

Task Force on Ecology and Transportation Newsletter

Transportation Research Board Task Force ADC30T

Fall 2005

Notes from the Chair

Tom Linkous, Chair

I can't believe ICOET is over and we are already well into planning for the next ICOET in 2007. The meeting this year in San Diego was a great opportunity to learn from the experts doing the research and working to implement solutions to ecological problems related to highways and railroads. Papers were varied and covered animals from fish to bears as well as management of vegetation. Problems of maintaining biodiversity by protecting native species and managing non-native invasive species were covered. It was a great conference and more than justified the time spent in San Diego. (It's a tough job, but someone has to do it.)

One of the emerging issues in road ecology is noise and its effects on species living near operating highways as well as those in habitats impacted by new construction. It is a topic which is almost as broad as the conference topics mentioned above. We have decided to highlight the issue of transportation noise effects on terrestrial wildlife at the 2006 TRB Annual Meeting in January (see Annual Meeting program highlights in this newsletter). The specific topic of our session centers on birds and the research/environmental studies being done to better define how noise affects the acoustic ecology of these highly auditory animals, but we have a special presentation on the recently completed synthesis on research relates to noise impacts on all types of wildlife. Those who attended ICOET will be familiar with the speakers, but we hope to see many new faces from the cosponsoring TRB Transportation-Related Noise and Vibration Committee, as well as the Environmental Analysis in Transportation Committee. There are paper sessions, a great workshop and several other relevant sessions at the Annual Meeting.

We will have two papers presented as a part of our business meeting. One is about the ongoing wildlife crossings research project at Utah State University, which you can read more about in this newsletter, and the other is about the National Research Council's report on Roads and Ecosystems. We have much important business to conduct, but as you can see, it will be more than just a business meeting.

Come to the business meeting ready to pitch in as we plan for our future role in TRB. We need to firm up plans to get on the web and develop programs for the Midyear Meeting in Seattle next summer. We also need to help identify research needs in the road ecology area and if there are topics in need of synthesis studies we need to come prepared to develop and

submit the suggested topics. This year's suggested topics must be submitted by February 10, 2006. Go to TRB's Web site to learn more about how to submit a synthesis topic: <http://www4.trb.org/trb/synthesis.nsf/NCHRP+New>

See you in Washington January!

Update on NCHRP 25-27: Evaluation of the Use and Effectiveness of Wildlife Crossings

By Patricia Cramer, Ph.D.,

USGS Utah Cooperative Fish & Wildlife Research Unit, College of Natural Resources, Utah State University

A large scale research project is under way to help transportation and natural resource professionals better mitigate roads for wildlife. The National Academies transportation research division, the National Cooperative Highway Research Program (NCHRP), awarded a grant to Dr. John Bissonette of the USGS Utah Cooperative Fish and Wildlife Research Unit at Utah State University to conduct research titled, "Evaluation of the Use and Effectiveness of Wildlife Crossings." This three-year project is midway through and promises to deliver a decision tool that can be used across North America to help make transportation projects and plans more accommodating of wildlife and help to create a more permeable landscape across roads. Currently the nine ecologists and engineers working on the project are developing individual projects of their own that will come together in this decision tool. The engineers specialize in traffic safety and are developing models of animal-vehicle



Photo 1. Bear crossing in Ashville, NC

crashes to help determine what common roadway factors occur in these crashes, and also to help predict crash-prone areas in future roads. Several wildlife passages across North America are being evaluated to determine if they reduce the number of animal-vehicle crashes. An ecologist on the team is also looking at animal-vehicle crashes from the perspective of landscape factors and accuracy of crash locations. Several members have been involved in small mammal studies to examine the indirect effects of roads. A literature review will inform the placement of crossings based on the size and movement characteristics of species. A survey of approximately 300 professionals in transportation and natural resource fields across North America revealed that there are a minimum of 450 terrestrial underpasses for wildlife, 6 overpasses, and upwards of 1,000 or more aquatic passages for fish and other stream dependent species. Participants in the survey have also conveyed information on the planning processes, how animal-vehicle collision data are collected and managed, and how the maps and data from state wildlife and fish agencies are used in the transportation planning and development process. All this information will be included in a decision tool that will help users select, configure, and place wildlife crossings, and then to monitor and evaluate and maintain these

structures over time. The current website for this project is: www.wildlifeandroads.org. For further questions or information on passages you would like us to add to this national database, please contact the manager of this project, Dr. Patricia Cramer at: pcramer@cc.usu.edu.



Photo 2. Another view, bear crossing in Asheville N.C.

New Environmental Subcommittee Proposed for Railroad Environmental Research Issues

By Marilyn Duffey, the Duffey Company

Environmental issues and compliance with environmental laws and standards is common to all forms of heavy rail (including high speed rail/maglev, commuter rail and freight rail). To address these crosscutting issues as they bear on heavy rail transportation will be the focus of this newly formed TRB subcommittee that would be jointly sponsored by several rail committees. This new joint-subcommittee of TRB would focus on research and technology transfer, and would serve as a means to bring together the currently fragmented attempts to address railroad environmental issues of interest to a broad public, private, industry, and consulting community. The first meeting of the new Subcommittee will be held on January 24, 2006 from 8am to 9:45am in Room 8222 Park Tower at the Marriott Hotel. This subcommittee is an off-spring of the Environmental Issues Related to Intercity Passenger Transportation Subcommittee, chaired by Marilyn Duffey.

Initial research topics for consideration that are germane to the Task Force include:

- Wildlife crossings for heavy rail corridors, particularly shared corridors for passenger rail and freight rail (drawing from research on culvert

design, bridges, and monitoring developed for highway corridors and some rail corridors (Canadian Pacific) in the U.S. and abroad).

- Endangered Species Act compliance for heavy rail lines including expansion, cumulative analysis of future operations and maintenance activities, mitigation banking opportunities for rail corridors.
- EMF/EMI along shared corridors with freight and electric or Maglev rail systems; effects to wildlife and habitat along the corridor.
- Noise and vibration effects from heavy rail to wildlife; methods of analysis, thresholds of significance, feasible mitigation measures; summary of monitoring data for existing high-speed and Maglev systems.
- Opportunities for improved wetland and floodplain crossing design for shared rail corridors; how to take 'credit' for improvements along a multi-county corridor (environmental benefits).

We look forward to collaboration with other committees and task forces, especially the Task Force on Ecology and Transportation.

Population Benefits of Wildlife Crossings Using DNA Methods in Payson, AZ

By Amanda Hardy, Western Transportation Institute

Banff National Park in Alberta, Canada represents one of the best testing sites of innovative wildlife – roadway mitigation passages in the world. Although the major commercial Trans-Canada Highway (TCH) bisects the Park, a diverse range of engineered mitigation measures, including the incorporation of a variety of wildlife underpasses and overpasses have helped maintain large mammal populations and inform 25 years of important data.

Consistent evidence of both the performance and effects of wildlife crossings is needed to support their continued and growing implementation by transportation and resource management agencies. There is still skepticism among some organizations regarding the conservation benefits of wildlife crossings. Monitoring track pads in Banff's crossings tell us that 10 species of large mammals have used them more than 60,000 times since 1996. However, the actual number of individual animals using the crossings is unknown and only rough estimates can be made. Healthy functioning ecosystems require viable wildlife populations. Thus, it is critical to know the performance of these crossing structures at the population level. Although intuitively these measures should enhance population viability, to date, there have been no specific studies that actually address their population level effects.

Obtaining data on individuals in a population can be problematic because wide-ranging, fragmentation-sensitive species like bears typically occur in relatively low densities and have low reproductive rates. However, modern molecular techniques now make it possible to identify individual animals, their sex, and genetic relatedness with only a few hairs. These innovations could provide a powerful, relatively inexpensive, and non-invasive way to acquire critical information regarding genetic interchange facilitated by crossings, without ever having to capture or see the animal.

Experiment—In 2004 and 2005, we have been piloting a DNA/hair-sampling system at two underpasses on the TCH in Banff. Our hair-snagging system consists of two strands of “sticky string” spanning the width of the underpass (Photo 1). Barbed wire is intertwined to enhance the efficiency of the system to obtain hairs with sufficient DNA/tissue for analysis. As our target species are large carnivores, primarily bears, the strands have been suspended at 35 cm and 75 cm above the ground. Page-wire and brush behind posts are used to “funnel” the animals toward the barbed-wire/sticky string as they pass through (Fig. 1). Hair left on the barbs or sticky string as the animal passes through the structure is collected daily and sent off to a laboratory that will identify species and individuals within species. The hair-sampling systems are also video-monitored 24-hrs a day to assess the success of the tech-

nique and to watch wildlife responses to the slightly modified underpasses. This video footage allows us to identify and correct any experimental flaws, or negative impacts on wildlife.

WiderProject—Performance monitoring continues at all 24 wildlife crossing structures in Banff. These results will provide measurable data on the value of these different structures in maintaining or restoring wildlife populations. Our information guided the design and location of 17 new structures to be built as part of the latest phase of TCH twinning (improvement) work - a key example of evolving science being used to inform transportation management planning decisions. It is hoped that this experience and expertise will raise international awareness and be valuable to other regions worldwide.

Our research is currently being funded through a unique partnership of four, leading North American conservation based foundations and science agencies: Parks Canada, the Western Transportation Institute (Montana State University – Bozeman), the Woodcock and Wilburforce Foundations, and the U.S. Humane Society. For more information, contact Tony Clevenger, (t) 403 760 1371, (e) tony.clevenger@pc.gc.ca or Chad Townsend, (t) 403 760 1371, (e) chad.townsend@pc.gc.ca.



Photo 1. Two-strand system of barbed-wire/sticky string used to sample DNA/hair of animals using wildlife underpass.

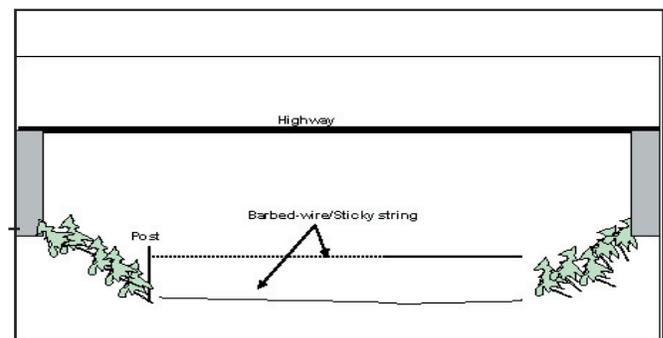


Figure 1. Design of DNA/hair-sampling system at wildlife underpass.

Successful Wildlife Crossing Field Course

By Jean C. Smith,
Board Member of Southern Rockies Ecosystem Project

In the decade from 1993 to 2003, more than 22,000 collisions with large animals occurred on Colorado roads. Untold numbers of deer, elk, bear, mountain lions, and even lynx and a wandering Yellowstone wolf were killed by cars. Human injuries numbered in the thousands, and there were several dozen deaths. Collisions with animals are clearly a serious threat to both wildlife and people.

Biologists and highway engineers increasingly look to solutions that keep animals off the roadways and yet allow them to follow their normal patterns of daily or seasonal movements. To further understanding of the issues, solutions and best management practices, Southern Rockies Ecosystem Project (SREP) took the lead in sponsoring the Rockies Wildlife Crossing Field Course, held in Payson AZ April 11-13, 2005. The course provided examples of regional connectivity projects and shared the successes and challenges of incorporating effective wildlife mitigation measures into transportation planning and highway construction.

The breadth of participation was impressive. The 138 participants came from 16 states and three Canadian provinces, and they included biologists, engineers, consultants, agency officials, non-profits and foundations, and staff from federal and state transportation agencies. Cosponsors included American Council of Engineering Companies of Arizona and Colorado, Arizona Department of Transportation, Arizona Game & Fish Department, Aztec, Carter & Burgess, Center for Transportation and the Environment, Defenders of Wildlife, Federal Highway Administration, U.S. Forest Service, Western Transportation Institute and the Yellowstone to Yukon Conservation Initiative.

The depth of learning was equally impressive. The class time was filled with detailed presentations on the science and practice of wildlife linkages, focal species and ecosystem approaches to identifying and designing crossings, monitoring and adaptive management, funding, and a number of excellent crossings projects, just to mention a few. Abstracts and presentations are available at http://itre.ncsu.edu/CTE/gateway/rockies_index.asp. The highlight was a full day in the field viewing the crossings being implemented near Payson.

The reconstruction and widening of route 260 to a four lane divided highway between Payson and Heber was bound to increase the number of animal-vehicle collisions - already at very high level. So the Arizona Transportation and Fish and Game Departments, the Federal Highway Works Administration, and Tonto National Forest are working together create safe passages for elk and other animals. When completed, there will be 11 wildlife underpasses and 6 larger bridges along the 17 mile route.

Along 260, the major vehicle-animal crashes are with elk as they move from the forest on north to the meadows south of the road. Road kill and collision statistics revealed areas where animals preferred to cross. Most of these were in ravines, which led logically to the concept of underpasses.

Are these underpasses working? In spite of a sixty-seven percent increase in highway traffic in the last few years, the number of collisions has not increased. The Arizona folks consider this a definite success.

The Field Crossings Course could well become a model for future events in Colorado or other parts of North America. Nothing beats bringing different perspectives together in one room, and nothing beats hearing about it in a slide show and then seeing it on the ground.



Figure 1. Elk Trapping in Payson Arizona.



Figure 2. Biped using a wildlife crossing in Payson AZ.

Annual Meeting Details

The 2005 Annual Meeting will take place from January 22 to January 26. We've got an exciting meeting coming up, and it is not too early to start making your travel plans. We have sessions hosted by our task force as well as other relevant sessions.

ADC30T - Ecology and Transportation Workshops, Paper or Conference Sessions

WILDLIFE AND HIGHWAYS: CONSIDERATIONS AND SOLUTIONS

Sunday, January 22, 2006, 8:30am- 5:00pm, Hilton, Caucus

- 8:30 to 8:45 **Welcome and Introductions** (Thomas Linkous, Ohio Department of Natural Resources)
- 8:45 to 10:05 **Planning – Integrating wildlife and fisheries issues with transportation planning** (Patricia White, Defenders of the Wildlife)
- a. Issues with Wildlife and Highways (Keith Knapp, University of Wisconsin-Madison)
 - b. Colorado's Statewide Linkage Area Assessment Planning (Monique DiGiorgio, Southern Rockies Ecosystem)
 - c. Florida's Efficient Transportation Decision Making (Daniel Smith, University of Florida)
- 10:20 to 11:40 **Engineering and Design – successes, what we know is working** (Sean Furniss, U.S. Fish and Wildlife Service)
- a. What works? An Overview of Successes (Amanda Hardy, Western Wildlife Institute)
 - b. Wildlife Crossings in North America: The State of the Science and Practice (Patricia C. Cramer, Utah State University)
 - c. Bridge Replacements and Other Opportunities (John Narowski, Vermont Agency of Transportation)
- 1:00 to 2:20 **Engineering and Design – lessons learned** (Sandra Jacobson, U.S. Department of Agriculture, Forest Service)
- a. Adaptive Management on Highway Construction (Terry Brennan, US Forest Service)
 - b. Washington DOT's Wildlife-Friendly Maintenance Program (Marion Carey, Washington Department of Transportation)
 - c. Lessons from Long-term Monitoring (Anthony Clevenger, Montana State University)
- 2:35 to 3:55 **The Future – where we are going, what we need to know** (Joseph Burns, U.S. Fish and Wildlife Service)
- a. Ecological: An Ecosystems Approach to Infrastructure Planning (Tom Pettigrew, US Forest Service)
 - b. Tools for the Future: SAFTEA-LU and Help for Practitioners (Patricia White, Defenders of Wildlife)
 - c. Research Gaps and The Road Ecology Center (Alison M. Berry, University of California, Davis)

Tuesday, January 24, 2006, 1:30pm- 3:15pm, Hilton, Thoroughbred

507 Ecology and Transportation Research

Integrating Transportation Network Data into Predictive Models for Invasive Species

Wildlife and Domestic Animal-Vehicle Collisions in Utah

Use of Highway Underpasses by Large Mammals and Other Wildlife in Virginia and Factors Influencing Their Effectiveness

594 Land Noise and Animal Impacts

Impacts of Road Noise on Birds

Bioacoustic Profiles: Evaluating Potential Masking of Wildlife Vocal Communication by Highway Noise

Synthesis of Noise Impacts on Wildlife

OTHER WORKSHOPS

Building a Green Highway: Environmental Stewardship Practices in Construction and Maintenance

Sunday, January 22, 2006, 8:30am-12:00pm, Hilton, Monroe West

Managing National Environmental Policy Act Process for Complex Projects

Sunday, January 22, 2006, 8:30am- 5:00pm, Hilton, Hemisphere

OTHER SESSIONS

359 Environmental Analysis in Transportation

Monday, January 23, 2006, 3:45pm- 5:30pm, Hilton, Lincoln West

316 When Is Tiered Environmental Documentation Effective?

Monday, January 23, 2006, 1:30pm- 3:15pm, Hilton, Lincoln West

445 Environmental Poster Mega Session

Tuesday, January 24, 2006, 9:30am-12:00pm, Hilton, International Center

Meetings

ADC10 Committee on Environmental Analysis in Transportation

Monday, January 23, 2006, 7:30pm- 9:30pm, Hilton, Map

ADC10(1) Committee on Environmental Analysis in Transportation Stewardship subcommittee

Monday, January 23, 2006, 8:00am- 9:45am, Hilton, Independence

Environmental Forecasting in an Uncertain Environment,

Monday, January 23, 2006 1:30-3:15, Shoreham Congressional A/B

Implications of New Environmental Metrics for Policy Makers

Monday, January 23, 2006 3:45-5:30 Shoreham Congressional A/B

AV030 Environmental Effects of Aviation Committee Mtg,

Tuesday, January 24, 2006 1:30-3:15 [501] Shoreham Diplomat

Lessons Learned from Large Airport Development Projects

Tuesday, January 24, 2006, 10:15-12:00, Shoreham Governors

Moving to Committee Status—We are Getting Closer!

As many of you know we are going to be “applying” for committee status this year. All committee members that attended ICOET met to strategize on what we need to do in order to have a complete application. Kim Fisher from TRB provided some great assistance to us in brain storming what we should compile. Mary has been spearheading this effort, documenting all that the task force has accomplished in our short history. In addition to the many sessions and workshops that we have undertaken, she has documented liaison activities and secured letters of support from other committees and research organizations. Special thanks to Mary Gray along with Susan Hagood and all others who are helping to make this dream a reality.

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