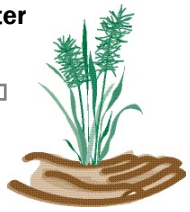
Chapter 1



Overview of Federal and International Activities

Overview of Select Provisions from SAFETEA–LU

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Abstract

The new transportation bill was passed in August 2005. It is a 5-year bill with new environmental provisions that are directly related to the areas of interest addressed at ICOET. Below are quick summaries of the key provisions. Some require regulations and guidance to be prepared by the Federal Highway Administration. Since the bill is still so new, work is still underway to get this guidance out.

Title 1 Subtitle A – Authorization of Programs

- Sec. 1113: Changes the State's Transportation Enhancement set aside to the greater of 10 percent of State STP apportionment or the amount set aside for FY2005. Transportation Enhancements projects which may include reduced vehicle-caused wildlife mortality while maintaining habitat connectivity.
- Sec. 1119:
  - Not to exceed $ 10 million per fiscal year. Shall be used for the costs of facilitating the passage of aquatic species beneath roads in the National Forest System.
  - Wildlife Vehicle Collision Reduction Study

Title 1 Subtitle D – Highway Safety

- Sec. 1401: The addition or retrofitting of structures or other measures to eliminate or reduce accidents involving vehicles and wildlife (may use safety funds).

Title 1 Subtitle H – Environment

- Sec. 1805: Use of Debris from Demolished Bridges and Overpasses. May involve the beneficial use of debris to construct features such as artificial reefs and other marine habitat creation or ecological restoration work in general.

Title V Research

- Sec. 5201: Exploratory Advanced Research. $14 million per year for 2005-2009 is authorized for an exploratory advanced research program to address longer-term, higher risk research, including environment.
- Sec. 5203: Technology Deployment. Innovative Pavement research and Deployment Program. One of the stated goals of this program is to, under subpart (H), develop designs and materials to reduce stormwater runoff.

Title VI – Transportation Planning and Project Development

- Sec. 6001: Transportation Planning.
  - Metropolitan Planning – Development of Long Range Statewide Plan must include "a discussion of potential environmental mitigation activities and potential areas to carry out these activities in consultation with Federal, State, and Tribal wildlife, land management, and regulatory agencies.
  - Statewide Planning — Development of Long Range Statewide Plan must include "a discussion of potential environmental mitigation activities and potential areas to carry out these activities and potential areas to carry out these
- Sec. 6002: Efficient Environmental Reviews for Project Decision Making.
  - Mandates a new environmental process for highway projects advanced with EISs.
  - Describes the USDOT's role as lead agency.
  - Creates a new category of "participating agencies."
  - Bars filing claims for judicial review of a permit, license, or approval by a Federal agency unless it is filed within 180 days after publication of a notice in the Federal Register.
  - Authorizes States to assume the Secretary's authority for determining that projects are categorically excluded from requirements for EIS or EA.

- Allows State to assume other environmental review responsibilities of the Secretary on categorically excluded projects.

- Sec. 6006 – Environmental Restoration and Pollution Abatement: Control of Noxious Weeds and Aquatic Noxious Weeds and Establishment of Native Species.
  - The first portion (pollution abatement and restoration) extends the existing STP eligibility to the NHS.
  - The second portion is a new eligibility item that promotes the detection and eradication of noxious weeds and establishes a preference to the extent practicable for the planting of native plant species.

Biographical Sketch: Mary E. Gray has been with the Federal Highway Administration for 15 years. She currently works for the headquarters of the Office of Natural and Human Environment, specializing in the Endangered Species Act and wildlife crossings. She has also worked in California, Idaho, and Washington. Her responsibilities have included right-of-way, engineering, and the environment. Because of her responsibility as state environmental program manager, she has worked in almost every environmental area. Mary has degrees in environmental studies and geography from the University of California, as well as a master's degree in civil engineering from Stanford University.

Reducing Habitat Fragmentation by Roads: A Comparison of Measures and Scales

Organized Oral Session at the INTECOL-ESA 2005 Joint Meeting in Montreal, August 7th to 12th, 2005

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Abstract

Introduction

Concern is growing over the fragmentation of habitats by roads and other transportation infrastructure. A number of measures to avoid, minimize, mitigate, or compensate for the detrimental effects of such fragmentation have been suggested.

These are geared to specific scales, from culverts at the scale of a single road to plans for re-connecting habitats across entire countries or continents. They include the removal of roads, building of overpasses and underpasses at roads and railways to increase permeability for animals, restoration or creation of wildlife corridors and networks of wildlife corridors across transportation infrastructure, and the design of less fragmenting road network patterns, e.g., the bundling of traffic lines.

However, it is still unknown which measures are the most effective in terms of restoring ecological processes. The investigation of their effectiveness, therefore, is an important and most urgent task because the most effective measures should be applied predominantly in order to use resources most efficiently.

How can the effectiveness of such measures be evaluated (criteria and methods)? For example, possible criteria for the effectiveness of crossing structures are the reduction of road-kill frequencies, increased passage frequencies, presence of species on both sides of the road, genetic exchange across the road, recovery of lowered reproductive rates and skewed sex ratios, re-colonization success, recovery of skewed foraging intensities among foraging areas on either side of the road, and recovery of skewed predation rates. More generally, the measures should enhance landscape connectivity and restore ecological processes among habitat patches and across landscapes.

During the last three years, considerable progress on measuring the effectiveness of such measures has been made in both Europe and North America. This session brought together the “Father of Road Ecology” Richard Forman with researchers from Europe (Austria, The Netherlands, etc.) and North America working at different scales and in different locations. They presented current methods and results on the success of various mitigation measures to foster cross-scale comparison and synthesis on this topic. The presentation included empirical studies, synthetic overviews, modeling studies, and conceptual studies.

List of abstracts and talks

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1. Forman, R. T. T. 2005. Integrating traffic, network location, and surrounding habitat to create a connected landscape. Harvard University, Cambridge, Massachusetts.

   Using simple spatial models, three key variables (traffic, location in network, and habitat arrangement relative to roads) are evaluated for their effects on habitat loss, degradation and fragmentation. Although the overall approach may be new, parts of the picture have been successfully applied in, e.g., Germany, Netherlands, Massachusetts, Florida and New Jersey.

   First, the values of large patches (natural habitat), high connectivity, and small patches are used to ecologically evaluate a road segment, plus a road network, relative to the spatial arrangement of large patches, small patches, wide corridors and narrow corridors. Overall, a gradient emerges from the best arrangement (small habitat patch in center of a network enclosure) to the worst (large patch dissected by network). The best location for a road passing between two large patches is part way between the mid-point and a patch edge.

   Second, the curvilinear relationship between road traffic and wildlife crossing, as well as between traffic (noise) and effect distance on wildlife, are added to the analysis, along with spatial differences between natural and agricultural or suburban landscapes.

   Based on habitat loss, degradation, and fragmentation, the ecologically worst situations are high and medium traffic in a natural area and high traffic alongside a large natural patch in an agricultural/suburban landscape. For a given traffic flow, the best network form has a few large enclosures and is characterized by a few busy roads.

Further modeling of network forms, traffic, and habitat arrangements, plus empirical field studies, should convert the patterns uncovered into principles for transportation, ecology and society.

Keywords: ecological effects of traffic, ecology of network form, habitat arrangement relative to roads, roads and habitat loss, degradation and fragmentation.

2. Bissonette, J. A. 2005. Taking the road less traveled: The importance of scaling indirect road effects allometrically. United States Geological Survey Utah Cooperative Fish and Wildlife Research Unit, College of Natural Resources, Utah State University, Logan, Utah.

   The roaded landscape has both direct and indirect effects on ecological patterns and processes. In particular, animal movement is especially hindered as road density increases. Although barrier effects are not similar across all roads, the effects of road geometrics (e.g., road type, width, presence of fences) present significant problems to animals, resulting in fragmented habitats and often isolated populations.

   Mitigation to decrease barrier effects includes, among other things, the construction of crossing structures of two general types; those that cross over the road, and those that provide passage underneath. The number, type, configuration, and placement of crossing structures will determine whether permeability is restored to the roaded landscape.

   By permeability, I refer here specifically to the ability of species of all kinds to move relatively freely across the roaded landscape. By my definition, landscape permeability differs from the term connectivity: permeability implies the placement of crossing structures allometrically scaled to the organism; connectivity as I define it here refers to the human perception of how connected the landscape matrix is, irrespective of organism scaling.

   As Wiens pointed out (*1989 Functional Ecology 3:385-397*), scale dependency in ecological systems may be continuous or not. I suggest that whether it is or not, it may be possible to find domains of scale for groups of species for which animal movement scaling functions can be identified and used to guide the placement of appropriate types of crossing structures. Early work has suggested a relationship between metabolism rate and home range size. Bowman et al. (*2002 Ecology 83(7):2049-2055*) argued that dispersal distance of mammals is proportional to home range size.

   To the extent that these arguments hold, it may be possible to identify allometrically scaled domains of movement that presumably include similar sized animals. If this is possible, the placement of appropriate types of crossing structures can be accomplished in a scale informed and sensitive manner, resulting in a permeable roaded landscape. In this paper, I explore these ideas with evidence and analyses.

   Keywords: scaling, roads, permeability, connectivity.

3. Beier, P., K. L. Penrod, C. Luke, W. D. Spencer, and C. R. Cabañero. 2005. The Missing Linkages Project: Restoring wildland connectivity to southern California. Northern Arizona University, Flagstaff, Arizona.

   In Fall 2001, the groundbreaking Missing Linkages report identified 232 wildlife linkages in California. South Coast Wildlands immediately spearheaded an effort to prioritize, protect, and restore linkages in the South Coast Ecoregion.

   We first forged a partnership with 15 federal and state agencies, conservation NGOs, universities, county planners, and transportation agencies. By partnering from the start (rather than developing a plan on our own and asking others to “unite under us”), we garnered spectacular support and are making rapid progress. With our partners, we (1) selected 15 priority linkages (out of 69 linkages in the ecoregion) on the basis of biological importance (size and quality of core areas served) and vulnerability; (2) held workshops to identify 12 to 20 focal species per linkage; (3) researched the needs of focal species, obtained high-resolution spatial data, conducted GIS analyses, and collected field data to develop a linkage design; and (4) presented the design to partners who are now procuring easements and land, changing zoning, restoring habitat, and mitigating transportation projects.

   Our collaborative, science-based approach provides a template for creating a green infrastructure in even the most human-dominated landscapes. A more recent effort in Arizona is being led by state and federal transportation agencies. These efforts promise not to merely slow down the rate at which things get worse, but rather to create projects that will improve connectivity for wildlife.

   Keywords: corridors, wildlife linkages, reserve design, habitat fragmentation by roads.

4. Jaeger, J. A. G. and L. Fahrig. 2005. Effects of bundling of roads on population persistence. Swiss Federal Institute of Technology ETH, Zurich.

   Roads act as barriers to animal movement, thereby reducing the accessibility of resources on the other side of the road. They also increase wildlife mortality due to collisions with vehicles, and reduce the amount and quality of habitat. The strength of these effects depends on the amount of traffic. To minimize these effects,

the bundling of roads and traffic has been suggested because it keeps as large areas as possible free from disturbances due to traffic.

This can be done in two ways: avoiding the construction of new roads by upgrading of existing roads and placing new roads close and in parallel to existing roads. However, this suggestion has been criticized because the accumulated effects of several roads bundled together, or an upgraded road with more traffic on it, may create a stronger overall barrier effect that may be more detrimental to population persistence than the even distribution of roads across the landscape. We used a spatially explicit individual-based simulation model of population dynamics to evaluate the effectiveness of road and traffic bundling. We compared the probability of population persistence and the time to extinction for three different road configurations and different types of animal behavior at the road, when traffic volume was varied.

Our results support the bundling concept. Population persistence was generally better when all traffic was put on one road than when it was distributed on several roads across the landscape. If traffic cannot be combined on one road, our results suggest it is better to bundle the roads close together than to distribute them evenly across the landscape.

Keywords: barrier effect, road effects, spatially explicit population model, traffic mortality.

5. Zink, R., R. Grillmayer, F. Reimoser, F. Völk, and M. Woess. 2005. Reducing habitat fragmentation: Strategies, scales, and implementation in Austria. University of Veterinary Medicine, Research Institute of Wildlife Ecology, Vienna, Austria.

   In Europe nowadays, migration and genetic interchange for wildlife species crucially depend on the location and distribution of barriers such as motorways. We illustrate the emergence of wildlife passageway concepts, their legislative implementation in Austria and present some case studies.

   In addition to an increase of transit, the central, geographic characteristics and position of Austria combined with extended road construction has impacted the ability for wildlife to migrate. Especially in Alpine valley regions, residential areas and highways are concentrated, and they often irreversibly prohibit wildlife passage. Although historical migration routes and corridor areas for wildlife were not appreciated in the past, this topic is intensively studied today.

   Substantial lobbying has led to better public understanding and resulted in legislative changes. Authorities and transport planning officials, regional planners, game managers, farmers, foresters, hunters and conservationists cooperated to put the results into practice. A federal directive (RVS 3.01, FSV 1997) to reduce traffic accidents and road-kills began a series of measures to restore landscape connectivity in Austria. Passageways and migration corridors are an inherent part of wildlife ecological spatial planning (Reimoser 2002) and have been included in regional land-use regulation.

   In order to provide an overview about potential migration corridors in Austria, a GIS-model at the University of Natural Resource and Applied Life Sciences was developed. This model is based on land-cover data and spatial resistance for wildlife mobility (Grillmayer et al. 2002). The outcome provides information about habitat fragmentation and potential migration routes for the umbrella species red deer and brown bear.

   Additionally, terrestrial surveys have been undertaken and more than 3,500 bridges have been evaluated for passage possibilities (Volk et al. 2001). We combined potential migration routes and dividing road networks to determine high-value, key patches for migration. The construction of several ‘green-bridges’ in cooperation with the Austrian highway operator ASFINAG has occurred. It is also partly financed by the European Union and is only one example that proves our effort to succeed on national and international levels.

   Keywords: habitat fragmentation, wildlife corridor, modeling, spatial planning.

6. van der Grift, E. A. and J. Verboom. 2005. Patch-based monitoring to assess the effect of wildlife passages on the viability of metapopulations. Alterra, Wageningen University and Research Center, Wageningen, Netherlands.

   It has been proven that wildlife crossing structures, such as badger pipes, amphibian tunnels, or wildlife overpasses, are frequently used by a variety of species. However, it is not clear yet if these defragmentation measures affect population viability. Transport corridors, as well as accompanying mitigation measures, affect populations in a complex way. Wildlife passages may improve reproductivity, reduce mortality, and increase both immigration and emigration. Wildlife fences prevent mortality, but increase, at the same time, the barrier effect of transport corridors, resulting in a decline in gene flow or a reduced recolonization probability.

   Considering these complex relations between mitigation measures and population dynamics, monitoring the effectiveness of defragmentation measures is not an easy task. Based on metapopulation theory, we suggest a so-called patch-based monitoring to measure the effects of wildlife crossing structures at transport corridors on the survival of populations.

In this method, the presence or absence of a species is assessed in all spatially distinct habitat patches suitable for the species. Presence in a habitat patch is as important as absence, based on the characteristics of metapopulations that not all suitable patches are inhabited simultaneously at a certain moment in time and that over time, populations become locally extinct and habitat patches become recolonized again.

Survey results can be statistically compared with model predictions of the probability that a species occurs in each habitat patch, based on differences in patch size, isolation, and patch quality, as well as characteristics of the species itself such as dispersal capacity. In such predictive models, the barrier effect of infrastructure as well as the defragmentation effect of wildlife crossing structures can be included.

To prove an effect of defragmentation measures on population viability, both study species and study sites should be carefully selected. Study species should, among others, be sensitive to both fragmentation impacts by transport corridors and defragmentation impacts by mitigation measures. Study sites can be best chosen at locations where defragmentation measures will result in a considerable shift in population viability. Surveys should preferably be conducted over many years.

Keywords: population viability, wildlife passages, defragmentation, patch-based monitoring.

7. Reck, H., M. Böttcher, K. Hänel, and A. Winter. 2005. German Habitat Network: Effects of fragmentation in Germany and solutions to preserve, restore, and develop functioning ecological interrelationships. Christian-Albrechts-University, Kiel, Germany.

   The ecological and legal situation is that Germany's traffic is the densest worldwide: 1.8 km road/km2, 4.9 percent traffic areas; traffic density is 1.750.000 km driven by car/a km2. Less than 23 percent of Germany consists of areas least 100 km2 in size which are undivided by heavy traffic. Urban areas cover 6.5 percent of land. Agriculture and forestry is intensive.

   As a consequence, we find extreme deficiencies of up to 80 percent in ground beetle communities in isolated habitats and similar effects in other taxa as well as deficiencies in genetic diversity, and we find that road kills are a threat even to fast-moving mammals.

   Therefore, in 2002 a new article was added to the Federal Nature Conservation Act, covering at least 10 percent of the total area, a network of interlinked biotopes must be designed and every new project has to undergo an impact-regulation procedure if it may impair the ecosystem.

   Draft of the German Habitat Network. For execution of the law, a first sketch of a network was carried out as an integrated approach to preserve, restore, and develop functioning ecological interrelationships, not only for maintaining species diversity, but also for human use.

   The lecture reviews the aims and methods used in setting up this draft in the scale of 1:750.000. It is basic information to identify priorities for minimizing ecological barriers and to identify priorities for mitigation or compensation of future impacts; so it is essential information in impact assessment procedures. The draft is also a request to improve landscape data and knowledge necessary for developing landscape corridors and stepping stones in more detailed scale.

   Current activities: In order to improve motivation, design and execution, especially research on ecological needs and capabilities for migration of representative target and keystone species (plants, insects, mammals) is in demand. At present, four approaches supported by the Federal Agency for Nature Conservation shall enhance knowledge: 1. Identifying most-important habitats and best-fitting corridors within Germany using new land cover data and GIS algorithms, 2. Compiling ideas for international linkages, 3. Metaanalysis for an integrative assessment of barrier effects (connected with a combination of metapopulation models with movement modeling of target species) 4. Assessment of the benefits of undivided areas with low traffic.

   Keywords: impact assessment, mitigation, habitat corridors, modeling migration.

8. Adriaensen, F. and E. Matthysen. 2005. Using least-cost models to plan and evaluate measures reducing habitat fragmentation by roads. University of Antwerp, Department of Biology, Campus Drie Eiken, Antwerp.

   The growing awareness of the adverse effects of habitat fragmentation on natural systems has resulted in a rapidly increasing number of actions to reduce current fragmentation of natural systems, as well as a growing demand for tools to predict and evaluate the effect of changes in the landscape on connectivity in the natural world. Recent studies have used least-cost modeling (available as a toolbox in GIS systems) to calculate effective distance, a measure for distance modified with the cost to move between habitat patches based on detailed geographical information on the landscape as well as behavioral aspects of the organisms studied.

   We will discuss the modeling technique, as well as some results of the application of the method to a small-scaled agricultural system subject to different scenarios (e.g., tree lines along road sides) and to the construction of a wildlife bridge across a highway. Least-cost modeling is not a tool to measure effectiveness of

mitigating measures. The key role for least-cost models is in the planning phase, in modeling the potential effects of measures given that these measures will function as predicted.

There are some very important aspects on restoring connectivity that may be modeled using least-cost models. Different locations for mitigating measures can be evaluated for their effect on a local as well as on a larger scale, taking into account other corridors and barriers even if they are located at some distance . Different locations can be evaluated for their accessibility from source populations of the target species. Especially in complex landscapes, the evaluation of different scenarios may become a very complex problem. Least-cost models are able to generate more integrated landscape-wide 'pictures.'

The model is shown to be a flexible tool in scenario building and evaluation in wildlife protection projects and applied land/infrastructure management projects. (F. Adriaensen et al. 2003. The application of 'least-cost' modeling as a functional landscape model. *Landscape and Urban Planning* 996, 1-15).

Keywords: least-cost, modeling, landscape connectivity.

9. Strein, M., R. Suchant, and M. Herdtfelder. 2005. Aggregated wildlife road kills as indicator for wildlife corridors at different scales: Modeling for practical application. Forstliche Versuchs und Forschungsanstalt, Baden-Wuerttemberg, Freiburg, Germany.

   Annually more than 200,000 larger mammals are killed through traffic in Germany, of which 20,000 are counted for the federal state of Baden-Wuerttemberg. These accidents cause about 3,000 injuries and kill about 50 people. The direct damages without the costs of the peoples economy amounts to more than 400,000,000 Euro.

   For most wildlife in Germany road mortality ranks among the main causes of death; respectively the populations of rare species suffer from landscape fragmentation by traffic infrastructure and substantial impairment of ecological functions that are especially contradictory to the ranges of larger mammals. However, large mammals are among the decisive indicators for the functionality of wider ecological relations in cultivated landscapes.

   Our actual work is based on research about potential wildlife corridors in Baden-Wuerttemberg, where we found out that many wildlife road kills are concentrated over long time periods in very short traffic sections of maximal 500 meters. For that reason, foresters, hunters and road-maintenance personnel all over Baden-Wuerttemberg were questioned for the location of short traffic sections with aggregated road kills, number and concerned species of annual wildlife road kills and possible installed measurements of prevention.

   Surprisingly, about 40 percent of the total of 20,000 wildlife road kills in Baden-Wuerttemberg is concentrated in about 1,000 short road sections. The analysis of the landscape ecology in the environment of these road sections allows us to differentiate between different causes, as well as to calculate or predict collision risks at already-existing or planned traffic infrastructure. Therefore, we will identify and describe landscape parameters of these road sections with aggregated road kills that locate wildlife corridors on a regional landscape level and higher. These results are directly used in modeling for the parameterization of wildlife corridor models and compared with traditional wildlife routes, as well as with the results of the former project Wildlife Corridors in Baden-Wuerttemberg.

   Therefore, the number of wildlife collisions does not only correlate with the abundance of a certain species and a given traffic volume, but under certain circumstances it is beyond dependent on wider functional landscape ecological relations.

   Keywords: wildlife road kills, fragmentation, road ecology, modeling.

Biographical Sketch: Jochen A. G. Jaeger is a postdoctoral fellow in the Department of Environmental Sciences at the Swiss Federal Institute of Technology Zurich (ETH Zurich), Switzerland, with Prof. Dr. Klaus Ewald. He studied physics at the Christian Albrecht University in Kiel, Germany, and at the ETH Zurich. He received his Ph.D. from the Department of Environmental Sciences at the ETH Zurich. He has held a position at the Center of Technology Assessment in Baden-Württemberg in Stuttgart, Germany, and has lectured at the University of Stuttgart, Germany. In 2001, he won a two-year research grant from the German Academy of Natural Scientists Leopoldina and went to Carleton University in Ottawa, Ontario, Canada, as a postdoctoral fellow with Dr. Lenore Fahrig in her Landscape Ecology Laboratory (Department of Biology). Dr. Jaeger is currently working on his habilitation thesis, funded by a research fellowship from the German Research Foundation (DFG). His research interests are in landscape ecology, quantification and assessment of landscape change, assessment of the suitability of landscape metrics, environmental indicators, road ecology, modeling, urban sprawl, and novel concepts of problem-oriented transdisciplinary research.

Stewardship on the Horizon: Integrated Planning in the 21st Century

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Abstract

Currently, highway projects are planned, funded, and designed before considering the potential impacts to wildlife and habitat. Often, this can lead to expensive delays, lawsuits, and unnecessary loss of habitat. Streamlining project delivery and reducing unnecessary delays is important to state transportation agencies. By utilizing natural-resource data in early stages of planning, state transportation agencies can avoid, minimize, and mitigate early and avoid costly delays later in the life of their projects.

As part of the federally funded State Wildlife Grants Program, all state fish and wildlife agencies have recently completed comprehensive, wildlife conservation strategies, called State Wildlife Action Plans. These Action Plans will prioritize efforts and maximize investments to protect the state's natural resources. While fish and wildlife agencies are leading the charge, the aim is to create a strategic vision for conserving the state's wildlife–not just a plan for the agency.

Each Action Plan includes eight required elements, including "distribution and abundance of wildlife species" and "descriptions of locations and relative condition of key habitats and community types." Many states produced maps of prioritized habitat throughout the state. Correspondingly, the new transportation bill, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) included provisions that integrate consideration of wildlife conservation into the transportation planning process.

Under the new law, each metropolitan planning organization (MPO) and state department of transportation (DOT) will consult with resource agencies in developing long range transportation plans and compare the transportation plan with conservation maps or natural resource inventories–such as the new State Wildlife Action Plans.

The State Wildlife Action Plans are an opportunity for states to adopt a proactive approach to habitat conservation and an effective tool for transportation planning. For the first time, transportation agencies will have access to comprehensive natural-resource data at the planning stage, rather than waiting until environmental review.

Biographical Sketch: Trisha White is the Director of Defenders of Wildlife's Habitat & Highways Campaign at their national headquarters in Washington, D.C. The Habitat & Highways Campaign seeks to reduce the impact of surface transportation infrastructure on wildlife and encourage state and local authorities to incorporate wildlife conservation into transportation and community planning. In partnership with the Surface Transportation Policy Project (STPP), Trisha authored a best practices report, *Second Nature: Improving Transportation Without Putting Nature Second*, which has since been awarded the 2004 Natural Resource Council of America Award of Achievement for best publication. White is also:

- International Conference on Ecology and Transportation (ICOET) sponsor and member of steering and program committees
- Member, Federal Highway Administration's Europe Scan tour on wildlife mortality
- Member, Transportation Research Board Task Force on Ecology and Transportation
- Board Member, Southern Rockies Ecosystem Project

Prior to Defenders, Trisha spent three years with World Resources Institute's Biological Resources program and one year as environment policy consultant to the U.S. Agency for International Development's Global Environment Center. In 2000, she received her Masters degree in environment & resource policy from the George Washington University.

Update IENE and Other New European Actions

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Abstract

The following contains general information about some important issues concerning habitat fragmentation due to linear infrastructure and measures taken to counteract this phenomenon.

COST 341

At the International Conference on Ecology and Transportation (ICOET) 2003, I presented an overview of COST 341. This European action, ordered by the European Union (EU), was initiated by the Infra Eco Network of Europe (IENE). The action concluded in November 2003 with a well-attended international conference in Brussels. At this conference, we appreciated it very much that several ICOET representatives attended. As the official chairman of the conference, I gave a piece of the jigsaw to Mary Gray to remind the Federal Highway Administration (FHWA) to continue with the subject and to use the information.

At the conference, the products of the COST 341 action were presented. These products include the *European Review*, the handbook, the national state-of-the-art-reports, and the database.

The Handbook of Cost 341 was translated to national versions for several countries. In each version of the handbook, specific, nationally oriented comments and questions were added. This was done in the Czech Republic, France, the Netherlands, Norway, Sweden, and Switzerland. In several of the 18 connected countries inside the action, the national working groups still exist as groups of well-informed people concerned about habitat fragmentation due to linear infrastructure.

Also very important is that the network of people at the international level is still vital. When there is a need for information, a second opinion, or advice, a COST 341 colleague is willing to give assistance. This is only possible because there is a network of capable and involved people.

The information gathered in COST 341 was the basis of several contributions at conferences concerning environmental issues in general or habitat fragmentation specifically. At the World Road Association (PIARC) 2003 World Congress in Durban, the results of COST 341 were presented as well. Habitat fragmentation now is included in the work of PIARC in Technical Committee (TC) 2.1, Sustainable development and road transport. I am responsible for the action mitigation of the environmental impact of road transport, one of several actions under this TC. This technical committee sent out a questionnaire to contacts all over the world, and we will hope to have enough feedback to produce some practical recommendations on how to handle fragmentation in our report to the next World Congress in Paris 2007.

At conferences in France, Italy, the Netherlands, and Poland this information was given to other people for use in other situations.

Some general developments with big impact in Europe

Previously, there were several EU directives concerning environmental issues around transport. Four of note include: the Habitat and Bird Directive, Soil Directive, Noise Directive, and Air Quality Directive. These directives must be implemented in the national legislation of each country that signed such a directive.

These EU directives have a big influence on policy and legal aspects concerning nature protection and environmental issues along roads and rail lines. For example, the Air Quality Directive, which is already implemented in Dutch legislation, was enforced in this year and caused reconstruction plans to be stopped. A Dutch high court decided that the expected pollution levels would be too high. That means that the reconstruction was postponed until the expected impact has been measurably decreased. This court decision gave an enormous push to the research and measures involving air pollution due to traffic.

Since 2004, there have been 10 new member nations added to the EU. The bilateral contacts intensified rapidly. There is an enormous increase of travel and cargo trade to and from these countries. And with this increasing amount of movement, there is a big need for new motorways and improvement of roads. This urgent need demands knowledge and for a new set of cooperation tools.

These new countries must fulfill the regulations for road-building activities ordered by the EU directives. That is an important reason for several bilateral contacts, projects, and programs to exchange knowledge and information. So at this moment (September 2005), there is a conference in Poland where the 10 new EU countries are discussing the possibilities and tools for environmental impact assessments and strategic environmental assessments.

Some developments in the Netherlands
In the new handbook (Leidraad aunavoorzieningen; see http://www.rwsnatuurenlandschap.nl), there is a lot of information about approaches, procedures, and ideas for defragmentation measures.

The Long-Term Defragmentation Program has been launched and has been accepted by Parliament. In this program three ministries (Agriculture, Nature Protection and Food; Transport, Public Works and Water Management; Spatial Planning and Housing) give their intentions, including work schemes and money to counteract fragmentation due to national infrastructure (motorways, canals, and rail). This program is to solve the problems in the ecological main structure, including the robust zones inside that main structure. The approach in this long-term program is area-oriented, integrated, and based on cooperation between involved parties in the region.

Biographical Sketch: Hans Bekker graduated from the Agricultural University of Wageningen as an engineer. He works at the Road and Hydraulic Engineering Institute (DWW), an inside advisory unit of the Ministry of Transport, Public Works and Water Management in the Netherlands. Bekker is a program leader working mainly with wildlife, roads, and traffic. He functions as a bridge between civil engineers and ecologists. He was chair of the European project COST 341: Habitat Fragmentation due to Transport Infrastructure. He is program leader for the Dutch Long-Term Defragmentation Program. He is a member of the steering committee of the International Conference on Ecology and Transportation (ICOET), where he represents the Infra Eco Network Europe (IENE).