: Critical achievements and future challenges in transportation and ecology.
- Geospatial data and decision making tools: What’s new, what’s needed, and how are they being used?
- Climate change adaptation: Strategies for addressing impacts on ecology in the transportation field.
- Leveraging technology: Innovations that improve the protection of natural resources from transportation impacts.
- Cross-cutting strategies: Looking to other fields and practices for applications in transportation and ecology.
- Achievements in avoiding wildlife and fisheries habitat fragmentation, improving landscape-level connectivity, and implementing transportation corridor crossings.