



Committee on Ecology and Transportation Newsletter

January 2019



The Chair's Message

*Daniel J. Smith, PhD, AICP
University of Central Florida*

TRANSPORTATION FOR A SMART, SUSTAINABLE, AND EQUITABLE FUTURE

The theme for the 2019 Annual Meeting is "Transportation for a Smart, Sustainable, and Equitable Future." This year we have a full slate of workshops/sessions that we are either lead sponsor or co-sponsor. A special thanks to several of our members who were instrumental in the planning of these offerings. The following is a preview of ADC30's program for this January.

Workshops include: 1) Developing a Road Map for Ecologically Sustainable Transportation [1016], 2) Emergency Undertakings and Historic Properties: Assessing Measures for Dealing with Unanticipated and Catastrophic Events [1018], 3) Safe and Sustainable Snowfighting: Managing Environmental Impacts in Winter Maintenance [1038], and 4) 50 Years of the National Environmental Policy Act: Where Have We Been, Where Are We Going? [1062].

Sessions include: 1) Developing Climate Adaptation Strategies that Address Ecological Concerns Associated with Transportation Facilities [1455], 2) Hot Topics and Emerging Issues in Ecology and Transportation [1324], 3) Current Issues in Ecology and Transportation (Posters) [1432], 4) Maximizing the Benefits of Cured-in-Place-Pipe (CIPP) Stormwater Culvert Rehabilitation with Environmental and Safety Considerations [1178], and 5) Pragmatic, Innovative and Cost Effective Alternative Right of Way Use Practices [1647].

You can find the schedule for these events by looking up the session number [in brackets] using the TRB online interactive program or the meeting app (<http://www.trb.org/AnnualMeeting/AnnualMeeting.aspx>).

Also, please plan to attend and participate in our meetings in the Marriott Marquis on Wednesday, January 16: 1) ADC30 Standing Committee on Ecology and Transportation from

10:15 am to 12 pm in the Archives Room (level M4) that will include two interesting presentations on "Greenroads" and "Ecologically Sustainable Transportation," and 2) ANB20(2) Joint Subcommittee on Animal-Vehicle Conflicts from 8 to 9:45 am in Ballroom Salon 8 (level M2).

In step with this year's overall theme, we are principally focusing on issues of Sustainability and Climate Change Adaptation. The workshop on Ecologically Sustainable Transportation will employ a multidisciplinary approach in defining what it means to establish "ecologically sustainable" transportation systems. Inherent to the concept is developing a nexus between Transportation Planning and Natural Resource Conservation. There are a multitude of publications about sustainability. An early, official treatise [1987] includes the U.N. World Commission on Environment's publication of "Our Common Future." Their report defined sustainable development as that which "meets the needs of the present without compromising the ability of future generations to meet their needs." When considering the balance required to meet the demands of a rapidly growing global human society and what is required to protect essential ecological systems in perpetuity, it becomes a tremendously complex and difficult issue. Please be sure to read the preview of the workshop included in this newsletter. It promises to be an exciting, collaborative and productive session, we look forward to seeing you all there.

A subset of the above topic that we are highlighting this year is climate change adaptation. Our session on this subject will explore the use of ecological principles for planning, design, construction and maintenance that improves our ability to protect the nation's natural resources and keep our roads structurally sound and safe. Presentations will provide

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applied examples of best practices, guidelines and lessons learned for developing climate adaptation strategies that address ecological concerns associated with transportation facilities.

Lastly, I remind everyone to visit our website: www.ecologyandtransportation.weebly.com and encourage you to read the articles in this issue of our newsletter. On behalf of

TRB, I offer my sincere appreciation to those who submitted articles and to the dedicated members and friends of the Committee for their continued service in furtherance of our mission.

International Conference on Ecology and Transportation – California, 2019

Submitted by: Deb Wambach (ICOET Conference Chair, Montana DOT) and Fraser Shilling (Road Ecology Center, UC Davis)

We are proud to announce that the next International Conference on Ecology and Transportation (ICOET; <http://icoet.net>) will take place in Sacramento, California from September 22 through September 26, 2019. Co-hosts Caltrans and the California Department of Fish and Wildlife, the new ICOET lead organizer Road Ecology Center (REC, UC Davis), and the Steering Committee selected downtown Sacramento as providing the most amenities, convenience, and affordability among a range of options in north-central California.

The 2019 ICOET Conference theme is “Achieving Balance in Ecology and Transportation.” The conference will highlight ways that transportation agencies and partners, scientists, policy-makers, and stakeholders work together to balance often-diverging goals for sustainability and transportation, including railways. The Steering Committee, hosts and organizer have been designing a program that cuts across many areas of transportation ecology, matched by field trips to montane, urban, and coastal project areas. Traditional focuses on wildlife and aquatic ecology will be joined by presentations on protecting pollinators, planning for climate change and extreme events, regional planning, understanding mitigation effectiveness, and more.

We are also excited that the call for abstracts and proposals is anticipated in January 2019, so start planning now! Abstracts for traditional podium presentations and posters, as well as special sessions, lightning talks, mini-workshops, multi-media presentations, and other creative ways to tell the transportation ecology story will be invited. You are welcome to enjoy ICOET special events including a film festival, vendor exhibits and demonstrations, and of course, an exciting evening reception.



On behalf of the state hosts, ICOET 2019 Steering Committee, and partners the Institute of Transportation Studies and the National Center for Sustainable Transportation we welcome you to Sacramento, California in September 2019 for the 10th biennial ICOET Conference. We look forward to seeing you there! For more information, contact Fraser Shilling, REC Co-Director (fmshilling@ucdavis.edu).

Automating Wildlife-Vehicle Collision Hotspot Analysis

Submitted by: Fraser Shilling (Co-Director, Road Ecology Center, University of California, Davis); fmshilling@ucdavis.edu

Wildlife-vehicle collisions (WVC) are a large and growing concern among Departments of Transportation (DOTs), conservation organizations and agencies, and the driving public. Scientists have estimated that between 89 and 340 million birds may die per year in the US from collisions with vehicles (Loss et al., 2014). In California, the Road Ecology Center estimated that the annual cost of WVC to society is close to \$300 million (http://www.wildlifecrossing.net/california/files/xing/CROS-CHIPs_Hotspots_2017_Report_fn.pdf). State agencies have recognized the seriousness of these impacts and many are rising to the challenge.

Many DOTs are trying different methods of reducing WVC, including fencing roadways and providing crossing structures across the right-of-way to allow safe animal passage. WVC occur when traffic coincides with a place where animals

decide to cross the surface of a roadway. One common finding with spatial analysis of WVC is that collisions are clustered, which often leads to analysis of proximate causes of clustering for individual species (e.g., road or landscape features). One approach is to use previous collisions to develop predictive landscape models to find “hotspots.” To inform these types of predictions and corresponding mitigation at a large scale (e.g., a US state), it becomes necessary to collect accurate, extensive, long-term WVC data.

Many states maintain databases of change to wildlife-vehicle collisions (WVC), including locations of carcasses and crashes involving animals. Good examples are Idaho (<https://idfg.idaho.gov/species/roadkill>) and Maine (<http://www.maine.gov/mdot/safety/resources/>). Once these data are collected, a common and costly barrier before they can be used in safety and environmental planning is identification of “hotspots” of incidents (here defined as locations of high-rates and/or statistically-significant clusters).

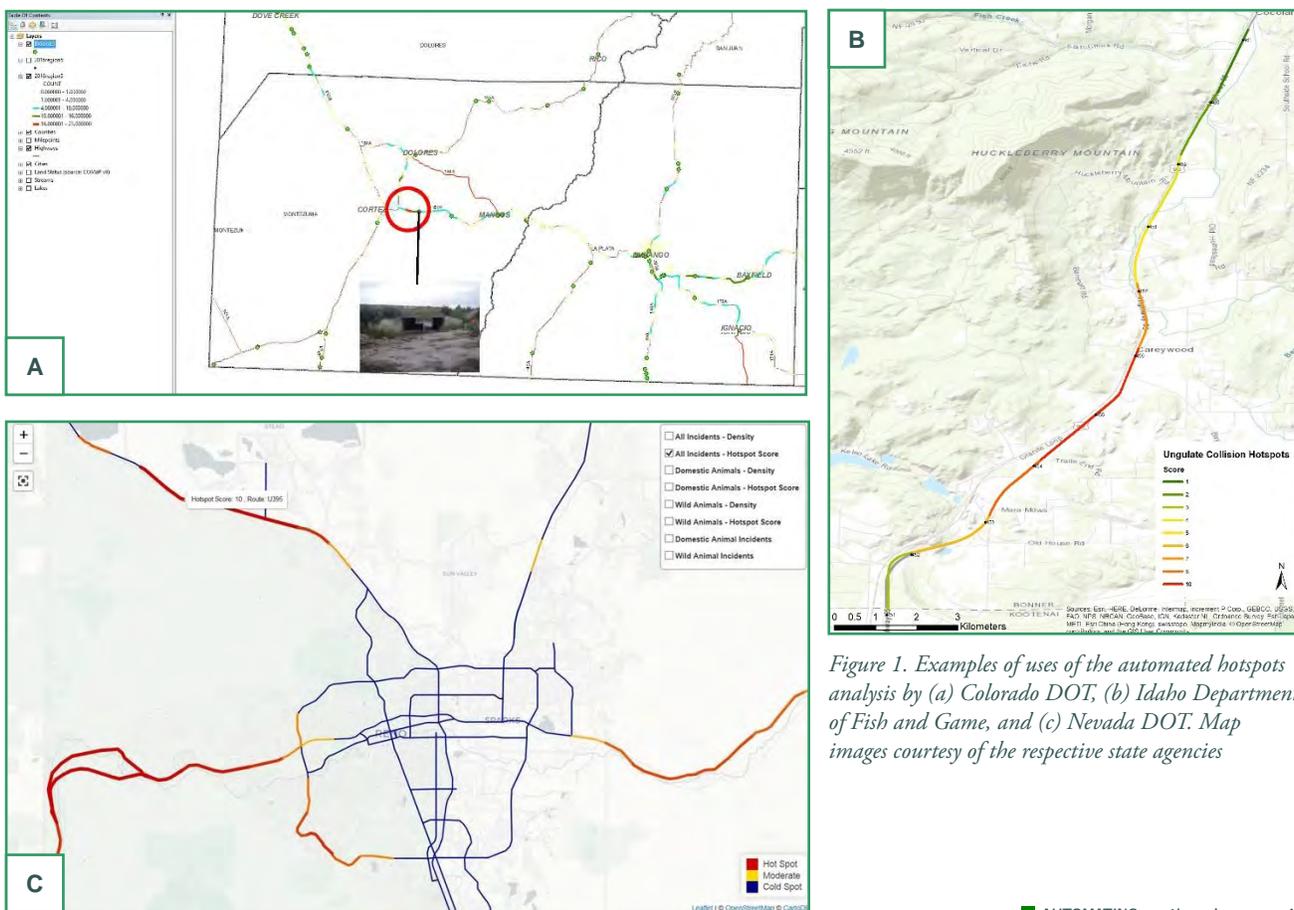


Figure 1. Examples of uses of the automated hotspots analysis by (a) Colorado DOT, (b) Idaho Department of Fish and Game, and (c) Nevada DOT. Map images courtesy of the respective state agencies

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■ AUTOMATING continued from page 3

Modern web-based collection and management of WVC data relies on relational databases and software that make it straightforward to automate many analysis and visualization tasks. If these analyses and visualizations are informed by science (and a scientist) and agency-users, then we have a perfect recipe for taking extensively-collected WVC data and turning it rapidly into decision-support for transportation planning.

The Road Ecology Center has pioneered app and web-based reporting and visualization systems for carcass and crash data for California. With support from the US Department of Transportation through the National Center for Sustainable Transportation, we have developed a web-based analytical environment that any state agency can use to automate analyses of WVC hotspots in order to inform planning to improve driver and wildlife safety. The system relies on several published approaches for delineating hotspots (e.g., Shilling and Waetjen, 2015, doi:10.3897/natureconservation.11.4438). The first is density of WVC incidents (e.g., # incidents/mile-year), which can also be species-specific. The second approach uses analysis of statistically-significant clustering of WVC, often using statistical tools such as Getis-Ord. Any state, local, federal, or private organization can create an account, then upload a file containing the locations of WVC (or other point events of concern) on highways and the system will take care of the rest and report back to you when it's done. The output includes a shapefile of the analytical products, graphs summarizing results, and a jpeg of the resulting map.

Multiple states (CO, ID, ME, MN, NV, VA) helped us to develop and perfect the tool, patiently making their way through alpha and beta versions (Figure 1). During this process we discovered a couple of limitations for the tool: 1) One of the geospatial processing steps consumes a lot of memory, so it may not work with >30,000 points (but we are working on it); 2) the tool works with "single-part" points, but not multi-part (different types of point shapefiles); and 3) we know the tool can handle 3 simultaneous users, but we aren't sure about larger groups. We invite potential users to go it alone, or contact us and we can give you some pointers. Either way, you will follow these basic steps: 1) create an account and log-in; 2) create an assessment and upload a file of defined types; and 3) check back in a few minutes (1000's of points) to a few hours (10,000's of points) and download your output zip file. You can either

use the products as is, or as part of GIS-based assessment and planning at the state or corridor scale (Figure 1).

For California, we have gone one step further, carrying out both automated hotspots analyses and real-time mapping of deer-vehicle conflicts (DVC), reported by California Highway Patrol (CHP) and carcass observations from the California Roadkill Observation System (CROS; <https://wildlifecrossing.net/California>). CHP records are updated every few minutes, creating the world's first real-time map of WVC (Figure 2; <https://roadecology.ucdavis.edu/hotspots/map>). These data are useful for longer-term planning (when combined with other data), as well as to inform driver-assistance and connected-automated-vehicle programs that the vehicle is entering a known hotspot and/or area of recent collisions.

Individual users and states are already exploring various aspects of the tool, including species-specific analyses of events, inter-annual comparisons to look at trends over time, and to inform local project planning. These collaborations and continued work in California with WVC incidents and all traffic incidents in general will lead to improvements to the tool over time. For example, one state has already asked for a range of highway segment lengths (e.g., 100 yard, ½ mile, and the existing 1 mile) to study how variation in length could affect hotspots localization.

For more information on the system, for special analysis requests, or for other information, contact Fraser Shilling (Co-Director, Road Ecology Center, University of California, Davis); fmshilling@ucdavis.edu; <https://roadecology.ucdavis.edu>.)

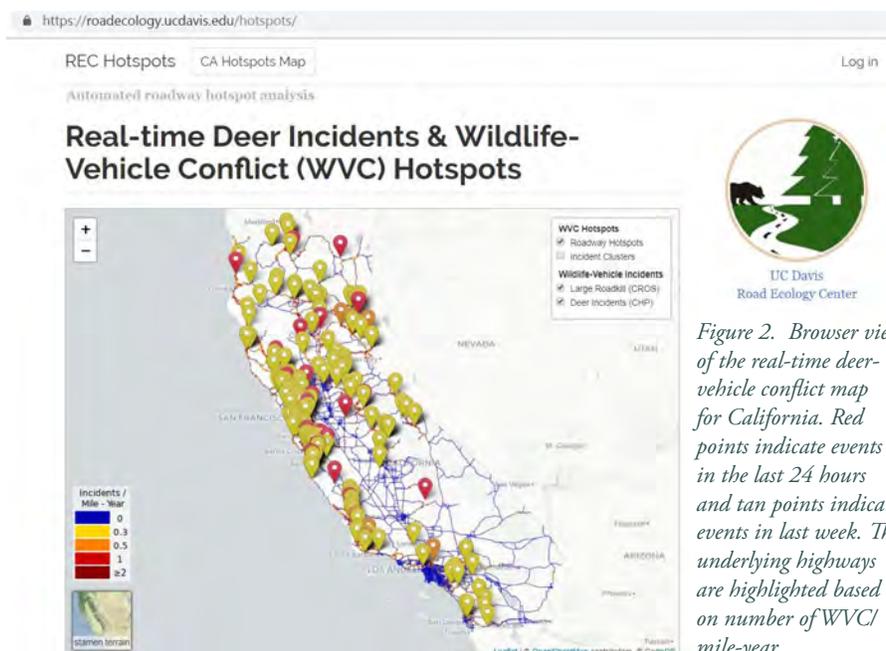


Figure 2. Browser view of the real-time deer-vehicle conflict map for California. Red points indicate events in the last 24 hours and tan points indicate events in last week. The underlying highways are highlighted based on number of WVC/mile-year.

Workshop on Ecologically Sustainable Transportation

TRB Annual Conference, Sunday, January 13th, 9 am -12 noon,
144A, Convention Center



Submitted by: Fraser Shilling (Road Ecology Center, UC Davis) and Daniel Smith (University of Central Florida)

Sustainable transportation is defined in a variety of ways within the various transportation fields. These fields have particular theories, practices and communities. Across these fields, including transportation ecology, there is no good and widely-shared definition of environmentally-sustainable, or ecologically-sustainable transportation. We propose to use these various areas as the basis for the question “What is ecologically-sustainable transportation (EST)?” We invite regular participants in the International Conference on Ecology and Transportation with other TRB conference-goers to help coalesce critical research and policy directions for EST. As active members of ADC30 and ICOET, the organizers are familiar with many of the people attending TRB who can bring an ecological/environmental perspective on sustainable transportation. We also work regularly with transportation planners, engineers and policy makers so we are familiar with the approaches that will attract them.

Based on this experience and working with other TRB committees, presenters will summarize their understanding of EST and its utility across transportation disciplines. Presentations include Jeralee Anderson talking about

“Green Roads,” Emmanuel Liban talking about “Ecological Sustainability in Urban Regions,” Daniel Smith talking about “Wildlife and Roads,” Kris Gade discussing “Novel Roadside Ecosystems” and AASHTO’s role, and Daniel Sperling predicting the “Future of Sustainable Transportation.”

To prompt discussion, workshop participants will be given 5 questions gleaned from discussions with the various relevant committees. They will be asked to spend 10-15 minutes discussing each question and will be encouraged to re-frame or add questions that they are missing. The participants’ feedback will be compiled in a short white paper that will be sent to them via a sign-up list. If you want to join in the discussion, please come to the workshop. For more information, contact Fraser Shilling, REC Co-Director (fmshilling@ucdavis.edu). The workshop is co-sponsored by Standing Committee on Ecology and Transportation (ADC30); Standing Committee on Environmental Analysis in Transportation (ADC10); Standing Committee on Resource Conservation and Recovery (ADC60); Standing Committee on Transportation and Sustainability (ADD40).

Influences on wildlife frequency of use of small bridges and culverts along the Qinghai-Tibet railway, China

Submitted by: Yun Wang*, Lei Guan, Xinjun Wang, Jiding Chen, Yaping Kong, China Academy of Transportation Sciences, 240 Huixinli, Chaoyang District, Beijing, 100029, China

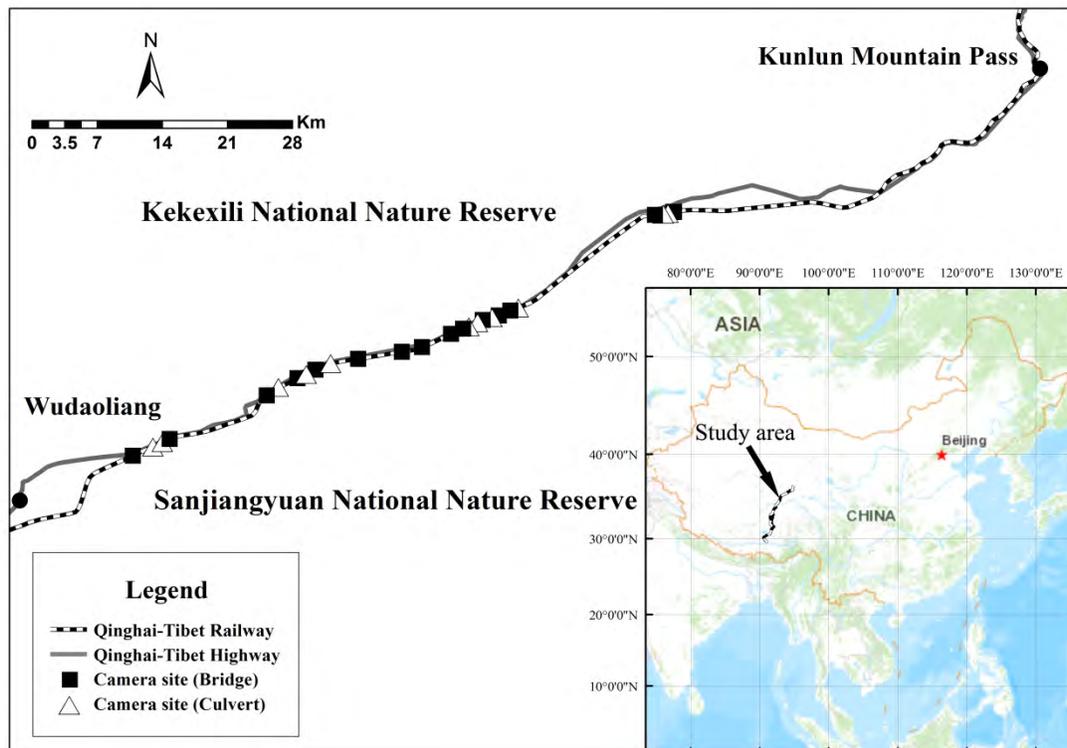
*Correspondence author at: Rm. 203, China Academy of Transportation Sciences, wangyun80314@163.com

Understanding the use of small bridges and culverts by wildlife to cross the Qinghai–Tibet railway will aid in the design of wildlife crossing structures for similar transportation infrastructure. From 2014 to 2016, 36 infrared cameras were placed inside 14 small bridges and 11 culverts along the Qinghai–Tibet railway to determine the structures’ effectiveness as wildlife passages (Figure 1). Thirteen species of mammals were found to use the small bridges and culverts to cross the railway (Table 1). The crossing rate per structure for small bridges (190.81 +/- 25.48) was significantly higher than that for culverts (90.27 +/- 22.48) for all mammals (Mann–Whitney U = 28.000, Z = -2.961, P = 0.003). Tibetan antelope (*Pantholops hodgsonii*), Tibetan gazelle (*Procapra picticaudata*), kiang (*Equus kiang*), and wild yak (*Bos mutus*) preferred small bridges over culverts to cross the

railway (Figure 2). In contrast, mountain weasel (*Mustela altaica*) and Asian badger (*Meles leucurus*) preferred culverts to cross the railway (Figure 2).

Six species-specific models were developed (Table 2). Some structural and road-related factors were important model components for wild yak, kiang, Tibetan gazelle, woolly hare, and common wolf, although their influence varied by species. The crossing rates of all mammals, particularly Tibetan gazelle and woolly hare, were positively influenced by structure width. Structure height had a positive influence on wild yak, but structure length had a negative influence on kiang. The distance to the highway had a positive influence on the crossing rates of all mammals, particularly wild yak and woolly hare. Human use of the structures had no influence on the crossings of most mammals except for common wolf. We suggest that road design schemes include large and open crossing structures to benefit most species with limitations on human activities near wildlife passages.

Figure 1. Sketch map of the research section of the Qinghai–Tibet highway and railway, and the camera locations



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English name	Scientific name	Chinese protective class	IUCN
Tibetan antelope	<i>Pantholops hodgsonii</i>	I	NT
Kiang	<i>Equus kiang</i>	I	LC
Wild yak	<i>Bos mutus</i>	I	VU
Tibetan gazelle	<i>Procapra picticaudata</i>	II	NT
Eurasian lynx	<i>Lynx lynx</i>	II	LC
Corsac fox	<i>Vulpes corsac</i>	China RL-EN	LC
Beech marten	<i>Martes foina</i>	China RL-EN	LC
Mountain weasel	<i>Mustela altaica</i>	China RL-NT	NT
Asian badger	<i>Meles leucurus</i>	China RL-NT	LC
Common Wolf	<i>Canis lupus</i>	China RL-VU	LC
Tibetan fox	<i>Vulpes ferrilata</i>	China RL-VU	LC
Woolly hare	<i>Lepus oiostolus</i>	China RL-LC	LC
Himalayan marmot	<i>Marmota himalayana</i>	China RL-LC	LC

Table 1. Species of mammals that used small bridges and culverts along the railway

IUCN International Union for Conservation of Nature and Natural Resource, RL Red List, I First class protection in China, II Second class protection in China, EN endangered, NT near threatened, VU vulnerable, LC least concern

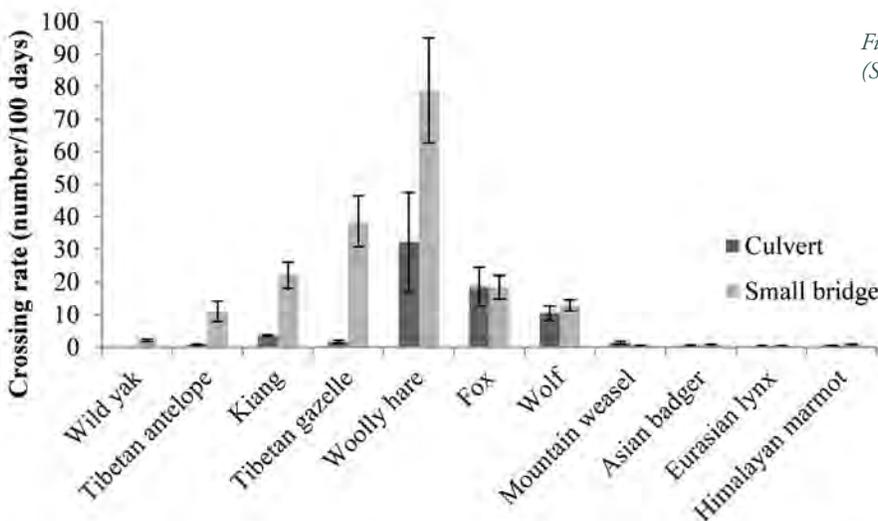


Figure 2. Crossing rates [mean ± standard error (SE)] of wildlife in different types of structure

Species	Variables	B	SE	P-value	R ²
	Constant	-0.998	0.310	0.004	0.472
Wild yak	Height	0.303	0.088	0.002	
	Distance to highway	0.001	0.000	0.022	
Kiang	Constant	24.891	4.813	0.000	0.308
	Length	-1.297	0.405	0.004	
Tibetan gazelle	Constant	3.344	6.536	0.614	0.309
	Width	2.582	0.804	0.004	
Woolly hare	Constant	-29.066	10.436	0.011	0.716
	Distance to highway	0.129	0.022	0.000	
	Width	2.822	1.241	0.033	
Common wolf	Constant	7.836	1.795	0.000	0.208
	Human disturbance	0.066	0.027	0.022	
	Constant	11.988	15.836	0.457	
All mammals	Width	7.521	1.883	0.001	0.662
	Distance to highway	0.119	0.033	0.001	

Table 2. Variables retained in the stepwise regression model, coefficients (B), standard error (SE), significances, P-value (t-test) and deviance explained (R²)

Wildlife and Roads Projects: Endangered Wildlife Trust



Submitted by: Wendy Collinson-Jonker, Wildlife and Transport Programme Manager, Endangered Wildlife Trust, wendyc@ewt.org.za

Roads are a critical element to economic development, and road construction is set to continue unabated through the foreseeable future. Unfortunately, roads have mostly negative consequences for biodiversity. Amongst other things, they destroy and degrade habitats, fragment wildlife populations and their dynamics, increase mortality through collisions, and increase access to previously remote areas thereby increasing natural resource use. The science of road ecology—our understanding of impacts of roads on wildlife—is fairly well developed in North America, Europe and Australia, but only in its infancy in regions like Africa.

To address the threat to biodiversity from roads and road users, the Endangered Wildlife Trust (EWT) launched the Wildlife and Roads Project in 2010, the only large-scale initiative of its kind in South Africa. Our projects are not only countrywide but have expanded to other corners of the African continent and are categorized into four areas:

1. Gathering the Facts: Research and Monitoring of Wildlife and Transport
2. Roads in Parks
3. Making a Difference on Roads in South Africa: Tools that Drive Mitigation
4. Travelling in New Directions: Impacts of Linear Infrastructure on Wildlife

Does size matter?

Working with Tshwane University of Technology, we are assessing drivers' attitudes towards snakes, and indeed, whether they are killed deliberately by motorists. Using three different sized fake (rubber) snakes, we determined that most drivers do alter their behavior to snakes on the road, and in most cases, the bigger the snake, the more likely they are to alter their course to avoid a collision. However, about 20% of drivers deliberately changed their course to drive over the fake snake. Determining why some drivers elect to deliberately kill a snake will be the next challenge in our project. Bridging the gap between biological and social sciences is an area in need of attention—we can only start to make a difference through understanding why people behave the way they do.

Highways in Ethiopia

Our program offers support to other developing countries and our expertise has been sought by researchers, including in Ethiopia where we collaborate with the Ethiopian Biodiversity Institute in undertaking an assessment of roadkill rates for all vertebrates along the Ethio-Djibouti highway. This highway passes through five protected areas in eastern Ethiopia, and is home to several species of conservation significance, such as the Endangered Grevy's Zebra (*Equus grevyi*), and Near Threatened Striped Hyaena (*Hyaena hyaena*).

A total of 128 roadkill were recorded comprising 44 species from 25 families. Birds were the most frequently killed

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taxonomic group (56.8%) followed by mammals (38.6%), and reptiles (4.5%). Of the 128 roadkill and according to the International Union for Conservation of Nature and Natural Resource (IUCN) Red List of Threatened Species, 81.8% were of Least Concern, 6.8% were Vulnerable and 5.7% Near Threatened. Diurnal species constituted the majority of roadkill detected (71.3%) with 19.8% being nocturnal and 2.8 % being crepuscular. Most roadkill were encountered on roads adjacent to protected areas than roads >60 km from protected areas.

Driving social change

Citizen science represents a collaboration between professional conservationists and the general community in problem solving and data collection. The approach has facilitated analysis of ecological processes operating at broad spatial and temporal scales, far beyond the limit of traditional field studies.

Our Wildlife and Roads Citizen Science Project established the first national database for animal road mortalities and, to date, over 200 citizen scientists have reported almost 20,000 roadkill data points throughout southern Africa. This has allowed us to identify those species and habitats at most risk from roads. Information like this leads to roads being formally recognised as a threat to the survival of many species in the recently published national Red List of Mammals of South Africa, Swaziland and Lesotho. The data have also been used to inform our recent scientific paper that will guide future management decisions on mitigating the negative impacts of roads, and provide a platform from which to design future studies.

Who do we work with?

Working closely with stakeholders in the transport sector is integral to our work. Currently, we support three of South Africa's toll concession companies: Bakwena N1N14 Toll, TRAC N4 and N3 Toll Concession. Together, we address a reduction in wildlife-vehicle collisions, as well as the impact of these collisions on human safety. In 2017, almost 15,000 people were killed on South African roads. We are examining ways to quantify how many of these fatalities resulted from animal collisions, and balance the cost of vehicle damage, injury to, or loss of human life, against the cost of interventions that will significantly reduce collisions with animals. This will ultimately result in a reduction of roadkill, and an improvement of human safety on roads. In 2017/18 alone, we delivered six training courses, supporting 75 staff in road ecology related matters.

Roads in parks

With high visitor numbers, wildlife-vehicle collisions (hereafter collisions) commonly occur in South Africa's 23 national parks. With tourism expected to grow significantly, there will inevitably be more vehicles in these protected areas, and more collisions. Social media has highlighted public concern for collisions inside protected areas, and we consequently launched our Roads in Parks Project, in 2014. Starting in the Pilanesberg National Park, the main goal of our five-year project is to reduce the rates of roadkill in South Africa's protected areas. This last year we investigated factors affecting the likelihood of collisions in Pilanesberg National Park. Through a series of controlled experiments, using dummy wildlife, we found that an interaction between driver speed and driver occupation (staff or visitor) was the best predictor for wildlife-vehicle collisions. Contrary to our predictions, when driving below the speed limit, visitors were almost three times more likely than staff to hit our dummy snake. Collision probabilities increased when speeding, becoming more similar between visitors and staff, although still significantly higher for visitors.

We also investigated the effectiveness of signage in modifying driver behavior, using signs depicting either a Cheetah or a snake. Significantly, using signage improved wildlife safety, as 61% of drivers who passed a wildlife-warning sign changed their behavior when they saw a dummy snake placed on the road, compared to 37% with no sign present. This reduced collisions with the snake, with 98% of drivers positively altering their behavior. The distance from the sign to wildlife on the road played a role too, as a wildlife-warning sign depicting a snake, and placed 100 m (as opposed to 1,000 m) before the dummy snake, was most effective at reducing collisions. Our results suggest that drivers adapt their behavior to signage that portrays smaller animals and awareness retention is low. We have subsequently extended our research into the Kruger National Park, where it forms part of a B.Tech. degree (Tshwane University of Technology) and a Master's degree (University of Venda). The outcomes of our research will assist SANParks with a traffic-monitoring plan, and ultimately reduce roadkill in our protected areas.

Carrying out roadkill surveys by driving a road over long distances is both costly and time consuming. To address this, our joint project with the University of Venda and GreenMatter aims to design a more cost-effective method of undertaking surveys. We will generate a roadkill risk model to determine which environmental and road-related factors contribute to roadkill. We will test this model in Kruger National Park and we will hopefully be able to use it as a blueprint for other protected areas in the country.

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Making a difference on roads in South Africa: tools that drive mitigation

We collaborate with a number of research institutions to support and facilitate projects that implement and assess the effectiveness of roadkill-mitigation-measures. Working together, this will ultimately lead to a reduction in animal road-mortalities.

These include the Samango Monkey Roadkill Mitigation Project. This project addresses the high numbers of Samango Monkey (*Cercopithecus mitis*) road deaths along a particular stretch of road along the eastern Soutpansberg Mountains. This project aims to design and install permanent canopy bridges specifically suited for Samango Monkeys – a rare primate that inhabits highly fragmented high canopy forest habitat. Having completed a camera trap survey, and with two years of behavioural data about how Samango Monkeys cross their canopy-bridges, we are preparing guidelines for a “primate canopy overpass,” for conservation and management use. We continued with our awareness work in the Soutpansberg to make motorists aware of this threatened species.

Working in close partnership with the N3TC toll company, data collected by their patrollers has enabled us to identify species most at risk from roads. This has highlighted the plight of Servals (*Felis serval*), a small cat species. To date we have data from 94 Serval mortalities on the N3 Toll Route from 2014 to 2017, stretching the length of this highway. In conjunction with the EWT’s Carnivore Conservation Programme and the University of Venda, we have used the invaluable data collected by patrollers to determine the environmental and anthropogenic variables most related to Serval deaths, which was greater in areas with lower rainfall. This information provides an opportunity to determine where N3TC should target their mitigation efforts for Serval along the highway.

Travelling in new directions: impacts of linear infrastructure on wildlife

To date, our projects have focused primarily on the impacts of roads on wildlife. This new project will expand our outreach more widely across the transport sector (railways, marine shipping) and linear infrastructure (fencing).

In 2018, we expanded our road ecology training to incorporate rail ecology, the first training of its kind in the country. We delivered a three-day Road and Rail Ecology Training Course to field rangers and management of the EWT’s Medike Nature Reserve in the Soutpansberg Mountains. These mountains—part of the Vhembe Biosphere Reserve—are bisected by a railway, and with plans to upgrade the railway line and the surrounding substations, we are now gathering baseline data of rail mortalities here.

Marine wildlife is also impacted by collisions with shipping vessels. We have commissioned a study into the scope and extent of collisions between marine vessels (cargo ships, cruise liners, and recreational vehicles) and marine species, such as whales, sharks, dolphins, marine turtles, penguins and seals.

We currently operate within South Africa, but our network is continent-wide. As the leading experts in this field, we work towards expanding our support and training to other African countries. In order to accelerate learning in the field of road ecology in Africa, and in conjunction with the EWT’s Wildlife and Energy Programme, we are facilitating an international conference for linear infrastructure (the African Conference for Linear Infrastructure and Ecology) to foster international collaboration and sharing of good practise, which will take place in March 2019.

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What our stakeholders are saying



“EWT is lucky to have champions like you who are committed to making a difference.”

Patience Gandiwa, International Conventions & Transfrontier Conservation Areas Department, Zimbabwe Parks and Wildlife Management Authority Headquarters

“Well done with the recognition you have afforded to those who have made a major contribution to your ongoing efforts to reduce roadkill of our wildlife.”

Karl Jensen, RSA

“Well done. Thanks for your wonderful efforts in conserving the Soutpansberg and its fauna and flora.”

Inga Gilfillan, Lalapanzi Hotel, Louis Trichardt

“You have been working so hard and putting in lots of sincere efforts to help protect and conserve wildlife. It is indeed a proud moment for all of us who are directly or indirectly associated with you, to win a Science Oscar.”

Satish Kumar, Department of Wildlife Sciences, Aligarh Muslim University, India

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Statistics

- We are currently mentoring four students on road ecology projects (two B.Tech. and two M.Sc.) and providing input into one Ph.D., thus providing opportunities to expand their knowledge.
- Our Roads in Parks Project saw a 98% change in driver behavior in Pinaloes National Park, significantly reducing collisions with wildlife.
- In 2017/18, six training courses were delivered to three toll concessionaire companies (Bakwena N1N14 Toll, TRAC N4 and N3 Toll Concession), supporting 75 staff.

Recognition

We are extremely proud to be the recipient of the TW Kambule-NSTF Award: Emerging Researcher at the National Science and Technology (NSTF) awards. Wendy Collinson scooped the prestigious award for her work in establishing and running the EWT's Wildlife and Roads Project.

Raising the profile of our work is important to us, and we are therefore active on a number of forums and working groups both nationally and internationally. In 2017, we joined the IUCN's Transport Working Group and Connectivity Conservation Specialist Group. We were invited to serve as committee members on the international Transportation Research Board (TRB) and the International Conference for Ecology and Transportation (ICOET). This enables us to partake in global discussions for the direction of road ecology.

We strive to undertake high-quality scientific studies and frequently publish scientific papers in international peer-reviewed journals. Through our partnerships with academic institutions, we ensure that our scientific understanding is innovative and contributes towards finding solutions to some of the challenges we face in conservation. In the last year, we published two scientific papers in peer-reviewed journals, with a further two under-review and five in preparation. We attended a number of national and international conferences representing the work undertaken by the Endangered Wildlife Trust. National conferences included the De Beers Research Conference, Southern African Wildlife Management Association and Symposium of Contemporary Conservation Practice. International conferences included the International Conference for Ecological Transportation in Salt Lake City (USA), and the 2017 MAB Youth Forum – committed to sustainable Development (Italy).

CALL FOR ABSTRACTS

International Urban Wildlife Conference

Portland 2019



The call for abstracts for the 2019 International Urban Wildlife Conference (IUWC) - Now open! Please submit your abstracts at www.urban-wildlife.org/.

We are also excited to announce the theme of IUWC 2019:

Collaboration and Conservation: Applications to Urban Wildlife

Presenters are encouraged to submit abstracts related to the theme of collaborative conservation and multi-use use landscapes with sub themes of conflicting land use needs in urban areas, bringing communities and diverse groups together, and habitat connectivity. However, all urban ecology topics are welcome.

The abstract submission form will close **January 12, 2019**, so get yours in now! Questions? Contact Nils Peterson at nils_peterson@ncsu.edu.

African Conference for Linear Infrastructure and Ecology

DIVERGING LANDSCAPES: THE LINEAR WAY

March 10-15th, 2019

Nombulo Mdluli Conference Centre At Skukuza Rest Camp,
Kruger National Park, South Africa



The inaugural African Conference for Linear Infrastructure and Ecology (ACLIE) will co-hosted by the Endangered Wildlife Trust and Eskom.

ACLIE invites professionals and students to submit abstracts for oral presentations, posters and workshops at its 2019 Conference which will take place in Kruger National Park, South Africa.

Centered around the theme Building Partnerships and investing in nature: the linear way in Africa, the conference will focus on the intersection of people and linear infrastructure, specifically how both people and nature are connected along, across and between different types of infrastructure.

Sub themes

- **Roads, Canals and Rail Transportation:** Issues, direct effects, mitigation
- **Energy (Pipelines, Powerlines, Wind, Solar and Hydropower):** Finding, developing and extracting energy using linear infrastructure
- **Development (Mining, Planning, Policy and Regulations):** Interaction of development and linear infrastructure
- **Management of Habitat related to Linear Infrastructure (Agriculture, Protected Areas, Fences, Rivers):** Mortality and habitat connectivity.

The aims of ACLIE are:

1. To promote a safe and ecologically sustainable pan-African linear infrastructure; and,
2. To promote networking opportunities and effective partnerships that facilitate communication and exchange of knowledge, ideas and news.

Our focus will target four main themes:

1. Impacts of Linear Infrastructure on local flora & fauna;
2. Linear infrastructure through sensitive areas;
3. Mitigating impacts; and,
4. Building partnerships.

The ACLIE programme includes podium presentations, posters, field trips, and exhibits on topics of interest to researchers, biologists, engineers, planners, project managers, administrators, and policy makers.

Important Dates

Sunday March 10	Arrival and registration. Meet and Greet' cocktail function in evening (complementary)
Monday March 11	Paper Sessions
Tuesday March 12	Paper Sessions
Wednesday March 13	Field trips and workshops
Thursday March 14	Paper Sessions. Bush braai (booking required)
Friday March 15	Paper Sessions (am)

Please see the below link to our website:
<https://www.eiseverywhere.com/ehome/321729/755912/>

We look forward to welcoming you to Skukuza.

There's No Place Like Home

Temporary Relocation of Schweinitz's sunflower (*Helianthus schweinitzii*) in York County, South Carolina

Submitted by: Edward W. Frierson, SCDOT NEPA Coordinator and Biologist and Tara D. Allden, JD of Kimley-Horn and Assoc.

The South Carolina Department of Transportation plans to replace more than 300 bridges across the state in the coming years. Each of these projects involves routine preconstruction work including NEPA documentation and permitting, which lead to a thorough investigation of the natural environment in the project vicinity. Occasionally, these investigations lead to interesting opportunities for innovative solutions.

The S-654 Bridge Replacement over Burgis Creek in York County provides an example of not only looking at a "problem" from a new angle but also of collaboration among several groups with a common goal. As is required for transportation projects, consultant biologists reviewed the U.S. Fish and Wildlife Service's "List of At-Risk, Candidate, Endangered, and Threatened Species" for York County early in the NEPA document preparation. This list includes Schweinitz's sunflower, which is one of likely hundreds of yellow flowers that bloom along South Carolina roadsides in late summer to early fall. This particular sunflower species, however, has been federally listed as endangered since 1991 and is only known to grow in the central Piedmont region of North and South Carolina. Over 90 percent of known sites occur in managed right-of-ways (ROWs) along existing roads that are subject to widening and improvement projects which usually disturb or eliminate the existing adjacent ROW.

Because finding Schweinitz's is so uncommon, biologists from Kimley-Horn were very careful and consulted several botanists in keying out the species when it was found growing abundantly in our project corridor, along the existing ROW approaching the bridge from the north. The purplish stem and rough-on-top and smooth-on-bottom leaves were telling (*Photo 1*); its thickened, tuberous roots were the clincher (*Photo 2*). Because this project has a federally protected



Photo 1. Flowers, leaves, and stem. Photo by Tara Disy Allden.



Photo 2. Tuberous roots. Photo by Chris Tinklenberg.

species in its path, the NEPA document would no longer qualify as a programmatic document, and coordination with US Fish and Wildlife Service (USFWS) was required. SCDOT, FHWA, and USFWS developed an Action Plan that included preconstruction plant rescue, storage and care, replanting in the project corridor, and monitoring. The USFWS gave its concurrence that the proposed bridge replacement project, with implementation of the Action Plan, is "not likely to adversely affect Schweinitz's sunflower."

■ THERE'S NO PLACE continued on page 14

■ THERE'S NO PLACE continued from page 13

The rescue and return of the plants to their home ground is in keeping with the USFWS habitat-based approach to endangered species recovery. April Punsalan in the USFWS South Carolina Ecological Services Office offered the following explanation:

The greater Charlotte-Gastonia-Concord area of North and South Carolina was identified as one of the 35 fastest growing large metropolitan areas in the country in a recent report examining the effects of sprawl upon endangered species (Ewing et al. 2005). For these reasons, the Service, SCDOT, and project consultants need to work closely together to ensure the continuation of this species along existing ROWs in Lancaster and York County. Because the Endangered Species Act (ESA) takes a habitat-based approach to endangered species recovery, conserving and protecting the sunflower along existing ROWs is preferred over relocating individuals to a new site.

Andy Cabe, botanist at the Riverbanks Zoo and Garden in Columbia, South Carolina helped coordinate the rescue in May 2018 (*Photo 3*) and will serve as the temporary caretaker of the plants. Andy provided the following summary of the plan and the summer:

Once we dug the plants they were transported back to the Riverbanks Botanical Garden and potted. The surviving plants thrived in our nursery over the summer and they all bloomed nicely. We isolated several plants in our greenhouses while they were flowering and we manually pollinated these plants with the hope of seed production. Seed will be sown and those propagules will be available for the reintroduction efforts, as well. Riverbanks will continue to grow these plants and hold them for about a year. Then, they will then be replanted at the original site once bridge construction is complete.

Steps one and two have been successful for the S-654 population of Schweinitz's sunflower (*Photo 4*). The full project team from the consultant to the SCDOT and FHWA to the state and federal resource agencies (SCDNR and USFWS) and the zoo remain enthusiastic and vested in seeing the plant continue to thrive at home.



Photo 3. The Rescue Team--Andy Cabe and SCDOT field maintenance staff. Photo by Tara Disy Allden.



Photo 4. Rescue plant in bud. Photo by Andy Cabe.



TRB Annual Meeting

**January 13-17, 2019
Washington, D.C.**

The full 2019 program, including information on nearly 800 sessions and workshops, is available now via the online Interactive Program. In addition, you can view curated session charts that provide representative samplings of sessions for attendees with various specific interests.




INTERNATIONAL CONFERENCE ON ECOLOGY AND TRANSPORTATION California 2019

We are proud to announce that the next International Conference on Ecology and Transportation (ICOET) will take place in Sacramento, California in late September 2019.

The Road Ecology Center (REC) and the ICOET Steering Committee selected downtown Sacramento as providing the most amenities, convenience, and affordability among a range of options in Northern Central California. Working with Caltrans, we will design a program that cuts across many areas of road ecology, matched by field trips to montane, urban, and coastal project areas. The REC is joined by other UC Davis research entities in welcoming you to California in 2019: the Institute of Transportation Studies, National Center for Sustainable Transportation, and the John Muir Institute of the Environment. We look forward to your participation.

**For more information, contact Fraser Shilling,
REC Co-Director (fmshill@ucdavis.edu).**

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*Editor: Jeff Simmons
Coordination: Kate McPherson
Layout: Maryellen De Vivo*