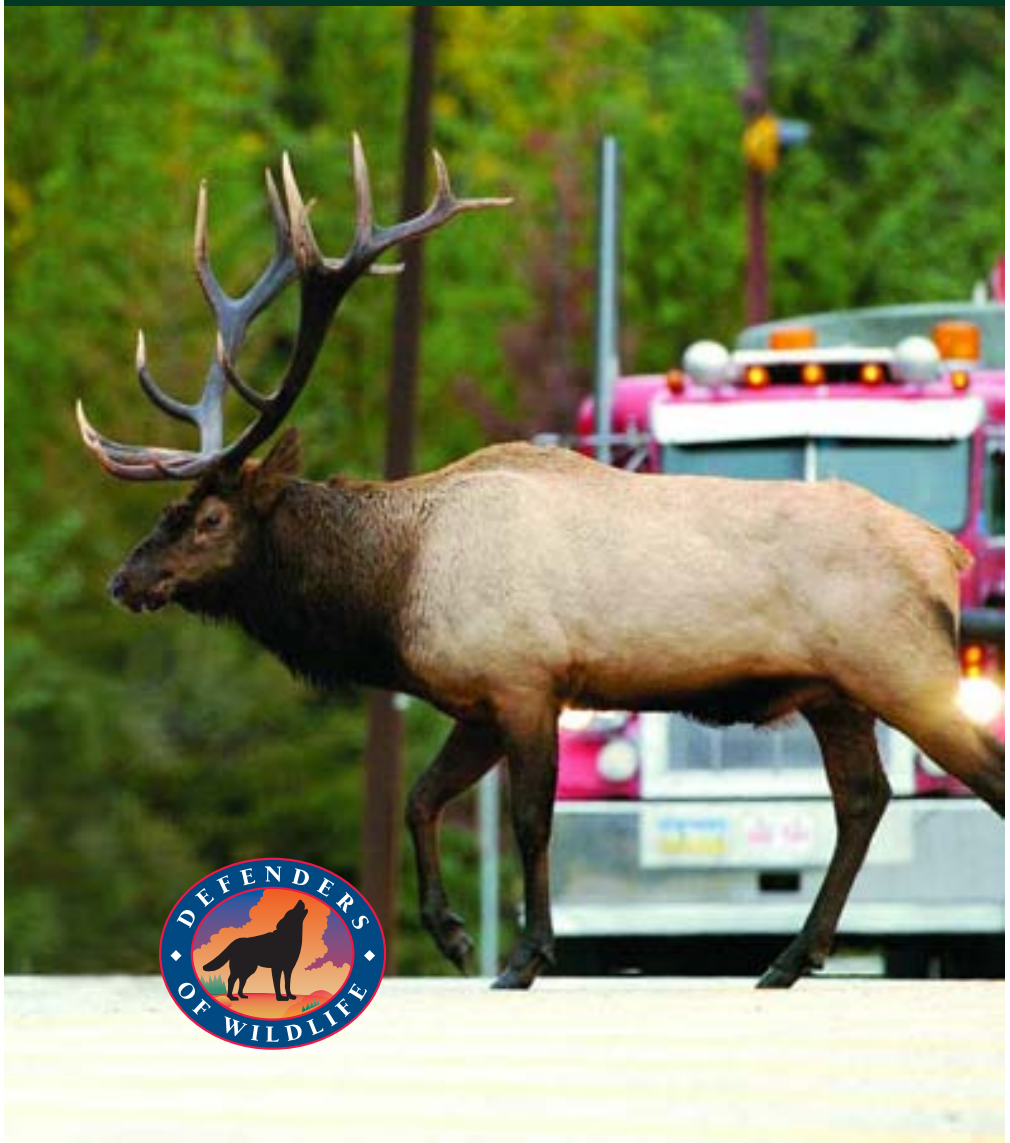
GETTING UP TO *SPEED*:

A Conservationist's Guide To Wildlife and Highways



DEFENDERS OF WILDLIFE

Defenders of Wildlife is a national, nonprofit membership organization dedicated to the protection of all native animals and plants in their natural communities.
Defenders launched the Habitat and Highways Campaign in 2000 to reduce the impacts of surface transportation on our nation's wildlife and natural resources.

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ACKNOWLEDGEMENTS

Defenders of Wildlife is grateful to the Surdna Foundation for their generous support of our Habitat and Highways Campaign and this publication. We also thank the following individuals for their assistance with this project:

Ann Adler
Steve Albert
Paul J. Baicich
Bill Branch
Arnold Burnham
Josh Burnim
Carolyn Campbell
Barbara Charry
Gabriella Chavarria
Patricia Cramer
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Monique DiGiorgio
Bridget Donaldson
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Bonnie Harper Lore
Laurie MacDonald
Noah Matson
Kevin McCarty
Jim McElfish
Gary McVoy
Louisa Moore
Jim Motavalli
Carroll Muffett
Siobhan Nordhaugen
Leni Oman
Yates Opperman
Terry Pelster
Jim Pissot
Robert Puentes
John Rowen
Bill Ruediger
Inga Sedlovsky
Shari Shaftlein
Chris Slesar
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Allison Srinivas
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GETTING UP TO *SPEED*:

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FOREWORD

The nation's transportation infrastructure, a remarkable engineering achievement, was mainly built before the first Earth Day in 1970 and before the rise of modern ecology. Since then, we have entered an era of new scientific information and new societal objectives. Transportation, science and the public have evolved accordingly. Today, enhancing the natural environment has increasingly joined safety and efficiency as the central goal of transportation for society.

Fortunately, along with this important and challenging development, the science of road ecology has emerged, focusing on plants, animals and water linked to roads and vehicles. Interested parties—transportation departments, natural resource agencies, nonprofit organizations, academics and the informed public—are rapidly discovering new common interests and opportunities for a new era of achievement. Project by project, spots along our infrastructure slowly improve and environmental objectives are increasingly included in transportation plans.

Yet, the big picture offers the greatest environmental gains and cost benefits. Three big-picture objectives provide a vision for all parties:

1. Improve the natural environment close to the entire road network.
2. Integrate roads with a sustainable emerald network across the landscape.
3. Integrate roads with near-natural water conditions across the landscape.

The first is a flexible trajectory with different solutions in different places. The second meshes road networks with the land's large valuable natural areas connected by major wildlife corridors for the future. The third integrates road networks with the land's natural groundwater/surface-water flows, aquatic ecosystems and fish. Indeed, diverse interested parties with a common vision are an unbeatable recipe for a powerful, cost-effective environmental accomplishment for transportation and society.

How can we get there from here? Think big, and take that first step through the pages of this book. Defenders of Wildlife's Patricia White has demystified the world of transportation for you, providing new discoveries at every turn. Knowing how to navigate and gain leverage in this big labyrinth makes us all more effective. Conservationists and transportation experts alike will find a goldmine of elucidations and opportunities for new partnerships.

Getting Up To Speed carries you on a journey across time and space, throughout our nation's transportation network and the maze of social, cultural and governmental influences on our natural resources and wildlife. Indeed, if you absorb but a tenth of this information, you are a dangerous opponent to the status quo. Start by improving a place, and watch that improvement cascade across the road network and the land.

Read on and see your journey come alive. Your discoveries and actions can make nature, transportation all of us winners.

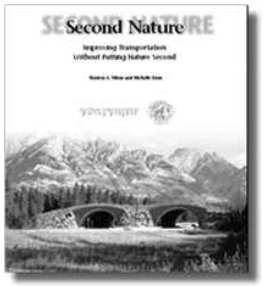
Richard T. T. Forman
Harvard University

INTRODUCTION

Entering the 21st century, we face the final frontier of conservation—both literally and figuratively. It's no longer enough to save species *or* spaces. As precious acres slip away under expanding infrastructure and associated development, advocates must look to a more comprehensive approach to conservation and can no longer afford to overlook unconventional partnerships. In the next century, our remaining habitat cores and corridors will be absolutely critical to wildlife as they attempt to respond to climate change.

Over the last decade, Defenders of Wildlife has recognized the urgency of addressing the impacts of highways on our nation's wildlife. Habitat loss is a significant threat to America's biodiversity, and one of the greatest consumers of habitat is poorly planned, sprawling development. Better transportation planning can shape future growth, thereby determining the quantity and quality of the habitat left for wildlife. As the issue of wildlife and transportation has garnered more attention, several excellent resources have surfaced, including the seminal *Road Ecology: Science and Solutions* by Richard T.T. Forman et al. The burgeoning science of road ecology has spawned action in agencies, academia, legislature and the conservation community.

Defenders launched the Habitat and Highways Campaign in 2000; a concerted effort with dedicated staff working to reduce the effects of surface transportation on our nation's wildlife and natural resources. The campaign has two simple objectives: reduce the impacts of highways on wildlife and prevent future habitat loss to unwise and unnecessary road building. In 2003, Defenders of Wildlife, in partnership with the Surface Transportation Policy Partnership released *Second Nature: Improving Transportation Without Putting Nature Second. Second Nature* outlines six winning approaches to reducing the impacts of roads and highways on wildlife and habitat, including integrating conservation planning into transportation planning, early interagency coordination, restoring habitat connectivity with wildlife crossings and using native species in roadside vegetation management.



Defenders is now proud to present *GETTING UP TO SPEED: A Conservationists' Guide to Wildlife and Highways*. While *Second Nature* was written specifically for transportation professionals, *Getting up to Speed* (GUTS) is intended for conservation advocates. Conservationists are often faced with conflicts involving transportation projects, but are ill prepared to respond in an informed manner. For the uninitiated, the world of transportation can be confusing and intimidating. As a result, advocates may feel powerless and ultimately surrender, or expend their limited resources in futile battles. Without a clear understanding of how highways happen, the conservation community cannot make effective changes.

GUTS seeks to crack the code on transportation and make the process more transparent from beginning to end—everything you always wanted to know about road building, but were afraid to ask. Transportation and resource professionals provided valuable input, as did academics and veteran advocates. By demystifying the world of transportation, we hope to provide conservationists with the necessary foundation for becoming better informed, more effective stakeholders in transportation debates.

GUTS is divided into five sections:

Law, Policy and Governance describes the legislative and regulatory framework associated with our transportation infrastructure, including the highway bill, funding, research and management of roads on public lands.

Anatomy of a Road illustrates the life cycle of a road project, from the planning process to environmental review, through construction and long-term maintenance.

Natural Environment provides greater detail about transportation policies and practices specifically related to wildlife, roadside vegetation and aquatic resources.

Advocacy outlines helpful hints for conservation advocates and showcases some of the best examples of successful organizations and campaigns.

The **Appendix** provides conservationists with abundant additional information and tools to help work more effectively on this issue locally and nationally.

GUTS is not an anti-road call to arms. While we fully respect our colleagues who oppose all highways, it has not been the focus of the Habitat and Highways Campaign and is not the message you'll find in *GUTS*. We are *unapologetically opposed* to an ever-expanding network of highways that fragments and destroys precious, remaining wildlife habitat that is essential to biodiversity conservation. Despite

the heroic efforts of the road-building sector, it is impossible to develop an ecologically benign highway. We *enthusiastically support* any and all efforts to enhance existing human habitat because it reduces the pressure to build more of it in wildlife habitat.

GUTS is not about logging roads or roadless areas. There are many different types of roads, from one-lane, dirt roads to two-lane rural streets to major interstate highways. While the impacts to wildlife may be similar, the development, ownership and management of various types of roads are very different. *GUTS* is focused specifically on public roads and highways, built and maintained by county, state and federal agencies and used by the general driving public.

GUTS is not a best practices manual for transportation agencies, it is a guide to *all* practices—the good, the bad, and the ugly—for conservation advocates. We do include several examples of better practices that conservation advocates should be aware of and encourage their transportation agencies to adopt.

GUTS is not comprehensive. There is no shortage of information on the subject of transportation and certainly too much to corral into one book. Add wildlife to the equation, and you've got enough information to fill a library. Each chapter could easily be expanded into a full book of its own. In most cases, finding the information was less of a challenge than condensing several hundred pages of information into a few paragraphs. Transportation policy and practice is continually evolving, as is our understanding of wildlife and transportation conflicts. And because transportation policy and practice varies wildly from state to state, you will still need to do your homework on how things are done in your home territory. This book will not eliminate the need for other resources. In fact, we predict it will encourage you to seek out even more.

Finally, *GUTS* is not complete without you. There has never been a better time for conservationists to take our rightful place in this debate. There is much left to learn, but we now have enough information, technology, policy and people to turn the corner on this issue. Even Congress has now recognized the wisdom and the urgency of addressing this crisis. Provisions in the last highway bill gave conservationists the power to tackle wildlife and transportation conflicts at both the local and landscape level. There is also a growing cadre of good people in transportation and resource agencies making progress, but they can't do it alone. Necessary change won't happen without the conservation community, and it won't happen unless we get organized, get involved early in the process and *get up to speed*.

HOW TO USE THE *GUTS* GUIDE

Getting Up To Speed (GUTS) was written with you, the conservation advocate in mind—from the novice to the seasoned veteran. There is a lot of information, and it may seem overwhelming, but *GUTS* is organized to put vital information in context to make it easier to understand. If you are the type who likes to read a book from cover to cover, *GUTS* will not disappoint. By starting with the large, overarching subjects and progressing through the process to the specifics, *GUTS* tells a story. If you are the type who likes to just read the parts you need when you need them, *GUTS* is designed to help you quickly find what you're looking for.

Look for the special *GUTS* symbols that direct you to additional information on subjects of particular interest to conservation advocates:

SAFETEA-LU directs you to conservation-related information regarding the 2005 highway bill, the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users.

points the way to suggestions for effective advocacy opportunities related to each subject.

CAUTION alerts you to potential pitfalls.

GUTS also contains many special features to help you navigate the guide and the world of transportation:

Thumb tabs are found on the page edges so you can flip to individual sections and chapters.

Hall of Fame sections inspire you with some of the best and brightest examples of policy, practice and advocacy for wildlife in transportation.

You Make the Call boxes present the hottest topics of debate, followed by representative viewpoints from two opposing perspectives.

Guest Columns showcase insight on various topics from experts in the fields of transportation, wildlife and advocacy.

Quotes from veteran advocates, transportation and resource professionals are scattered throughout the chapters and give voice to the topics.

Resources are found at the end of each chapter, giving you a handy guide to other valuable sources on the chapter topic.

The Appendix is chock full of additional resources such as a Who's Who on transportation professionals and groups, a what's what on road types, acronyms, websites, listservs and other goldmines of information you may want to refer to as you are reading the chapters.

GUTS is all about learning new lingo. Transportation is a very jargon-heavy field and you will be learning a lot of new terminology. You will also find that transportation professionals rely heavily on the use of acronyms. In fact, many acronyms are used so frequently they are considered words themselves and replace the words they represent. Here is a short list of the most frequently used acronyms:

FHWA	Federal Highway Administration
USFWS or FWS	United States Fish and Wildlife Service
SAFETEA-LU	Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users
MPO	Metropolitan Planning Organization
AASHTO	American Association of State Highway and Transportation Officials
TRB	Transportation Research Board
FLHP	Federal Lands Highway Program
LRTP	Long-range transportation plan
STIP	Statewide Transportation Improvement Plan
NEPA	National Environmental Policy Act
EIS	Environmental Impact Statement

GUTS is also available online at
http://www.gettinguptospeed.org

Law, Policy and Governance

IN THIS SECTION

Legislation and Regulation walks you through the history of transportation law and policy in the United States. Starting with the Federal-Aid Highway Act of 1944, through the Interstate Era and our present day TEA bills you can follow the progress from early roads to the juggernaut we know as our highway system. You will also get an overview of all transportation related laws and a quick primer on the Code of Federal Regulations, where these and all our laws are safely kept.

Transportation Funding answers the big questions: Where does the money come from? Where does the money go? You'll learn about gas tax and how the Highway Trust Fund pays for our highways.

Transportation Research describes the many and varied institutions of transportation research, including who does it, where you can find results and how conservationists can contribute.

Public Roads and Public Lands introduces you to the agencies and policies that control public roads and alternative transportation choices in our public lands.

LEGISLATION AND REGULATION

John Lennon said, "Reality leaves a lot to the imagination." When we look at our landscape today, do we see an accurate reflection of our values and the policies intended to implement them? It's obvious that we value convenience and unmitigated access, but it's getting harder and harder to see that we also value natural resources, wildlife, open space, clean water and air, healthy kids and a sense of community.

Demographic and socio-economic factors are always in play but public policies on transportation and land use have an important role in shaping development patterns. In a single century, our network of roads and highways went from largely unseen to the *largest human artifact on earth* (Forman, 2003). If you're still on the fence about whether this is an important issue for you, your organization or your community, consider this—between 1950 and 1990, urban land area increased more than twice as fast as population, and at our current pace, the amount of land developed in the next 25 years will equal the total amount developed since the country's founding (FHWA, 2001). How much of this was a result of policy and how much was a result of other forces remains the subject of heated debate.

This chapter offers a quick overview of transportation law and policy, with some insight into the forces that have shaped them. Conservationists would do well to become intimately familiar with both. You'll quickly find that we don't suffer from a lack of laws, but more likely from a lack of participation. Ready for the challenge?

HISTORY

Though difficult for us to imagine, highways as we know them are a relatively new phenomenon, and so are the laws and policy that govern them. Prior to the 20th century, most of our roads were built and maintained by local governments. In 1904, the first national survey of road conditions revealed that only 7 percent of the country's roads were surfaced. Even those were surfaced with gravel or low-quality macadam, suitable for horse and carriage, but unsuitable for faster, heavier automobiles. The federal government planned and sporadically built pieces of a "National Road" which was later abandoned and turned over to counties. By and large, Americans relied on railroads for long distance travel and used roads only as necessary for local trips (Gutfreund, 2004). Roads were built on an as-needed basis to accommodate industrialization until a burgeoning automobile industry recognized that poor road conditions would discourage auto travel, and consequently auto sales. Soon thereafter, auto makers began clamoring for high quality, publicly financed, long-distance highways (Holtz Kay, 1997).

The Great Depression and World War II would conspire to keep the nascent highway program from being realized until decades later. Near the end of the war, Congress accelerated the highway building process by passing the Federal-Aid Highway Act of 1944, which designated 40,000 miles to create a national system of interstate highways (Weingroff, 2006). When Dwight D. Eisenhower took office in 1953, he brought a vision of an integrated national highway system that would "protect the vital interest of every citizen."

Interstate System

Under Eisenhower's leadership, Congress passed the Federal-Aid Highway Act of 1956, providing $175 million to begin building our national highway network. Two years later, $25 billion was authorized for the next decade of highway building, to be built with uniform interstate design standards and controlled access. The Interstate System was to be a grand plan for a system of highways, developed through a cooperative alliance among state and federal transportation officials (Weingroff, 2005).[MAP]

Unfortunately, many proposed routes were drawn up without regard for impacts to local communities because construction of the highway system was considered a national issue, trumping local concerns. Low-income urban neighborhoods and rural areas were often targeted as prime areas for new highway corridors. In response, a series of "freeway revolts" broke out in cities from Boston to San Francisco throughout the 1960s. Resident activists and community leaders stood up and successfully stopped or modified many proposed routes. As a potent reminder of the power of people to affect political change, short stretches of unfinished highways and abruptly-terminating alignments can still be found in many U.S. cities (Burwell, 1977).

Did You Know? During the first decade of interstate construction, 335,000 homes were bulldozed to build highways; more homes than have been built by the National Public Housing Program (Benfield, 1999).

The freeway revolts demonstrated the need for collaborative transportation planning with local input and paved the way for public involvement in the road-building process. The Federal-Aid Highway Act of 1962 instituted a federal requirement for urban transportation planning. To receive federal funding, urbanized areas (with populations of 50,000 or more) were required to plan all transportation projects cooperatively with state and local governments. The Bureau of Public Roads (predecessor to the FHWA) soon thereafter required the creation of agencies we now know as Metropolitan Planning Organizations (MPOs) to carry out the planning process. Over the next 30 years, transportation policy and practice remained relatively unchanged within a country that was rapidly changing. The United States needed an infrastructure that would embrace local concerns, expand the focus beyond travel demand and incorporate a wide range of social, economic and environmental concerns. But it wasn't until the end of the 20th century that a new era of transportation legislation began.

Intermodal Surface Transportation Equity Act (1991)

Championed by Senator Patrick Moynihan (D-NY), the Intermodal Surface Transportation Equity Act (ISTEA) set forth groundbreaking reforms when it passed in 1991, representing a major shift in transportation policy. ISTEA set out to transform our 1950s era highway building program into "...a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner."

ISTEA promoted an intermodal approach to highway and transit funding with flexible funding, collaborative planning requirements and devolution of power to municipalities. One of the most significant innovations was the creation of the Transportation Enhancements (TE) program that provided funds for community-based projects to enhance the travel experience, protect scenic vistas, create bike paths, develop walkable downtowns and protect the environment. Also for the first time, ISTEA directly addressed transportation's impact on air quality through the Congestion Mitigation Air Quality Improvement (CMAQ). ISTEA greatly increased available funding, authorizing $155 billion in spending for fiscal years 1992 to 1997.

Transportation Equity Act for the 21st Century (1998)

By the time ISTEA was up for reauthorization, its groundbreaking reforms were largely established, proven and effective. Passed in 1998, the Transportation Equity Act for the 21st Century (TEA-21) was in every sense a direct successor to ISTEA—continuing flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. New programs such as the Transportation and Community and System Preservation (TCSP) pilot and safety incentives aimed at seatbelt use and drunk driving targeted special areas of national interest.

Building on ISTEA's strengths, Congress attempted to correct some of its perceived weaknesses as well. Prior to TEA-21, transportation had to compete for appropriations with all other national priorities and Highway Trust Fund monies could be spent in other areas as necessary. TEA-21 instituted a "guarantee" that prevents making transportation funds available for other uses. Also, funding formulas that were seen as favoring some states over others were changed to increase equity and settle the debate between so-called "donor" and "donee" states. **For more information, see Funding.** The Minimum Guarantee would ensure that each state received at least 90.5 percent of gas tax revenues collected in that state. This was a significant change considering TEA-21 authorized $218 billion in funding for highways and transit—a 43 percent increase over ISTEA's funding levels.

TEA-21 also spawned what is known as "environmental streamlining." For years, the powerful road-building lobby claimed that the environmental review process was too burdensome and was delaying important highway building. Some members of Congress responded by proposing measures to "streamline" the environmental review process by limiting input from resource agencies, mandating concurrent analysis and limiting judicial review. After months of heated debate, TEA-21 ultimately did

HALLMARKS OF ISTEA/TEA-21

1. Half of all federal funding is flexible for highways, transit or other uses.
2. Decisions about how to use funds are made through inclusive and honest planning at the state and metropolitan levels.
3. Significant funding is reserved for maintenance of existing highway, bridge and transit systems.
4. A small but important sum is set aside to support alternatives to the highway system and reduce its negative effects on society.

TEA-21 User's Guide, STPP, 1998

not include the dramatic weakening of the environmental review process that some had hoped for, but codified the increasingly common practice of establishing agreements between agencies with collaboratively established timelines. **For more information, see Environmental Review.**

And notably for conservationists, TEA-21 contained two milestones for wildlife. First, an additional activity was added to the Transportation Enhancements program, making funds available to "reduce vehicle-caused wildlife mortality while maintaining habitat connectivity." Second, TEA-21 created the Refuge Roads program, authorizing the use of highway dollars for maintenance and improvement of public roads within the National Wildlife Refuge System.

Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (2005)

Much had changed in the United States between the time TEA-21 was signed and when it expired. While TEA-21 reflected the period of relative peace and prosperity in which it was created, its successor was also every bit a product of its time. After a change in administration, the devastation of the terrorist attacks on September 11, 2001, and the abrupt shift from a budget surplus to a deficit, more would be expected of the highway bill than ever before. Could this legislation make a shaken country feel safe again, address energy uncertainty and shoulder the burden of a lagging economy? These lofty expectations, new priorities and multiple, sometimes competing interests were reflected in the bill, right down to its name. After three years, two election cycles and 12 extensions, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law in 2005, authorizing $286.5 billion to fund highways and transit through 2009.

SAFETEA-LU continued most ISTEA reforms, retaining TEA-21's budget firewall and revisiting the donor/donee debate once again, increasing the minimum guarantee to a 92 percent return. With an emphasis on transportation safety and security, safety funding was doubled and new programs were added for border security and safety planning. A bit schizophrenic, SAFETEA-LU contained both a new commission to examine future funding shortfalls and the highest dollar amount earmarked for pork projects.

Virtually everything that proponents of environmental streamlining did not get from TEA-21 was included in SAFETEA-LU. Congress customized an environmental review process specifically for transportation projects that limits judicial review to 180 days, imposes strict deadlines on participating agencies and institutes a "tattle tale" clause that discourages them from bringing forth any issue that would delay the project under review.

On the plus side, SAFETEA-LU included provisions that recognize and begin to address the conflicts between wildlife and transportation. Long-range transportation planning will now include consideration of conservation interests and Congress commissioned a comprehensive study on the causes and impacts of wildlife-vehicle collisions.

SAFETEA-LU expires in 2009, but discussions on Capitol Hill have already begun. Stay tuned for the sequel—TEA 4!

Rumor Has It...

The "LU" in SAFETEA-LU has a hidden, romantic meaning. Former House Transportation and Infrastructure Committee Chair Don Young (R-AK) pledged to name the highway bill after his wife, Lu, claiming the gesture was "cheaper than flowers."

APPROPRIATIONS

Congress utilizes authorization and appropriation measures. *Authorization* measures (ISTEA, TEA-21 and SAFETEA-LU) are under the jurisdiction of the legislative committees such as the House Transportation and Infrastructure Committee and Senate Environment and Public Works Committee. Once the authorization measure is signed into law, the House and Senate Committees on Appropriations must *appropriate* the funds that have been authorized. The president initiates the appropriations process by submitting his annual budget, usually on or before the first Monday in February. In the budget, the president recommends spending levels in the form of *budget authority,* representing the legal authority for federal agencies to make *obligations* requiring either immediate or future expenditures. These obligations (for example, entering into a contract to build a new highway) result in outlays, which are payments from the Treasury. Not all new budget authority provided for a fiscal year is expended that year. For instance, in the case of construction projects, the outlays may occur over several years as various stages of the project are completed.

Law, Policy and Governance

What's wrong with "Pork?"

Within any bill, legislators may designate a specified amount of money to a particular project in their home states or districts, also lovingly referred to as "pork" projects. Special projects or demonstration projects are often added during the conference phase, when the House and Senate meet to reconcile differences in their respective bills. Because pork is usually inserted into larger, must-pass bills which fund the federal government, members of Congress are reluctant to oppose them on principle. And through the age-old practice of "logrolling," members agree to support a bill containing a another member's pork with the expectation that he or she will return the favor on another bill.

Because the highway bills are always high dollar, they are a favorite place for lawmakers to "bring home the bacon," and seats on transportation committees are among the most highly sought after assignments in Congress. SAFETEA-LU did not disappoint, incorporating an unprecedented 6,373 pork projects worth a staggering $24 billion (Taxpayers for Common Sense, 2005). Chairman Don Young (R-AK) was publicly ridiculed for his now infamous $315 million "Bridge to Nowhere" that would connect Ketchikan (population: 8,000) to Gravina Island (population: 50). As a result of the negative media attention, Rep. Young agreed to release the obligation, allowing Alaska to spend the money on other projects.

Pork projects reduce the amount of money appropriated to transportation agencies where they can exercise discretion over where and how the funds are spent. Planners have likely spent years preparing plans and work programs that will all now have to be changed and reprioritized to make room for unexpected requirements. This is like getting a big paycheck, but your boss gets to tell you how to spend it. Pork projects take decision-making control away from local and state governments and force them to use these funds for a specified project, or not at all.

Indigo Snake

Can pork be used for good and not evil? The Nature Conservancy successfully lobbied for demonstration projects through SAFETEA-LU for their conservation programs. One project will restore 4,000 acres of longleaf pine and wiregrass forest in Georgia that is home to rare eastern indigo snake and gopher tortoise. Transportation agencies can also request pork money for wildlife crossings rather than new highways.

Pork projects now consume more than 12 cents of every new federal highway dollar to the states, up significantly from about 6 cents per dollar under TEA-21. As a result, the share of federal dollars dedicated to core highway program activities, such as maintenance of the interstates, bridge repair, clean air and other priorities declined by nearly the same amount (STPP, 2005).

REGULATION

We all remember learning "how a bill becomes a law" in civics class, but they never taught us what happens to the law after that. While Congress writes the bills that will become law, they often lack the time or technical expertise to define the specifics. Thus the federal agency responsible for implementing this law (FHWA, in this case) may also have to clarify it through a rulemaking process in order to fill out the details.

This new language is published in the Federal Register, our federal government's official daily newsletter of new rules, notices and executive orders. At this point the public is invited to submit comments within a set deadline (rarely more than 180 days). The agency is generally required to consider and publicly respond to all comments and to make changes. Then, finally, the language is entered into the Code of Federal Regulations.

Find out what your government is up to. Sign up for the Federal Register daily e-mail updates.

The Code of Federal Regulations (CFR) is the official compilation of federal regulations issued by federal departments and agencies. Published by the National Archives and Records Administration, the CFR is divided into 50 titles, each representing a broad area subject to federal regulation. Volumes of the code are issued on a quarterly basis, and each volume is updated once each year. Every time legislation is created or modified, portions are inserted into the most appropriate title, according to its subject matter. Conservationists should be familiar with the titles most relevant to transportation and wildlife:

Title 23: Highways

Title 23 pertains to all federal laws related to federal aid for highways. It defines the Federal Highway Administration's role as it interacts with the states, designates design standards and uniform safety codes, provides for pedestrian and bicycle routes, and mandates particular environmentally related procedures, among many other issues. Section 771, "Environmental impact and related procedures," and Section 777, "Mitigation of impacts to wetlands and natural habitat," are particularly relevant to the environmental considerations that go into highway design and construction.

Title 40: Protection of Environment

Title 40 contains regulations for environmental protection and pollution control, including the regulations of the EPA.

SAFETEA-LU shows up in Title 40 with the low-emission vehicle standards and the new provision permitting all state transportation agencies to determine if a project can be categorically excluded from environmental review.

Title 49: Transportation

Title 49 describes the organization of the Department of Transportation and explains its duties and powers, which include, generally, "leadership in formulating and executing well-balanced national and international transportation objectives, policies and programs." Title 49 also stipulates as policy that "The agency will strive to carry out the full intent and purpose of the National Environmental Policy Act of 1969 and related orders and statutes, and take positive steps to avoid any action which could adversely affect the quality of the human environment." In this title you can also find the language that mandates the submission of Environmental Impact Statements with new applications, if the project will have significant impacts on the environment.

SUMMARY OF TRANSPORTATION-RELATED LAWS

Transportation agencies are required to abide by certain laws in carrying out their mission. While it is not their stated mandate, as government agencies they are required to protect and restore the environment.

Rivers and Harbors Act | 1899
Placed federal improvements of rivers, harbors and other waterways under the jurisdiction of the Department of the Army, under the direction of the Secretary of the Army and under the supervision of the Chief of Engineers. It also required that all improvements include due regard for wildlife conservation.

Federal Aid Highway Act | 1956
More commonly known as the National Interstate and Defense Highways Act, marked the official beginning of the modern interstate system. Eisenhower signed this bill into law, allocating $25 billion over 10 years for the construction of 40,000 miles of interstate highway.

Wilderness Act | 1964
Established the National Wilderness Preservation System. The Secretary of the Interior was directed to review every roadless area of 5,000 acres or more and every roadless island within the national wildlife refuge and national park systems for possible inclusion in the wilderness system.It also included some national forest lands in the system and directed the Secretary of Agriculture to recommend others. More than 100 million acres have been included in the National Wilderness Preservation System so far.

Fish and Wildlife Coordination Act (as amended) | 1965
Required that any modification of a body of water by a federal department or agency must include consultation with the U.S. Fish and Wildlife Service and with the head of the state wildlife agency where construction will occur.Also provided that land, water and interests may be acquired by federal construction agencies for wildlife conservation and development. Also established that real property under jurisdiction or control of a federal agency and no longer required by that agency can be utilized for wildlife conservation by the state agency exercising administration over wildlife resources upon that property.

Land and Water Conservation Fund Act | 1965
Created admission and user fees at certain recreational areas and also established a fund to subsidize state and federal acquisition of lands and waters for recreational and conservation purposes.

Department of Transportation Act, Section 4(f) | 1966
Provided special protections for significant public parks, recreation areas, or wildlife and waterfowl refuges and historic sites.

National Historic Preservation Act, Section 106 | 1966
Required federal agencies to attempt to resolve "adverse effects" of their projects on historic sites listed on, or eligible for, the National Register of Historic Places.

National Trails System Act | 1968
Created a national system of trails for recreation and preservation of outdoor areas. The system now consists of national recreation trails, national scenic trails, national historic trails and connecting or side trails.

Wild and Scenic Rivers Act | 1968
Established a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Called for classifying rivers as wild, scenic or recreational. Also designated specific rivers for inclusion in the system and prescribed the methods and standards by which additional rivers may be added.

National Environmental Policy Act | 1969
Set a national policy to encourage harmony between humans and the environment and to promote efforts to better understand and protect ecological systems and natural resources important to the nation. Required agencies to prepare a detailed environmental impact statement for any major federal action significantly affecting the environment. Also established the Council on Environmental Quality to review government policies and programs for conformity with NEPA.
NOTE: *Although NEPA requires agencies to take a hard look at the*

environmental consequences of their actions, it does not force them to take the most environmentally sound alternative.

Clean Air Act | 1970
Required the EPA to develop and enforce air quality standards, leading to regulations on controlling pollution from transportation sources.

Federal-aid Highways - General Provisions - Standards 23 U.S.C. 109(h) | 1970
Required the Department of Transportation to submit guidelines to Congress for avoiding adverse economic, social and environmental effects relating to any proposed project on any federal-aid system. Also stipulated that final decisions on projects would be made in the best overall public interest, taking into consideration the need for fast, safe and efficient transportation, public services, and the costs of eliminating or minimizing such adverse effects.

Water Bank Act | 1970
Promoted the preservation of wetlands by authorizing the Secretary of Agriculture to enter into land-restriction agreements with owners and operators in return for annual federal payments.

Clean Water Act (Federal Water Pollution Control Act, as amended) | 1972
Created a comprehensive statute aimed at restoring and maintaining the chemical, physical and biological integrity of the nation's waters, including highway stormwater runoff. Enacted originally in 1948, it was amended numerous times until it was reorganized and expanded in 1972. It continues to be amended almost every year.

Coastal Zone Management Act | 1972
Established an extensive federal grant program within the Department of Commerce to encourage coastal states to develop and implement coastal zone management programs, and ensure that activities that affect coastal zones are consistent with approved state programs. Also established a national estuarine reserve system.

Marine Protection Research and Sanctuaries Act | 1972
Authorized the Secretary of Commerce, with significant public input, to designate and manage national marine sanctuaries based on specific standards. Provided for supervision by the Secretary over any permitted private or federal action that is likely to destroy or injure a sanctuary resource, and required periodic evaluation of implementation of management plans and goals for each sanctuary. Also specified prohibited activities, penalties and enforcement.

Endangered Species Act | 1973
Provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the United States or elsewhere. Includes provisions for listing species, creating recovery plans and designating critical habitat for listed species. The act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions. The Endangered Species Act is also the enabling legislation for the Convention on International Trade in Endangered Species of Wild Fauna and Flora, commonly known as CITES. Criminal and civil penalties are provided for violations of the act and the convention.

Surface Transportation Act | 1978
Authorized funds for highway safety programs, motor carrier safety programs, the hazardous materials transportation safety program, boating safety programs and other purposes. Represents the first time Congress integrated transit, highways and safety into one piece of legislation.

Coastal Barrier Resources Act | 1982
Protects undeveloped coastal barriers and related areas by prohibiting direct or indirect federal funding of projects that might support development in these areas. Limited exceptions, such as funding for fish and wildlife research, are allowed.

Emergency Wetlands Resources Act | 1986
Promotes wetlands conservation for the public benefit and helps fulfill international obligations in various migratory bird treaties and conventions. Also authorizes the purchase of wetlands with Land and Water Conservation Fund monies. Also requires the Secretary of the Interior to establish a National Wetlands Priority Conservation Plan; obligates the states to include wetlands in their Comprehensive Outdoor Recreation Plans; and transfers funds from import duties on arms and ammunition to the Migratory Bird Conservation Fund.

Clean Air Act Amendments | 1990
Sets stricter requirements on air quality, and can often effect transportation planning.

Intermodal Surface Transportation Efficiency Act (ISTEA) | 1991
Funded federal highways with $155 billion for fiscal years 1992-1997. It promoted increased local responsibility and flexibility, and for the first time directly addressed some environmental issues within transportation.

National Highway System Act | 1995
As mandated under ISTEA, designated 160,000 miles of roadway as vital to national needs.

Transportation Equity Act for the 21st Century (TEA-21) | 1998
Authorized $217 billion for highways, safety and transit for the six-year period 1998 to 2003. As successor to the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), continued the transformation of our 1950s-era highway building program into a flexible transportation program. Along with ISTEA, heralded a revolution in how America executes transportation policy—shifting primary responsibility from the federal government to state and local levels and placing more emphasis on building communities rather than roads.. Changed priorities to improved planning, environmental protection and spending flexibility for greater transportation choice.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) | 2005
Appropriated $286.4 billion for surface transportation from 2005 through 2009.

SUMMARY OF TRANSPORTATION-RELATED EXECUTIVE ORDERS

Floodplain Management Executive Order 11988 | 1977
Declared to help avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

Protection of Wetlands Executive Order 11990 | 1977
Declared to help avoid the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands.

Federal Emergency Management Executive Order 12148 | 1979
Established the Federal Emergency Management Agency (FEMA), combining several federal agencies tasked with emergency preparedness and civil defense spread across the executive departments into a unified entity.

Invasive Species Executive Order 13112 (64 FR 6183) | 1999
Declared to prevent the introduction of invasive species, to provide for their control and to minimize the economic, ecological and human health impacts that invasive species cause.

Environmental Stewardship and Transportation Infrastructure Project Reviews Executive Order 13274 | 2002
Called for the streamlining and timely completion of permits and environmental reviews to expedite the Secretary of Transportation's designated priority projects, among other provisions.

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http://www.taxpayer.net/Transportation/safetealu/states.htm

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LEGISLATION AND REGULATION RESOURCES

Highway History
http://www.fhwa.dot.gov/infrastructure/history.htm

ISTEA
USDOT's ISTEA Page
http://www.dot.gov/ost/govtaffairs/istea/

ISTEA Planners Workbook by Surface Transportation Policy Partnership
http://www.transact.org/report.asp?id=3

TEA-21
TEA-21 User's Guide by Surface Transportation Policy Partnership
http://www.transact.org/report.asp?id=74

FHWA Guide to TEA-21
http://www.fhwa.dot.gov/tea21/index.htm

National Transportation Enhancements Clearinghouse
http://www.enhancements.org/

SAFETEA-LU
From the Margins to the Mainstream: A Guide to Transportation Opportunities in Your Community, Surface Transportation Policy Partnership
http://www.transact.org/PDFs/margins2006/STPP_guidebook_margins.pdf

FHWA's SAFETEA-LU Page
http://www.fhwa.dot.gov/safetealu/index.htm

ENVIRONMENTAL STREAMLINING
What is Environmental Streamlining? Defenders of Wildlife
http://www.defenders.org/habitat/highways/new/streamlining.html

FHWA's Streamlining Page
http://environment.fhwa.dot.gov/strmlng/index.asp

Streamlining Environmental Reviews of Highway and Transit Projects
Congressional Research Service, The Library of Congress
http://www.ncseonline.org/NLE/CRSreports/04dec/RL32032.pdf
http://www.ncseonline.org/nle/crsreports/03Jun/RS20841.pdf

AASHTO's Center for Environmental Excellence Streamlining Page
http://environment.transportation.org/environmental_issues/proj_delivery_stream/

APPROPRIATIONS
Seate Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
http://appropriations.senate.gov/transportation.cfm

House Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
http://appropriations.house.gov/

Thomas: The Ultimate Guide to Congress
http://thomas.loc.gov/

Database of Earmarks in Conference Agreement to the Transportation Bill
Taxpayers for Common Sense
http://www.taxpayer.net/Transportation/safetealu/states.htm

REGULATION
Code of Federal Regulations
http://www.gpoaccess.gov/cfr/index.html.

Federal Register
http://www.gpoaccess.gov/fr/index.html

Summary of Environmental Legislation Affecting Transportation
http://www.fhwa.dot.gov/environment/env_sum.htm

TRANSPORTATION FUNDING

What would YOU do with $286 billion? That's how much Congress authorized for spending in the last highway bill. And yet, some believe it may not be enough. The cost of road building is continually rising, sometimes dramatically outpacing other sectors of construction and land development. Building and maintaining roads and transit facilities requires spending on land, labor, capital equipment and materials. Historically, our roads and highways have been funded by the government with user fees such as the gasoline tax. Experts are beginning to question how much longer this system of "drill and drive" will last.

We invest enormous sums in our transportation systems—significantly more than we spend on natural resource and land management. This chapter provides conservationists with the fundamentals: Where does the money come from and where does it go?

WHERE DOES THE MONEY COME FROM?

The lion's share of federal funding comes from the **Highway Trust Fund** (HTF, hereafter "the Fund") established in 1956. Prior to that time, highways were paid for out of the General Fund of the Treasury. Although gas taxes existed, they were not linked to funding for highways. The Federal-Aid Highway Act of 1956 established the Fund as a mechanism for financing the Interstate Highway System. At the time, Congress imposed a modest 3 cents per gallon tax on retail fuel sales that was set to expire in 1969 when our highway system was estimated to be completed. Since then, the gas tax has risen to 18.4 cents per gallon, and highway building continues. In 34 states, federal funding represents the primary source of financing for highways (Katz, 2005).

The Fund is considered a user-supported program. More than 90 percent of the money comes from driving-related taxes so the amount of money entering the system is tied to the use of roads by motor vehicles. People and businesses that use highways pay into the Fund through taxes on fuel, tires and other costs related to driving. That money, in turn, is used to build and maintain our highway system.

The Internal Revenue Service collects revenues from motor fuel taxes and other taxes on highway users. In 1982, Congress determined that some revenues from the fuel taxes should be used to fund transit needs and passed the Highway Revenue Act of 1982. Since then, the Fund has been split into two primary parts: the Highway Account and the Mass Transit Account. The gas tax is distributed to the accounts as follows:

15.44 cents – Highway Account
2.86 cents – Mass Transit Account
.10 cents – Leaking Underground Storage Tank Trust Fund

18.4 cents — Total

The following chart shows the various types and rates of gas taxes and the portion of each tax that goes to the highway and transit accounts.

Fuel Type	Tax Rate cents per gallon	Highway Account	Transit Account
Gasoline*	18.4	15.44	2.86
Diesel	24.4	21.44	2.86
Gasohol** (10% ethanol)	18.4	15.44	2.86
Special fuels:			
General rate	18.	15.44	2.86
Liquefied petroleum gas	18.3	16.17	2.13
Liquefied natural gas	24.3	22.444	1.86
M85 (from natural gas)	9.25	7.72	1.43
Compressed natural gas	48.54	38.83	9.71
	cents per thousand cubic feet		
***** Truck-Related Taxes (All Proceeds go to Highway Account)**			
Tire Tax 9.45 cents for each 10 pounds of the maximum rated load capacity thereof as exceeds 3,500 pounds			
Truck and trailer sales 12 percent of retailer's sales price for tractors and trucks over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 GVW			
Heavy Vehicle Use Annual tax: Trucks 55,000 pounds and over pay $100 plus $22 for each 1,000 pounds in excess of 55,000 (maximum: $550)			
* 0.1 cent per gallon of fuel sales goes to the Leaking Underground Storage Tank Trust Fund			
** The General Fund of the U.S. Treasury receives 2.5 cents per gallon of the tax on gasohol.			
*** Because trucks are believed to inflict more damage on our highway system, trucking pays greater user fees through truck sales, truck tire sales and a considerably higher tax on diesel fuel.			

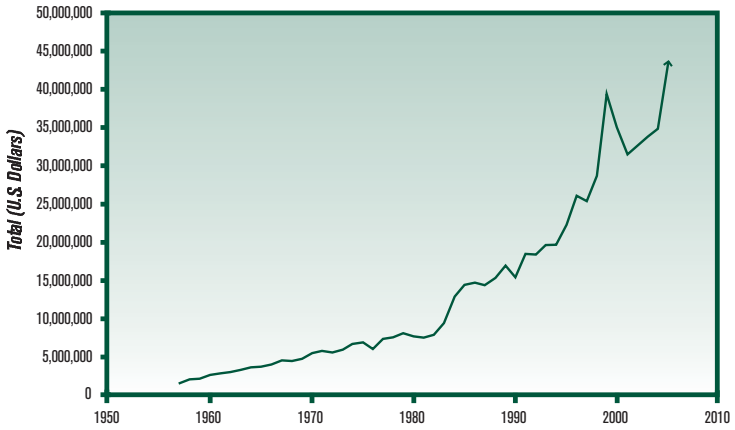
Gas tax is NOT collected at the pump. The Internal Revenue Service collects federal taxes on gas, tires and trucks at the first point of distribution, so most of the money actually comes from

a small number of companies found in a small number of states where gas, tires and trucks are made. Federal Highway Administration (FHWA) then makes estimates based on state fuel use to determine how much should be credited to each state.

This funding system is vastly different than that of our federal lands and natural resources. The Department of the Interior receives funding support from the General Fund of the Treasury, and requires annual appropriations from Congress and the White House to determine how much money they will receive. Depending on the political and economic climate, funding may fluctuate from year to year, making long-range planning and consistent conservation efforts increasingly difficult.

Did You Know? The portion of the gasoline and special fuel tax receipts used by motorboats and small engines such as lawnmowers and chain saws is transferred to the Sport Fish Restoration and Boating Trust Fund, formerly the Aquatic Resources Trust Fund. Of that amount, $1 million goes annually to the Land and Water Conservation Fund, which provides funds to federal agencies and to the 50 states and six territories. Federal allocations include national park, forest, wildlife refuge and Bureau of Land Management area fee and easement acquisitions. Money allocated to the states may be used for statewide planning and for acquiring and developing outdoor recreation areas and facilities, such as boat ramps and deer blinds. Though these measures aren't always directly related to conservation, using transportation dollars instead of resource agency dollars leaves more for conservation efforts.

The Rise of the Highway Trust Fund



THE FALL OF THE HIGHWAY TRUST FUND?

SAFETEA-LU guaranteed $286 billion for highway and transit from 2004 to 2009, but can she keep her promise? According to a 2005 report by the National Chamber Foundation, the Highway Trust Fund will actually only receive about $231 billion, resulting in bankruptcy by 2008. Because gas taxes are not indexed to inflation and have not been raised since 1993, gas tax dollars just don't go as far as they used to. Don't look to Congress to change that any time soon. The mere suggestion of raising this or any tax is political kryptonite. So how will we fill the Fund in the future?

Guest Column:
CASHING IN ON THE BP BELTWAY

Robert Puentes, Fellow, Brookings Institution

Back in the 1970s, *National Lampoon* wrote a commentary on corporate influence in America entitled: "We're Changing the Name of the Country to Exxon." Today, commercial interests are turning their eyes toward some of our nation's most prominent roadways. We need to slow down.

Earlier this year, Indiana Governor Mitch Daniels leased his state's toll road for 75 years to a private consortium for $4 billion that he then spent on other roadway projects around the state. In 2004, Mayor Richard Daley reprogrammed the $1.8 billion from his 99-year lease of the Chicago Skyway back into city coffers to be spent largely in unspecified ways. All that up-front cash looks sweet, but the long-term revenue stream is lost since all the toll receipts flow directly to the private operators. Far worse, policymakers lose the ability to connect transportation to other emerging metropolitan trends. Governments are taking steps to manage the demand for car trips due to concern over how traffic congestion effects climate change. These important policy objectives are in conflict with the commercial interests of private companies running toll roads. They want more traffic not less.

Selling off toll roads is not a silver bullet solving all transportation problems. We're letting politicians and policymakers off the hook. We should all roll up our sleeves, define, design and embrace a new, unified, competitive vision for transportation policy and not be seduced by the easy money.

OTHER SOURCES OF FUNDING

If we decide that selling all our highways and bridges to Pepsi and Microsoft is a bad idea, we'll have to continue funding their upkeep on our own. State governments supplement money from the Highway Trust Fund with revenue from several other sources, including:

- State gas tax
- Bonds
- Grant Anticipated Revenue Vehicle notes
- Tolls
- Local taxes
- Motor vehicle excise tax
- Vehicle registration fees
- License fees
- Rental car taxes

Oregon was the first state to enact a gas tax in 1919. Today, all 50 states have a state gas tax, but they vary widely in collection methods and amounts. On average, states collect 23 cents per gallon, but the highest state tax is 30 cents per gallon in Rhode Island while the lowest is 7.5 cents in Georgia. In 10 states, the gas tax makes up the largest source of funding for highways.

States also borrow heavily to pay for their transportation programs by issuing bonds or Grant Anticipated Revenue Vehicle (GARV) notes. Money is borrowed in anticipation of future federal appropriations, and backed by the state's general fund.

How much is your state gas tax? What does it pay for?

The 2005 Washington State Legislature voted to increase gas taxes and other fees to fund a 16-year plan designed to address some of the state's most critical transportation needs. More than 270 projects are to be funded by a tax package intended to make roads and bridges safer, and ease traffic congestion in the system. The package includes:

9.5 cent gas tax increase phased in over four years	$5.5 billion
Vehicle weight fee on passenger cars	$908 million
Increase in the light truck weight fee	$436 million
Annual motor home fee of $75	$130 million

WHERE DOES THE MONEY GO?

The financing cycle begins when Congress enacts authorizing legislation, referred to as "the Highway Bill," such as TEA-21 and SAFETEA-LU. **For a full discussion of the legislative process that makes the money possible, see Legislation and Regulation.**

Besides the obvious, the Fund supports initiatives such as highway safety, emergency relief, motor carrier safety, research, transportation statistics, use of safety belts and prevention of alcohol-impaired driving. The Fund has also recently begun to support automated toll collection, research into "smart" emergency vehicle access systems, transportation analysis and various vehicle warning systems. Federal transportation funding is restricted to capital expenditures, such as construction and reconstruction of roads. Regular maintenance on noninterstate roads, including pothole patching and snowplowing, must be funded through other sources.

FUNDING CATEGORIES

Title I	Federal Aid Highways	Highway Account
Title II	Highway Safety	Highway Account
Title III	Federal Transit Administration Programs	Mass Transit Account
Title IV	Motor Carrier Safety	Highway Account
Title V	Transportation Research	Highway Account
Title VII	Miscellaneous	General Fund

Deductions

Everyone wants their little piece of the pie. Before any of the Fund leaves Washington, D.C., 1.5 percent is deducted automatically for administration. Six branches within the Department of Transportation receive administrative money from the Fund:

1. Federal Highway Administration
2. Federal Transit Administration
3. Federal Motor Carrier Safety Administration
4. National Highway Transportation Safety Administration
5. Federal Rail Administration
6. Bureau of Transportation Statistics

President George W. Bush's 2007 budget delivered a record high funding level for the federal highway and transit programs. It included $39.1 billion for the federal highway program—a $3.4 billion increase—and $8.97 billion for the federal transit program—an increase of $474 million.

Apportionments and Allocations

Once the deductions are made, the rest of the money is distributed to the states based on a system of apportionments and allocations. Apportionments are based on formulas whereas allocations are funded on a competitive basis.

Formula programs—such as Interstate Maintenance and Surface Transportation—*apportion* funds to state transportation agencies based on formulas set forth in legislation. For example, interstate monies are distributed among the states based on a formula that weighs each state's volume of interstate highway miles, vehicle miles traveled on its interstates and annual contributions to the Fund attributable to commercial vehicles. So, if your state has 1,000 miles of interstate carrying a million cars per day, you will get more money than a state that has 100 miles of interstate carrying 1,000 cars per day. Congestion Mitigation and Air Quality (CMAQ) funds are distributed based on a formula that measures the number of people living in non-attainment areas (places in violation of federal air quality standards, such as Atlanta, Houston and Los Angeles) or in maintenance areas (places that violated air quality standards in the past, but have recently come into compliance).

Discretionary programs—such as Public Lands Highways and Scenic Byways—fall under the purview of FHWA and are meant to be *allocated,* or awarded through competition. FHWA solicits for candidates and selects projects for funding based on the applications received. Each program has its own eligibility and selection criteria established by law, by regulation or administratively. However, members of Congress earmark most discretionary program funding before it ever leaves Capitol Hill. These funds are "use it or lose it" and will be withdrawn and reallocated among the other states if they go unused within a given timeframe.

Here's where you come in. Although all these programs could stand to be greener, some programs have more immediate conservation potential. The Transportation Enhancements program provides funding for all kinds of amenities—including wildlife habitat connectivity—through a competitive grant program. The Public Lands Highway program provides funding for refuge roads and restoring fish passage on forest highways. More details on these and other opportunities are to come in other chapters—so hang in there!

The following chart shows how various programs are funded. **For a list of all the major programs, see the Appendix.** Note: Some programs fall under both categories because they are eligible for funding from either source.

APPORTIONMENTS	ALLOCATIONS
Surface Transportation Program	Bridge
• State	Corridor Planning and Development and Border Infrastructure (Corridors and Borders)
• Small Metro and Rural	Ferry Boats
• Metropolitan suballocated	Innovative Bridge Research and Construction
• Safety	Innovative Bridge Research and Deployment Program
• Enhancements	National Historic Covered Bridge Program
National Highway System	ITS Deployment Program
Interstate Maintenance	Interstate Maintenance Discretionary
Bridge	Public Lands Highways
Minimum Guarantee	Scenic Byways
Congestion Mitigation and Air Quality Improvement	Transportation and Community and System Preservation Program
High Priority Projects (Earmarks, pork)	Transportation Infrastructure Finance and Innovation Act
Other	Value Pricing Pilot Program
Metropolitan Planning	
Recreational Trails	
Safe Routes to School	
Appalachian Highways	

The Minimum Guarantee

Each state is guaranteed a certain share of the total program, but no one is guaranteed a 100 percent return. The minimum guarantee ensures that each state receives at least 90.5 percent of its contributions to the Highway Account of the Fund. For example, if Kansas contributes 2 percent of all the money in the Highway Account for 2007, it's only guaranteed to get 90.5 percent of that money back. If the share from the first part of the guarantee does not provide 90.5 percent return to a state, the share is increased until it reaches that percentage. The shares of all other states are reduced so that the total shares still add to 100 percent. Each state receives at least $1 million per year.

YOU MAKE THE CALL: DONOR vs. DONEE

If your state pays into the Fund, it will get the same amount out of the Fund, right? Not necessarily. Money in the Fund is distributed to the states according to complicated mathematical formulas that attempt to match need with revenue. As a result, some states get more than they put in and some states get far less. States that pay more into the Fund than they get in return are called "donor" states and states that receive more money from the Fund than they contribute are called "donee" states. Proponents of the system say that some highway needs such as roads on federal lands, borders, trade routes and interstates are national in scope. Some states, especially in the rural West, have a higher proportion of interstates and federal lands yet have small populations and smaller gas tax revenues. Opponents decry that large, fast-growing states are forced to subsidize motorists in slow-growing or rural states.

DONOR	DONEE
"Texas money should be spent on Texas mobility to create Texas jobs—it's only fair," says former Republican House Majority Leader Tom DeLay of Texas, whose state receives about 90 cents in highway funds for every $1 its motorists paid in gasoline taxes. "Texas and other donor states have been sending highway money to Washington for decades without seeing a fair return on that investment." Texas, with 302,000 miles of public roads, paid $288.5 million more in federal gas taxes than it got back for highway construction in 2003. Between 1956 and 2003, the Lone Star State received $5.6 billion less than it paid into the highway fund—a loss of 13.5 percent. "It's time for donor states to start keeping more of what they contribute—it's time for fundamental fairness and equity to carry the day," DeLay concludes. (From 2004 press release)	New York state had a $1.23 to every dollar rate of return, has invested billions in its mass transit system, and its drivers thus use less gas, says Rep. Jerrold Nadler (D-NY). Reducing New York's slice of the pie "would be the same as being punished for being energy efficient. It's completely perverse." Nadler suggests Congress consider the bigger picture. Beyond just the gas tax, New York contributes far more to the federal government than it gets in return. While New York received $193 million more in federal highway funds than it contributed to the Fund, the state overall sent $26 billion more to Washington D.C. than it received back in federal funding. "If everybody gets back what they put in," Nadler says, "what's the point of the federal government?" (From: *Battle brewing over who gets fair share of highway money,* The Associated Press, 2004.)

In 2003, 23 of the 50 states were so-called donor states, paying a greater share into the Fund than they received. Of the 23 donor states, 17 have been donors since the program's inception in 1956 (Utt, 2004). However, transportation is just one small part of the overall federal budget—just 2 percent of the $2 trillion that is spent every year. Most "donor" states—including 11 of the 14 states that lobbied Congress for a greater return on the gas tax—are net *recipients* of overall federal funding (Seaman, 2003).

How much federal highway money does your state receive? Are you a donor or donee state?

Setasides

Once your state transportation agency has the money, they can spend it any way they see fit, right? Not exactly. Federal highway law requires states to spend 2 percent off the top on state planning and research, one-fourth of which must go to research, development and technology transfer. One-tenth of the Surface Transportation Program is immediately reserved for safety and another 10 percent is reserved for the Transportation Enhancements program.

Flexible Funding

A one-size-fits-all approach to funding would never work for our vastly different states. A hallmark of the TEA bills is the permission for state transportation agencies to "flex" dollars from one pot to another, based on their own needs and priorities. Because

State Constitutions Ban Use of Gas Tax for Non-highway Investments

Unlike the federal Highway Trust Fund which shares some gas tax revenue with mass transit, many states choose to use all gas tax money on highways exclusively. In more than 30 states, the state constitution specifically prohibits the use of state gas tax revenue for anything other than highway construction and maintenance.

For instance, the 18th amendment to the constitution of the state of Washington declares:
Article 2 Section 40: HIGHWAY FUNDS. All fees collected by the State of Washington as license fees for motor vehicles and all excise taxes collected by the State of Washington on the sale, distribution or use of motor vehicle fuel and all other state revenue intended to be used for highway purposes, shall be paid into the state treasury and placed in a special fund to be used exclusively for highway purposes.

one state might prioritize public transportation more than another, roughly 75 cents of every federal highway dollar can be used for transit investments such as bus, rail or streetcar systems. Highway dollars can be flexed for fix-it-first or pedestrian and bicycle safety initiatives. Unfortunately, only a handful of states have taken advantage of the flexibility. According to the Surface Transportation Policy Partnership, 87 percent of flexible funds given to state transportation agencies in the 1990s went to highway and bridge projects. Most of that flexible spending (82 percent) happened in just five states (New York, California, Pennsylvania, Oregon and Virginia). But, in theory, the transportation bill allows state and local governments, transit operators and metropolitan planning organizations (MPOs) to build a multimodal transportation system to meet their unique needs.

Does your state take advantage of flexible funding? If not, remind your transportation agencies that highway dollars are flexible and suggest they might be better spent on more efficient, multi-modal solutions rather than more highways.

Obligation and Reimbursement

The Federal Aid Highway Program is not a "cash up-front" program. The federal government makes a promise called an "obligation" to pay state transportation agencies for the federal share of a project's eligible cost. Certain spending levels are "authorized," but state transportation agencies don't actually see any of that money until after they have spent it. State transportation agencies are simply notified that they have federal funds available for their use. Projects are approved, work is started. The federal government makes payments to the state transportation agency for costs as they are incurred on projects. The project does not need to be completed before the federal government reimburses the state. Depending on the type of project, the time elapsing between obligation and reimbursement can vary from a few days to several years.

Reimbursement – Sequence of Events

1. Work is done by a contractor.
2. Contractor sends a bill to the state transportation agency.
3. Vouchers for the bills are sent to FHWA.
4. FHWA certifies the claim.
5. Certified schedules are submitted to the Treasury.
6. Federal share is transferred to state transportation agency bank account.

NOTE: *Steps three through six can happen in as little as one day.*

Federal Share

Got a match? Most highway projects receive 80 percent federal funding and the state is required to come up with the remaining 20 percent. New transit projects, on the other hand, only receive 50 percent federal funding, leaving the state responsible for the other half of the funding. This discrepancy sets up a perverse incentive for states to continue to rely on additional highways rather than transit to meet transportation needs because they cost the state less out of pocket.

"In looking at projects occurring around the state, it is tough to see a true prioritization of our funding dollars in transportation. There is an increasing need to maintain existing roads and increase transit, but there is still a push for new roads and old solutions." Conservation advocate

Interstate maintenance receives 90 percent federal funding, while Federal Lands Highway projects and Emergency Relief receive a full 100 percent federal funding.

The required matching funds can come from the following sources:

- State or local government funds
- Private contributions
- Credit for donated property
- Other federal agencies (if specifically authorized in law)
- Federal Lands Highway Program (if the project provides access to or within federal or Indian lands).

What funding sources does your state use to pay the nonfederal match for transportation projects?

–Does your state constitution ban the use of gas tax for non-highway investments? If so, find out why the ban was first imposed. Have conditions in your state changed since then to justify changing the restriction?

Guest Column:

THE HIDDEN COSTS OF HIGHWAYS

By Jim Motavalli, Editor, E/The Environmental Magazine and author of Breaking Gridlock: Moving Toward Transportation That Works

How much does it cost to own and drive a car for a year? The Automobile Association of America (AAA) puts the average cost (including fuel, depreciation, insurance, registration and more) at $7,967 in 2006, based on a medium-sized sedan driving 15,000 miles. Per mile costs average 52.2 cents. That adds up to 15 to 20 percent of the average family budget in the United States. Straightforward enough, right?

But what about the so-called "external costs"? Despite the fact that the interstate highway system is completely built out, governments spend $200 million every day constructing, fixing and improving roads in this country. Traffic management and parking enforcement on those roads costs $48 billion annually, and $20 billion is spent on routine maintenance.

According to Terry Tamminen's book *Lives Per Gallon*, the external cost of air pollution from motor vehicles is $24.3 billion per year. Federal tax breaks for the oil industry cost as much as $113 billion. Add in health care costs of up to $672 billion, damage to crop yields of $3 to $6 billion and to forests of up to $2 billion.

Katie Alvord's *Divorce Your Car* ups the ante with congestion costs of $168 billion annually in the United States. She cites statistics averaging external costs as 79 cents to $1.20 per vehicle mile, or $9,927 to $15,053 per car per year. And so the total annual cost of owning AAA's average car—with the planet in mind—jumps as high as $23,020. That's one expensive sedan!

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FHWA Flexible Funding. Retrieved from: *http://www.fhwa.dot.gov/hep/flexfunda1.htm*

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U.S. DOT Participation in Louisiana Long Term Community Recovery Funding Programs. Retrieved from: *http://louisiana.volpe.dot.gov/docs/usdotfunding.doc*

Utt, R. *The Federal Highway Program Shifts Money from South to North*, 2004. Retrieved from *http://www.heritage.org/Research/SmartGrowth/em938.cfm*

TRANSPORTATION FUNDING RESOURCES

HIGHWAY TRUST FUND

FHWA's Highway Trust Fund Primer
http://www.fhwa.dot.gov/policy/primer98.pdf

Highway Trust Fund: Financial Report for Fiscal Year 2004
http://www.fhwa.dot.gov/reports/htffy04/

Status of the Highway Trust Fund: 2007
http://www.cbo.gov/ftpdocs/79xx/doc7909/03-27-Highway_Testimony.pdf
http://www.cbo.gov/ftpdocs/71xx/doc7123/04-04-Highway%20Revenues.pdf

USGAO's Overview of Highway Trust Fund Financing
http://www.gao.gov/new.items/d02435t.pdf

Key Facts About America's Road and Bridge Conditions and Federal Funding
The Road Information Program
http://www.tripnet.org/NationalFactSheetMarch2006.pdf

STATE GAS TAX

ARTBA's State Gas Tax Report
http://www.artba.org/economics_research/current_issues/ARTBA%20State%20Gas%20Tax%20Report%20July04.pdf#search='state%20gas%20tax'

ARTBA's Map of State Gas Tax
http://www.artba.org/economics_research/current_issues/Gas_Tax_Rates_dev_since_1997.pdf

DONOR / DONEE

Are you a donor or donee state?
Surface Transportation Policy Partnership
http://www.transact.org/2006workshops/statespending92-05.pdf

Dividing the Pie: Placing the Transportation Donor-Donee Debate in Perspective
Rudin Center for Transportation Policy and Management
http://www.nyu.edu/wagner/transportation/files/dividingpie.pdf#search='donor%20states%20and%20highway'

States' Highway Alliance for Real Equity (SHARE)
http://www.sharestates.org/index.htm

Fair Alliance for Intermodal Reinvestment (F.A.I.R. Alliance)
http://www.dot.state.ny.us/fair/

FLEXIBLE FUNDING

Changing Direction: Federal Transportation Spending in the 1990s
Surface Transportation Policy Project
http://www.transact.org/PDFs/changing_direction.pdf

Flexible Funding for Transit: Who Uses It?
Robert Puentes, The Brookings Institution
http://www.brookings.edu/ES/URBAN/flexfunding.pdf

Flexible Funding Provisions Under 23 USD and 49 USC
Federal Transit Administration
http://www.fta.dot.gov/documents/Flexible_Funding_Final_Report_10Nov05.pdf

HIDDEN COSTS OF HIGHWAYS

Breaking Gridlock: Moving Toward Transportation That Works
Jim Motavalli, Sierra Club Books 2001

The Price of Mobility: Uncovering the Hidden Costs of Transportation
Peter Miller and John Moffet, Natural Resources Defense Council 1993.

The Roads Aren't Free: Estimating the Full Social Cost of Driving and the Effects of Accurate Pricing
Clifford W. Cobb, Redefining Progress
http://www.redefiningprogress.org/newpubs/1998/wpts3_execsum.html

The Going Rate : What It Really Costs to Drive
James J. MacKenzie, Roger C. Dower, Donald D.T. Chen, World Resources Institute 1992
http://www.wri.org/climate/pubs_description.cfm?PubID=2559

TRANSPORTATION RESEARCH

Have you ever wondered how much salt it takes to melt an inch of ice at 10 degrees below zero? Or have you pondered the decibel level of tire noise on pavement? Well, if it is transportation related, you can bet that someone, somewhere, is studying it in gruesome detail. In an effort to continually improve our transportation systems, the transportation sector invests billions in research, seeking innovations in procedures and practices that can be practically applied on our roads and highways. According to the Transportation Research Board, 16 government agencies spent $2.63 billion on transportation-related research in 2002.

Funded primarily by government agencies, transportation research is conducted by several different organizations, both government and private, analytical and experimental. Other bodies are responsible for stimulating research and distributing results. Over the past decade, an increasing amount of transportation research has focused on the impacts of roads on wildlife and developing mitigation measures. This chapter seeks to help conservationists become more active participants in, and recipients of, transportation research funding by introducing some of the major players and policies.

STATE PLANNING AND RESEARCH (SPR)

State transportation agencies are required to set aside 2 percent of funds from the Surface Transportation, National Highway System, Bridge Replacement and Rehabilitation, Interstate Maintenance, Congestion Mitigation and Air Quality, and Minimum Guarantee Funds programs for state planning and research activities, or "SPR." Of that 2 percent, they must then allocate at least 25 percent to research.

State transportation agencies are encouraged to develop research programs that anticipate concerns before they become critical problems. Each state is permitted to tailor its program to meet local needs, but must be certified by the Federal Highway Administration (FHWA). Highest priority is given to applied research on state or regional problems, transfer of technology from researcher to user, and setting standards and specifications. Major research areas include infrastructure renewal, safety, operations, environment and policy analysis.

State transportation agencies cooperate with other states, FHWA, and other appropriate agencies to achieve objectives established at the national level and to develop a technology transfer program to promote and use those results. When the FHWA division office gives the go-ahead, state transportation agencies post their new research in the *Research in Progress* (RiP) database. To address progress in the program, the state must prepare an annual report of activities detailed in the work program.

Contact your state transportation agency's research division about research programs and projects. Get to know your state's AASHTO Research Advisory Council (RAC) member, typically the research program manager. Suggest a meeting with your organization to discuss research topics that will address the wildlife/transportation conflicts in your state or area of interest. Offer your involvement if your organization has the capacity to provide data, volunteers, monitoring or other support for ongoing or upcoming research.

TRANSPORTATION POOLED FUND (TPF)

Established by FHWA and AASHTO's Research Advisory Committee, the Transportation Pooled Fund (TPF) program maximizes the benefits of transportation research funding by encouraging consolidation of resources to address common transportation-related issues.

To qualify as a pooled fund study, more than one state transportation agency, federal agency or other body (such as a Metropolitan Planning Organization (MPO), university or a private company) must commit funds or other resources to conduct the research, planning or technology transfer activity. Anyone (yes, anyone!) can suggest ideas for TPF studies, but they must be sponsored by either a state transportation agency or FHWA and only specified individuals are authorized to post solicitations on the TPF Web site, typically the AASHTO Research Advisory Committee member in the state. Each TPF proposal must include background information on the subject, the intended process to conduct the research and estimated costs and time required to complete the research. Upon submitting the proposal and request to establish the study, the lead agency may post its pooled fund solicitation on the TPF Web site. Local and regional transportation agencies, private industry, foundations, universities and nonprofit organizations may partner with any or all of the sponsoring agencies to conduct pooled fund projects.

State-led TPF studies are generally conducted under contracts managed by the state or are administered by the Transportation Research Board (see below). FHWA-led studies must consider proposals through a competitive process. FHWA monitors the use of State Planning and Research funds by requiring project status and progress reports on a quarterly basis, online at the TPF Web site.

Suggest a TPF study! If you have a brilliant idea or can partner on an existing study, contact your AASHTO Research Advisory Committee member and ask how to get more involved.
–See "How to write a research problem statement" in the Appendix.

TRANSPORTATION RESEARCH BOARD (TRB)

One of six divisions within the National Research Council, the Transportation Research Board (TRB) draws on more than 5,000 scientists, engineers and other transportation professionals who volunteer their expertise through a complex system of committees, panels and task forces. The mission of TRB is to promote innovation and progress in transportation through research. Among its many, varied activities and responsibilities are:

- facilitating the sharing of information on transportation practice and policy
- disseminating publications, reports, and peer-reviewed technical papers on research findings
- stimulating research
- offering research management services that promote technical excellence
- providing expert advice on transportation policy and programs
- operating an on-line computerized file of transportation research
- conducting special studies on transportation policy issues at the request of the U.S. Congress and government agencies
- hosting an annual meeting in Washington, DC that draws nearly 10,000 transportation professionals from around the world.

TRB is financially supported by the U.S. Department of Transportation and other federal agencies, individual state departments of transportation, industry associations, non-governmental organizations and others who share an interest in transportation practice and policy.

Committees of Interest

TRB is organized under a committee structure, with standing committees, project-based committees and governing committees. Of primary importance to conservationists are the following technical committees that address issues crucial to wildlife conservation and transportation. Each committee below shows the committee name and designator, followed by the official description of the committee's scope.

Environmental Analysis in Transportation ADC10 (A1F02)
This committee is concerned with issues relating to the environmental impacts of transportation projects and systems. Emphasis is placed on planning, decision-making, mitigation strategies, policies and processes, as well as multidisciplinary impact considerations.

Ecology and Transportation ADC30T
This committee identifies and shares information on the science of ecology, best management practices and solutions related to transportation ecology issues at TRB meetings, the International Conference on Ecology and Transportation (ICOET), and other transportation and ecology related forums.

Safety Data, Analysis and Evaluation ANB20 (A3B05)
This committee is concerned with mitigation of the safety and ecological effects of roadways (railways and airports also given cursory attention) including:

- primarily – safety hazards caused by large animals on the roadway
- secondly – detrimental effects (roadkill mortality, lack of permeability, etc.) on healthy animal populations along roadsides.

Subcommittee on Animal Vehicle Crash Mitigation A3B05-2
This committee is concerned with the safety and ecological effects of roadways (railways and airports also given cursory attention) including:

- safety hazards caused by large animals on the roadway
- detrimental effects (roadkill mortality, lack of permeability, etc.) on healthy animal populations along roadsides.

Task Force on the Transportation Needs for National Parks and Public Lands ADA40T (A5T55)
The task force addresses the role of transportation in providing access to and mobility within national parks and other public lands. It also provides a forum for transportation and tourism planners and operators and public officials to share experiences regarding access, circulation and travelers in national parks and on public lands. The task force provides a forum for identification of research needs and requirements regarding recreation travel and tourism.

Statewide Multimodal Transportation Planning ADA10
The committee acts as an information exchange and promotes research in all the technical and institutional aspects of comprehensive multimodal statewide transportation planning. The committee is also concerned with the identification and clarification of the interrelationship of state resource development planning and programming.

Public Involvement in Transportation ADA60
This committee works to develop a conceptual framework for integrating public involvement into the transportation planning process, and to address specific planning and policy questions that have been encountered by transportation agencies while attempting to increase public involvement.

Volunteer as a "friend" of a TRB committee. Committee friends network with transportation and resource professionals from other geographic areas and disciplines while receiving valuable and timely information on research, technologies and current practices. Volunteers can participate in committee meetings, review research papers, work on committee projects, give presentations and preside at a session of TRB's annual meeting. To participate as a volunteer, contact the committee chair and express your interest.

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)

Created in 1962, the National Cooperative Highway Research Program (NCHRP) conducts research in highway planning, design, construction, operation and maintenance. The program is sponsored by individual state transportation agencies and FHWA, yet administered by TRB. Each state contributes 5.5 percent of its State Planning and Research (SPR) funds which can only be spent on issues approved by at least two-thirds of sponsoring states.

Priorities are set annually by the AASHTO Standing Committee on Research (SCOR) based on input from state transportation agencies, FHWA, and AASHTO's Board of Directors and committee chairs. Submissions are evaluated and SCOR determines which completed or ongoing projects should receive NCHRP support and publishes the preliminary scopes of work each April.

TRB solicits research proposals from universities, nonprofit institutions, consulting firms and individual consultants that demonstrate capability and experience in each issue. TRB assigns expert panels to review the proposals, recommend contract awards, monitor research in progress, provide technical guidance, and review reports for acceptability. Research findings are published in the NCHRP series, designed as reader-friendly for both the administrator and engineer.

Stay tuned for these wildlife related NCHRP projects:

- *Evaluation of the Use and Effectiveness of Wildlife Crossings* (NCHRP 25-27)
  - Anticipated completion in 2007
  - *http://www.trb.org/trbnet/projectdisplay.asp?projectid=762*
- *Animal-Vehicle Collision Data Collection* (NCHRP 37-12)
  - Anticipated release in 2007
  - *http://www.trb.org/trbnet/projectdisplay.asp?projectid=104*

FHWA'S OFFICE OF RESEARCH, DEVELOPMENT AND TECHNOLOGY

FHWA's Office of Research, Development and Technology (RD&T) is located at the Turner-Fairbank Highway Research Center in McLean, Virginia, and performs three basic roles:

- Coordinator of the development of the national highway research and technology agenda, working with other offices in the Department of Transportation and FHWA and with partners in state and local governments, academia, industry and professional organizations
- Investigator of new and existing technologies to improve the safety, efficiency and operation of our highway system
- Disseminator of research results to the highway community where it may be placed into practice.

BUREAU OF TRANSPORTATION STATISTICS

ISTEA created the Bureau of Transportation Statistics (BTS) in 1991 to administer data collection, analysis and reporting to advance the *Department of Transportation's Strategic Plan*. Because it serves a broad audience (Congress, federal agencies, state and local governments, MPOs, universities and the private sector), BTS is meant to remain objective and policy-neutral, covering all modes of transportation with unique competencies in statistics, economics, information technology and geographic information systems. SAFETEA-LU authorized $27 million per year for BTS, which is administered within the Research and Development account under FHWA.

AASHTO'S STANDING COMMITTEE ON RESEARCH (SCOR)

Like TRB, AASHTO is also organized by committee structure. The Standing Committee on Research (SCOR) is supported by the AASHTO Research Advisory Committee (RAC) which is comprised of research managers from each state transportation agency. SCOR's responsibilities include:

- Encourage and assist other AASHTO committees and subcommittees to identify research needs, define research emphasis areas and utilize research findings
- Solicit research problem statements from state transportation agencies, AASHTO committees and FHWA; screen the submittals; prioritize them and recommend annual programs of NCHRP for consideration by AASHTO's Board of Directors
- Monitor TRB's performance as program manager for the NCHRP
- Monitor the NCHRP and make appropriate recommendations and reports to AASHTO
- Review, observe and encourage the effective use of research

funding, and recommend appropriate funding levels
- Serve as a forum, coordinating committee and advocate for highway and other transportation research on behalf of AASHTO and state transportation agencies
- Review, monitor and foster coordination of the various national programs of highway and other transportation research
- Study and foster the role of industry in highway and other transportation research.

RESEARCH AND INNOVATIVE TECHNOLOGY ADMINISTRATION (RITA)

Established in 2005, the Research and Innovative Technology Administration (RITA) is dedicated solely to technological innovation to improve mobility, promote economic growth and deliver a better integrated transportation system. RITA is composed of the Bureau of Transportation Statistics, the former Research Office of the Research and Special Programs Administration, Volpe National Transportation Systems Center, Transportation Safety Institute, and Office of Intermodalism. RITA is self-described as "part university research lab and part Silicon Valley entrepreneurial company."

UNIVERSITY TRANSPORTATION CENTERS

RITA now manages the University Transportation Centers (UTC) program. Since 1988, the Department of Transportation has awarded grants to universities to establish education centers devoted to transportation related issues. Centers are fully integrated within existing universities and each has a particular focus area—such as rural transportation or safety. SAFETEA-LU authorized $76 million per year to be distributed among the 60 UTCs for fiscal years 2005 through 2009.

The following UTCs are engaged in research of particular importance to conservationists:

Center for Transportation and the Environment

The Center for Transportation and the Environment (CTE) conducts research, education and technology transfer concerning the impacts of surface transportation on the environment. Located at North Carolina State University's Centennial Campus, CTE is funded jointly by the USDOT and NCDOT. CTE works on a variety of environmental subjects, from air quality and climate change to hazardous materials. Most notably for conservationists, CTE has a wildlife and terrestrial ecosystems initiative that examines the impacts of roads on wildlife and mitigation measures such as wildlife crossings. Conservationists can use CTE's research database and listserv to stay informed on the latest developments in road ecology. CTE is also responsible for managing the biennial International Conference on Ecology and Transportation (ICOET).

Sign up for the Wildlife, Fisheries and Transportation (WFT) listserv. *Go to: http://itre.ncsu.edu/CTE/gateway/WFTlistserv.asp*

Western Transportation Institute (WTI)

The Western Transportation Institute (WTI) was designated as a UTC in 1998 and focuses on rural transportation safety and operations, winter maintenance and effects, road ecology, infrastructure maintenance and materials, systems engineering development and integration, mobility and public transportation, logistics and freight management and transportation planning and economics. Located in the College of Engineering at Montana State University, WTI employs approximately 30 professional staff and faculty and 30 students. Its annual budget exceeds $5 million.

SAFETEA-LU contains a provision requiring the USDOT to commission a study of methods to reduce collisions between motor vehicles and wildlife. The study will include an assessment of causes, solutions and best practices for reducing wildlife-vehicle collisions. In carrying out the study, researchers must conduct a thorough literature review, survey current transportation agency practices and consult with appropriate experts in the field of wildlife-vehicle collisions. The contract for the collision study was awarded to WTI in June 2006, and final results are expected in fall, 2007. The results of the study will be used in formulating a best practices manual to serve as a guide for developing statewide action plans to reduce wildlife-vehicle collisions. The manual will become the basis for a training course for transportation professionals.

University of California at Davis, Road Ecology Center

The UC Davis Road Ecology Center brings together researchers and policy makers from ecology and transportation to design sustainable transportation systems based on an understanding of the impact of roads on natural landscapes and human communities.

Sign up for the UC Davis Road Ecology Center listserv. Go to: ttp://roadecology.ucdavis.edu/listserv.html

INTERNATIONAL CONFERENCE ON ECOLOGY AND TRANSPORTATION (ICOET)

Since 1996, the mission of the International Conference on Ecology and Transportation (ICOET) has been to identify and

share quality research applications and best management practices that address wildlife, habitat and ecosystem issues related to surface transportation systems. The conference is the primary gathering of experts in the field of transportation development, research and administration with the goal of enhancing both the project development process and the ecological sustainability of transportation systems.

ICOET is a multi-disciplinary event with a diverse and growing sponsorship including FHWA, state transportation agencies, the U.S. Fish and Wildlife Service, USDA Forest Service, Defenders of Wildlife and the Humane Society of the United States. Held every two years, ICOET draws approximately 500 participants from across the world for a week-long program that includes hundreds of papers and poster presentations, field trips, social networking events and a professional exhibitor area. All proceedings are accessible in electronic format on the official ICOET website.

Attend the International Conference on Ecology and Transportation (ICOET) and submit your own paper or poster if appropriate. This event not only showcases the latest and best research on wildlife and transportation, but also provides participants with an opportunity to spend quality time networking, building connections and advancing the dialogue among representatives of a variety of interests.

WHERE TO FIND RESEARCH RESULTS

Online databases and Web sites are excellent sources if you need to make a case for a conservation initiative or are just curious about current research on wildlife and transportation issues. A few of the most helpful are detailed below.

The *Wildlife, Fisheries and Transportation Research Database* contains bibliographic data on research from several published databases as well as from the proceedings of the International Conference on Ecology and Transportation.

The FHWA *Environmental Research Program (ERP) Projects Database* tracks and documents FHWA-funded research from 1990 to the present, both active and completed.

TRB's *Transportation Research Information Services (TRIS) Database* is the world's largest and most comprehensive bibliographic resource on transportation information. TRIS contains more than 600,000 records of published and ongoing research, covering all modes and disciplines of transportation. TRIS is sponsored by state transportation agencies, the U.S. Department of Transportation and other TRB sponsors.

TRB also maintains the *Research In Progress (RiP) Database* and a data-entry system to allow users in state transportation agencies to add, modify and delete information on their current research projects. The RiP database contains more than 7,800 transportation research projects by FHWA, state transportation agencies and UTCs.

Bookmark the major research Web sites and stay up to speed on the latest research results. This information may prove valuable in your involvement in other elements of transportation, such as planning and environmental review.

SAFETEA-LU established the Surface Transportation Environment and Planning Cooperative Research Program (STEP) as the sole source of federal transportation funds available to conduct all FHWA research on planning and environmental issues. SAFETEA-LU authorized $16.9 million per year for fiscal years 2006 through 2009 to implement the STEP research program.

The STEP program recognizes the dramatic differences in views and interests regarding transportation and environment research, and differentiates the views based on stakeholders' strong vested interest in receiving STEP funding to conduct research. STEP breaks the enormous and diverse number of stakeholders into three tiers:

Tier I – Federal Agencies and Tribes
Tier II – State and Local Government
Tier III – Nongovernmental Transportation and Environmental Stakeholders.

Conservation advocates can provide input and feedback on the implementation of STEP at several key points, including:

- Input and feedback on STEP programmatic structure, governance, implementation strategy, goals and emphasis areas
- Input from potential funding partners on collaborative research opportunities
- Input, advice and feedback on yearly-proposed research activities (both programmatically and by emphasis area)
- Input and advice during listening and outreach sessions at the TRB Annual Meeting, and other venues
- Input and feedback on the STEP Annual Report.

Requests for proposals, including broad agency announcements for grants and cooperative agreements to conduct research, will be developed to address emphasis areas. Unsolicited proposals are not likely to receive funding, but can be submitted via the existing formula.

Get involved in STEP. Provide input and feedback on the implementation of STEP and encourage continued research on reducing the impacts to wildlife and improving mitigation measures.

See "How to write a research problem statement" in the Appendix.

TRANSPORTATION RESEARCH RESOURCES

TRB: Environmental Research Needs in Transportation, 2002
See chapter, "Wetlands, Wildlife and Ecosystems"
http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_28.pdf

STATE PLANNING AND RESEARCH (SPR)

http://www.tfhrc.gov/sprguide/index.htm

TRANSPORTATION POOLED FUND (TPF)

http://www.pooledfund.org/

Overview of TPF
http://www.tfhrc.gov/site/active.htm
http://www.tfhrc.gov/site/04105/index.htm

TRANSPORTATION RESEARCH BOARD (TRB)

http://www.trb.org

TR NEWS: Magazine of the Transportation Research Board
Available online at *http://www.trb.org/news/blurb_browse.asp?id=14*
Subscriptions available for $55 for 1 year at 202.334.3216

TRB Transportation Research E-Newsletter
http://trb.org/news/browse_newsletters.asp

An Invitation to Become Involved in TRB Committee Activities
http://onlinepubs.trb.org/onlinepubs/dva/GetInvolved.htm

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)

Guide to NCHRP
http://www.tfhrc.gov/sprguide/nchrp.htm

Overview of NCHRP
http://www4.trb.org/trb/crp.nsf/reference/appendices/NCHRP+Overview

NCHRP Projects (since 1989)
http://www.trb.org/crp/nchrp/nchrpprojects.asp

Information and Instructions for Preparing Proposals
http://www.trb.org/NotesDocs/ProposalPrepNCHRP.pdf

NCHRP Announce listserv notifies when new project statements are posted
http://www.trb.org/CRP/CRPEmailList.asp

AASHTO'S STANDING COMMITTEE ON RESEARCH (SCOR)

http://research.transportation.org/?siteid=55

UNIVERSITY TRANSPORTATION CENTERS (UTC)
http://utc.dot.gov/

Center for Transportation and the Environment
http://itre.ncsu.edu/CTE/index.asp
Western Transportation Institute
http://www.coe.montana.edu/wti/
UC Davis Road Ecology Center
http://roadecology.ucdavis.edu/

International Conference on Ecology and Transportation (ICOET)
http://www.icoet.net

TRANSPORTATION RESEARCH DATABASES
Wildlife, Fisheries and Transportation (WFT) Research Database
http://itre.ncsu.edu/CTE/gateway/wildlife.htm
http://itre.ncsu.edu/CTE/gateway/index.asp

Environmental Research Program (ERP) Projects Database
http://itre.ncsu.edu/CTE/FHWA-ERP/fhwa-erpsearch.htm

Transportation Research Information Services (TRIS) Database
http://ntlsearch.bts.gov/tris/index.do

Research In Progress (RiP) Database
http://rip.trb.org/

TRANSPORTATION RESEARCH LISTSERVS
The Wildlife, Fisheries, and Transportation (WFT) Listserv
http://itre.ncsu.edu/CTE/gateway/WFTlistserv.asp

UC Davis Road Ecology listserv
http://roadecology.ucdavis.edu/listserv.html

SURFACE TRANSPORTATION ENVIRONMENT AND PLANNING COOPERATIVE RESEARCH PROGRAM (STEP)
http://www.fhwa.dot.gov/hep/step/index.htm

PUBLIC ROADS AND PUBLIC LANDS

We love our public lands, but are we loving them to death? Federal lands (national parks, forests, wildlife refuges and monuments) encompass more than one-quarter of the United States and provide habitat for nearly two-thirds of all species that are listed as threatened or endangered. Of these species, twelve percent are restricted largely to federal public lands, making them invaluable to biodiversity conservation (Stein, 2000).

Public lands also provide the human population with valuable recreation opportunities, making them critical for local and regional economies. National parks alone generated $10 billion in visitor spending and supported more than 211,000 jobs in 2005. More than 273 million people visited national parks in 2005 and 40 million visitors come to national wildlife refuges each year. Many of these areas are accessible only by personal vehicle, driving up traffic congestion and air pollution on public lands. Increased vehicle traffic also increases the number of animals killed by vehicles. The National Park Service recorded 12,577 wildlife-vehicle collisions between 1989 and 2006 (Evans, 2007). If these impacts go unchecked, public lands will cease being suitable habitat for some of the more sensitive wildlife species. Without wildlife and the high quality habitat they need, public lands will also cease being suitable vacation destinations for tourists.

This chapter introduces conservationists to the agencies and policies that control roads and alternative transportation choices in our public lands. Recent advances in federal transportation policy have created unprecedented opportunities for conservationists to partner with land managers and engineers to reverse the negative trends that threaten our public lands and the wildlife that depend on them.

ROADS VS. ROADLESS

From one-lane, dirt logging roads to two-lane rural streets to major interstate highways, there are many different types of roads. While the impacts to wildlife may be similar, the development, ownership and management of various types of roads are very different. Therefore, the options for addressing the impacts are also very different. For instance, if an advocate wishes to decommission a logging road, she or he would petition the Forest Service. If that same

advocate wants to improve a culvert under a highway in that same forest, she or he would work with FHWA.

Getting Up to Speed is focused specifically on the impacts of public highways, built and maintained by county, state and federal agencies and used by the general driving public—not the roadless issue. Several conservation organizations are focused on reducing the impacts of logging roads, off-road trails, illegal roads or roads built to facilitate oil and gas exploration within our public lands, including Wildlands CPR and The Wilderness Society.

FEDERAL LANDS HIGHWAY PROGRAM

National parks and forests, wildlife refuges and other federally owned or managed lands comprise about 28 percent of the land in the United States. The Federal Lands Highway Program (FLHP), an adjunct to the Federal-Aid Highway Program, was created in 1982 to fund a coordinated roads program for transportation needs of federal and Indian lands that are not the responsibility of a state or local government. Federal lands highways (160,000 miles of public roads) connect with the National Highway System to provide seamless routes for travel to and within federal and Indian lands. Often referred to as "the DOT for federal lands," FLHP's purpose is threefold:

1. To ensure effective and efficient funding and administration for a coordinated program of public roads and bridges serving federal and Indian lands.
2. To provide needed transportation access for Native Americans.
3. To protect and enhance our nation's resources.

The Office of Federal Lands Highway is part of FHWA and located in Washington, DC. FLHP field organization consists of three field division offices:

Western Federal Lands Highway Division
Vancouver, Washington

Central Federal Lands Highway Division
Lakewood, Colorado

Eastern Federal Lands Highway Division
Sterling, Virginia

Find out which FLHP division office covers your state or area of interest. Bookmark their Web site. Look through their list of projects. Ask to be added to their mailing list.

Through cooperative agreements with federal land managing agencies—including the National Park Service, Forest Service, Military Surface Deployment and Distribution Command, Fish and Wildlife Service, and the Bureau of Indian Affairs—the FLHP provides engineering services for the planning, design, construction and rehabilitation of the highways and bridges that access federally owned lands. FLHP roads are intended to serve recreational travel and tourism, protect and enhance natural resources, provide sustained economic development in rural areas and provide transportation access for Native Americans. FLHP funds can be used for transportation planning, research, engineering and construction of highways, roads, parkways and transit facilities, but the land management agency has to pay for maintenance and operations.

FLHP covers five categories:

1. Public Lands Highways
2. Forest Highways
3. Indian Reservation Roads
4. Park Road and Parkways
5. Refuge Roads

FLHP funds are distributed to each category, where project selection is delegated to users (federal land management agencies, Indian tribes and states) based on three-year transportation improvement plans (TIP). Roads owned by the Bureau of Land Management, Bureau of Reclamation, U.S. Army Corps of Engineers and other Department of Defense agencies do not receive dedicated funding and have to compete for funds under the discretionary category.

Request a copy of the FLHP TIP in your area of interest. Are the projects in the best interest of the wildlife that depend on our public lands? Where appropriate, suggest wildlife conservation measures be included in upcoming projects.

SAFETEA-LU extended funding for all the programs within the FLHP through 2009 for a total of $4.5 billion. Provided this funding is not used to build new roads, and is instead applied to improve the environmental performance of existing roads, the increase is a success for public lands. Every dollar spent out of transportation funding means a potential dollar saved out of public lands' operations and maintenance. While it is not specifically stipulated in the language, this funding should be used for wildlife-friendly maintenance practices that are appropriate for the landscape and surrounding natural resources.

	2005	2006	2007	2008	2009
Indian Reservation Roads	$300M	$330M	$370M	$410M	$450M
Park Roads & Parkways	$180M	$195M	$210M	$225M	$240M
Refuge Roads	$29M	$29M	$29M	$29M	$29M
Public Lands (Discretionary and Forest Highways)	$260M	$280M	$280M	$290M	$300M
Total	**$769M**	**$834M**	**$889M**	**$954M**	**$1,019M**

Inventory and make a list of all the public lands in your state or area of interest. Contact your public lands manager and ask how they are using the FLHP.

Public Lands Highways Discretionary

Congress established the Public Lands Highways program (PLH) in 1930 to improve access to and within federally owned lands. Currently, 34 percent of the total PLH funds are earmarked for discretionary or special projects (PLH-D). Each year, FHWA issues a call for PLH-D projects, and selects them based on need. Preference is given to states that contain at least 3 percent of the total public lands in the nation and those projects that FHWA believes are significantly impacted by federal land and resource management activities. Nevada has received the largest amount of PLH-D funding: $96 million out of $1.1 billion allocated though 2002.

PLH-D projects range from New Mexico Route 537 through the Jicarilla Indian Reservation to roadway reconstruction and rehabilitation projects to improve access in and around the National Mall in Washington, DC.

Forest Highway Program

The National Forest System (NFS) consists of 155 forests across 42 states, and 192 million acres—from the Gila National Forest in New Mexico to the Monongahela in West Virginia. Every year, our national forests receive 205 million visits, most of which arrive via the 29,000 miles of state and local roads that are designated as Forest Highways (FH).

The Forest Highway Program (FHP) is part of the Public Lands Highway program, and receives 66 percent of the total PLH funds. According to FHWA, "the objective of the FHP is to construct or improve roads which connect our national forests to the main state transportation network."

Forest Highways are public roads that provide access to, through or within a forest unit and should not be confused with logging roads. Forest Highways are primarily owned and maintained by state and local governments. Funds are allocated by administrative formula and may be used to fund transportation planning, research, engineering and construction/reconstruction of roadways, bridges, transit, pedestrian and bicycle facilities. The program is administered through tri-agency agreements (FHWA/state/Forest Service) and annual program meetings in each state.

SAFETEA-LU included funding to replace inadequate culverts on Forest Highways and improve fish passage. The Forest Service will receive $10 million per year to "pay the costs of facilitating the passage of aquatic species beneath roads in the National Forest System, including the costs of constructing, maintaining, replacing or removing culverts and bridges, as appropriate." **For more information on culverts and fish passage, see Aquatic Resources.**

Critics of the Forest Highways Program question the ecological implications of turning a forest road (dirt, gravel, narrow, winding) into a Forest Highway (paved, widened, straightened and realigned to American Association of State Highway and Transportation Officials (AASHTO) standards). While paving a dirt or gravel road does result in a decrease in sediment yield and airborne dust, there are also many negative ecological consequences to improving a road to Forest Highway specifications.

Forest Planning

The National Forest Management Act of 1976 (NFMA) required the Forest Service to develop management plans for all forests and grasslands in the National Forest System. Management plans set the rules for managing resources and determine appropriate uses, allowable projects, and how wildlife will be managed, among many other things. All actions on these lands must be consistent with the governing management plan, including road projects. Many key decisions regarding the management of national forests and grasslands are made in the management plan and subsequent revisions and amendments. Extensive public involvement is required in the writing of forest management plans, and includes formal public comment and objection periods, workshops, round table discussions, working groups, focus groups, field trips, web sites, newsletter mailings and public notifications.

Get involved in the forest planning processes. Call your forest managers, ask to be added to their mailing list and request copies of planning documents. Attend planning events and take advantage of all public participation and comment opportunities. Discourage the expansion of roads and highways in forests and suggest that FLHP funding be used to correct past mistakes and restore habitat connectivity.

Indian Reservation Roads

Indian reservation roads are public roads that provide access to and within Native American reservations, land communities or Alaska native villages, while contributing to economic development, self-determination and employment of Indians and Alaska Natives. Approximately 50 percent of reservation roads are state and locally owned and the other half are owned by the Bureau of Indian Affairs (BIA) and jointly administered with FHWA in accordance with an interagency agreement.

The Indian Reservation Roads (IRR) program funds transportation planning, research, engineering and construction or reconstruction of any type of transportation project, including roadways, bridges, transit, and pedestrian and bicycle facilities. The BIA and tribal governments conduct most of the design and construction of reservation road projects. The program also includes the Tribal Transportation Allocation Methodology that allocates funds based on the relative needs of tribes and reservation or tribal communities for transportation assistance.

Refuge Roads

Our National Wildlife Refuge System contains more than 560 refuges and wetland management districts across all 50 states and U.S. territories. This network of public lands was the first and remains the most extensive in the world. Our refuges are crucial to many rare and imperiled species, including the whooping crane, ivory-billed woodpecker and Sonoran pronghorn.

Almost 40 million visitors access refuges every year via private vehicle, bus, watercraft, bicycle, on foot or horseback. The Refuge Road category of the FLHP provides funding for the maintenance and improvement of public roads that provide access to or within a unit of the refuge system.

The Refuge Roads program is jointly administered by FHWA and the U.S. Fish and Wildlife Service (FWS) and covers approximately 4,800 miles of public use roads. Funding is allocated to FWS regions based on relative need, established from refuge road mileage, area of parking facilities, road and bridge conditions, visitation and traffic safety. In order to establish priorities, FHWA and FWS develop safety, bridge, pavement and congestion management systems as appropriate. Design and construction of all refuge road projects must meet standards of the latest edition of the *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects* or approved state or local highway agency specifications.

In 1999, FWS and FHWA entered into a cooperative agreement for the management and improvement of public use roads within the refuge system.

According to the agreement, FWS is responsible for:

- Carrying out a transportation planning process adequate to support the construction and improvement program
- Developing a five year program plan, and submitting annual priorities to FLHP for approval and allocation of the sums authorized

Comprehensive Conservation Plans

With the enactment of the National Wildlife Refuge System Improvement Act of 1997, refuges, for the first time, were given a solid, system-wide set of guidelines and standards for an ecosystem-based approach to refuge management and conservation. The act also requires each of the 547 refuges to develop a 15-year management plan. This plan, called a Comprehensive Conservation Plan (CCP), is necessary to ensure that the biological integrity, diversity and environmental health is maintained or restored on every refuge, as well as within the refuge system as a whole. Once completed, every CCP must be revised every 15 years. Transportation decisions on the refuge will be made both in the CCP and step-down transportation plans, and in the five-year program plan developed by the refuge system for FHWA.

"This is really where the meat of the issues are. CCP is much more than a planning program. For transportation issues, folks really need to know what public use projects are going to be funded over the coming five years. The opportunity to leverage funds with state transportation programs exists every year and you need to know what's happening so you can see how you can take advantage of potential opportunities."
Sean Furniss, FWS National Transportation Coordinator

Get involved in your CCP process. Interagency program and policy review meetings are conducted on a regular basis. FWS regional staff meet with FLHP staff every year for a nationwide meeting to cover a broad range of topics from process, management and future direction. Participate in developing the CCP and step-down management plans. Encourage the use of transportation funding to restore habitat connectivity and provide alternatives to driving.

In 2005, FWS released their revised Refuge Roads Guidance to help identify projects and project enhancements that may be funded under the Refuge Roads program. According to the guidance, *construction of new roads is not authorized*. Basic eligibility for funds is limited to:

1. Maintenance and improvements of refuge roads.
2. Maintenance and improvement of eligible enhancement projects noted below that are located in or adjacent to wildlife refuges:
   a. Parking areas
   b. Interpretive signage
   c. Provisions for pedestrians and bicycles
   d. Roadside rest areas including sanitary and water facilities.
3. Administrative costs associated with such maintenance and improvements.

Park Roads and Parkways Program

Perhaps more so than on other public lands, providing access to visitors is integral to our national parks. The National Park Service (NPS) owns and operates 5,500 miles of paved roads, 4,500 miles of unpaved roads and 1,803 structures. These structures include 22 railroad bridges, 71 tunnels, 143 trail bridges and 1,608 roadway bridges. Whether by train, bus, auto, horse carriage, bicycle, boat or on foot, our 390 national parks welcome more than 273 million visitors every year. Most parks are accessible primarily by automobile, pushing the limitations of park roadways and parking lots, and threatening the very resources parks were created to protect. The NPS struggles with deteriorating roads and bridges, potholes, and an aging transit system while seeking more creative solutions that are more appropriate to the resource.

The Park Roads and Parkways (PRP) program covers public roads that provide access within a national park. The program is jointly administered by NPS and FHWA and funds are distributed on a regional basis. NPS is responsible for planning, environment and resource protection while identifying project priorities. FHWA provides planning, engineering and technical support and is the formal voice to Congress.

PRP projects are grouped into two categories:
Category I – includes road, bridge and safety projects to ensure that major roads and bridges throughout the national parks are in "acceptable" condition; to improve safety by using current design standards; and to apply sound asset management strategies to protect and reduce lifecycle costs.
Category II – includes completion of congressionally mandated projects such as the Foothills Parkway's "missing link" in Tennessee and multi-use trails along the Natchez Trace Parkway in the southeastern United States.

Alternative Transportation in Parks and Public Lands

As outdoor recreation grows in popularity, traffic congestion and pollution are increasing on our public lands. Sitting in traffic jams detracts from the visitors' experience and impacts the natural resources they came to see. Recognizing that more roads and parking lots are not the solution, NPS began introducing visitor transit systems to alleviate traffic problems and increase park accessibility. Within the park system, alternative transportation systems integrate all modes of travel—transit, automobile, bicycle and pedestrian—and include a whole range of technologies, facilities and transportation management strategies. The first Alternative Transportation Program was launched in 1998 to "preserve and protect resources while providing safe and enjoyable access to and within the national parks by using sustainable, appropriate and integrated transportation solutions." The program coordinates policies, projects and activities related to planning, partnering and implementation of alternative transportation systems, and develops strategies and recommendations for application across all national parks.

SAFETEA-LU expanded the 1998 alternative transportation initiative to include all public lands, including parks, refuges, forests and recreational areas managed by the Bureau of Land Management and the Bureau of Reclamation. The Alternative Transportation in Parks and Public Lands (ATPPL) is managed by the Federal Transit Administration. According to the provision, "The term 'alternative transportation' means transportation by bus, rail, or any other publicly or privately owned conveyance that provides to the public general or special service on a regular basis, including sightseeing service. Such term also includes a nonmotorized transportation system (including the provision of facilities for pedestrians, bicycles, and non-motorized watercraft)."

ATPPL funds may be used for either planning or capital projects, and must be in or near an eligible area. Projects can include research, development and deployment of new technologies that will conserve resources, prevent or mitigate adverse environmental impacts, improve visitor mobility, accessibility and enjoyment and reduce air, noise and visual pollution on public lands. To qualify, projects must involve one or more of the following:

- Clean fuel technology
- Replacement of buses with vehicles that introduce innovative technologies
- Coordination with other public transportation systems
- Providing a non-motorized transportation system

- Providing waterborne access
- Providing an alternative transportation project that enhances the environment
- Preventing or mitigating an adverse impact on a natural resource
- Improving federal land management agency resource management
- Improving visitor mobility and accessibility and the visitor experience
- Reducing congestion and pollution
- Conserving a natural, historical or cultural resource

Where appropriate, suggest alternative transportation projects. Look at the list of eligible projects and determine if any of them would be appropriate and beneficial for the public lands in your state or area of interest.

National Park Service Planning

Because transportation defines many important aspects of the park visitor's experience—from what to see to where to stay—the NPS plans and designs its transportation systems through each of its four NPS Planning Elements.

NPS Planning Element	Planning horizon	Public involvement
1 General Management Plan • the broadest level of NPS planning • establishes core park values • defines transportation-related challenges	20 years	Required
2 Strategic Plan • designed to integrate programs and set priorities • transportation considerations include current condition of facilities, access, operations and development outside park boundaries	3-5 years	
3 Implementation Plan • developed when action is imminent and funding is committed • focuses on using transportation projects to achieve long-term goals • projects included will likely require formal environmental analysis	2-5 years	Public is involved to ensure location and design of new roadways will be accepted
4 Annual Performance Plan • sets work goals and objectives for the coming year • identifies funding sources and staff requirements • transportation issues are limited to activities for that year	1 year	

Guest Column:

PARKS NEED YOUR INPUT ON ROADS

Laura Loomis, Senior Director of Government Affairs
National Parks Conservation Association

The National Parks Conservation Association (NPCA) believes the transportation system that serves our national parks should enhance a visitor's experience and protect the resources. Some of the most spectacular roadways in this country are also some of the most dangerous. Decades of chronic underfunding have resulted in a $4.5 billion maintenance backlog for the more than 8,000 miles of roads in the national parks. Roads in good condition are the optimal means to provide safe and enjoyable services, protect wildlife and other resources, and ensure the best return on taxpayers' dollars.

Conservation advocates should get involved in the General Management and Implementation Plans. When it comes to park roads, the best time to get involved is during the scoping process that takes place prior to developing the draft plan. The public has the greatest influence during Implementation Plans because they include much more detail than the General Management Plans. Contact your park managers, ask to be added to their mailing list and request copies of planning documents. Attend informational sessions held by park staff and take advantage of all public participation and comment opportunities.

SECTION 4(f)

Certain public lands enjoy an extra layer of protection from a small, but powerful provision in the Department of Transportation Act of 1966. Known as "Section 4(f)," the provision was intended to protect public places such as parks and refuges from being used for highway building. Section 4(f) declares that the United States Government will make a special effort "to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." FHWA cannot approve a project requiring the use of publicly owned land (public park, recreation area, wildlife/waterfowl refuge, or historic site) unless adequate planning was done to minimize harm and there is no prudent and feasible alternative.

Know your 4(f) properties. Make a list and map of all the parks and refuges in your state or area of interest that qualify for 4(f) protection. For more information on 4(f), see Environmental Review.

SAFETEA-LU Section 4(f) is remarkably simple, yet has been criticized by a small number of vocal state transportation agencies who find it overly restrictive and prohibitive. Following attempts by opponents to remove or weaken 4(f), the amended language in SAFETEA-LU's section 6009 retains the restrictions on impacting public resources, but provides flexibility for projects that have "de minimis" impacts. To reach a de minimis finding, the transportation agency must provide an opportunity for public comment and review, determine that the project will not adversely affect the resource and receive concurrence from the resource manager. Once de minimis is determined, analysis of avoidance alternatives are not required and the project may proceed.

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SAFETEA-LU AND PUBLIC LANDS

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http://www.fhwa.dot.gov/environment/4f.htm

Anatomy of a Highway

IN THIS SECTION

Transportation Planning is perhaps the most important chapter in this book. You'll learn about the planners, process and products and how to take advantage of public participation opportunities to be a voice for wildlife. And don't forget the exciting new developments in integrating conservation in transportation planning.

Environmental Review walks you through the major environmental protections—NEPA, ESA, Clean Water Act and 4(f)—and how they apply to transportation projects.

Design and Construction will teach you a thing or two about how highways are designed, right of way purchasing and the basics of the construction process.

Maintenance and Operations rounds out the section with an overview of responsibilities of your maintenance division and some of the best management practices they can use for wildlife conservation.

NOTE: *When working on wildlife and transportation conflicts at all of these stages, conservationists will be interacting with transportation agencies. However, you should be aware that the lion's share of work is actually done by consulting firms, not by the agency itself. Be sure to ask which firms have been contracted to do the job.*

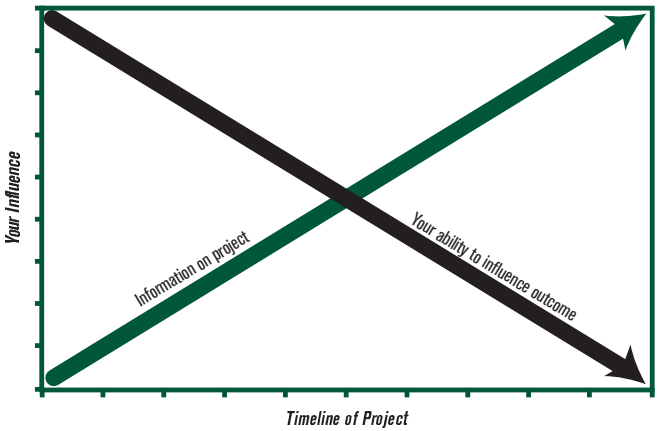
TRANSPORTATION PLANNING

If you learn only one thing from *Getting Up To Speed*, make it this: You hold in your hands the power to change the future.

Transportation planning guides decisions about where we will build or expand our infrastructure. The decisions we make today will influence the location, direction and shape of the development that happens tomorrow, and hence the location, types and quality of habitat that we are able to protect. If conservationists don't bring our voices and expertise to this process, we can no longer be surprised when the results don't reflect our priorities.

The bad news is, the transportation planning process is complicated, obtuse and a bit overwhelming. In addition to reading this chapter, you will need to turn over a lot of rocks, do your homework, make a lot of calls and diligently track several simultaneous processes, plans and products. Because planning is comprehensive and continuing, you can bet there is always some*thing* going on some*where* with some*one*.

The good news is, there is already a role for you and other conservation advocates in the process. It's our job to get involved because transportation planning—for all its faults—is where it's at. During planning, advocates have the opportunity to voice concerns early enough to actually *avoid* many impacts. By the time a bad plan gets to the project stage, usually all we can do is minimize and mitigate the harm.



As a highway project progresses, the amount of information increases, but your ability to influence the outcome diminishes with each phase.

And there's more good news. Two new serendipitous developments from Capitol Hill have converged to set the stage for our increased involvement. State wildlife agencies have recently completed the much-anticipated State Wildlife Action Plans, giving us a blueprint for proactive, coordinated conservation. And now SAFETEA-LU requires transportation planners to incorporate conservation into long-range transportation plans, virtually hardwiring conservation into the transportation planning process. There has never been a better time for conservationists to take that seat at the table and help shape the future for America's wildlife.

"We can engage earlier in the process than the comment period. We make ourselves a player at the table when we bring alternatives and solutions rather than simply opposition." **Conservation advocate**

HISTORY

We have had highways for a century now but *transportation planning* did not begin in earnest until the 1960s. Prior to that, billions of dollars were spent to repair old and obsolete highways and to build the shiny new interstates, but neither were done with local input or consideration of long-term impacts. The Federal-Aid Highway Act of 1962 created the first federal requirement for urban transportation planning, whereby urbanized areas (with 50,000 or more residents) were required to plan all transportation projects cooperatively with state and local governments in order to receive federal road dollars. Since then, Congress has incrementally strengthened the planning process by further engaging local elected officials and incorporating a wide range of social, economic and environmental concerns. In 1991, Congress proclaimed a new era in transportation policy with the Intermodal Surface Transportation Equity Act (ISTEA). In theory, the old top-down decision making would be replaced with inclusive and honest planning at the state and metropolitan levels. Congress set forth a list of planning factors meant to guide the transportation planning process, written into law as follows:

- Support the economic vitality of the United States, the states and metropolitan areas, especially by enabling global competitiveness, productivity and efficiency.
- Increase the safety and security of the transportation system for motorized and nonmotorized users.
- Increase the accessibility and mobility options available to people and for freight.
- Protect and enhance the environment, promote energy conservation, improve quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.

- Enhance the integration and connectivity of the transportation system, across and between modes throughout the state, for people and freight.
- Promote efficient system management and operation.
- Emphasize the preservation of the existing transportation system.

CAUTION: With a list like this, how can we go wrong? As good as the planning factors are, they are merely guidance and not regulatory in nature. Failure to consider any factor is not reviewable in court and could be disregarded by any Metropolitan Planning Organization (MPO) or state transportation planning office. Also, terms such as "environment" and "quality of life" are exceptionally (and intentionally) vague. As a result, MPOs and state transportation agencies are free to interpret these terms in their own way.

THE THREE CS

The Federal-Aid Highway Act of 1962 mandated urban transportation planning and gave rise to the "three Cs," which continue to be a good idea for planning. The act read:
"After July 1, 1965, the Secretary shall not approve under section 105 of this title any programs for projects in any urban area of more than fifty thousand population unless he finds that such projects are based on a **continuing, comprehensive** transportation planning process carried out **cooperatively** by states and local communities in conformance with the objectives stated in this section."

TRANSPORTATION PLANNING: THE FUNDAMENTALS

Transportation planning should be easy, right? All you have to do is figure out how to move people and goods, safely and efficiently in the least expensive, fastest, most aesthetically pleasing manner, while balancing land use, economic development, security, and cultural preservation *and* meeting the impossible demands of local businessmen and a politician up for reelection. Oh, and please do so in the most environmentally sensitive fashion, with full participation and input from the public. And whatever you do, don't put it in my back yard.

To help you begin to understand this complicated process, let's break it down into these essential elements:
Planners – Who does transportation planning?
Process – What is the process whereby roads are planned?
Products – What are the finished plans, what do they look like and where can I find them?
Funding – Who pays for transportation funding?

"Conservationists need to recognize that transportation agencies are public agencies trying to meet a long list of public needs, including environmental needs as well as safety, mobility, infrastructure preservation and livable communities." **State transportation agency staff**

"Until I trade in my car for a horse, I am part of the problem too."
Conservation advocate

Planners

Planners are the folks who examine current transportation operations (including traffic, congestion, accident rates and road conditions) and try to anticipate future transportation needs. They are hard at work everywhere—from small towns to massive cities—and are employed at various levels of government, including:
At the local level, many **small communities and counties** have their own transportation planners, often working in concert with land use planning.

Rural areas may have **regional planning organizations** made up primarily of local elected officials. These organizations plan for specific geographic areas within the state that have populations below 50,000, and are therefore not covered by metropolitan area plans.

Some areas also have **regional development organizations,** regional councils, planning commissions or councils of government that work closely with local communities, governments and businesses on everything from economic development and emergency services to housing and transportation planning. Regional development organizations typically administer, and/or serve as, the regional planning organization. More than 25 state transportation agencies contract with these regional development organizations to provide rural transportation planning services.

Many states also utilize **transportation advisory committees** (TAC). Members of these committees are appointed by their respective municipality or transportation agency. The TAC makes recommendations to regional development organizations and state transportation agencies regarding the development of plans, activities and projects, and influences transportation policy at the regional and state levels.

For cities with more than 50,000 people, a **metropolitan planning organization** (MPO) is designated by agreement between the governor and representatives of the metropolitan area. Almost three-quarters of U.S. citizens live and work in areas served by MPOs. These organizations have responsibility for planning, programming and coordination of federal highway and transit

investments within their jurisdiction. Most MPOs are "free standing" or housed within city or county organizations. Less than half of them are housed within regional development organizations. **MPOs are responsible for long-range transportation plans, short-range work programs and a plan of studies to determine transportation needs.**

Very large metropolitan areas with populations that exceed 200,000 are known as **transportation management areas**, but are still considered MPOs. Transportation management areas have some additional planning requirements—including congestion management systems to identify actions and strategies to reduce congestion and increase mobility.

Every **state transportation agency** has a planning division that works with metropolitan and regional planning organizations and others to initiate studies and conduct transportation planning for the entire state. State transportation agencies are responsible for producing long-range transportation plans, short-term work programs and air quality implementation plans.

Attend meetings of local transportation boards and transportation advisory committees. Express concerns you may have about the existing, ongoing and potential impacts of the transportation system on wildlife. Provide information and offer to make a presentation at the next meeting on the impacts and solutions.
-Volunteer to serve on a citizen focus group or advisory committee. If no such committee exists, suggest it.

How many transportation planners does it take to...?

Transportation plans pass through many, many hands before going to design, review and construction. At every step in the process, someone is "planning" the next step, and is thus a part of the long continuum of planners. In the course of your work with transportation agencies and professionals, you may be confused when you encounter many people with the word "planner" in their title. Indeed, they *are* all planners, but only some of them are involved with planning at the system level—which is what we are covering in this chapter. Some are involved at the individual project level—these are "project planners." Some state transportation agencies have "environmental planners" who plan how to guide a project through environmental review. The plethora of "planners" can be confusing, so make sure you know who you are talking to. As a conservationist, they will often assume you want to talk to the environment shop, and this is not always the case.

Invite a transportation planner to meet with your organization and discuss the transportation planning process, the plans themselves and how you can more effectively be involved.

"We get along really well with our environmental office but we still need to break the barrier with the planning department and develop relationships at the highest levels." **Conservation advocate**

Planning Process

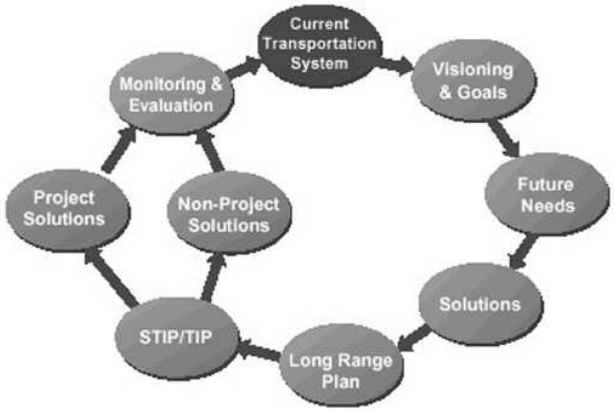
Don't be confused when you discover that your town or state does things its own way—they all do. Federal transportation law lays out some guidelines and standards, but for the most part, the process differs from state to state and continues to evolve with every new highway bill. Each town and state has established its own schedule, its own set of actors, and its own standards and processes. The planning process is continuous and comprehensive, so there's always planning going on somewhere, and often, there's no clear beginning point or finish line. Several steps can take place at once and planners may repeat some steps several times.

The basic steps in the transportation planning process are:

1. Define the problem, scope, area, issues
2. Set goals, objectives and criteria
3. Collect data
4. Develop alternatives and scenarios
5. Model—forecast future travel behavior
6. Evaluate alternatives
7. Select a preferred plan
8. Implement the plan through projects

At the state level, the state transportation agency is responsible for conducting transportation planning for its non-metropolitan areas. State transportation agencies are also required to consult with non-metropolitan local officials in statewide transportation planning and programming. The statewide transportation planning process requires coordination of:

- transportation plans and programs developed for metropolitan planning areas
- participating organizations
- statewide trade and economic development planning activities
- related multi-state planning efforts.



"While we look at the transportation planning process comprehensively, the agency deals with different parts of the process separately. The long-term planning group has a statewide focus, the short-range planners work regionally and project planners are engineers working on specific projects." **Conservation advocate**

CAUTION: The best laid plans…

Not to burst your bubble at this point, but the planning process is not the decision making process. If done well, it can provide a framework for informed decision-making, but ultimately those elected or appointed to make decisions will make the call. Every transportation planner has a story about good plans being scuttled by some ill-advised, hair-brained proposal that slipped into the process by means of an earmark or other political maneuvering.

Travel Modeling

Transportation planners rely on complex mathematical models of the "real world" that can be used to show the impact of changes within the transportation system—such as adding a new road or transit line, or increases in population or employment. Current planning regulations require that MPOs have an analytical process in place for evaluating projects, but state transportation plans do not have the same requirement. While all planning departments may use their own variation, most use some form of the basic four-step approach in modeling transportation demand.

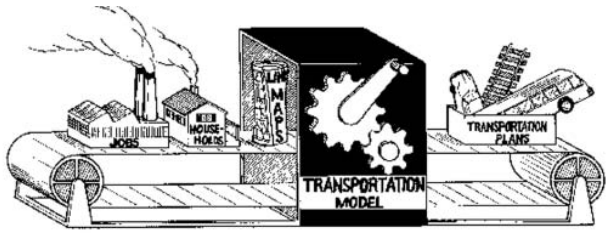
1. **Trip generation**: Estimate the number of trips generated in each zone, destined for locations in other zones. Trip estimates are based on assumed relationships among socio-economic factors, land use patterns and the existing number of trips.
2. **Trip distribution**: Develop a trip table showing the number of trips originated in each zone and destinations in each zone.
3. **Mode split**: For the number of predicted trips between each origin zone and destination zone, estimate the number of trips made via each mode available for that trip. Modes include driving alone, carpooling, using transit, etc.
4. **Network assignment**: Estimate the number of trips per mode for each possible path throughout the road and transit network. Assign all trips to a network. Compare the capacity of each road or transit segment to the projected demand to forecast the level of congestion to be expected at that location.

Four-step models are used to predict transportation demand, but planners and engineers also use other models to predict performance and resulting impacts. Impact models determine the likely effects that new roads will have on the surrounding environment and community, such as air quality, noise and community impact. Cost models estimate the likely costs of transportation projects, calculating, for example, dollars per linear foot of rail line. Some of the newer cost models incorporate "life-cycle" costing to estimate expected costs, both capital and operating, for a possible project over the expected life of that project.

What's wrong with models?

Models can never provide a definitive picture of the future; they are only intended to provide estimates or "guesstimates." Traffic forecasts can be affected by demographic changes and trends in economic growth and development, which can never be predicted with certainty. Moreover, transportation planners have been using the same models for the past 40 years. In theory, by projecting the future performance of roads, transportation planners can accurately determine how and where to expand the network. In fact, much of the methodology we use for transportation planning was developed to build highways in urbanized areas such as Chicago, Detroit and New York in the 1950s. But we've changed more than hairstyles since the 1950s. Issues such as air quality, sprawl, energy crises and global warming were not on the radar screen back then. Therefore, models based on that time period may be inappropriate today.

Both ISTEA and the Clean Air Act Amendments of 1990 brought about improvements to modeling by requiring consideration of land use, air quality and multi-modal options. However, all models are limited by the very assumptions, factors and alternatives that are explicitly included in the equations used by those models.



Even today's models can be insensitive to non-automobile modes of travel, resulting in overestimating the demand for new highways and underestimating the effectiveness of alternative, less car-focused scenarios. If we keep asking the same questions of the models, we will continue getting the same answers. And more of the same adds up to less habitat for wildlife.

Ask your transportation planners which models they use, and if those models adequately include alternative and multi-modal solutions.

Planning Studies

In addition to models, transportation planners rely on planning studies to develop concepts early in the planning process. A planning study is a defined set of activities performed to identify transportation problems and solutions. Studies can be conducted at the statewide, regional, sub-area, corridor or route levels.

Some studies are the direct result of a state or regional plan that highlights a particular problem. Each planning study results in a concept that will require further scoping and design to develop into a construction project ready for delivery.

Planning studies vary significantly in content and coverage. Corridor studies focus on an existing facility such as a highway or a broad geographic area that connects major destinations, such as two cities. The corridor width extends well beyond the facility right of way and may extend miles on either side. Responding to a specific problem (such as a high accident rate, congestion or land-use changes), corridor studies identify deficiencies and evaluate alternative solutions using a long-range outlook of 20 or more years. The finished study usually includes a description of the proposed facility and potential environmental impacts.

Other study types include corridor management plans, transportation systems analyses, route development plans, alternate route analyses and spot/locations studies. Also, some environmental review documents are considered planning studies.

Check with your transportation planning divisions and ask about ongoing and upcoming planning studies in your state or area of interest. Ask about public participation opportunities.

Planning Products

Transportation planners are nothing if not prolific. In maintaining that "continuous" and "comprehensive" mantra, they have a product output that would put Stephen King to shame. And good news—even though the planning process is different in each state, the products of planning remain consistent across the board.

At the metropolitan level, MPOs are required to develop the following:

Long-Range Transportation Plan (LTRP) – A long-term vision for the area, covering a planning horizon of at least 20 years.

Transportation Improvement Program (TIP) – A short-term program (about five years) based on the long-range transportation plan and designed to serve the area's goals, using spending, regulating, operating, management, and financial tools.

Congestion Management System – Areas with populations over 200,000 are called transportation management areas (TMA) and are required to develop strategies to reduce congestion and increase mobility. In air-quality non-attainment areas, projects that increase capacity for single occupancy vehicles (by adding new roads or widening existing ones) must conform with the area's Congestion Management System.

Unified Planning Work Program (UPWP) – TMAs are required to cooperate with the state and the local transit operator to develop a unified planning work program that discusses and documents planning activities.

At the state level, state transportation agency planning offices produce the following:

- **Long-Range Transportation Plan (LRTP)** – A long-term vision for the state, covering a planning horizon of at least 20 years.*
- **Statewide Transportation Improvement Program (STIP)** – A short-term program for the state that incorporates and integrates the MPO plans. Developed on at least a two-year cycle, these programs contain individual transportation improvements and projects. All federally funded projects must be part of an improvement program to be implemented, and STIPs often have project cost estimates.
- **State Implementation Plan (SIP)** – As required by the Clean Air Act, this plan outlines measures the state will take to meet the National Ambient Air Quality Standards including measures to reduce automobile emissions that contribute to smog.
- **Strategic Highway Safety Plan:** A statewide-coordinated safety plan that provides a comprehensive framework, and specific goals and objectives, for reducing highway fatalities and serious injuries on all public roads. This statewide document includes input from public and private safety stakeholders. The safety plan is a data-driven, four to five year comprehensive plan that integrates the four E's—engineering, education, enforcement and emergency medical services. The plan establishes statewide goals, objectives and key emphasis areas developed in consultation with federal, state, local and private sector safety stakeholders.

** Unlike metropolitan transportation improvement programs and long-range plans, statewide long-range transportation plans do not have a requirement to be financially constrained; that is, to demonstrate the likelihood that funds will be available to cover all proposed projects.*

Download or request copies of your state and local LRTP, STIP, TIP and corridor studies. Now bite the bullet and read them. Note where and how any upcoming transportation projects or activities will impact your area of interest. Attend all public meetings and submit comments when appropriate. Volunteer for the citizen advisory committee if they have one and suggest one if they don't.

HOW TO READ A STIP

It's big. It's ugly. It's your Statewide Transportation Improvement Program (STIP)—the official source on federally funded transportation projects that may or may not get built in the coming years. Every STIP looks different, but here are some general guidelines:

- If you can't find your STIP on your state transportation agency's website, call and request a copy. While you're at it, get a copy of your long-range transportation plan too and ask to be added to the agency's mailing list so you can get updates.
- Look for a handy key or guide at the front of the STIP to help you navigate.
- STIPs are generally divided into sections by county or transportation district, and are listed in alphabetical order. Locate your area of interest; scan down the project/program code column and red-flag those projects that will potentially have major impacts.
- Compare your STIP to existing conservation, land-use and habitat connectivity plans. Look for overlaps, potential conflicts and projects that could include wildlife habitat restoration.
- Large construction projects may also be described in greater detail on your state transportation agency's website in the projects section.
- Remember that just because a project is listed in your STIP does not mean it is guaranteed to actually get approved and be built!
- Also remember that the STIP may only include the federally funded projects. Your state or local area may have several other projects that don't show up in the STIP.

Types of Long-range Transportation Plans

Congress mandated the long-range transportation plan, but left plenty of wiggle room for states and MPOs to approach the process in their own ways. Some plans are presented in a big picture, vision-based fashion but fall short of explaining how to get there. Other plans are more needs-based, grounded in reality with policies, strategies and investments to meet those needs. The Volpe National Transportation Systems Center evaluated all the statewide long-range transportation plans in 2002 and found "a great diversity in approach, content and emphasis. Some plans are updated frequently, while others remain in effect from the early years of ISTEA…There is a great potential for these plans to continue to evolve into increasingly valuable components of the statewide planning process, and to become vital sources of information for decision-making."

HALL OF FAME: NEW HAMPSHIRE GETS IT AND GETS IT RIGHT

In 2006, the New Hampshire Department of Transportation (NHDOT) released a long range transportation plan, but they didn't write it. NHDOT Commissioner Carol Murray appointed a 24-member Community Advisory Committee (CAC) for the task. State and local officials, business leaders, housing advocates, environmental groups and community organizations met over an 18-month period and hosted several community meetings. Marking a shift in transportation planning, the committee recommended strengthening partnerships and focusing on people and communities rather than roads and cars. "Business as usual will not meet New Hampshire's future transportation needs," said Lewis Feldstein, Chairman of the CAC and President of the New Hampshire Charitable Foundation. "As Commissioner Murray said to us at our first meeting, 'if you don't link land use and transportation, both will fail.'"

"If you don't link land use and transportation, both will fail."

NHDOT Commissioner Carol Murray

CAUTION: What does planning have to do with project selection? That's the $64 question. Without a doubt, the long range and short range plans are wildly different with vastly different processes and purposes. They both may have opportunities for public input, but what happens in between remains a mystery to many. In theory, the TIP/STIP is supposed to reflect the LRTP, but somewhere between the lofty, larger than life LRTP and the detailed, bottom line TIP/STIP, we can lose our place. That's why it is important for you to track all the planning activities in your state or area of interest. Below are two examples of the project selection or programming process at the state level.

Texas Department of Transportation (TxDOT) describes its project selection process in five steps: identify needs, build a proposal

(funding), begin planning, project development and construction. Public involvement doesn't kick in until project development, long after project selection, which rests with the commission and local officials.

Arizona Department of Transportation (ADOT) district engineers meet with MPOs once a year to develop a list of candidate projects for submission to a selection committee. Projects go through scoping (not NEPA scoping) to flesh out the project details such as traffic, safety considerations and cost. Using a set annual budget, projects are selected up to that budget amount. The State Transportation Board conducts three public hearings on the draft five-year construction program. The STIP is culled from that five-year program, including the federally funded projects, local TIPs, FLHP and Bureau of Indian Affairs projects.

Take the initiative to map out the planning-to-project process in your own state and share it with other citizens and advocates.

Planning and Air Quality

When do transportation planners consider impacts to the environment? Until recently, the only environmental consideration required during transportation planning was air quality. Our car-loving culture is a great contributor to air pollution, pumping four of the six most reviled pollutants into the air—ozone, carbon monoxide, particulate matter and nitrogen dioxide. Locations that fail to meet air quality standards as defined by the Clean Air Act are called non-attainment areas and are tasked with developing a State Implementation Plan (SIP). SIPs contain emission budgets and establish measures to reduce emissions from stationary, area and mobile sources in order to attain or maintain air quality standards. Transportation plans must demonstrate that projected motor vehicle emissions from planned transportation projects will not exceed the budget established in the SIP. If the air quality in a particular location does not meet goals set out in the air quality plan (SIP), the state transportation agency will not receive federal transportation funding, except for essential safety projects and those projects with prior commitments. In fact, these sanctions may be imposed even if the lapse of conformity is not transportation related.

Planning Funding

For a task as big and important as transportation planning, one would think we invest vast amounts of time and resources to make sure it is done carefully and correctly. In fact, planning funds comprise a small fraction of the money given to state transportation agencies to distribute among their MPOs. Funds for metropolitan planning are called Planning Funds and amount to *just 1.25 percent* of highway and transit program funding. Funds for state planning are called State Planning and Research Funds and amount to *only 2 percent* of highway and transit program funding. States are required to set aside at least 25 percent of these funds for research and the remainder is used for state transportation planning.

In 2003, Defenders of Wildlife developed this guide to transportation planning in Florida. Get inspired and write a similar guide for your state!

Historically, transportation planning has existed on a starvation diet while highway building has been the hog at the trough. But cutting corners on planning rarely saves time or money in the long run. Poor planning may lead to costly mistakes, public controversy, longer environmental review, more mitigation and possibly litigation. By the time you get to court, you will have spent far more than it would have taken to plan well in the first place. We have to fully fund planning if we want a transportation system that meets our needs and respects all of our values.

Lobby for increased funding and authority for planning. Better planning is an investment that we can't afford to pass up.

"It's all about relationships and politics. Getting engaged at the local transportation planning region stage is really key. The sooner you do it, the better." **Conservation advocate**

PUBLIC PARTICIPATION

This means you! Our transportation planning process isn't perfect, but hundreds of public advocates have spent decades fighting to make it open, transparent and accessible to the public. You wouldn't pass up a chance to vote in an important election, would you? Well every day, in every state, some very important decisions are being made without you. Maybe you are skeptical about your ability to influence the outcome of transportation plans or projects. Perhaps you find transportation plans too abstract and the planning process simply incomprehensible. Whatever the reason, remember that without adequate public participation, these plans are made, and ultimately highways are built, with very little input from citizens like you and me. The process becomes weighted toward business and development interests while regular folks—and wildlife—are left to confront the impacts.

Contact your state and local/regional transportation planning division and ask them to put your name on their mailing list to receive newsletters, updates and other information. Ask them for specific public involvement opportunities in your area.
–Attend public participation meetings or hearings regarding draft or finished plans. Express concerns you may have about the

existing, ongoing and potential impacts of the transportation system on wildlife.

–Send written comments during public comment periods for plans and recommend solutions. Encourage partner groups and coalition members to comment as well.

During the planning process, there are numerous instances in which information must be made available to the public for comment.

PUBLIC PARTICIPATION: WHEN TO GET INVOLVED

WHAT	WHEN
Planning or corridor studies (state transportation agency, MPO)	Scheduled meetings
Long-range transportation plan (state transportation agency, MPO)	Draft and final plans are open for public comment, possible hearings
Transportation improvement program (MPO only)	Draft and final plans are open for public comment, possible hearings
Annual listing of obligated projects (MPO only)	List made available on web
Public participation plans (state transportation agency, MPO)	Open for public comment
Strategic highway safety plan (state transportation agency only)	Open for public comment

SAFETEA-LU required each MPO to develop public participation plans and detail all the opportunities for public input and comment during the development of long-range transportation plans. The public is also allowed to help shape the public participation plan itself, so the MPO will understand what information the public wants and how the public would like it communicated. This means you!

SCENARIO PLANNING

Video games aren't just for kids. Transportation planners can take advantage of visualization software to test various future alternatives without laying one bucket of pavement. Scenario planning tools and techniques can visually manipulate trends in traffic congestion, land use, demographics, economic development and the environment to develop alternative future scenarios, each reflecting different assumptions and tradeoffs. For instance, a planner might model how a road laid in a particular place would affect sensitive species in southern Florida. Using scenario planning tools, they can not only predict the impacts on communities, they can see them. Planners often engage the public in scenario planning exercises either to facilitate consensus building or to justify a given decision or project.

SAFETEA-LU – validated the importance of visualization techniques by requiring state transportation agencies and MPOs to use them to help the public understand complex information and concepts. Plans and project lists must also be made publicly available electronically.

YOU MAKE THE CALL: LAND USE AND TRANSPORTATION

This is the classic "chicken or the egg" dilemma: Which comes first—land use or transportation? Does the way we use land dictate where we build roads or are we building roads to influence the way we use land? The connection between the two is clear, but transportation agencies are reluctant to accept any responsibility. Land use has implications for transportation and every transportation action affects land use. New and improved roads shape future land use by providing the access and mobility for more intensive land use. Development then brings more people, more cars, more traffic and more traffic generates the need for yet more new roads.

Gary Naeyaert, Michigan DOT's chief spokesman, said his agency is aware of growing public concern about sprawl and the need for transportation alternatives. He added, though, that neither the governor's office nor MDOT see it as state government's responsibility to get involved in land planning. "We are not a social engineering agency," said Naeyaert. "Our role is to solve transportation problems, not land-use fights."

David Bulkowsk, of the Center for Independent Living in Grand Rapids said, "The transportation department's role in building roads that weaken city centers, produce congestion in the suburbs, make it impractical to get around except by automobile and result in growing pollution and social inequality is unmistakable. This agency is pursuing a policy of social engineering that is powerful, pervasive, and needs to change."

From *Roads to Ruin*, By Keith Schneider

"We need to make sure that transportation planning is done in coordination with the ecological and land use planning also occurring in the state." **Conservation advocate**

"As can be seen, new commercial development generally follows major transportation corridors like interstates and major state highways." **Atlanta Regional Commission, 2007**

CONSERVATION PLANNING

As a conservationist, you know that conservation doesn't just happen. Like transportation, conservation takes an orchestrated effort including science, technology, research, policy, money, management and a healthy dose of public participation. But unlike transportation, conservation doesn't have a huge cadre of conservation planners required to maintain a rigorous "continuing, comprehensive and cooperative" planning process with an ever-expanding network of conservation lands. But we can dream.

Within the past few decades, there have been some notable efforts to address conservation needs for certain habitat types such as wetlands and old growth forests, but generally only in response to federal mandates such as the Clean Water Act and Endangered Species Act. To capitalize on these efforts and new technology, the U.S. Fish and Wildlife Service launched the Gap Analysis program in the late 1980s. Congress funded the cooperative fish and wildlife research units and other university scientists to map the vegetation, land cover, species distributions, land ownership, and land management of each state in order to identify "gaps" in the conservation network. The U.S. Geological Survey now manages the program and most states have completed at least one coarse-scale biodiversity assessment. The development and refinement of geographic information systems and gap methodology stimulated interest in statewide wildlife conservation planning.

HALL OF FAME: MAINE IS BEGINNING WITH HABITAT

Maine's Beginning with Habitat (BwH) is a public-private partnership that combats sprawl by providing communities with practical tools to incorporate natural resource conservation into local land use planning. BwH brings together crucial wildlife and habitat data into customized GIS maps and makes the information accessible to local decision-makers, including planning boards, regional planning commissions, community conservation commissions and land trusts. BwH resource materials, including a road ecology primer, *Conserving Wildlife On and Around Maine's Roads,* are distributed via public presentations and technical assistance. Collaborating with state transportation officials and educating local communities is critical to advancing good road ecology.

Founded in 2001, BwH is guided by a seven-member steering committee that consists of: Maine Audubon, Maine Natural Areas Program, Maine Department of Inland Fisheries and Wildlife, Maine State Planning Office, Maine Coast Heritage Trust, the Maine Chapter of The Nature Conservancy, and the U.S. Fish and Wildlife Service. BwH received an Environmental Merit Award from EPA and has been recommended by the Association of Fish and Wildlife Agencies (AFWA) for use in all 50 states.

STATE WILDLIFE ACTION PLANS

If it takes a village to raise a child, what does it take to manage and conserve America's wildlife? Primary responsibility for wildlife management has always rested with the states. Traditionally, state fish and wildlife agencies have focused on game management and responding to their constituents within the sport hunting, fishing and recreation communities. The federal resource and land management agencies primarily manage wildlife occurring on public lands and endangered species. Essentially, our conservation framework disregards all non-game, non-listed species and nearly all private lands. Without protection, these species are vulnerable to continued habitat loss, degradation and eventual listing. Without incentives, private landowners may develop rather than conserve vital habitat.

Acknowledging that conservation is much more cost-effective than endangered species recovery, Congress established a program to assist state fish and wildlife agencies in conserving non-game and non-listed wildlife species through "wildlife diversity programs." The 2002 Department of Interior Appropriations bill included language creating the State and Tribal Wildlife Grants Program which provides new, dedicated funding for cost-effective, proactive conservation efforts intended to prevent wildlife from declining to the point of becoming endangered. State fish and wildlife agencies receive federal appropriations according to a formula based upon the state's size and population. Projects include the restoration of degraded habitat, removal of invasive vegetation, reintroduction of native species, partnerships with private landowners, research and monitoring.

Much like the earliest transportation planning, conservation planning began as a condition of receiving continued federal funding. Congress charged state fish and wildlife agencies with completing a State Wildlife Action Plan by October 1, 2005. The U.S. Fish and Wildlife Service reviewed each action plan and state wildlife agencies are required to revisit and update them at least every 10 years to ensure conservation success over the long term. The action plans not only address "species of greatest conservation need," but also, the "full array of wildlife and wildlife issues," and

they establish a plan of action for conservation priorities with limited funding. To "keep common species common," all plans are based on targeting resources to prevent wildlife from declining to the point of endangerment. Ideally, each action plan will *create a strategic vision for conserving the state's wildlife, not just a plan for the fish and wildlife agency*.

Congress identified eight essential elements the action plans must contain in order to ensure nationwide consistency:

1. Information on the distribution and abundance of species of wildlife (including low and declining populations) that are indicative of the diversity and health of the state's wildlife
2. Descriptions—including locations and relative conditions—of key habitats and community types essential to conservation of species identified in (1)
3. Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts relevant to restoration and conservation of these species and habitats
4. Descriptions of needed conservation actions and priorities
5. Proposed plans for monitoring species and their habitats, for monitoring the effectiveness of conservation actions and for adapting these conservation actions to respond appropriately to new information or changing conditions
6. Descriptions of procedures to review the action plan at intervals not to exceed 10 years
7. Plans for coordinating, to the extent feasible, the development, implementation, review and revision of the action plan with federal, state, and local agencies and Indian tribes that manage or affect significant land and water areas within the state
8. Broad public participation is an essential element.

The practical effect of this new planning requirement was to take advantage of the many disparate, ad hoc and unrelated conservation planning initiatives, combining them under one all-inclusive, sanctioned and funded program. The scale is ambitious, yet manageable and fits easily into an existing administrative framework. Strategies are intended to remain dynamic, serving as the home base for prioritizing conservation efforts in each state and coordinating the roles and contributions of all agencies and conservation partners. Implementation of strategy goals and objectives is aided through continued federal funding, matched by additional sources. In theory, the strategies represent the future of wildlife conservation. Collectively, they will create—for the first time—a nationwide approach to wildlife conservation.

If each action plan is indeed a strategic vision for conserving the state's wildlife, implementation will require more than the state fish and wildlife agency. For the conservation strategies to be successful, all sectors must embrace the goals, engage in the process and accept responsibility for their own roles and contributions—*including transportation agencies*.

Get involved with your State Wildlife Action Plan. Get a copy of your state's action plan and actually read it. Invite the implementation coordinator to meet with your organization to discuss the plan and how you can be more effectively involved.

"Conservation advocates should support planning efforts of state wildlife agencies such as the State Wildlife Action Plans. Make an effort to stay involved and hold the agency to a higher standard."
State wildlife agency biologist

INTEGRATING CONSERVATION AND TRANSPORTATION PLANNING

Over the last decade, transportation officials have struggled to find ways to reduce costs and accelerate project delivery, but unfortunately they have set their sights on streamlining the environmental review process rather than investing more time and money refining the planning process. Several legislative, policy and procedural fixes have been attempted with mixed success. Streamlining proponents succeeded in including several damaging provisions in SAFETEA-LU, effectively steamrolling the review process and weakening environmental protection. (**For more information, see Environmental Review.**) But conservationists didn't leave empty handed. Look closely and you'll find a small, unassuming but very powerful provision that could ultimately protect millions of acres of habitat by changing the way we do long-range transportation planning. For the first time, wildlife conservation will be among the very first things we consider, rather than the last.

SAFETEA-LU requires each metropolitan planning organization (MPO) and state transportation agency to consult with federal, state, tribal and local land use management, natural resources, wildlife, environmental protection, conservation and historic protection agencies while developing long-range transportation plans. Each consultation will include a comparison of the transportation plan with conservation maps or inventories of natural and historic resources such as the State Wildlife Action Plans. Each plan will also include a discussion of potential environmental mitigation activities—and potential areas to carry out these activities—that may have the greatest potential to restore and maintain the environmental functions affected by the plan.

In light of this new requirement, the State Wildlife Action Plans and other conservation planning are now hard-wired into trans-

portation planning and can demonstrate their full value and utility. Beyond their conservation value, the Action Plans have great potential to aid state transportation agencies in streamlining project delivery. Use of habitat mapping data in the action plans can provide an effective early warning system to red-flag transportation projects that will have a major impact on wildlife. Early detection of such problems can help avoid costly delays later in the life of projects. Early planning for conservation can also provide a good opportunity to explore mitigation options and identify the best remaining sites for acquisition and restoration. Often, by the time a road project develops through the planning, review and design process, many of the opportunities for high-quality and affordable mitigation have been lost. As an added bonus, the transportation agency can adopt a proactive approach to conservation and become a full partner in implementing the action plan for the entire state.

Get involved in the Section 6001 consultation! Ask someone from both your state planning division and your MPO (if applicable) how they conduct Section 6001 consultations, who is involved and what conservation plans/maps they use. Contact your state wildlife agency and make sure they are aware and involved. Contact representatives from federal resource and land management agencies (U.S. Fish and Wildlife Service, Forest Service, EPA, Tribes) and make sure they are aware and involved. SAFETEA-LU does not require public participation in Section 6001 consultations, but if your group has information, input, data or resources to contribute, you can at least request a place at the table.

–Be a real catalyst for change. Suggest your transportation and wildlife agencies formalize their commitment to better integrating conservation into transportation planning through a Memorandum of Agreement (MOA), a non-regulatory agreement between two or more agencies. **See Advocacy for a template MOA that can be tailored for their needs.**

–If your transportation agencies make progress in integrating conservation and transportation planning, recognize their efforts publicly. Nominate them for one of the many transportation award programs. **For a list of transportation-related award programs, see the Appendix.** Environmental awards are typically given to agencies for their project level activities, but should be used more for achievements in planning. Efforts to avoid impacts are more deserving of praise than efforts to simply minimize, mask or mitigate them.

In 2006, Defenders of Wildlife teamed up with FHWA and NatureServe to organize "Linking Conservation and Transportation Planning" workshops in Arkansas, Arizona and Colorado. Workshops provided a venue for transportation planners and resource professionals to share existing and emerging data, expertise and technologies while gaining a fresh understanding of each other's capacities and limitations. Participants were able to identify phases of the transportation planning process where conservation considerations would be most appropriate and effective.

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About MPOs: A Brief History
http://www.njtpa.org/public_affairs/mpo_history/hist_mpo1.htm

The Metropolitan Transportation Planning Process: Key Issues
http://www.planning.dot.gov/documents/BriefingBook/BBook.htm

A Citizen's Guide to Transportation Decisionmaking
http://www.fhwa.dot.gov/planning/citizen/citizen4.htm

From the Margins to the Mainstream: A Guide to Transportation Opportunities in Your Community, Surface Transportation Policy Partnership
http://www.transact.org/PDFs/margins2006/STPP_guidebook_margins.pdf

Evaluation of Statewide Long-Range Transportation Plans
Volpe National Transportation Systems Center
http://www.fhwa.dot.gov/hep10/state/evalplans.htm

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Guidebook on Statewide Travel Forecasting
http://www.fhwa.dot.gov/hep10/state/swtravel.pdf

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Air Quality Planning for Transportation Officials
http://www.fhwa.dot.gov/environment/aqplan/index.htm

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Edward Beimborn, Center for Urban Transportation Studies
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INTEGRATING CONSERVATION AND TRANSPORTATION PLANNING

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Maine's Beginning with Habitat (BwH)
www.beginningwithhabitat.org

ENVIRONMENTAL REVIEW

Ah yes. Environmental review. The National Environmental Policy Act (NEPA) is the Magna Carta of environmental laws and familiar territory for conservationists. NEPA is this nation's basic charter for protection of the environment. It is also the nation's foremost government accountability law, requiring federal agencies to disclose and seek public input on the environmental impacts of all major actions that may significantly affect the quality of the human environment. It is a law that empowers people—businessmen, ranchers, state and local governments, conservationists and ordinary citizens—and gives them a voice in federal decisions that affect their lives and communities. Many of us have spent untold hours, months and even entire careers seeking that elusive "No Build Alternative" with mixed success. We diligently read every document, pour over every detail, memorize every flaw and compose a brilliant 63-page comment letter in hopes that it will be read, incorporated and make a difference.

The glory days of environmentalism gave us a family of environmental protection laws including NEPA, the Endangered Species Act and the Clean Water Act. The jury is still out on how effective they have been in protecting *all* aspects of our natural environment. To date, the only habitat protected by federal law are wetlands, designated critical habitat for endangered species and some public lands. All other habitat types—and the species that depend upon them—are vulnerable to highway building and associated development.

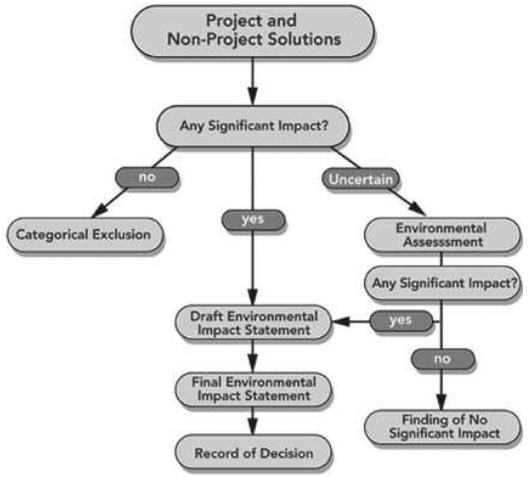
Unfortunately, environmental review does not apply to highway planning and doesn't kick in until the project level—after many crucial decisions have been made. Despite our strict laws and cumbersome reviews, you can still damage the environment, but it's going to cost you. A major industry in environmental documentation preparation supplies transportation agencies with expertise in compliance, but not conservation. Agencies spend millions on paperwork instead of protection.

True environmental stewardship is unlikely to happen unless conservationists start getting involved long before the environmental review process even begins.

Nevertheless, conservationists will always be involved in environmental review. Highway projects are subject to environmental review under many different federal statutes, as well as additional requirements from individual states. Volumes of information have been produced regarding the interpretation and compliance of these laws. Countless people have dedicated their entire lives to enforcing or complying with these statutes. The author is not one of them and doesn't expect you will be one of them as a result of reading this chapter. You will, however, get an overview of the major protections as they apply to transportation and some suggestions for more effective advocacy. **For a list of federal environmental statutes, see Legislation and Regulation.**

NATIONAL ENVIRONMENTAL POLICY ACT

The granddaddy of all environmental protections, the National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental impacts of their proposed actions and reasonable alternatives to those actions. State transportation agencies are subject to NEPA because they use federal funding. As soon as the state transportation agency determines that a proposed project may or will affect the environment, the environmental review process begins. This section will walk you through the basic steps of the NEPA process.



Lead and cooperation agencies The lead agency carries responsibility for the federal action and therefore supervises the preparation of the environmental documentation. For highway projects, the lead agency will always be the FHWA. Cooperating agencies are those with special expertise or jurisdiction like the U.S. Fish and Wildlife Service and are specifically requested by the lead agency to assist during the environmental process.

Categorical exclusion If the state transportation agency can demonstrate that a category of projects will have minimal environmental impacts, (both individually and cumulatively) the project may qualify for "categorical exclusion" from intensive federal environmental review. These projects should be small, routine

and should not add new lane miles to the road system. Projects like road resurfacing or bridge repair might qualify for categorical exclusion. According to FHWA, approximately 91 percent of about 31,000 federally funded highway projects received categorical exclusions in 2001. This represents about 76 percent of the $17.6 billion in federal funding distributed to states for highway projects in fiscal year 2001. A specific list of categorical exclusions normally not requiring NEPA documentation is set forth in the Code of Federal Regulations, at 23 CFR 771.117(c).

Environmental assessment If the significance of the impact is still uncertain, FHWA requires the state transportation agency to prepare an Environmental Assessment, a short report that gives a project description, need, alternatives considered, impacts and coordination. Following FHWA approval, the assessment is made available for a 30-day public comment period. Public hearings may or may not be required.

Finding of no significant impact If the Environmental Assessment determines that there are no significant impacts associated with the project, a Finding of No Significant Impact is prepared by modifying the assessment to reflect all applicable comments and responses. No formal circulation is required, but FHWA recommends the public be notified, after which the project can proceed.

Environmental impact statement If the agency determines the proposed action will have a significant impact on the environment, FHWA requires that an Environmental Impact Statement (EIS) be prepared. An EIS is a public document that details the purpose of and need for the project, alternatives to the project, the affected environment, the impacts of the alternatives to the affected environment, and public and agency comments received. Typically, state departments of transportation are responsible for coordinating the activities of environmental review involving environmental impact statements.

According to FHWA, only 3 percent of approximately 31,000 federally funded highway projects (representing just 9 percent of the $17.6 billion in federal funding distributed to states for highway projects in fiscal year 2001) required an environmental impact statement in 2001 (U.S. General Accounting Office, 2003).

Once the decision to move forward with an EIS is reached, FHWA should prepare a Notice of Intent, which is a brief announcement that FHWA will be preparing an EIS to be published in the Federal Register. As early as possible, a formal scoping process begins to identify the significant issues related to the proposed action. Scoping can be done by letter, phone and formal meeting but should involve all affected agencies and should be well documented for future phases of NEPA and the EIS.

Sign up for the Federal Register daily notices to receive information about environmental reviews for highway projects in your state or area of interest.

Once set in motion, the EIS contains these basic elements:

Purpose and Need Considered by many to be the most important part of an EIS, the purpose and need statement establishes a justification for spending large sums of tax dollars on a project that has significant environmental impacts. As a practical and political matter, expenditure of funds must be shown to be necessary and the impacts must appear acceptable relative to the project's importance. Ideally, the purpose and need is derived from the formal transportation planning process. Common "needs" cited in EISs include transportation demand, safety, legislative direction, urban transportation plan consistency, modal interrelationships, system linkage, and the condition of the existing facility.

Alternatives Regulations require the EIS "rigorously explore and objectively evaluate all reasonable alternatives" including the "no-action" or "no-build" alternative. Each alternative must connect "logical termini," or distinct beginning and end points, and must have "independent utility" which means the project is necessary in and of itself. Graphic representations should be used to show the locations of the alternatives in relation to each other and the project area. No alternative can be considered that would restrict consideration of future alternatives. In the draft EIS, all reasonable alternatives should be discussed at a comparable level of detail. The "preferred" alternative need not be identified at this stage, but if one has been chosen, it should be so stated in the document.

Affected Environment The affected environment section includes information on the existing social, economic and environmental setting, including environmentally sensitive features.

Environmental Consequences In order to form a basis for the comparison, the environmental consequences section describes the impacts of the alternatives to the affected environment and documents the methodologies used in the evaluation. Impacts should be quantified and potential mitigation discussed, regardless of significance. Secondary and cumulative impacts, though difficult to anticipate or quantify, are also required to be considered and discussed in the EIS.

Mitigation All measures proposed to mitigate the adverse impacts need to be described in the EIS as part of the overall project. Mitigation commitments should be documented in a "Summary of Mitigation Monitoring Commitments" appendix.

Comments and coordination This section includes the results of the early scoping process, including results of meetings and comments during preliminary coordination.

List of preparers The list of preparers includes those primarily responsible for preparing the EIS and background documentation, including the state transportation agency, consultants and FHWA division personnel.

If you are tracking a particular highway project under environmental review:
–Use the handy "Watchdog Worksheet" found in the Advocacy section.
–Contact the project manager as early as possible and ask to be put on the project mailing list.
–Sign up for the project newsletter, if available.
–Bookmark the project website, if available.
–Attend all public involvement workshops and hearings related to the project.
–Request a project representative attend your organization's meeting to discuss the project in question.
–Read all relevant documents and submit comments.
–Spread the word and establish partnerships with others who share your views.

Draft EIS When completed, the draft EIS is filed with the Environmental Protection Agency (EPA) and made public via a Notice of Availability in the Federal Register, which establishes a comment period of not less than 45 days and indicates where comments are to be sent. Supporting documentation generally is not circulated with the draft EIS, but all special studies and information referenced in the draft must be available for inspection by the public.

Public Hearings For all projects with anticipated significant environmental, social or economic impacts, FHWA requires that public hearings be held. Note that hearings need not be held *after* the issuance of the draft EIS, but if they are, the public is to be given 15 days to review the draft before the hearing takes place, and copies must be available at the hearing.

Comment Period The Federal Register notice establishes a comment period and provides instructions for submitting comments. The public and affected agencies will have a minimum of 45 days to read, review and comment on a draft EIS. The state transportation agency and FHWA division office reads all comments, including those from the public hearing and prepares responses to all substantive comments. Depending on the project size, scope and level of controversy, the lead agency can receive anywhere from zero to thousands of comments.

Final EIS Once all comments have been received and considered, the final EIS is prepared and released. The final EIS contains all the information in the draft EIS, with changes based on comments received. The final EIS identifies and describes the preferred alternative and the basis for the decision, and it demonstrates compliance with environmental laws including any mitigation measures that are to be incorporated into the proposed action. The final EIS should include all substantive comments, provide the lead agency's responses and discuss any opposing views, showing consideration given to issues raised and providing sufficient information to support the position taken. If a large number of comments were received, the lead agency may choose to summarize comments.

Common responses to comments include modifying alternatives or analyses, making factual corrections and evaluating new alternatives. If the lead agency determines a new alternative should be considered, they must prepare a supplement unless it was adequately covered in the draft EIS. If the lead agency determines a comment does not warrant a response, they must explain and cite sources, authorities or reasons that support its position.

Each final EIS is reviewed for technical accuracy, completeness, accordance with state and federal laws and editorial consistency. A Notice of Availability must be published in a local newspaper and the full document must be accessible at a state transportation agency office, local government office or library. The final EIS must be available to the public for 30 days prior to the transportation agency taking any action on the project, and another public comment period begins.

Dispute Resolution If disagreements arise regarding a proposed action, every reasonable effort is supposed to be made to resolve the dispute before issuance of a final EIS. If substantial issues remain unresolved, the lead agency must identify the disputed issues and document all efforts that were made to resolve them in the final EIS.

Record of Decision The Record of Decision (ROD) is the last step in the EIS process and may not be issued sooner than 30 days after the approved final EIS is distributed or 90 days after the draft EIS is circulated. The ROD must be made publicly

available, but is not required to be published in the Federal Register. Like the final EIS, the ROD identifies the selected alternative and presents the basis for the decision. If the selected alternative is not the "environmentally preferable alternative," the ROD must justify the decision and explain why some values were considered more important than others. The ROD should summarize mitigation measures with information on the means to avoid, minimize and mitigate for impacts. As with the draft EIS, all substantive comments received regarding the final EIS must be identified and given appropriate response in the ROD. However, the ROD represents the transportation agency's final decision regarding the proposed action and is a judicially enforceable document. While the ROD is the green light to proceed with the project, it may still be delayed by other matters such as funding or changes to the project.

IT CAN HAPPEN: A NO-BUILD RECORD OF DECISION!

On March 7, 2007, FHWA issued a revised ROD for a highway project in Lane County, Oregon. The original ROD was issued in 1990, but was met with substantial public resistance. In issuing the new decision, FHWA said "In large part, FHWA selects the no-build alternative in the revised ROD based on: public and resource agency input, including the Oregon DOT; a Lane Council of Governments resolution; and, a conflict assessment report prepared by FHWA and the City of Eugene. While the no-build does not satisfy an existing transportation need in the area, selecting the no-build alternative is in the best overall public interest at this time."

Supplemental EIS If new information or circumstances regarding a proposed project arise, FHWA and the state transportation agency may determine that new environmental studies are needed to assess the impacts of the changes. If FHWA determines that the changes would result in significant environmental impacts not evaluated in the EIS, a supplemental EIS will be prepared.

A supplemental EIS must be developed using the same process and format as an original EIS, except that scoping is not required. Contents of the supplemental are also similar—including a description of the proposed action and the changes that precipitated the need for a supplemental analysis—but are limited to the new information or changes in the project. New environmental requirements and the results of any re-evaluations should be summarized, reflecting the current consideration of the entire proposed action and the expected effects on the environment.

Only if the supplemental EIS involves a significant portion of the overall project will FHWA suspend activities until it is finished. If FHWA deems the scope of the supplemental is limited, the transportation agency may proceed with granting new approvals and other project activities before the supplemental EIS is completed.

MITIGATION

Mitigation is legalese for "oops." For significant impacts that are not avoided through project planning and redesign, the transportation agency can compensate by replacing the lost area or ecological value. All measures taken to compensate for unavoidable impacts are identified in the EIS, and commitments should also be documented in the "Summary of Mitigation Monitoring Commitments" appendix. Mitigation commitments include information regarding responsible agencies, monitoring, performance standards and schedules for implementation.

Mitigation is an art, not a science. Many potential impacts can be reduced by modifying the project design or location. A mitigation action should result in a physical change to a proposed project that will actually reduce or eliminate impacts. Consultation, preparation of studies, plans and analyses, and monitoring environmental conditions are not measures that result in a physical change and should not be considered adequate or effective mitigation measures.

In order to receive federal funding, mitigation measures must meet the following criteria:

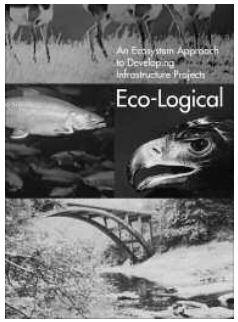
- The impact for which the mitigation is proposed actually resulted from the project
- The proposed mitigation represents a reasonable public expenditure considering the extent to which the mitigation results in compliance with a federal statute or other regulation or policy

FHWA's Environmental Policy Statement (EPS) calls for an expanded interpretation of NEPA requirements, beyond avoid, minimize and mitigate. The EPS calls upon transportation agencies to *"Seek opportunities to go beyond traditional project mitigation efforts and implement innovative enhancement measures to help the project fit harmoniously within the community and natural environs."* The only restrictions on funding additional environmental augmentations are that such activities be in the public interest, that they constitute a practical public expenditure and additional costs are reasonable related to the highway project.

CAUTION: While NEPA requires that an EIS discuss mitigation measures that could be implemented, the statute does not require federal agencies to develop such measures or actually carry them out. (Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989)). Only if the final EIS contains mitigation measures presented as commitments do FHWA regulations require that they be incorporated into the project and carried out.

"SMART" MITIGATION IS ECO-LOGICAL

Traditionally, compensatory mitigation has been conducted on-site and on a project-by-project basis. Sometimes this is the best option, but often it results in several small, isolated patches of habitat scattered around the landscape. Because the objective is *compliance* instead of *conservation*, these small patches rarely add up to the sum of their parts. To add insult to injury, even the least and most ineffective mitigation is expensive for the transportation agency. So, when it's all said and done, we have lost valuable habitat and the transportation agency has spent oodles of our money on something that has little or no ecological value. Isn't there a better way?



Recognizing the shortfalls of our current approaches to mitigation, FHWA teamed up with representatives from seven other agencies including the U.S. Fish and Wildlife Service, U.S. Forest Service, National Park Service and the Army Corps of Engineers to develop *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects*. Traditional mitigation measures don't always achieve the greatest environmental benefit or address habitat connectivity and conservation. Eco-Logical highlights the flexibility in regulatory processes to go beyond just compliance in mitigation.

"The role of the environmental professional has too long been associated with compliance instead of quality assurance. Precedence has been that those with the slide rules work in a vacuum and those with work boots provide information but are not as valued in transportation." **Former state transportation agency staff**

ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the United States or elsewhere. The act outlines procedures for federal agencies to follow when taking actions that may adversely affect listed species, and contains exceptions and exemptions.

Section 7(a)(1) directs all federal agencies to utilize their authorities in furtherance of the purposes of the act by carrying out programs for the conservation of listed species, making it clear that all federal agencies should participate in the conservation and recovery of listed threatened and endangered species.

Florida Panther

Section 7(a)(2) states that federal agencies shall ensure that their actions are not likely to jeopardize the existence of a listed species or result in the destruction or adverse modification of designated critical habitat. To fulfill that duty, federal agencies must engage in consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service (hereafter the Services) regarding the effects of their actions on listed species and their habitat.

Determination If FHWA and the state transportation agency (the "action agency") have no reason to believe that a listed species or designated critical habitat exists in the project area or will be affected by the project, they may determine that no consultation is required. If there is any question or if they determine the project may affect listed species or critical habitat, coordination and/or informal consultation with the Services should be initiated.

Section 7 Consultations In order to determine whether or not a particular highway project is likely to jeopardize a listed species, the transportation agency enters into what is commonly known as "Section 7 consultation" with the Services.

Informal consultation is an optional process to determine whether the proposed project may adversely affect listed species or critical habitat. An informal consultation usually includes correspondence and meetings and results in either a "not likely to adversely affect" or "likely to adversely affect" finding. If the proposed project may adversely affect a listed species or designated critical habitat, formal consultation is required, initiated by a written request from FHWA.

Every Section 7 consultation contains the same basic elements:

Biological assessments (**BA**) are prepared by the state transportation agency, under the direction of FHWA, to determine whether a proposed action is likely to adversely affect listed species or designated critical habitat. Each BA contains six types of information:

1. Description of the action to be considered.
2. Description of the specific area that may be affected by the action.
3. Description of any listed species or critical habitat that may be affected by the action.

Anatomy of a Highway

4. Description of the manner in which the action may affect any listed species or critical habitat and an analysis of any cumulative effects.
5. Relevant reports, including any EIS, environmental assessment (EA), or BA prepared.
6. Any other relevant available information on the action, the affected listed species, or critical habitat.

Biological opinions (**BO**) are prepared by the Services, detailing their opinion as to whether or not the proposed action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of designated critical habitat. Each BO should include a description of the proposed action, status of the species, critical habitat, the environmental baseline, effects of the action, cumulative effects, the Services' conclusion regarding jeopardy and reasonable and prudent alternatives.

If the proposed action is expected to incidentally "take" endangered species, but not jeopardize the species overall or harm critical habitat, the BO will include an "incidental take statement." The incidental take statement describes the anticipated incidental take and provides reasonable and prudent measures to minimize such take. If the action agency complies with the recommended reasonable and prudent measures, they will be exempt from legal liability for the otherwise illegal take.

If the Services conclude the proposed project will result in "no jeopardy" and no adverse modification of critical habitat, the consultation is complete and the action agency may proceed. In the event the Services determine the proposed action is likely to jeopardize the species or adversely modify critical habitat, they will issue a "jeopardy" opinion.
The Services must suggest "reasonable and prudent alternatives" (RPAs) if any exist, that will allow the agency to fulfill the purpose of its proposed action without jeopardizing the species or destroying critical habitat. Such "RPAs" may include alternative designs or routes that minimize impacts on the species. If the Services cannot identify RPAs, they may issue a jeopardy opinion, but these are extremely rare.

CAUTION: Despite the gravity of a jeopardy ruling, the action agency may still proceed with the proposed project. In a 2005 memorandum on ESA consultation, FHWA says "…the Services have no veto power over a project." The Services can only offer a BO, but they have no regulatory authority. However, if the project results in take, they can prosecute for violation of the ESA. Defying a jeopardy opinion leaves an action agency extremely vulnerable to litigation, so this is also rare.

Did You Know? In 1992, the General Accountability Office found that almost 90 percent of all consultations between the Services and other federal agencies over proposed federal actions in fiscal years 1987 through 1991 were resolved informally. More than 90 percent of the formal consultations concluded that these actions would not harm listed species. Of the less than 10 percent of the formal consultations that concluded that a proposed action would likely jeopardize a species, almost 90 percent provided reasonable but prudent alternatives that would allow the project to proceed.

Best Scientific and Commercial Data Available

The ESA requires the action agency to use the "best scientific and commercial data available" throughout the formal consultation and in all measures to insure the proposed action will not jeopardize the species in question. Potential sources of information include listing packages, recovery plans, active recovery teams, species experts, prior consultations on the species, state/tribal wildlife and plant experts, universities, peer-reviewed journals and state heritage programs.

If significant data gaps exist, the Services can suggest deferment on the biological opinion due date, until sufficient information is developed. If the action agency insists consultation proceed with insufficient information, the biological opinion will be developed with the available information, but will give the benefit of the doubt to the species. When and if additional data becomes available, reinitiation of consultation may be required.

CAUTION: The action agency can only be held to the information that is available. New research or analyses does not have to be created by the action agency, even if it is necessary to determine the impact on the species or habitat in question.

The Services have jointly published a policy on Information Standards Under the Endangered Species Act. This policy calls for review of all scientific and other information used to prepare biological opinions, incidental take statements and biological assessments, to ensure that any information used to implement the act is reliable, credible and represents the best scientific and commercial data available.

Indirect Effects

In National Wildlife Federation v. Coleman, 529 F.2d 359 (5th Cir.), cert. denied, 429 U.S. 979 (1976), the court ruled that indirect effects of private development resulting from proposed construction of highway interchanges had to be considered as impacts of a proposed federal highway project, even though the private development had not been planned at the time the highway project was proposed.

CLEAN WATER ACT

The Federal Water Pollution Control Act, better known as the Clean Water Act (CWA), is the primary federal law governing water pollution. The stated aim of the act is to eliminate discharge of pollutants into navigable waters and achieve water quality for fish, wildlife and recreation in and on water. Most pertinent to this guide is Section 404 of the CWA, "Wetland Protection/Dredge and Fill Permits." The U.S. Army Corps of Engineers administers the Section 404 program, which requires anyone who proposes to physically alter any aquatic site (including wetlands, rivers and streams) to apply for a permit. Since many highways are built through wetlands and streams, transportation agencies frequently seek 404 permits.

The permit review process is based on a sequence of "avoid, minimize and mitigate." Prior to receiving a 404 permit, the applicant (the state transportation agency) must demonstrate that it has avoided and minimized wetlands impacts as much as practicable. If the proposed project does not absolutely need to be executed in or near the affected waters, the Corps is to assume that practicable alternatives do exist and can deny the permit. Under guidelines issued by the EPA, the Corps may not issue the permit if there is a practicable alternative that would have less significant adverse environmental consequences. According to the Corps, under this regulation, it can only authorize the least environmentally damaging, practicable alternative.

The Corps shares the duties of enforcing Section 404 with the EPA, which is responsible for interpreting environmental criteria used in evaluating permit applications, overseeing state actions and reviewing individual permit applications. The EPA can also override a Corps decision if they find an "unacceptable adverse effect" on the aquatic environment. Since 1979, the EPA has issued only 11 vetoes out of an estimated 150,000 permit applications received.

If threatened or endangered species may be affected by the proposed activity, the Corps will consult with the appropriate federal agency (for example, the U.S. Fish and Wildlife Service) to obtain a biological opinion on the effects on the species. If the proposed activity will have significant impacts on the human environment, the Corps will require an EIS. If cultural resources are within the permit area and will be impacted by the proposed activity, the Corps must comply with section 106 of the National Historic Preservation Act and the applicant may be required to obtain cultural resource surveys.

Did You Know? In 2003, the Corps evaluated 86,177 permits and denied only 299.

MITIGATION

For any remaining unavoidable impacts, the applicant must provide compensation through activities to restore or create wetlands. Under Section 404, mitigation can include:

- wetland restoration (restoring a former wetland to its natural condition).
- wetland creation (making a new wetland where historically no wetland had existed).
- wetland enhancement (improving an existing wetland).
- preservation (purchasing or otherwise protecting an existing, high-quality wetland).

For conservation value, wetland restoration is generally the preferred form of mitigation because it results in a net gain of wetland acreage. Creating new wetlands is less desirable because created wetlands rarely replace the same values that are being lost. Preservation of existing wetlands is essential to any landscape level or watershed plan, but should not be allowed as mitigation for destruction of wetlands because it results in a net loss in total acreage of wetlands in the watershed.

Wetland mitigation is generally carried out in one of three ways:

1. On-site, in-kind mitigation means the transportation agency will set aside some land on the project site that is just like the kind they destroyed.
2. Off-site, mitigation banks are large contiguous wetlands or other habitat types that have been created, preserved or restored to earn advance mitigation "credits" for impacts elsewhere.
3. In-lieu fee is the "pay to play" option. In some places, transportation agencies and developers can simply pay a penalty for their impacts. The fees collected are then used toward larger conservation efforts elsewhere.

THE SWANCC DECISION

In 2001, the United States Supreme Court issued a ruling regarding "isolated" wetlands in Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers. The court concluded that the Corps did not have Clean Water Act jurisdiction over "isolated" wetlands such as prairie potholes and pocosins. These wetlands may be defined as isolated if they lack a direct surface connection to other bodies of water. The problem

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is, they are often connected by groundwater or overflow and provide significant landscape functions such as flood control, water quality maintenance and habitat to wildlife populations.

HALL OF FAME: EUROPEAN UNION TELLS POLAND, "NO HIGHWAY THROUGH WETLAND"

The European Commission gave Poland a week to halt work on a planned highway through a protected environmental area that is home to rare flora and wildlife, or face a court action. The European Union's executive, speeding up legal measures it can take when a member state violates EU law, sent a final warning to Warsaw and set a tight deadline for a response in an effort to avoid "irreversible damage" to forests and animals. Poland wants to build a section of a highway linking Warsaw to Helsinki via the Baltic states through the northeastern Rospuda Valley, one of Europe's unique peat lands, which is home to rare plants and wildlife. EU Environment Commissioner Stavros Dimas said Brussels supported building road infrastructure in Poland, but not at the cost of the environment. "What the Commission does not accept is the irreversible damage that will be caused by the bypasses in the Rospuda Valley. It is neither necessary nor justified," he said. *Reuters, 2007*

HALL OF SHAME: ENGINEERS SENTENCED FOR FILLING WETLANDS

Two state highway engineers will spend a year on unsupervised federal probation for illegally placing dirt into wetlands during a road construction project near Plentywood, Montana. U.S. Magistrate Richard Anderson sentenced Ronald T. Arthur, 60, of Culbertson, and Lesley G. Peterson, 58, of Forsyth. The men pleaded guilty to a misdemeanor count of violating the Clean Water Act. They faced a possible penalty of one year in prison and a $2,500 fine per day of violation. The prosecutor said the offense occurred in 2001 during construction of almost 11 miles of state Highway 5 west of Plentywood. The project crossed wetland areas by Big Muddy Creek. The state transportation agency got a permit in 2000 from the U.S. Army Corps of Engineers to place fill in 2.52 acres of wetlands for the project. The men acted negligently when they allowed more wetlands to be filled than was permitted, the government said. *Billings Gazette, 2006*

SECTION 4(f)

Though the ESA and CWA are the most well known of our environmental laws, other provisions can be useful in protecting wildlife and natural places. The Department of Transportation Act of 1966 contains a tiny but powerful provision that was intended to protect public places such as parks and refuges from highway builders. Section 4(f) declares that the federal government will make a special effort "to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." FHWA cannot approve a project requiring the use of publicly owned land (including public parks, recreation areas, wildlife/waterfowl refuges and historic sites) unless adequate planning was done to minimize harm, and there is no prudent and feasible alternative. Section 4(f) is often considered in combination with Section 106 of the National Historic Preservation Act that requires only that effects on historic properties be considered.

The Department of Interior has declared the following listed lands as eligible for 4(f) protection:

- Lands of the National Park System, National Wildlife Refuge System, National Fish Hatchery System.
- Lands under the jurisdiction of the Bureau of Reclamation and Bureau of Land Management and Indian lands held in trust by the Department of Interior that are administered as parks, recreation areas, wildlife refuges or historic sites.
- State lands acquired, developed or improved with federal grants for fish and wildlife conservation, restoration or management.
- Local and state lands acquired or developed with monies from the Land and Water Conservation Fund.
- Lands acquired as mitigation under the Fish and Wildlife Coordination Act.
- Properties listed on, or eligible for, inclusion in the National Register of Historic Places.
- Federal surplus real property.
- Abandoned railroad rights of way.
- Areas publicly owned that receive de facto use as park, recreation or refuge lands.

CAUTION: Be aware that 4(f) can pit one protected resource against another, and 4(f) trumps them all. For example, if the choice is between impacting a wetland or an historic barn, the wetland will lose. But don't allow such false dichotomies to rule the day. If you're being asked to choose between the Mona Lisa and the Sistine Chapel, step back and rephrase the question. Which alternative can protect both precious and irreplaceable resources and address the transportation need?

Section 4(f) was tested shortly after it passed when transportation officials proposed to build Interstate 40 through Overton Park in Memphis, Tennessee. The case went all the way to the Supreme Court where Justice Thurgood Marshall stated that Section 4(f) "is a plain and explicit bar to the use of federal funds for con-

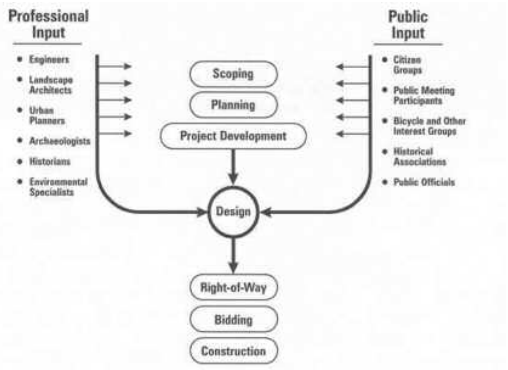
struction of highways through parks—only the most unusual situations are exempted." (Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402 (1971)) **For more information on 4(f), see Public Roads and Public Lands**

SAFETEA-LU: Section 4(f) is remarkably simple, yet has been criticized by a small number of vocal state transportation agencies that found it overly restrictive and prohibitive. Following attempts by opponents to remove or weaken 4(f), the amended language in SAFETEA-LU's section 6009 retains the restrictions on impacting public resources, but provides flexibility for projects that have "de minimis" impacts. What is de minimis, you ask? SAFETEA-LU says the transportation agency must convince the public and the resource manager that the project will not adversely affect the resource, and if they can, the project may proceed without further analysis.

PUBLIC PARTICIPATION

Have you ever sat through endless public hearings or spent your weekend reading an EIS that makes the yellow pages seem like a pamphlet? Then you know that public participation is a cornerstone of the NEPA process. The Council on Environmental Quality regulations on implementing NEPA require that agencies make a diligent effort to involve the public in preparing and implementing their NEPA procedures. They also require that agencies provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents so as to inform those persons and agencies who may be interested or affected.

FHWA defines the "public" broadly as including all individuals or groups who are potentially affected by transportation decisions. This includes anyone who resides in, has interest in, or does business in a given area that may be affected by transportation decisions. The "public" includes both individuals and organized groups.



FHWA also requires that each state develop procedures to carry out a public involvement program. State public involvement and public hearing procedures must provide for:

- Coordination of public involvement activities and public hearings with the entire NEPA process.
- Early and continuing opportunities during project development for the public to be involved in the identification of social, economic and environmental impacts, as well as impacts associated with relocation of individuals, groups or institutions.
- One or more public hearings to be held at a convenient time and place for any federal-aid project which has a significant social, economic, environmental or other effect, or for which the FHWA determines that a public hearing is in the public interest.
- Reasonable notice to the public of either a public hearing or the opportunity for a public hearing. The notice shall also provide information required to comply with public involvement requirements of other laws, executive orders and regulations.

Contact your transportation agency and ask for details about its public participation process.

Opportunities for public participation

Phase Scoping	Participation
Environmental assessment	Means of soliciting public input are determined on a case specific basis, taking into consideration the results of public participation efforts at the planning and programming stages, and the degree of public interest or controversy
Draft EIS	Maximum 60 days (SAFETEA-LU)
Final EIS	Once published, 30 days to review before Record of Decision is approved
Supplemental EIS	Should be same as draft EIS
Record of Decision	Cannot be issued sooner than 30 days after final EIS is distributed or 90 days after the draft EIS is circulated
ESA	Consultation is typically private until the BO is issued
Clean Water Act	Pubic comments due within 30 days of the issuance of a notice
4(f)	Public participation for de minimis determination

ENVIRONMENTAL STREAMLINING

For the past decade, the highway building industry and interests pressured Congress to include language that would "streamline" the environmental review procedures as they are applied to transportation construction projects. Many projects, they contend, are needlessly delayed by strict environmental regulations, increasing costs and denying American drivers the efficient transportation system they deserve. "Over the years, the well-intentioned NEPA process has become enmeshed in a web of duplicative bureaucratic reviews," according to the American Highway Users Alliance.

Really? According to a 2000 AASHTO study, 91 percent of all environmental documents produced by state transportation agencies are Categorical Exclusions. Less than 2 percent require EISs. Contrary to the horror stories generated by highway building advocates, processing times for environmental reviews average between eight months and 3.5 years, depending on the level of complexity associated with the analysis. (TransTech Management, Inc., 2000).

"Some people are so busy learning the tricks of the trade that they never learn the trade."

Vernon Law, Pittsburgh Pirates pitcher

Streamlining becomes steamrolling when opportunities for public participation are limited and contributing agencies are pressured into silence about potential environmental problems or bullied with unreasonable deadlines and demands.

TEA-21 contained a provision known as section 1309, which mandated the Secretary of Transportation to "develop and implement a coordinated environmental review process for highway construction and mass transit projects..." The purpose of the environmental streamlining provisions were to coordinate federal agency involvement in major highway projects under the NEPA process to address concerns relating to delays in implementing projects, unnecessary duplication of effort, and added costs for reviewing and approving surface transportation projects. The streamlined process was intended to:

- Establish an integrated review and permitting process that identifies key decision points and potential conflicts as early as possible.
- Integrate the NEPA process and other environmental reviews and approvals as early as possible in transportation planning.
- Encourage full and early participation by all federal, state and local agencies that must review a transportation project or issue a permit, license, approval or opinion relating to the project.
- Establish a dispute resolution mechanism to address unresolved issues.

Streamlining did bring one silver lining: section 1309 permitted state transportation agencies to provide highway funding to resource agencies to help expedite the review process while ensuring that environmental concerns are fully considered. The increase in highway projects has increased the burden on resource and regulatory agencies to participate in environmental reviews, yet the resource agencies have not received any additional funding to meet this new demand. To date, a handful of states have taken advantage of the provision and now enjoy the benefits of having early and substantive involvement from resource agencies.

Does your state transportation agency support a liaison or coordinator in your state resource or wildlife agencies? If so, schedule a meeting with them. Introduce yourself, your organization and your concerns about the wildlife and transportation conflict in your state or area of interest. If your state transportation agency does not support liaison staff, suggest that they do.

Directed by TEA-21, FHWA put forth a new, streamlined environmental review process in 2000 with concurrent reviews, cooperative time periods and assistance to affected agencies, but proponents of streamlining were not satisfied. During the next reauthorization, the streamliners pushed Congress for even more drastic measures in SAFETEA-LU.

SAFETEA-LU Responding to road industry complaints that the environmental review process is too burdensome, time-consuming and expensive, Congress included a revised NEPA process specifically for transportation projects. In the process of trying to streamline environmental review, Congress developed a process that at once, significantly weakens NEPA and unnecessarily complicates the process for participating agencies.

SAFETEA-LU Section 6002 includes the following: **Concurrent reviews** To the extent possible, all reviews (NEPA, ESA, CWA, 4(f)) should be carried out concurrently, rather than sequentially.

Preferred alternative The preferred alternative may be developed to a higher level of detail than all other alternatives, in effect defeating the purpose of considering more than one alternative.

Comment deadlines The public and participating agencies will have no more than 60 days to comment on a draft EIS and no more than 30 days for all other comment periods. Overburdened agencies and understaffed advocacy groups often need more time to read and respond to an EIS, which can be thousands of pages in length and sometimes not available in a timely manner.

Issue identification This "tattle-tale" clause requires all participating agencies to immediately identify any issues that could delay the review or be cause for denial of permits. If said issues are not

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resolved in less than 30 days, the lead agency must notify the heads of all relevant agencies, Congress and the governor. The problem is, members of Congress and the governor are not transportation experts, nor are they trained in dispute resolution. This provision was clearly intended to intimidate resource agencies and discourage them from bringing forth potential conflicts that would delay completion of the environmental review process or result in denial of a permit approval.

Assistance to affected agencies Carrying on the practice from TEA-21, Section 6002 further sanctions the practice of reimbursing state and federal agencies participating in the environmental review process for transportation projects. Funds can be used for planning, training, information gathering, mapping and dedicated staff. Unfortunately, the provision limits the available funds to those needed to meet unrealistic new deadlines.

Limitation on claims The public is also limited to just 180 days to file a claim following a record of decision on a road project. Prior to this drastic change, the public had as much as six years to file a claim.

SAFETEA-LU's streamlining measures continue with a series of provisions designed to devolve NEPA responsibilities to the states. Section 6003 establishes a pilot program to give handpicked state transportation agencies the sole responsibility for environmental review for all transportation projects. Section 6004 allows all state transportation agencies to determine if a project can be categorically excluded from environmental review. Section 6005 establishes a pilot program in which five states are given full responsibility for NEPA on one or more highway projects. Ironically, the pilot states appear to have been selected based NOT upon a measurable criteria or capacity to accept these critical responsibilities, but instead upon political favoritism. There is a correlation between pilot states and congressional representation in leadership positions within the reauthorization conference committee. Coincidence?

STATE-BASED ENVIRONMENTAL LAWS

State agencies are often responsible for enforcing federal environmental statutes. Failure of state governments to properly implement federal environmental laws may result in sanctions, such as withdrawal of federal highway funding. In addition to federal environmental protections, many states have enacted their own statues. Several states have their own "mini-NEPA" and many also have a state ESA. Generally, Congress has allowed states to establish more stringent requirements under state environmental laws. For example, California's state ESA is stricter than the federal ESA. In New Jersey, the state wetland protections are stronger than those set forth by the federal Clean Water Act.

Virginia's Department of Transportation (VDOT) uses the State Environmental Review Process (SERP) for all state-funded road and highway projects. SERP allows state environmental agencies the opportunity to comment on VDOT projects at the earliest possible stage. Environment and resource agencies supply information to assist VDOT in determining if the proposed project has significant environmental impact early enough to allow the project manager and designer time to avoid or minimize impacts.

To find the environmental laws in your state, check the following resources:

- State departments of environmental protection, natural resources or wildlife often have descriptions of the applicable laws and regulations on their websites.
- Law libraries or their online equivalent.
- Many states have access to state statutes on state legislature or governor websites.
- Try Findlaw.com.
- Professional, for-profit services such as Lexis-Nexis or Westlaw.
- State bar associations may have an environmental law section on their Web sites with compendia and summary materials.

LINKING PLANNING AND NEPA

In addition to complaints that environmental review takes too long, many transportation officials have complained that the process is redundant with the planning process. Studies related to transportation alternatives and impacts undertaken during transportation planning, they contend, are needlessly disregarded during NEPA reviews. Transportation officials maintain that decisions made during the planning process should not have to be revisited during the environmental review process.

Environmental and public advocacy groups disagree, concerned that the existing planning process does not provide an adequate legal framework or appropriate public participation for agenda-setting determinations on specific projects, alignments and modal choices. The transportation sector has fought to keep its planning process from receiving NEPA-level scrutiny. Federal law specifically dictates that planning is not subject to NEPA and courts have repeatedly upheld that standard. If planning is not subject to NEPA, advocates ask, then how can the products of the planning process be used to satisfy NEPA requirements?

YOU MAKE THE CALL: IS LINKING PLANNING AND NEPA A GOOD IDEA?

In 2005, FHWA released guidance on linking planning and NEPA, to be implemented on a voluntary basis at the state level. The guidance does not "NEPA-ize" the planning process, but shows "how information, analysis, and products from transportation planning can be incorporated into and relied upon in NEPA documents under existing laws."

YES

Cindy Burbank, former FHWA Assistant Administrator for Planning, Environment and Realty

The disconnect between planning and NEPA has often resulted in duplication of work and delays in implementation of transportation improvement projects.

FHWA has reviewed its legal authority and found substantial opportunity to reinforce planning as a foundation for NEPA. But, FHWA guidance does not NEPA-ize planning and planning is still not subject to NEPA requirements.

Federal agencies will still have to affirm that the planning process meets legal requirements, that the data and analysis were credible and that the planning approach and assumptions were rational or at least not irrational.

From Transportation/Environment Alert, Volume 7, Issue 22. February 4, 2005

NO

Janine Bauer, transportation attorney representing environmental and public advocacy groups on NEPA issues

Some metropolitan planning organizations are not capable of a NEPA level of analysis and often don't do planning in the context of valid and reliable data about employment, housing, jobs, growth, environmental and conservation restrictions and land use plans.

For FHWA's approach to work, the transportation plan would have to be conducted as a NEPA process itself, with all the legal requirements of NEPA. If you don't "NEPA-ize" planning, then to rely on planning products in the NEPA process short circuits the NEPA process by allowing some of those very important decisions to be made outside of NEPA.

Environmentalists are in favor of an efficient planning and environmental review process, but we're against treading on existing public comment and environmental review safeguards to do it.

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U.S. General Accounting Office. *Stakeholders' Views on Time to Conduct Environmental Reviews of Highway Projects.* 2003. Retrieved from *http://www.gao.gov/new.items/d03534.pdf*

ENVIRONMENTAL REVIEW RESOURCES

NATIONAL ENVIRONMENTAL POLICY ACT

NEPA (full text) *http://ceq.eh.doe.gov/nepa/regs/nepa/nepaeqia.htm*

FHWA Environmental Review Toolkit
http://www.environment.fhwa.dot.gov/

CEQ Task Force, NEPAnet
http://www.nepa.gov/nepa/nepanet.htm

EPA'S NEPA Homepage
http://www.epa.gov/compliance/nepa/index.html

FHWA's Environmental Policy Statement (EPS)
http://www.fhwa.dot.gov/environment/epsfinal.htm

Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects
http://www.environment.fhwa.dot.gov/ecological/eco_index.asp

NEPA Under Seige: The Political Assault on the National Environmental Policy Act
Robert G. Dreher, Georgetown University Law Center. 2005
http://www.law.georgetown.edu/gelpi/current_research/documents/NEPAUnderSiegeFinal.pdf

ENDANGERED SPECIES ACT

Full text of the ESA *http://www.fws.gov/endangered/esa.html*

Final ESA Section 7 Consultation Handbook
http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf

FHWA's Management of the ESA Environmental Analysis and Consultation Process
http://www.fhwa.dot.gov/environment/esaguide.htm

FHWA's Legal and Program Guidance on ESA Consultation Under Section 7 (2005)
http://nepa.fhwa.dot.gov/ReNepa/ReNepa.nsf/aa5aec9f63be385c852568cc0055ea16/79681451970f2a5a85256fb1004f9c17?OpenDocument

USFWS Information Standards Under the Endangered Species Act
http://www.fws.gov/endangered/policy/pol004.html
USFWS Mitigation Guidance on Conservation Banking
http://endangered.fws.gov/policies/conservation-banking.pdf

CLEAN WATER ACT

River Network: CWA Information
http://www.cleanwateract.org/cwa_search.asp

Army Corps of Engineers: Clean Water Act and Mitigation Banking
http://www.usace.army.mil/cw/cecwo/reg/sec404.htm
www.usace.army.mil/civilworks/cecwp/branches/guidance_dev/pgls/pdf/pgl46b.pdf

USEPA: Clean Water Act
http://www.epa.gov/region5/water/cwa.htm

U.S. Fish and Wildlife Service's Clean Water Act information
http://www.fws.gov/habitatconservation/cwa.htm

USGAO Report on the SWANCC Decision
http://www.gao.gov/new.items/d05870.pdf
FHWA Regulation on Mitigation Banking (23 CFR 777)
www.fhwa.dot.gov/hep/23cfr777.htm

4(f)

FHWA 4(f) Information
http://www.fhwa.dot.gov/environment/4f.htm
http://www.environment.fhwa.dot.gov/projdev/impTA6640.asp

Department of Interior's Handbook on Section 4(f) Evaluations
http://www.doi.gov/oepc/handbook.html

PUBLIC PARTICIPATION

FHWA's Public Participation information
http://www.fhwa.dot.gov/environment/pubinv2.htm

ENVIRONMENTAL STREAMLINING

USGAO: *FHWA Has Acted to Disclose the Limitations of Its Environmental Review Analysis*
http://www.gao.gov/new.items/d03338r.pdf
USGAO: *Stakeholders' Views on Time to Conduct Environmental Reviews of Highway Projects*
http://www.gao.gov/new.items/d03534.pdf

AASHTO's Report on DOT-Funded Positions at Resource and Regulatory Agencies
http://environment.transportation.org/center/products_programs/dot_funded.aspx

LINKING PLANNING AND NEPA

FHWA Guidance on Linking the Transportation Planning and NEPA
http://environment.fhwa.dot.gov/strmlng/linkingtrans.asp

AASHTO's report on linking planning and NEPA
http://www.transportation.org/sites/planning/docs/NCHRP%208-36%2848%29%20Final%20Report.pdf

STATE ENVIRONMENTAL LAWS

State Environmental Laws and Regulations on the Internet
http://meso.spawar.navy.mil/law2.html

DESIGN AND CONSTRUCTION

Still with me? Congratulations! If you've made it this far, you are a true conservationist. At this point in the process, you can sit back and relax. When the project reaches the final design phase, there is little if any opportunity for public participation. After the transportation agency finishes environmental review, the only thing that can stop or significantly improve the project is litigation. In the interest of being comprehensive, however, this chapter walks you through the basics of highway design and construction, with some familiar caveats. First, while the standards are relatively constant, each state will have its own design and construction process and every project is unique. Second, while construction has a relatively distinct beginning and end, design is an ongoing process that begins in the planning phase, continues throughout project development and can continue into construction if conditions change.

TYPES OF HIGHWAY CONSTRUCTION

Everything from potholes to the Big Dig fit into these four basic types of highway construction projects:

1. **New construction** involves the construction of a new highway where none currently exists.

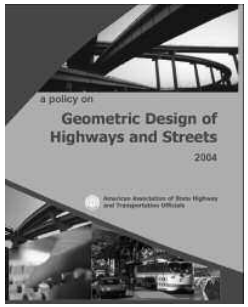
2. **Reconstruction** typically involves a major change to an existing highway within the same right of way corridor. Two lane, "farm-to-market" roads have been systematically reconstructed over the past few decades into multi-lane, divided arterials to accommodate or generate development and economic growth. Reconstruction may also involve modifications to horizontal and vertical alignment to address safety concerns. In many cases, realignments can involve substantial amounts of construction in previously undisturbed areas but they aren't classified as new construction because it's considered the same highway.

3. **Resurfacing, Restoration and Rehabilitation (3R)** projects focus primarily on extending the service-life of existing facilities and safety enhancements such as pavement repair, lane and shoulder widening, alterations to vertical grades (flattening) and horizontal curves (straightening), bridge repair and removal of roadside obstacles.

4. **Maintenance** activities are those necessary to keep existing facilities in good, safe operating condition, including repainting stripes, cleaning or repairing drainage features, mowing and removing snow.

THE "GREEN BOOK"

Before you get too excited, the Green Book is so named because the cover is green, not because it is environmentally friendly. The official title is "A Policy on the Geometric Design of Highways and Streets," and it is considered the definitive reference for highway design. American Association of State Highway and Transportation Officials (AASHTO) began publishing design standards in the 1930s and has been updating them since then. Depending on whom you ask, the Green Book serves as either *the* national policy by which we build highways in this country or merely as a handy series of guidelines that designers can use at their discretion. Federal Highway Administration (FHWA) has formally adopted parts of the Green Book as the national standard for roads in the National Highway System, which includes the interstates and some primary routes.



Critics of the Green Book say that, in our pursuit of standard design, we ignore other aspects of design that respect and reflect other cultural, aesthetic and environmental values. The "wider, flatter, straighter" formula doesn't always sit well with the locals. Different roads serve different purposes and different publics and Green Book standards are inappropriate for small facilities such as the hilly, tree-lined rural roads of New England or roads on public lands. We risk losing regional character and diversity by unnecessarily forcing modern, high-speed design standards on older, low-speed roads.

FINAL DESIGN

After environmental review is completed, the preferred alternative is agreed upon and the Record of Decision has been approved, the project enters the final design stage. Depending on the size, scale and complexity of the project, final design can take several months to several years. The process results in what is known as the "plans, specifications and estimates" (PS&Es) of required quantities of materials ready for the solicitation of construction bids and subsequent construction.

"The AASHTO standards assume that everyone on the road is a drunk speeding along without a seatbelt."

—James Lighthizer, a former Maryland transportation director and current co-chair of the Task Force on Traffic Capacity Across the Chesapeake Bay

ELEMENTS OF HIGHWAY DESIGN

Highway design is like plumbing—you don't think about it until something goes wrong. Many factors are considered and countless details are meticulously calculated before the first shovel of dirt is moved. Below is a partial list—for a complete list, you'll have to go to engineering school.

Design speed is the maximum speed that can be maintained on the highway under favorable conditions. Considered the core critical design element from which other criteria are developed, design speed determines everything else about the roadway. Based on the type and purpose of highway, the design speed considers topography, adjacent land use and potential future improvements. The design speed is not the same thing as the speed limit. Highways can be built with design speeds much higher than legal speed limits.

Level of service is the letter grade given a highway based on how well it moves traffic. Just like in school, highways are graded from A (best) to F (worst). When the level of service drops, the pressure to build more lanes increases.

Control of access is the regulated limitation of access to and from properties abutting highway facilities. In other words, how many cross streets, side roads, intersections and driveways are on the road? The more access allowed, the more slowing and stopping for drivers and the more associated development next to the highway. Toll roads, turnpikes and interstates often have low access with very high speeds.

Lane width is self-explanatory, but engineers call it "the portion of the traveled way used for a single line of vehicles."

Shoulder width is also self-explanatory, but no simple matter. Shoulders must be designed to allow for evasive maneuvers, emergencies, stopped vehicles, stormwater management, traffic protection, maintenance, oversized vehicles, bicycles and pedestrians.

Bridge roadway width is the clear distance between inside faces of bridge railings or curbs, including travel lanes, turn lanes, shoulders and parking or bike lanes.

Medians are those portions of divided highways separating the traffic traveling in opposing directions, and median width is the distance between them. Median width is a critical design element for interstates, freeways and other high-speed highways because medians provide a buffer between traffic and help reduce oncoming collisions.

Grade is the change in vertical alignment of a highway; in other words, how flat or hilly it is.

Horizontal curvature is the change in horizontal alignment of a highway; in other words, how curvy or straight it is.

Superelevation is the way the surface of the road tilts into a curve so your car doesn't fly off into the abyss. The cross slope of the

pavement is tilted to partially offset the centrifugal force on a vehicle going around a curve. For freeways and rural facilities, an 8 percent rate is often used to provide the maximum safety benefit while minimizing low-speed operational problems.

Stopping sight distance is the time and space it takes you to slam on the brakes before you hit the car (or moose) in front of you. The minimum sight distance available on a roadway should be long enough to allow vehicles traveling at design speed to stop before reaching a stationary object in the roadway.

Horizontal clearance is the part of the road next to the lane, called an "operational offset" or "clear zone."

Vertical clearance refers to the minimum vertical distance to an obstruction over any part of the road, or how tall your camper can be and still get through that tunnel.

Travel lane cross slope is the way the road crowns in the middle and slopes down on each side to promote faster drainage and keep water from pooling on the road.

Rollover is the difference in cross slope between two adjacent highway lanes or a lane and its shoulder.

Structural capacity is the ability of a bridge to carry its own weight and the traffic moving across it.

Pedestrian accommodation is the provision of sidewalks, ramps, pedestrian crossings and other design facilities that allow for safe pedestrian movement within and through a project area.

RIGHT-OF-WAY PURCHASING AND PREPARATION

Every transportation agency has a real estate division responsible for securing, preparing and managing right of way properties. These divisions have a variety of responsibilities, including surveying and appraising land, property management, right-of-way certification, utility relocation, licensing airspace and telecommunication facilities, and selling excess property.

Unless you inherit property from wealthy relatives, there are only two ways to get your hands on it: you either buy it (acquisition) or you take it (condemnation) and then pay for it. If a transportation agency determines it needs a particular property, the agency will notify the landowner and offer fair market value and relocation assistance. The Fifth Amendment to the U.S. Constitution dictates that no person shall "be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation." If a landowner declines an offer to sell, the state may simply exercise eminent domain and proceed with condemnation, which is legalese for the process by which the state can take ownership of private property for public use. Although the U.S. Constitution requires only that condemnation serve a public purpose and be accompanied by just compensation, state constitutions or laws may add additional requirements.

CONTRACT BIDDING

Every state transportation agency also has its own construction division, but they don't actually do the construction. Once the final plans, specifications and estimates (PS&E) is prepared and all right-of-way property is secured, the state transportation agency will "let for bid" or advertise for private contractors to bid on the project. The construction division oversees the letting, management and administration of highway construction contracts. Bidders of prospective highway projects generally must be prequalified by the construction division to ensure they are competent and responsible to perform the work. After reading the PS&E and inspecting the project site, bidders prepare and submit an estimated price and time frame they will need to complete the project. At the end of the open submission period, all bids are made public and the contract is awarded. The transportation agency may choose the lowest bid, but it has the option of choosing a higher bid for quality reasons.

CONSTRUCTION

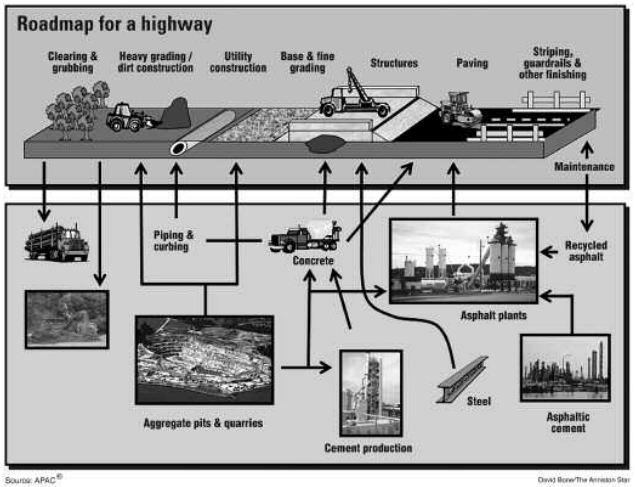
If the project has made it this far, construction itself is a simple matter. Construction staging plans are prepared to show the sequence of operation, work to be performed, materials to be used, and the routes to be utilized by traffic during each construction phase. Traffic handling plans show long-term closures of lanes and ramps, how the traffic is to be routed and maintained, and the number of traffic lanes available for public traffic.

The sequence of events follows these basic steps:

Clearing and grubbing prepares the work site by removing all trees, vegetation and obstructions of any kind—natural or artificial. During grubbing, trees are pulled completely from the ground to remove all roots and other materials below the surface. Desirable vegetation can be designated and either salvaged or left undisturbed.

Heavy grading and dirt construction removes all sod and grass to a particular depth as directed by the project specifications. Topsoil is excavated and stockpiled for reuse if appropriate.

Utility construction includes the location and placement of drainage piping. Other municipal utilities such as sewer, water, power and communications may also need to be accommodated within the project site.



Base and fine grading configures and contours the cleared ground area to remove abrupt slope changes, making the ground as flat and hard as possible in preparation for paving.

Structures provide the "concrete and steel" such as bridges, box culverts, overpasses and noise walls.

Paving is the step most of us are familiar with, when the asphalt is laid and smoothed.

Finishing measures put the final touches on the project, including striping, lighting, signing and guardrails.

During the above-outlined process, materials are purchased and transported from many sources to one location where they are mixed and prepared for construction. Choice of materials depends on geology, soils, weather variability, estimated amount of traffic and myriad other factors. Basic materials are stone, sand and petroleum byproducts that make up most of the road surface and base layers. A highway project could use as many as 200 different products in the course of construction. Large construction projects can also use tremendous amounts of water—up to a million gallons per day (Brennan, 2002).

Generally the road will be built in layers, starting with the subbase of local soils, then a gravel base of crushed rock, followed by the pavement, which is made of concrete or asphalt. It is then topped off by an asphalt surface. If a road is resurfaced later on, it will likely be with asphalt.

COSTS

Several factors come into play when estimating the costs of a given highway project. As with any real estate, it's all about location, location, location. Building highways in mountainous areas costs a lot more than building on flat ground. Urban projects are more expensive than rural projects. And more complicated projects, with bridges, several interchanges or engineering challenges will obviously up the ante.

So how much *does* it cost to build a mile of highway? The Washington State Department of Transportation (WSDOT) posed that very question to fellow state transportation agencies, based on the specs of an actual interchange project design that WSDOT believed was universal to all states. Based strictly on contract bid items—not including right of way or environmental compliance costs—the estimates ranged from $4 million to $26.7 million. With 25 states reporting, the cost to construct a single-lane mile of the selected project ranged from $1 million to $8.5 million with an average cost of $2.3 million (WSDOT, 2002).

In 2005, the Alabama Department of Transportation widened four miles of Interstate 20 for the bargain price of just $25.6 million. Not including the cost of the land or labor, here is how some of the numbers broke down:

Asphalt and base	$7,400,777
Mobilization (getting equipment to site)	$2,377,787
Concrete median barriers	$1,530,051
Drainage (installation and cleaning of pipes)	$1,268,210
Striping (painting and removal)	$521,659
Safety barriers and cones	$286,164
Rubblizing (breaking up existing pavement)	$243,326
Signs	$224,307
Clearing vegetation	$198,000

FHWA likes to keep track of construction costs, so for each contract exceeding $500,000, they ask that each state provide bid price data on the quantity of materials used and the installed price of the materials from contracts on the National Highway System. States provide FHWA with data for seven materials (common and unclassified roadway excavation, structural reinforcement and structural steels, bituminous and portland cement concrete surfaces, and structural concrete), as well as total contract costs for road and bridge aspects of the contract, and the location of the project. FHWA makes summaries of its bid price data, including a national composite index of all materials on which data are collected, available to the public in its quarterly *Price Trends for Federal-Aid Highway Construction* and in its annual *Highway Statistics*.

According to the American Road & Transportation Builders Association (ARTBA), 2006 was a record year for transportation construction. The value of construction work put in place on transportation projects totaled $105 billion, an almost unprecedented increase of 13.8 percent over $92.2 billion in 2005. The growth was powered by highway and bridge construction, which rose 15.4 percent to a record $75.5 billion from $65.4 billion in 2005.

Highest Value of Highway and Bridge Contract Awards for 2006

Texas	$5,314,500,000
California	$4,597,100,000
Florida	$3,227,800,000
Georgia	$2,631,100,000
Illinois	$2,393,100,000

(ARTBA, 2007)

CONTEXT SENSITIVE DESIGN

One of the most popular buzz phrases in transportation is "context sensitive design" (CSD), which means designing in a way that considers the total context of a transportation project. Don't be confused if you hear "context sensitive solutions"—it's the same thing. The gold standard of CSD is a collaborative, interdisciplinary approach to design that involves all stakeholders working together to achieve a transportation facility that fits naturally into its physical setting, preserves scenic, aesthetic and environmental resources, and maintains safety and mobility. Typical projects include sidewalks, bicycle facilities, landscaping and traffic calming roundabouts.

Is CSD just lipstick on the corpse? Everyone agrees that CSD has been a refreshing development in the world of transportation and continues to bring untold benefits to pedestrians, bicyclists and communities seeking safe, multi-modal and attractive facilities. Conservationists support any and all efforts to enhance human habitat because it reduces the pressure to build more of it in wildlife habitat. But, while CSD is a laudable concept, it has its limitations. Improvements to design will benefit the human environment more than the natural environment.

If CSD begins after the location has been chosen and the scope of the project has been determined, the benefits are largely restricted to aesthetics, functional fixes and minor mitigation. The problem is, it's not *how* you build it; it's *where* you build it. A project built in previously undisturbed wildlife habitat is the antithesis of **design** that is **sensitive** to the **context** in which it is built. Even the smartest design can't prevent major impacts at that point. If you build a highway in lizard habitat, the lizard cares little whether you paint murals of him on the overpass that destroyed his home.

It's not how you build it, it's where you build it.

SAFETEA-LU gave the official, yet noncommittal nod to the FHWA report, Flexibility in Highway Design, and the national context sensitive solutions workshop document, Eight Characteristics of Process to Yield Excellence and the Seven Qualities of Excellence in Transportation Design. The provision recommended use of these CSD manuals in establishing standards to be used on the National Highway System, but stopped short of a requirement.

CONSTRUCTION BMPs FOR WILDLIFE CONSERVATION

Regardless of the overall impacts of the project itself, there are several things construction crews can do to lessen the blow. Specific measures for wildlife should be determined in consultation with state and federal wildlife agencies. Erosion and sedimentation control and water quality protection are commonplace but there are many more ambitious measures that are starting to catch on:

- Prior to pre-construction clearing, limited numbers of target species (vegetation, fish, herpetofauna) can be salvaged for either relocation out of harm's way or restoration after project completion.
- Minimize tree removal.
- Minimize staging areas for construction equipment and locate them in previously disturbed sites.
- Schedule construction time frames around important breeding, spawning or nesting seasons.
- Avoid disturbing migratory bird nests.
- Wash equipment to avoid spreading invasive species.
- Provide training for construction workers on the special needs of wildlife in or near the project area.
- Use closed containers for trash and dispose of all refuse at an approved landfill.
- Upon completion, the project area should be revegetated with native species.

Ask your construction division if they require the contractors use wildlife best management practices during construction. Offer to help with periodic trainings on wildlife BMPs for construction professionals.

HALL OF FAME: EVERY LITTLE BIT HELPS IN ALASKA

In the process of replacing an off-ramp, the Alaska Department of Transportation and Public Facilities preserved and enhanced an isolated wetland that could have legally been filled or developed. Without adding much to the construction budget, crews transplanted wetland plants salvaged from another construction site and directed highway runoff to the half-acre wetland, providing a resting place for wild ducks and Canada geese.

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Washington State Department of Transportation. 2002. *Transportation Construction Cost Comparison: WSDOT Nationwide Survey*. Retrieved from: *http://www.wsdot.wa.gov/biz/construction/pdf/I-C_Const_Cost.pdf*

DESIGN AND CONSTRUCTION RESOURCES

DESIGN

FHWA's *Flexibility in Highway Design*
http://www.fhwa.dot.gov/environment/flex/index.htm

AASHTO Green Book: A Policy on Geometric Design of Highways and Streets
https://bookstore.transportation.org/item_details.aspx?ID=110

CalTrans' Highway Design Manual
http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm#hdm

NYSDOT's Highway Design Manual
http://www.dot.state.ny.us/cmb/consult/hdmfiles/chapt_12.pdf

Design Guidelines to Enhance Community Appearance and Protect Natural Resources
Joan Chadde. Michigan Technological University
http://www.deq.state.mi.us/documents/deq-exe-outreach-designguideline.doc

Designing Urban Corridors
Kirk Bishop, American Planning Association
http://www.planning.org/APAStore/Search/Default.aspx?p=2349

CONSTRUCTION

Price Trends for Federal-Aid Highway Construction
http://www.fhwa.dot.gov/programadmin/pricetrends.htm

CONTEXT SENSITIVE DESIGN

http://www.contextsensitivesolutions.org/

FHWA's CSD page
http://www.fhwa.dot.gov/csd/index.cfm

BEST MANAGEMENT PRACTICES FOR WILDLIFE

Environmental Stewardship Practices, Procedures and Policies for Highway Construction and Maintenance, NCHRP 25-25 04
Chapter 4, Construction Practices for Environmental Stewardship
http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/4_1.aspx

FHWA's Keeping it Simple
http://www.fhwa.dot.gov/environment/wildlifeprotection/

MAINTENANCE AND OPERATIONS

The minute construction of a highway is complete, the maintenance begins. Road maintenance divisions provide the necessary services to ensure that our infrastructure is in good working order and conditions are safe for the motoring public. While we may not always recognize the connection, maintenance professionals can be a conservationist's greatest allies. By prolonging the life of our existing infrastructure, they reduce the need to continuously build more and more new highways that may ultimately end up consuming and fragmenting remaining natural areas and essential wildlife habitat.

Maintenance measures are also essential for protecting the significant public investment that is our surface transportation system. Preventive maintenance such as pavement overlays and rehabilitation is crucial for extending the life of roads and controlling long-term costs. When essential maintenance is put off, roads deteriorate faster and require more expensive rehabilitation and even complete reconstruction at many times the cost.

Maintenance and operations can also be a treasure trove of opportunities to not only reduce the impacts of highways on wildlife, but also to improve habitat quality through voluntary stewardship actions. Sometimes small changes in maintenance practices can make a big difference. Conservationists would be wise to get to know their transportation maintenance and operations divisions and discover new partners in wildlife conservation.

DIVISION OF LABOR

Road maintenance and operations duties are shared among many different agencies and departments, from state to local and even private landowners. Local road maintenance divisions are often housed within the public works department, which also maintains parks, wastewater treatment and refuse collection facilities.

State transportation agencies maintain state highways and highways in the National Highway System (all roads that have route numbers, for example, M90 or US93) and interstate highways within state borders.

County highway maintenance divisions maintain main roads, neighborhood streets and rural/country roads.

Municipalities maintain roads within municipality borders.

Private homeowner associations maintain roads within gated, town home or condominium community boundaries.

RESPONSIBILITIES

And you thought taking care of your house was a big job! Highway maintenance and operations crews are responsible for keeping thousands of miles of highway and thousands of acres of right of way in tip-top shape—all while cars and trucks are zooming by in their workplace.

Road and shoulder maintenance—managing and preserving pavement, pothole repair, patching, crack filling, chip sealing, base stabilization, rocking shoulders, grading gravel roads, dust abatement and cleaning.

Bridge maintenance—inspecting, repairing, painting, flushing, cleaning and controlling scour.

Roadside maintenance—maintaining and repairing guardrails, signage, fencing, noise walls, medians, litter, beautification, outdoor advertising and removing roadkill.

Roadside vegetation management—caring for and controlling roadside vegetation, landscaping, mowing, herbicide spraying, brush and tree trimming, planting native vegetation, removing invasive species and improving soils. **For a complete description of roadside vegetation management, see Roadside Vegetation.**

Water management—maintaining and repairing catch basins, recharge basins, ditches, culverts, manholes, drywells, installation of storm systems, erosion and sedimentation controls. **For a complete description of water management and aquatics, see Aquatic Resources.**

Fleet and equipment—providing and administering a wide variety of vehicles, roadway maintenance equipment, vehicle fuel stations and support equipment.

Traffic control and operations—maintaining and repairing traffic lights, traffic calming, pavement markings, striping, sign installation, high occupancy vehicle lanes, incidence response, work zone safety and railroad crossings.

Enforcement—issuing permits for commercial vehicles, weigh stations, speed enforcement equipment and access to highways by homeowners, businesses and developers.

Intelligent transportation systems—monitoring traffic through transportation management centers, synchronizes signal systems, provides traveler information, incident response and transit and emergency management.

Road closures (emergency, seasonal)—snow plowing, applying de-icing chemicals, severe weather and avalanche/rockslide response.

Invite a representative from your maintenance and operations division to visit your organization and discuss possible best practices for wildlife conservation.

FUNDING

Many of the roads and highways you use may have been paid for with federal funding, but once built, they become the responsibility of state and local governments. Federal maintenance funding is authorized through the highway bill, but is only available for maintaining highways within the interstate system. Federal Interstate Maintenance funds are distributed to states by formula, based on lane-miles of interstate, vehicle-miles traveled and contributions to the Highway Trust Fund.

SAFETEA-LU authorized $25.2 billion for the Interstate Maintenance program through 2009, to be distributed by a formula based on lane-miles of interstate, vehicle-miles traveled and contributions to the Highway Trust Fund.

That is a lot of money, but it doesn't go far and it rarely applies to non-interstate highways. Federal transportation funds are reserved for capital improvements or major rehabilitation, and cannot be used for general road maintenance. To pay for the upkeep, local towns have to fund road maintenance with gas, property and sales taxes, parking fees and general funds. Other sources of local funding, such as developer fees, assessments and bonds are generally not used for regular road maintenance.

Lobby your state legislature and Congress for increased funding for maintenance.

"The reason construction gets all the money is because you can't hold a ribbon-cutting ceremony at a pothole filling."
Conservation advocate

Guest Column:

MAINTENANCE PROFESSIONALS WANT TO HEAR FROM YOU!

Gary R. McVoy, Ph.D.
Director, Office of Operations Management
New York State Department of Transportation

Highways and wildlife have to co-exist and we should all do our best to make sure both come out winners. The people who maintain your highways are public servants with a natural sense of stewardship. They live in your local communities. They work outdoors by choice. They want to do the right thing and have a tremendous, largely untapped capacity for improving the environment as part of their daily work.

Conservation advocates can help highway maintenance professionals do more to protect wildlife, enhance habitat and improve our common environment by:

- Asking them to help do what they can.
- Making them aware of how they can help by showing them the available compendium on best maintenance practices (see below).
- Providing clear, constructive information on wildlife on or near the right-of-way.
- Offering to help through volunteer programs such as Adopt-a-Highway, invasive species control and habitat enhancements.
- Participating in transportation decision-making at all stages of project planning, design, construction and operations.
- Showing your support for transportation agency efforts to strengthen environmental stewardship.

FIX IT FIRST

Common sense dictates that, it's probably best to fix the leak in your roof *before* you build a new addition. Sadly, common sense often eludes us when setting transportation priorities. In 2004, FHWA rated the condition of only 43.2 percent of our roads "good." In 2005, the American Society of Civil Engineers gave our nation's roads a report-card grade of D. Yet even as our existing infrastructure falls into disrepair, we keep spending billions on building new highways.

"Fix it First" is a radical, old-fashioned idea that has been catching on in some states like Michigan and Wisconsin and in large cities like Sacramento, California. Simply put, Fix it First means protecting what we have and looking to expensive, major new construction

projects only after our current roads have been taken care of properly. The longer we wait to fix our roads, the more expensive the fix. Bridges and highways in good condition are cheaper to maintain than those in bad condition. When we defer maintenance, the cycle for rehabilitation is shorter, pavement fails sooner and requires complete reconstruction at a much higher cost (SACOG, 2004). Rough roads are a pain in the wallet for drivers too. Poor road conditions cost U.S. motorists $54 billion per year in repairs and operating costs—that's $275 per motorist. According to FHWA, outdated and substandard road and bridge design, pavement conditions and safety features are factors in 30 percent of all fatal highway accidents.

Do you live in a "Fix it First" state? If not, maybe you or your organization could spearhead the effort.

"Our state has adopted a policy of no new highways. Basically, we will improve what we have, but we aren't going to be building anything new. There are exceptions to this, but in essence this is because we cannot afford to adequately maintain what we have now."
State transportation agency staff

BEST MAINTENANCE PRACTICES FOR WILDLIFE CONSERVATION

The best thing maintenance divisions can do for wildlife is take good care of the roads we have to reduce the pressure to build more. But maintenance professionals can also be tremendous stewards of the natural environment and many transportation agencies have accepted the challenge. Maintenance measures for wildlife range from small and simple to large and complex, and here are just a few examples:

Roadside vegetation management—inventory rights-of-way for sensitive species, alter mowing regimes to reduce disturbance and destruction of habitat for ground-nesting species, remove invasive vegetation and plant native species, herbicide use education, plant living snow fences to reduce need for road salt, designate special management areas, provide training.

Water management—clean and rehabilitate culverts to improve fish passage, reduce use of road salt and de-icing chemicals, install water quality improvement devices.

Bridge maintenance—promote migratory bird protection on bridges, install bat-friendly devices, schedule bridge maintenance for times when fish aren't spawning or migrating.

Habitat connectivity—provide gaps in median walls to allow wildlife to move across roads without being trapped between barriers, install elevated walkways in wet culverts to allow small terrestrial species to pass, install exclusionary fencing to direct herpetofauna to culverts.

Dynamic signage—install "smart" wildlife warning signs to alert drivers of the presence of wildlife in the right of way, install electronic signs that reduce the speed limit during peak wildlife movement times.

Volunteer your organization's assistance in implementing best maintenance practices for wildlife conservation, such as roadside vegetation surveys, invasives removal, planting native species and monitoring.

FHWA recognized the need for sharing information on best maintenance practices for wildlife conservation, and developed the "Keeping it Simple" website dedicated to going beyond compliance to identify simple techniques to help wildlife through road maintenance.

Through the National Cooperative Highway Research Program, transportation officials developed a comprehensive compendium of practices for integrating environmental stewardship into construction, operations and maintenance activities: *Environmental Stewardship Practices, Procedures and Policies for Highway Construction and Maintenance*.

Keep a copy of the National Cooperative Highway Research Program compendium, *Environmental Stewardship Practices, Procedures and Policies for Highway Construction and Maintenance* on your desk and refer to it often. Make extra copies for your maintenance division if they aren't already using it.

HALL OF FAME: WASHDOT REGIONAL ROAD MAINTENANCE ENDANGERED SPECIES ACT PROGRAM

The Washington State Department of Transportation collaborated with the National Marine Fisheries Service, local government agencies and other partners to develop a set of road maintenance policies and practices that contribute to the conservation of endangered aquatic species through 10 program elements including maintenance best management practices and a workforce training program.

If your maintenance and operations division is doing a good job, recognize their efforts. Consider nominating them for one of the many awards offered for transportation agencies and projects. For a list of transportation awards, see the Appendix.

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http://www.fhwa.dot.gov/policy/2004cpr/index.htm

MAINTENANCE AND OPERATIONS RESOURCES

MAINTENANCE DIVISIONS

Clark County, Washington
http://www.clark.wa.gov/public-works/operations/index.html

Montgomery County, Maryland
http://www.montgomerycountymd.gov/hwytmpl.asp?url=/content/dpwt/operations/highway/Hwy_MainLinkPg/CountyRoadMain.asp

North Carolina Department of Transportation
http://www.ncdot.org/doh/

ROAD CONDITIONS

The State of Our Nation's Roads
Surface Transportation Policy Partnership
http://www.transact.org/library/roadconditiondecoder.asp

Infrastructure Report Card, 2005
American Society of Civil Engineers
http://www.asce.org/reportcard/2005/index.cfm

FHWA Pavement Preservation
http://www.fhwa.dot.gov/preservation/index.cfm

FIX IT FIRST

Sierra Club
http://www.sierraclub.org/sprawl/fixitfirst/

1000 Friends of Wisconsin
http://www.1kfriends.org/Transportation/Transportation_Policy/Fix-it-First/Fix-it-First.htm

National Governors Association, State Overview of Fix it First Approaches
http://www.nga.org/cda/files/0408FIXFIRSTCHART.pdf

BEST MAINTENANCE PRACTICES

FHWA's Keeping it Simple
http://www.fhwa.dot.gov/environment/wildlifeprotection/

Environmental Stewardship Practices, Procedures and Policies for Highway Construction and Maintenance, NCHRP 25-25 04
http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/

Environmental Stewardship in NYSDOT Highway Maintenance
Kyle Williams, New York State Department of Transportation
http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1015&context=jmie/terc

Natural Environment

IN THIS SECTION

Impacts of Roads provides an overview of the impacts of roads on the natural environment, based on the sentinel article, *Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities* by Stephen Trombulak and Christopher Frissell first published in The Journal of Conservation Biology in April, 2000.

Wildlife introduces you to a variety of mitigation techniques from habitat connectivity linkage analysis to wildlife crossings. Of course, this chapter wouldn't be complete without an overview of potential funding sources for wildlife mitigation measures.

Roadside Vegetation takes you on a tour of our rights of way. You will learn how roadside landscapes are designed and maintained, and what transportation agencies can do to get the most ecological bang for the buck.

Aquatic Resources tells the epic battle between water and roads. Follow the water through bridges, culverts, riprap, fish passage stormwater and road salt.

IMPACTS OF ROADS ON WILDLIFE AND NATURAL RESOURCES

Most conservationists are well aware of the impacts of roads and highways on the natural environment. A massive body of research has documented these impacts and hundreds more studies are in progress. Perhaps the best overview of impacts was the sentinel article, *Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities* by Stephen Trombulak and Christopher Frissell first published in The Journal of Conservation Biology in April, 2000. Trombulak and Frissell group all the impacts of roads on wildlife into seven categories:

1. Mortality from Road Construction
2. Mortality from Collision with Vehicles
3. Modification of Animal Behavior
4. Disruption of the Physical Environment
5. Alteration of the Chemical Environment
6. Spread of Exotic Species
7. Changes in Human Use of Land and Water

The authors note that none of these effects occur in isolation and the presence of a road will ultimately lead to many or even all of these impacts. For instance, by altering the physical and chemical environment, roads facilitate the spread of invasive species. Due to increased human activity, some wildlife species may modify their behavior and avoid otherwise suitable habitat near roads.

Mortality from construction

In the course of clearing the work site in preparation for road construction, any slow moving organisms are killed. Species that nest underground, like gopher tortoise (*Gopherus polyphemus*) are often buried alive or "entombed" when their dens are bulldozed and eventually paved over. Compared to mortality from road collisions, few studies have been done on the direct mortality caused during road construction. The actual clearing and construction may last for only weeks or months and few, if any wildlife agency staff would be on the construction site to witness and record the mortality.

Mortality from road collisions

Perhaps more than any other impact, roadkill is clearly quantifiable and has been very well documented. Vehicle collisions claim individual animals regardless of age, sex or condition of the individual animal, and can have substantial effects on a population's demography.

Modification of animal behavior

The mere presence of a road in wildlife habitat can be enough of a disturbance to alter animal behavior. Roads and highways that bisect habitat can cause wildlife to shift entire home ranges, modify movement patterns and escape responses and change reproductive success and physiological state.

Disruption of the physical environment

Roads destroy and fragment the habitat wherever they are built and transform the environment well beyond the pavement's edge (Forman 2000). At ground level, soil water content and density change leading to altered surface-water flow, run off patterns and sedimentation. By opening the canopy and removing vegetation, the amount of light and heat increases. Additional light invites different plant species, often replacing native communities. Road surfaces store heat, creating heat islands that attract species like birds and snakes. Traffic stirs up dust and other contaminants that settle on plants, blocking necessary processes like photosynthesis and transpiration. In addition, traffic noise can make roadside areas inhospitable to certain nesting songbirds (Forman 2000).

Alteration of the chemical environment

Beyond the road itself, the vehicles that use the road instigate their own problems. Cars and trucks produce carbon dioxide, ozone and heavy metals that quickly contaminate the air, soil, plants, animals and water near roads. Because roads accelerate runoff, they reduce the buffering effects from riparian vegetation and deliver high levels of sediment, nutrients and pollutants to nearby waters. Among the concerns are reduced water quality from chemicals, metals, oil, gasoline, de-icing salts and other contaminants entering water as non-point source runoff from roads and parking lots.

Spread of exotic species

The construction and presence of roads create perfect conditions for non-native, invasive species to move in and ultimately displace native vegetation. Exotics are able to take advantage of the disturbed, altered conditions created when a road is originally built and native species are stressed or removed altogether. Roads also act as vectors for "hitchhiker" seeds that attach themselves to vehicles. Some roadside exotics are no accident. Transportation agencies have historically planted rapidly growing exotic species on bare ground and slopes after construction to control erosion.

Increased human use of an area

Roads are built for many uses—from mere access into remote areas to full blown development—but they are all built for human activities. Roads increase access to formerly remote areas, thus increasing the frequency and intensity of human activity—both legal and illegal.

Trombulak, S.C., and C. Frissell. 2000. "A review of the ecological effects of roads on terrestrial and aquatic ecosystems." *Conservation Biology* 14: 18-30.

WILDLIFE

It took us a while, but after 100 years of road building, we figured out that highways are bad for wildlife and other living things. In the last two decades, our understanding of *how* our highways impact wildlife has grown considerably. This "age of enlightenment" has led to incremental improvements such as the burgeoning science of road ecology, habitat linkage analysis, effective wildlife and fish passage structure designs and innovations in policy that make such measures possible. In some cases, we have even been able to turn back the hands of time and restore some measure of habitat connectivity where it had been severed by a highway decades earlier.

Effective wildlife mitigation techniques should result in a reduction in wildlife-vehicle collisions, hence they are as important to human safety as they are to habitat connectivity. Human deaths and injuries are common when vehicles collide with larger species such as deer, elk and moose. In many rural regions, wildlife-vehicle collisions are the most common cause of highway collisions.

In Banff National Park, a series of 22 underpasses and two overpasses tied together with fencing have decreased total roadkills by 80 percent. Monitoring has documented wildlife using these structures—approximately 75,000 separate uses by a wide range of wildlife, including wolf, grizzly bear, elk, lynx, mountain lion and moose.

This chapter aims to provide conservationists with a better understanding of all the things that are now possible to reduce the impact of existing highways on wildlife. With four million miles of roads and highways out there, we have our work cut out for us. Strategies used to counteract roadkill and habitat fragmentation range from site-specific projects such as underpasses to regional models that combine landscape ecology, conservation biology and human safety concerns with long-range transportation planning. Engineers and biologists are now making a joint effort to design effective wildlife crossing structures that will lessen the effect roads have upon wildlife.

CAUTION: Without question, we have made great strides in mitigating the impacts of roads and highways on wildlife and habitat. But, there's just no substitute for the real thing. Even the best mitigation cannot replace all the values lost when a highway is built in wildlife habitat. Roadkill can be substantially reduced with these measures, but roadkill is only a symptom of a much larger problem. While it is important for us to strive for mitigation projects on existing highways, we need to remain steadfast in opposing continued habitat losses to new highways and development.

WILDLIFE-VEHICLE COLLISIONS

We have all witnessed the carnage, but how many animals are killed on our roadways? We may never know. Some victims are too small to see, some crawl off the road and die elsewhere and others are either eaten by scavengers or taken by motorists. Recent estimates indicate between 725,000 and 1,500,000 animals are struck on our roads annually, but an older study by the Humane Society of the United States and the Urban Wildlife Research Center estimated up to a million vertebrates *every day*. Wildlife-vehicle collisions can take a toll on species at the population level and in some cases, push some rare species closer to extinction. Statistics for human victims are grim as well, with 200 fatalities, 29,000 injuries and more than $1 billion in property damage every year.

Not all transportation agencies record information on roadkill, and those that do vary widely in practice. Some agencies collect and analyze data on all incidents, while others ignore the issue altogether. By collecting and reporting roadkill data, transportation agencies can begin identifying locations for mitigation measures.

In British Colombia, Canada, the Ministry of Transportation pays private contractors to systematically collect wildlife accident data on a daily basis as part of the Wildlife Accident Reporting System (WARS). For each incident, workers record the date, time, location, species, sex and age of the roadkill. This data is used to determine the type and location of warning signs, exclusionary fencing and crossing structures.

Ask your transportation agency if they collect roadkill data. If so, do they analyze the data or report it to the wildlife agencies? Do they use the data to inform their planning, operations or maintenance decisions or processes?

HABITAT CONNECTIVITY LINKAGE PLANNING

Roadkill data is only one factor in determining where wildlife crossings or other mitigation measures are necessary. Transportation agencies can coordinate with resource agencies and conservationists to engage in linkage analyses and develop wildlife habitat connectivity plans. Animals need to move across the landscape for daily, seasonal and life cycle requirements. Climate change likely will force wildlife populations into new and perhaps more critical, movement patterns. They move between core habitat patches via corridors. Habitat connectivity describes the degree to which landscape characteristics (including highways and other development) facilitate or impede the ability of an organism to move within a landscape to acquire resources such as

food, water, cover and mates (Fahrig and Merriam, 1985). As wildlife respond to global warming, these corridors will become even more essential. Preparing statewide or regional plans for habitat connectivity is an essential part of developing a comprehensive system of effective wildlife crossing structures.

"Habitat connectivity across highways is obviously about much more than deer; it helps many species safely negotiate highways that fragment habitat, and from an ecosystem perspective, reconnects habitats that have become isolated by human development. If done well, we can even re-establish genetic connectivity and potentially 'rescue' isolated populations from extirpation." **State wildlife agency biologist**

HALL OF FAME: CORRIDORS OF LIFE

American Wildlands (AWL) has developed two Geographic Information System (GIS) models to locate the highest priority areas for mitigating highways with crossing structures, fencing or other measures in local landscapes. To prioritize work, habitat cores and corridors from AWL's regional *Corridors of Life* model are overlaid with the Statewide Transportation Improvement Plan (STIP) projects. State transportation departments rely on AWL's scientific methodology to justify expenditures of federal appropriations for wildlife mitigation. To date, they have improved five different highway projects in Idaho, Wyoming and Montana, resulting in the commitment to construct seven wildlife underpasses and two bridges for fish passage in the region. So far, this includes more than $2.7 million for wildlife mitigation and $2.2 million in private land conservation adjacent to highway mitigation. (insert map here)

Does your state have a wildlife habitat connectivity plan? If not, contact your state transportation agency and volunteer to spearhead the effort. If your state does have a wildlife habitat connectivity plan, is it being implemented? If not, contact your state transportation agency and volunteer to spearhead the effort.

Elements of a Habitat Connectivity

Aerial photos can be used to identify vegetation patterns, human developments, water bodies, aspect and terrain, and possibly existing trails.

Land ownership maps identify publicly owned lands that can be used as wildlife habitat linkages. Most public lands include wildlife habitat protection in their mission, and are more easily incorporated into a connectivity plan. However, some situations may call for key parcels of private land that may be necessary for successful habitat connectivity.

Vegetation maps that include general vegetation types such as conifer or hardwoods, riparian or upland, marshes or grassland provide sufficient detail for wildlife habitat connectivity planning.

Topographic maps provide important information such as slopes, draws, ridges, saddles, extremely steep lands and flats can often be used to help identify wildlife corridors.

Wildlife habitat or range maps from state wildlife agencies, state heritage programs, federal land management agencies and non-profit conservation organizations can provide valuable information on habitat locations.

Monitoring wildlife behavior—with radio collars, seasonal tracking, or direct observation—can determine where animals attempt to cross.

Roadkill information, available from some state transportation agencies, can provide locations and number of collisions (Ruediger, 2007).

In partnership with transportation and resource agencies, use your completed wildlife habitat linkage plan to develop and prioritize a comprehensive system of effective wildlife crossing structures throughout your state or area of interest.
–Cross-check the linkage plan with your Statewide Transportation Improvement Plan (STIP)
–Identify which pending transportation projects overlap with key linkage areas and move to have wildlife mitigation measures added to the scope of the projects.

HALL OF FAME: ARIZONA'S LINKAGES

The Arizona Wildlife Linkages Workgroup (AWLW) is a collaborative effort between public and private sector organizations to address habitat fragmentation through a comprehensive, systematic approach. Workgroup partners conducted a statewide assessment to identify blocks of protected habitat, the potential wildlife corridors between them, and the factors threatening to disrupt these linkage zones. After four successful workshops and many hours spent coordinating, meeting, mapping and writing, the AWLW presented their initial findings, methodology and recommendations in December 2006—a product that is intended to evolve and ultimately be used as a planning instrument.

SIGNAGE

Perhaps the most common measure to reduce wildlife-vehicle collisions is the ubiquitous "leaping deer" caution sign found on highway rights of way. But until we can teach whitetail deer to read, these signs do very little to prevent wildlife-vehicle collisions. Transportation agencies place the relatively inexpensive signs where wildlife vehicle collisions have occurred or where wildlife are known to cross. But the signs quickly lose their effectiveness as motorists become habituated to their presence. Thus, signs are not recommended as the sole mitigation measure, as they do not deter animals from entering the roadway and have little effect on motorist behavior.

Dynamic signage, however, holds some promise in reducing wildlife-vehicle collisions. Motion sensors are installed on the outer edge of the right of way to determine the presence of wildlife. The sensors then trigger illuminated warning signs next to the roadway, alerting motorists that animals are present and reducing the speed limit. Because the signs are only activated when wildlife are present, drivers are more likely to notice them and be alert.

Suggest reduced speed limits, speed limit enforcement and dynamic signage in areas with high wildlife-vehicle collision rates.

IN THE NEWS: WILDLIFE 'CROSSWALK' TESTED TO PROTECT ANIMALS, DRIVERS

The Associated Press, January 03, 2007

An experimental electronic "crosswalk" designed to keep Arizona's animals and drivers safe will begin operating east of Payson for the first time this month. The high-tech crossing is part of an extensive system of wildlife underpasses and electrified fencing along a three-mile stretch of Arizona 260, about seven miles east of Payson. The fences funnel the creatures to places where they can cross under the road, or to the electronic crossing. The crossing uses infrared cameras and military-grade software to set off large signs and warning lights so that drivers will be prepared for an elk, mule deer or another animal of significant size that may be about to cross the highway. "You don't have to train the animals to use the system. You have to train the drivers," said Norris Dodd, a wildlife biologist for the Arizona Game and Fish Department. "Hopefully, it will convince motorists to slow down." The crossing system and fencing cost about $700,000, most of which is being paid for with a federal grant. Areas where the elk are being funneled through underpasses have seen an 83 percent reduction in such incidents, Dodd said.

Find out how much wildlife-vehicle collisions are costing drivers and taxpayers in your state.

OTHER NONSTRUCTURAL TECHNIQUES

For as long as we've been building roads in wildlife habitat, we've had wildlife-vehicle collisions. And for as long as we have had wildlife-vehicle collisions, someone has been trying to invent a gadget to solve the problem, but with mixed success. Many of these measures, like reflectors and deer whistles have shown little or no effectiveness in reducing collisions.

Every proposed solution falls into one of two categories: changes that affect motorist behavior and changes that affect animal behavior. As it turns out, it's easier to teach animals to change than humans.

Changing motorist behavior

Lower speed limits in areas of high wildlife traffic, and at times of the day (especially dawn and dusk) when animals are more likely to be moving about, result in safer response time and distance, protecting drivers, their passengers and wildlife. However, this technique is only successful with aggressive speed limit enforcement.

Lighting along roadways can improve night visibility for motorists, allowing them to see wildlife and preventing collisions. However, artificial lighting can have negative impacts on wildlife.

Temporary or seasonal road closings allow for safe wildlife movement only during the most important migration periods (sometimes as little as a day) without long-term inconvenience for motorists.

In-vehicle technologies, such as infrared vision or sensors built into cars to detect animals on the road hold promise, but are still only available in a limited number of vehicles.

Reflective collars placed on large ungulates such as elk and moose reflect vehicle headlights at night, helping drivers see them on the road and preventing collisions.

Public and driver education such as seasonal campaigns educating motorists about animal-vehicle collisions raise awareness.

Informed planning should result in fewer new alignments in wildlife habitat; hence, fewer wildlife collisions.

Changing animal behavior

Habitat alteration—such as replacing natural vegetation with unpalatable vegetation—can reduce the attractiveness of roadsides to deer and other herbivores.

Intercept feeding is the practice of using strategically placed feeding stations to lure animals away from roadways.

Hazing animals by harassing them away from the road surface with noise or offensive odors can reduce roadkill, but also limits their ability to move across the landscape.

Herd reduction through hunting, sterilization and relocation has been used to reduce wildlife-vehicle collisions in urban areas.

Mirrors and reflectors mounted on posts along the edge of the highway reflect vehicle headlight beams and create a lighted fence believed to deter animals from entering the roadway. The success of this technique has not been established beyond anecdotal evidence.
Road salt alternatives may reduce the number of deer entering the right of way to lick salt from the road surface.
Ultrasonic deer whistles are mounted on vehicles to deter animals from entering the roadway. Like reflectors, there is little evidence showing the effectiveness of deer whistles.

Discourage mitigation spending on ineffective, unproven measures such as reflectors and whistles. Transportation agencies are less likely to try more effective techniques when they have previously wasted money on ineffective measures. Check out the Countermeasures Toolbox at *http://www.DeerCrash.com* for the latest research on each.

IN THE NEWS: HIGHWAY SHUT FOR BUTTERFLY TRAVEL

BBC News, March 24, 2007
Taiwan is to close one lane of a major highway to protect more than a million butterflies, which cross the road on their seasonal migration. The purple milkweed butterfly, which winters in the south of the island, passes over some 600m of motorway to reach its breeding ground in the north. Many of the 11,500 butterflies that attempt the journey each hour do not reach safety, experts say. Taiwanese officials conceded that the decision to close one lane of the road would cause some traffic congestion, but said it was a price worth paying. "Human beings need to coexist with the other species, even if they are tiny butterflies," Lee Thay-ming, of the National Freeway Bureau, told the AFP news agency. The measures are estimated to have cost $30,000 (£15,200).

WILDLIFE CROSSINGS

Considered by many to be the "holy grail" of mitigation measures, wildlife crossing structures (called ecopassages, ecoducts, overpasses, underpasses or land bridges) have been standard practice in many European countries for decades. Europeans tend to have a stronger land ethic and expect greater government control of land use. Governments respond by including the public in decision-making and incorporating social considerations into the landscape. Contrary to standard practice in the United States, the transportation planning process in European countries is slow, deliberate and transparent with high levels of public participation. As a result, one stretch of Germany's highway B31 has five land bridges. Switzerland has a fully vegetated land bridge with a functioning wetland over a six-lane highway. Early efforts in the United States have been less dramatic, but no less needed.

- (1980) In Montana, two underpasses were built in Glacier National Park to allow mountain goats to cross U.S. 2 on their way to the Flathead River.
- (1987) Massachusetts installed two tunnels in Amherst to allow a local salamander population to cross a two-lane street during its breeding season.
- (1993) Florida installed 24 underpasses under "Slaughter Alley," a stretch of I-75 where several endangered Florida panthers had been killed in collisions.

According to a recent National Cooperative Highway Research Project (NCHRP) study, there are at least 550 terrestrial underpasses for wildlife, six overpasses and more than 10,000 aquatic passages in the United States (Cramer, 2007). Several more crossing structures are currently in design and construction in the United States, including more than 40 crossing structures of all sizes within a 56-mile segment of U.S. 93 in Montana. Washington is planning several crossings as part of widening I-90 through Snoqualmie Pass.

CAUTION: Wildlife crossings are appropriate for retrofitting existing roads that fragment habitat connectivity, but they should never be used to justify building a new road in wildlife habitat. Wildlife crossings are not a panacea, they are merely Band-Aids. Crossings can only address one of the many impacts the highway brings, and only in the exact location of the crossing. The highway is still a major disturbance, source of pollution (air, water, soil, noise, vibration and light), vector for invasives and enabler of extensive loss of habitat through associated development. Even the best designed and most effective wildlife crossing can only restore a fraction of the habitat connectivity that was lost and will never replace the natural conditions that are lost forever when a highway is built.

CROSSING DESIGN

Wildlife crossings are generally designed to mimic the natural environment around them and recreate the natural habitat that was fragmented by the highway. The more naturally a wildlife crossing fits into the surrounding area, the more likely animals will use it. Successful crossing design depends on several factors:

Placement – Crossings should be built in a location where they are most likely to be utilized, generally where animals naturally approach a highway. Often animals choose areas to cross where there is a specific terrain feature, vegetation or narrower right-of-way. Ridges, valley bottoms, stream and river courses and wooded corridors are choice locations. When designing the crossings in Banff National Park, locating the underpasses and overpasses near the animals' natural travel corridors was crucial to the project's success. For carnivores, this meant placing the structures close to stream corridors or drainage areas. For ungulates, it involved doing the opposite—placing the structures far from carnivores (their predators) and with a clear view of the entrances of these structures.

Redundancy – Rarely will one crossing suffice for the full suite of species moving across a large landscape. For small animals, travel distance between crossings can be important. Reptiles and amphibians are unlikely to travel far to reach a crossing before giving up.

Size matters – In most cases, the larger the crossing, the better. Underpasses must be wide enough and tall enough for comfortable passing of various species. However, if crossings are too long, they may create a tunnel effect that is less inviting to certain species.

Openness ratio – For underpasses, the "openness" is determined by the height in relation to the width. In general, the more open the better, as it reduces the "tunnel" effect.

Light – Most species prefer a certain amount of light within a crossing, particularly prey species. Other species are sensitive to human disturbance and reluctant to use structures that are artificially lit. Natural lighting is best.

Moisture – For wet culverts, amphibians may prefer a continuous wet substrate to pass successfully.

Vegetation – Shrubs and other vegetation shield animals from traffic light and noise and provide cover for species that feel vulnerable when using crossings.

Temperature – Depending on the size and air flow within culverts, the temperature inside the crossing may differ from the outside, ambient temperature enough to deter some temperature-sensitive species such as snakes.

Substrate – The substrate within a crossing should replicate ground conditions on either side as much as possible.

Cover – Some small animals feel more secure using a crossing system if it provides sufficient cover. For example, rows of stumps and rootwads in an underpass appear to facilitate use by small mammals such as rabbits and voles.

Noise/Light – Traffic noise and artificial light are additional disturbances for most species, and can deter wildlife from using crossings. Overpasses use high berms and vegetation to reduce traffic noise and headlight glare.

Approaches – Some species prefer well vegetated approaches; others prefer open approaches with good visibility. Vegetation at the entrance of an underpass may deter some mammals that are wary of conditions that provide ambush opportunities for predators.

Line of sight – Structures should be designed as flat and straight as terrain permits. Animals approaching underpasses should be able to see through the structure to suitable habitat on the opposite side.

Fencing – Exclusionary fencing on either side of crossing structures keeps wildlife out of the right of way and guides animals to the structure for safe crossing (Ruediger, 2007).

"The standard response initially by some of the engineers involved was, 'this stuff doesn't work.' I'm still working on getting them to understand that it does work if done properly." **State wildlife agency biologist**

"Engineers are problem solvers. Once they understand the full scope of the problem, they can be creative and effective allies." **Conservation advocate**

Types of Wildlife Crossings

Wildlife crosses OVER the traffic.

Wildlife Overcrossing
A grade separation structure designed to allow wildlife to cross over an intersecting roadway. It is usually covered with vegetation. Also called *ecoduct, wildlife bridge, green bridge, biobridge,* or *wildlife overpass.* The largest overcrossings may be called *landscape connectors*.

Tunnel
The roadway bores through a substantial amount of earth, allowing undisturbed vegetation and soil on top.

Bridge: Wildlife crosses UNDER the traffic.

Wildlife Underpass
Animals pass under an intersecting roadway through a bridge. A bridge forms part of the roadway and is usually at least 20' long.

Single span bridge
The structure rests on abutments with no intermediate support columns. Also called *open span bridge*.

Multiple span bridge
A bridge with one or more intermediate support columns between abutments.

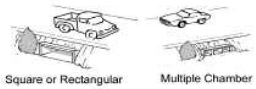
Viaduct
A long, multiple-span bridge

Causeway
Same as viaduct, only often over wetlands.

Culvert: Wildlife crosses UNDER the traffic.

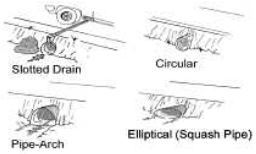
Wildlife Under pass
Animals pass under an intersecting roadway through a culvert. A culvert is a conduit covered with embankment around the entire perimeter. It may or may not convey water. Small conduits for amphibians are sometimes called *tunnels*.

Box Culvert
Culvert has four sides, including bottom. Sometimes square or rectangular corrugated metal pipe culverts without bottoms are called box culverts



Typical Material: Precast concrete, Cast-in-place concrete, Wood

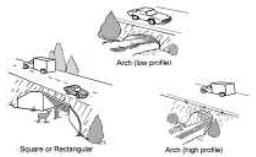
Culvert (Continuous)
Culvert is continuous in circumference. The lower portion may or may not be buried. Sometimes simply called *pipe*. European badger culverts are sometimes called *ecopipes*.



Slotted drain culverts are continuous except for a break in the upper portion.

Typical Material: Corrugated metal pipe, Metal plate, Cast-in-place concrete, Precast concrete, Wood

Bottomless Culvert
Culvert is discontinuous in circumference with rounded or square top and natural surface bottom. Also called *open-bottom culvert*.



Typical Material: Corrugated metal pipe, Metal plate, Precast concrete, Cast-in-place concrete, Wood

Barrier

Structures designed to stop movement in a given direction.

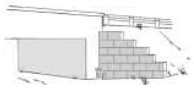
Fence
A barrier or diversion structure usually with some type of material between support structures. Often defined by the material between the support structures.

Typical Material: Diversion fences are sometimes called *drift* or *guide* fences, Wire ,Barbed wire, Woven wire, Chain link, Rail, Plastic mesh

Electric
Electrified strands that give grounded organisms a shock when touched. Shock is typically intense, but not physiologically damaging.

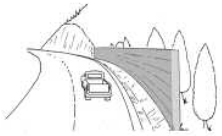
Typical Material: Braided Rope, High-tensile wire

Jersey Barrier
Structures used primarily to affect vehicles direction. Solid or solid with openings.
Typical Material: concrete



Wall
Solid wall

Typical Material: Concrete, Brick, Wood



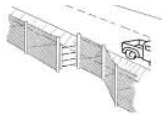
Sound Wall
A solid wall used for absorbing or deflecting sound produced from the highway.

Typical Material: Brick, Wood, Concrete, Sheet Piling

In-roadway Barrier
Support structures for vehicles built over a pit and used to prevent wildlife access across a break in fencing or other barrier. Similar to a cattle guard, but designed for wildlife. Also called *deer guard*.

Escape Structure

A structure designed to allow an animal trapped on the roadway by a diversion fence to exit. They allow passage in only one direction to make it easy to escape the roadway, but difficult to enter it.



One-way Gate
A gate designed to allow passage for the design species in only one direction.

Ramp

Funnel Fence

Graph courtesy of the USDA Forest Service's Wildlife Crossings Toolkit http://www.wildlifecrossings.info

MIXED USE

How would you like to share the sidewalk with a grizzly bear? She doesn't want to share her "crosswalks" with you either. Most wildlife prefer not to share their habitat with humans and wildlife crossings are no different. While some more common species such as deer and coyote can become easily habituated to human presence, sensitive species such as wolves and grizzly bears are disturbed by human activity and will avoid even high quality habitat if humans are near.

Seeking compromise in the face of competing needs and limited dollars, some states have designed mixed-use, human-wildlife crossing structures. But can a crossing structure frequented by humans truly be an effective passage for wildlife? Florida built a 16-meter-wide overpass in 2000 to reconnect the Marjorie Harris Carr Cross-Florida Greenway that crosses I-75 in Marion County. The land bridge was built to accommodate hikers, cyclists and horseback riders during the day and deer, foxes, coyotes, possums and other small mammals at night. Sporadic monitoring has captured images of bobcat and coyote using the bridge and officials have confirmed visual reports of indigo snake and gopher tortoise on the bridge, both of which are listed species in Florida (Thomason, 2007).

In Switzerland, signs are posted near wildlife crossings asking people to respect the purpose of the structures and only use crossings designed for humans.

But other studies have shown that wildlife crossings are less effective when frequented by human visitors. One study measured the use of 14 wildlife underpasses in Banff National Park and concluded that human influence was a factor at all locations. Either a nearby human population or human activity within an underpass consistently ranked high as a significant factor affecting species-performance ratios (Clevenger, 2000). In an effort to increase the low numbers of large carnivores using the structures at Banff, Parks Canada researchers are urging stricter limits on human activity near the crossing structures. According to Anthony Clevenger, wildlife ecologist and research scientist leading the evaluation of wildlife mitigation in Banff National Park, "Distance from humans is the most important consideration in designing crossing structures for large carnivores. The further the better." (Critter Crossings, 2000). The Canadian public supports the wildlife-only crossings. In a recent poll, 89 percent of respondents approved a management plan that would build separate crossings for park visitors, to keep humans from using wildlife crossings (Parks Canada, 2006).

Monitoring

To improve our understanding of how various species respond to different wildlife crossing designs, continued research is needed. It is important to conduct wildlife monitoring both before and after construction, using scientific methodology and publishing all results and recommendations so others benefit from what is learned. On individual highway projects, monitoring can help adjust mitigation measures like fencing, wildlife approaches to structures, and human use levels. Monitoring also helps determine the amount and type of wildlife use structures receive. Due to the learning curve for using crossing structures, more wary species may take years to become accustomed to structures and begin using them successfully.

Monitoring can range from low-cost wildlife track counts and roadkill surveys to medium-cost motion-triggered camera traps and genetic analyses of scat and hair samples. Because it is integral to the success of the structure as it contributes to overall habitat connectivity, monitoring should be included in the planning, design and cost of the project.

If you have existing crossing structures in your state or area of interest, are they being monitored for use and effectiveness? Work with researchers to implement monitoring strategies for crossing structures. Volunteer your organization to help with monitoring.

HALL OF FAME: USING CITIZEN SCIENCE FOR WILDLIFE CROSSINGS

The Southern Rockies Ecosystem Project (SREP), in collaboration with the Denver Zoo and the Gore Range Natural Science School, developed the *Citizen Science Wildlife Monitoring* program to monitor wildlife activity in the area where a wildlife crossing structure has been proposed across Interstate 70 in Colorado. The program engages local residents, educates communities and collects baseline data by monitoring wildlife presence and abundance through the use of motion-triggered cameras. Trained volunteers download images, replace batteries, reposition cameras, record important information on the camera's status, and reprogram the camera for future use. Images downloaded from cameras are compiled in a statewide monitoring database and posted on the Web.

As the program's capacity increases, monitoring efforts will be extended to a greater number of monitoring stations and volunteers will be trained in additional monitoring techniques including scat transects, hair snares and video monitoring. In its first year, the *Citizen Science Wildlife Monitoring* program has proven to be a very successful means for expanding our research capacity while engaging citizens at the local level and fostering knowledge and interest about the Southern Rockies ecosystem.

The Miistakis Institute in Calgary, British Columbia took the citizen science concept to the web with their "Road Watch in the Pass" project. Drivers who use Highway 3 through Crowsnest Pass are encouraged to report sightings of wildlife (dead or alive) on a special website. Users log in and fill out a simple report on the species, location and status. Data collected is analyzed and provided to planners, managers and decision-makers in the Municipality of Crowsnest Pass and beyond.

Where wildlife crossings are planned or needed, volunteer your organization to help with pre-project monitoring and citizen science.

SAFETEA-LU contains Section 6001, a planning provision that requires long-range transportation plans to be developed in consultation with agencies responsible for land use management, natural resources, conservation and environmental protection. The provision also requires that the consultation involve a "discussion of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan." These early consultations are great opportunities to begin discussing wildlife mitigation measures such as crossing structures. For more information on Section 6001, see Planning.

Take advantage of the Section 6001 consultation process.
–Ask someone from your state planning division if there are opportunities for public participation in the Section 6001 consultation.
–Bring your State Wildlife Action Plan and wildlife habitat linkage plan. Suggest that they be used as a basis for the mitigation discussion required under Section 6001. Find opportunities for wildlife mitigation in upcoming projects.

COSTS

Perhaps the most common questions related to wildlife crossings are "how much do they cost?" and "where does the money come from?" Like all aspects of highway building, wildlife mitigation techniques range in price from very inexpensive (warning signs) to very expensive (overpasses). Because each project is unique and because construction and materials costs are constantly fluctuating, it is nearly impossible to develop firm cost guidelines. However, we were able to collect the following estimates from various sources.

Crossing type	Cost	Source
Elliptical metal culvert	$150,000-170,000	The Use of Highway Underpasses by Large Mammals in Virginia and Factors Influencing their Effectiveness (cited in Donaldson, 2005)
Corrugated metal pipe bottomless arch culvert	$150,000	The Use of Highway Underpasses by Large Mammals in Virginia and Factors Influencing their Effectiveness (cited in Donaldson, 2005)
Arch culvert 13' x 23'	$250,000	Safe Passage: A User's Guide to Developing Effective High-way Crossings for Carnivores and Other Wildlife (Ruediger, 2007)
Concrete box	$120,000	Road Ecology (Forman, et al.)
Box culvert	$870,000	The Use of Highway Underpasses by Large Mammals in Virginia and Factors Influencing their Effectiveness (cited in Donaldson, 2005)
Bridge extension	$433,000 (extension only)	The Use of Highway Underpasses by Large Mammals in Virginia and Factors Influencing their Effectiveness (cited in Donaldson, 2005)
Open-span bridge–over land	$470,000–670,000	Road Ecology (Forman, et al.)
Open-span bridge–over waterway	Minimal added cost	Road Ecology (Forman, et al.)
Overpass	$1.15 million	Road Ecology (Forman, et al.)
Open span underpass	$1 million	Safe Passage: A User's Guide to Developing Effective Highway Crossings for Carnivores and Other Wildlife (Ruediger, 2007)
Combination over and under passes (FDOT is building 2 crossings, each with two bridges: one to bridge over the Barron Canal; one to allow passage under SR 29.)	$1,581,325.60 Cost of entire project: $7, 149,846.61	Personal communication with project engineer, Bill Franklin, March 27, 2007 Project: 407940-1-52-01, SR 70 Wildlife Crossings (SR 29)
Double span bridge	$3 to 4 million Cost of entire project: $14 million	Personal communication with Deborah Wambach of Montana Department of Transportation, April 5, 2007
Vegetated overpass	$5 million or more	Safe Passage: A User's Guide to Developing Effective Highway Crossings for Carnivores and Other Wildlife (Ruediger, 2007)
Elevated roadway	$8.5 million	Road Ecology (Forman, et al.)
Tunnel	$16 million	Road Ecology (Forman, et al.)

We know that habitat connectivity is critical to ecosystem health and we now have more than sufficient evidence that properly designed crossing structures are effective. Yet, with no specific funding mechanisms for wildlife crossings and no regulatory directives to build them, transportation agencies are often reluctant to spend highway dollars on crossing structures.

Regardless of the price tag, it is important to remember that—as with any other safety measure—wildlife mitigation measures should be seen within the context of the entire transportation project, and the costs should be seen within the context of the entire project budget. Cost alone should never be the sole factor in determining which mitigation techniques are used. Rather, the proposed measures should be evaluated based on cost-effectiveness, overall benefits and savings, and long-term return on the investment.

CAUTION: Don't fall for the "Jedi mind tricks" of wildlife mitigation. When discussing the high costs of wildlife crossings, inevitably someone will suggest that because they benefit wildlife, resource agencies and conservationists should pay for them. Nice try, Obi-Wan. Crossings are used by wildlife, but are still a part of our transportation infrastructure. They are only necessary because a highway was built through wildlife habitat. Efforts by transportation agencies to restore lost connectivity are highly commendable, but they are not charity. If a highway is built in an avalanche zone, is the weather bureau expected to pay for avalanche sheds?

BENEFITS OF EFFECTIVE WILDLIFE CROSSING STRUCTURES

Ecology: restoration of wildlife corridors, reduced effects of fragmentation, reduced road mortality

Human safety: reduction in wildlife-vehicle collisions means a reduction in deaths and injuries

Cost savings: reduction in property damage, hospital costs and lost wages

SAFETEA-LU contained a provision requiring the USDOT to commission a study of methods to reduce collisions between motor vehicles and wildlife. The study will include an assessment of causes, solutions and best practices for reducing wildlife vehicle collisions—including wildlife crossings and other mitigation measures. The results of the study will inform the development of a best practices manual to serve as a guide for developing

statewide action plans to reduce wildlife-vehicle collisions. The manual will become the basis for a training course for transportation professionals.

CAN WE AFFORD *NOT* TO BUILD CROSSINGS?

Wildlife crossing structures can be expensive, especially when they are done carefully and correctly—meaning predesign research is done, the size and number are adequate, they connect protected and quality habitat on either side, and they are maintained and monitored for the most efficient use. But consider the alternative.

With fewer than 100 cats remaining, vehicle collisions area a major threat to the endangered Florida pather.

- A recent study by the Western Transportation Institute calculated the average total costs associated with an animal-vehicle collision for three species: $7,890 per collision for deer, $17,100 for elk, and $28,100 for moose (Huijser 2006).
- The British Columbia Ministry of Transportation and Highways analyzed the various costs of wildlife vehicle collisions, including the obvious property damage and human injuries, as well as costs of accident clean up and the loss of the value of the animals in terms of tourism and hunting revenue. Between 1997 and 2000, a Canadian insurance provider paid out more than $67 million in wildlife-related motor vehicle accident claims. Between 1991 and 2000, Ministry Maintenance Contractors spent more than $5.2 million on wildlife-related accident clean-up and disposal. If every wild game animal reported killed on provincial highways represented an opportunity to sell a hunting license, the Province of British Columbia lost between $80,000 and $400,000 in hunting license revenues in 2000 (British Columbia Ministry of Transportation and Highways, 2000).
- Virginia Transportation Research Council recently conducted a cost-benefit analysis of two underpasses and concluded that an effective structure with fencing is cost-effective in terms of savings in property damage alone when it prevents just 2.6 collisions per year (Donaldson, 2005).
- Jerry Booth sued the state of Arizona for $3 million after he was severely injured in a collision with an elk lying in the roadway. A jury found that the state failed to guard against foreseeable collisions between motor vehicles and elk or deer (Booth v. State of Arizona, 2004). It should be noted that Arizona does have crossings for elk and other wildlife and is implementing several more mitigation measures.
- Endangered species are priceless and managing them is very expensive. Certain taxa like herpetofauna and carnivores are particularly susceptible to impacts from roads and highways. If existing road impacts aren't addressed through mitigation measures, highly vulnerable species could quickly be relegated to endangered status.

"There is such a demand for transportation dollars; the biggest hurdle is convincing people that wildlife crossings are truly needed and justifiable. This ultimately means changing the mindset of people."
Conservation advocate

SOURCES OF FUNDING FOR WILDLIFE MITIGATION MEASURES

Transportation funding for wildlife mitigation can come from several different pots, depending on the circumstance. This is by no means a complete list and conservationists should continue exploring new sources and creative ways to leverage all of our resources.

1. Project Budget

Crossing structures may ultimately benefit wildlife by restoring some fraction of habitat connectivity that was lost when the highway was built, but they are still part of our transportation infrastructure. Wildlife-vehicle collisions are a serious safety hazard on many highways because they were built through wildlife habitat. As such, any measure to reduce the risk of accidents is a legitimate transportation expense. The Washington Department of Transportation is not only including the cost of crossings in their pending widening of I-90 through Snoqualmie Pass, they have included the restoration of habitat connectivity in the purpose and need of the project.

"The politicians don't really want to spend money on highway amenities for wildlife unless forced to do so. People start getting nervous when you raise taxes for things like wildlife crossings."
Retired FHWA biologist

2. Retroactive Mitigation

Pssst—this may be one of the best kept secrets in the business. In December 2000, FHWA released a final rule on the eligibility of federal-aid transportation funding of mitigation activities. The final rule broadened the existing regulation to allow use of federal highway funds to mitigate for impacts to wetlands and *natural habitat* caused by current *or past* highway projects. Yes, you read that right. federal transportation funds can be used to mitigate impacts for nonwetland habitat that was impacted "due to already-completed projects which were not mitigated when the projects were built."

For the purposes of this rule, natural habitat is defined as "a complex of natural, primarily native or indigenous vegetation, not currently subject to cultivation or current artificial landscaping, a primary purpose of which is to provide habitat for wildlife, either

terrestrial or aquatic." Actions eligible for federal funding include restoration, enhancement or improvements of degraded wetlands or natural habitats and other measures to protect, enhance or restore the wetland or natural habitat character of the site. Federal-aid funds may be used for acquisition of proprietary interests in replacement wetlands or natural habitat, and the state transportation agency may acquire privately owned lands in cooperation with another public agency. Federal-aid funds may not be used unless the area will be maintained in the intended state as a wetland or natural habitat.

Ask a friend at your transportation agency about using retroactive mitigation for nonwetland habitat in your state or area of interest. Brainstorm a list of potential projects and make suggestions. Keep in mind that this mitigation is not required, but this rule does make federal funding eligible.

3. Federal Lands Highway Program

The Federal Lands Highway Program (FLHP) is an adjunct to the Federal-Aid Highway Program, created in 1982 to fund a coordinated roads program for transportation needs of federal and Indian lands which are not the responsibility of a state or local government. Often referred to as "the DOT for federal lands", FLHP's purpose is to:

1. ensure effective and efficient funding and administration for a coordinated program of public roads and bridges serving Federal and Indian lands
2. provide needed transportation access for Native Americans
3. protect and enhance our Nation's resources.

FLHP funds are distributed to each category, where project selection is delegated to users (federal land management agencies, Indian tribes and states) according to three-year transportation improvement plans (TIP). Roads owned by the Bureau of Land Management, Bureau of Reclamation and the U.S. Army Corps of Engineers and other Department of Defense agencies do not receive dedicated funding and have to compete for funds under a discretionary category. FLHP funds are 100 percent eligible for wildlife mitigation measures. **For more information on FLHP, see Public Lands.**

SAFETEA-LU provides $4.5 billion for the Federal Lands Highway Program through 2009, which is eligible for wildlife mitigation measures on highways within or serving our public lands system.

Contact your FLHP regional office and ask if they have any wildlife mitigation projects planned. Check the FLHP project list in your state or area of interest for opportunities to incorporate wildlife mitigation measures into pending projects.

"It's common sense to many people to make our roadways safer for people and wildlife and reduce the impact of our roadways on clean water. The divisive issues often center around how we pay for those improvements and making it clear to folks that this is a holistic transportation issue." **Conservation advocate**

HALL OF FAME: COLORADO'S FIRST VEGETATED OVERPASS

Heavily developed resort areas, recreational use and streams of passenger and freight traffic severely constrict wildlife movement in the Vail area. Conservationists teamed up with Colorado Department of Transportation (CDOT) and others to explore building a wildlife bridge just west of Vail Pass on I-70. The location was recognized as a high-priority habitat linkage for a diversity of species by an interagency group called "A Landscape Level Inventory of Valued Ecosystem Components" (ALIVE). When finished, the bridge will reconnect critical wildlife habitat fragmented by the interstate and restore one of the last remaining forested connections for wildlife moving north-south through the heart of the Rocky Mountains.

In 2005, Congress appropriated $500,000 through FLHP's Public Lands Highway Discretionary Program to conduct preliminary studies and planning and additional funds are expected. The project brings highway dollars into the state without bringing more highways and because it is funded under the PLHD program, no match is required from CDOT or local governments.

4. Safety

Because wildlife-vehicle collisions are now more widely recognized as a serious safety hazard for the traveling public, safety funding can be used to build wildlife crossings or any other mitigation measure.

SAFETEA-LU clarified the eligibility of safety funds with a provision in the Highway Safety Improvement Program (HSIP). "The addition or retrofitting of structures or other measures to eliminate or reduce accidents involving vehicles and wildlife" is

now considered a highway safety improvement project and therefore eligible for safety funding.

Contact your transportation agency and ask about using safety funds to reduce wildlife-vehicle collisions. Use accident data to make a list of collision hot-spots.

5. Transportation Enhancements

Beginning with ISTEA, the Transportation Enhancements (TE) program set aside 10 percent of all Surface Transportation Program dollars for community-based projects that expand travel choices and enhance the transportation experience by improving the cultural, historic, aesthetic and environmental aspects of our transportation infrastructure.

TE is a federal aid reimbursement program, whereby the federal government pays 80 percent of the project cost and the project sponsor pays the nonfederal match of 20 percent.

While TE uses federal funding, state transportation agencies retain most of the responsibility for implementing the program, and each state does so in its own way. Each state devises its own application, selection process and selection criteria but they all have some characteristics in common, such as eligibility, advisory committees, project implementation, innovative financing and streamlined project development. To qualify for consideration, projects do not have to be associated with a specific highway project, but they must be within the acceptable categories and must relate to surface transportation.

While wildlife mitigation measures have always been eligible for transportation dollars, TEA-21 was the first federal transportation bill that explicitly stated that highway dollars could be used for wildlife crossing structures and other mitigation measures. In 1998, Congress included Activity 11, known in law as "e*nvironmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity*." The provision provides communities with funding to decrease the negative impacts of roads on the natural environment—including water pollution and habitat fragmentation. To reduce water pollution from stormwater runoff, TE funds can be used for pollution studies, soil erosion control or river clean-ups. To address wildlife passage and habitat connectivity, TE funds can be used for crossing structures and monitoring and data collection on habitat fragmentation and vehicle-caused wildlife mortality.

CAUTION: Transportation Enhancement funds are not allowed to be used for standard environmental mitigation related to a current highway project, routine maintenance or the preservation of transportation corridors for future highway development. M

Since the inception of Transportation Enhancements in 1992 approximately $72 million (just 1 percent of all TE program dollars) has been programmed for Activity 11, environmental mitigation projects. Of that $72 million, only $19 million has been spent on wildlife habitat connectivity projects (National Transportation Enhancements Clearinghouse, 2007).

Get in there and take advantage of the TE program to address wildlife habitat connectivity needs in your state or area of interest.

–Read the Guide to Transportation Enhancements by the National Transportation Enhancements Clearinghouse.
–Contact your state TE coordinator to introduce yourself and your organization. Ask for information on eligibility requirements. Find out when the next selection cycle begins and ask to be added to the mailing list.
–Meet with other stakeholders (wildlife and resource agencies, other conservation organizations) and make a "wish list" of potential TE projects.
–Find a sponsor (must be a public entity such as a state agency) and apply for a TE project.
–Keep in mind that TE funds are not eligible for standard environmental mitigation related to a current highway project or routine maintenance. These funds are best used where mitigation measures are needed but no relative transportation projects are pending.

6. Bridge Construction

Along with constant maintenance and upkeep of highways, your transportation agency is fastidiously checking and rechecking all the bridges and culverts in your state. They keep records of the conditions and schedule them for maintenance, restoration and full reconstruction when necessary. Bridge reconstructions are an excellent time to rethink the opportunities for better aquatic and terrestrial passage under the bridge. Sometimes, just extending the bridge's footprint by a few feet on either side makes a world of difference.

HALL OF FAME: "BRIDGING" BETWEEN FUNDING SOURCES FOR PANTHERS

In 2006, Defenders of Wildlife's Florida office applied for a TE project to improve a small bridge on US 41 in the Big Cypress National Preserve for wildlife passage. Despite lowered speed limits, seven Florida panthers had been killed within 2.5 miles of the bridge. Florida Department of Transportation checked their records and discovered that the bridge was already scheduled for

reconstruction. As a result, they will use bridge replacement funds for the project, supplemented with $425,000 in TE funds for preconstruction monitoring and design.

7. Intelligent Transportation Systems

We've all seen traffic surveillance cameras, travel advisory radio signs and electronic toll collection systems on highways. These and all the communications-based information and electronics technologies used on our highways are called Intelligent Transportation Systems (ITS). When integrated into our infrastructure and in vehicles themselves, ITS can improve safety and mobility—but can we put them to use for wildlife? Absolutely! A federal program began in 1991 to research, develop, and test ITS technologies, funded at $110 million annually. The program is divided into 16 application categories, three of which hold promise for preventing wildlife-vehicle collisions:

Crash Prevention and Safety applications include animal warning systems such as infrared or other detection technologies to identify large animals are approaching the roadway and warn drivers with flashing warning signs.

Roadway Operations and Maintenance applications include information dissemination via dynamic message signs that can be also be used to warn drivers about approaching wildlife.

Driver Assistance Systems applications include in-vehicle vision enhancement technologies such as dashboard infrared to help drivers see wildlife on the road at night.

Take advantage of the ITS program for wildlife. As of 2004, only six states had implemented ITS animal warning systems.

8. Transportation, Community and System Preservation Program

TEA-21 gave birth to the Transportation, Community and System Preservation (TCSP) program, a research and grants program to fund innovative transportation strategies that enhance community preservation, environmental protection and social equity. Big job, little program. Total funding for TCSP is $61 million per year, divided among all states. Nevertheless, one of the factors for eligibility is to "reduce the impacts of transportation on the environment." State, tribal, regional and local governments can apply, and priority is given to applications that meet certain criteria, including "environmental mitigation."

9. Ballot Measures

In the United States, ballot measures have recently been proposed for everything from legalizing marijuana to funding stem cell research. Conservationists have been using ballot measures for years to protect open space and bring much-needed funding for habitat acquisition. Now, ballot measures are being used to raise money for wildlife crossings. Typically, ballot measures are created when a threshold number of signatures is gathered on a petition to express public support. Once the signature threshold is met,, the measure is certified for the election and then presented to the public on a ballot for the voters' final decision. Ballot measures commonly require a simple majority of the public's vote to be enacted.

HALL OF FAME

In May 2006, voters in Pima County, Arizona, voted to pass a half-cent sales tax increase to fund their Regional Transportation Authority's (RTA) $2.1 billion regional transportation plan. The RTA plan was developed with input from a diverse, 35-member Citizens Advisory Committee and a 22-member Technical/ Management Committee. The plan included several highway and transit projects, but also set aside $45 million for a "Critical Landscape Linkages" category that will fund wildlife crossing structures and amenities in transportation projects. The crossings are critical to accomplishing the vision of a much larger effort under the Sonoran Desert Conservation Plan. Crossings will complement land acquisitions purchased with a 2004 open space bond, with more planned in the future.

HALL OF FAME

In 2005, the Washington State Legislature passed a transportation bill that included $387 million for the Snoqualmie Pass East I-90 Project, which includes several wildlife passages. Members from both sides of the aisle and the state worked to pass this bill, and make sure that I-90 remained on the project list. This package was challenged by an initiative to repeal the gas tax funding for the transportation bill, but was upheld by statewide voters in the fall of 2005. Since that time, the governor has requested further funding for the project as transportation costs in the state increase.

10. Impact or User Fees

Wildlife mitigation measures should always be paid for with transportation funds, but under special circumstances, conservationists could also consider creative, supplemental sources of funding such as bonds, specialized license plates and fees on recreation equipment. Impact fees could be assessed as an increase in sales tax on vehicles sales, or a flat-rate surcharge tacked on to vehicle registration fees. Assessing an additional one dollar per vehicle registration could generate millions per year, depending on the state. California's state constitution allows gasoline tax dollars to be used for environmental mitigation related to construction and operation of roads and highways.

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Simulation of overpass to be built for the Snoqualmie Pass East I-90 Project in Washington

WILDLIFE RESOURCES

WILDLIFE VEHICLE COLLISIONS

SAFETEA-LU Wildlife Vehicle Collision Study
http://safety.fhwa.dot.gov/safetealu/factsheet1119n.htm

Deer-Vehicle Crash Information Clearinghouse (DVCIC) and Countermeasure Toolbox
http://www.deercrash.com/
http://www.deercrash.com/Toolbox/index.htm

British Columbia Conservation Foundation's Wildlife Collision Prevention Program
http://www.wildlifeaccidents.ca/

HABITAT CONNECTIVITY

Highways and Habitat: Managing Habitat Connectivity and Landscape Permeability for Wildlife
http://www.fs.fed.us/pnw/sciencef/scifi79.pdf

Corridors of Life: Wildlife and Wild Places in the U.S. Northern Rockies
American Wildlands
http://www.wildlands.org/land.html
http://www.wildlands.org/highwaywildlife.pdf

Restoration of Carnivore Habitat Connectivity in the Northern Rocky Mountains
Bill Ruediger
http://www.defenders.org/habitat/highways/new/sub/library/bill's%20carnivore%20paper.pdf

WILDLIFE CROSSINGS

Wildlife and Roads
http://www.wildlifeandroads.org/

The Wildlife Crossings Toolkit
http://www.wildlifecrossings.info/

FHWA's Critter Crossings
http://www.fhwa.dot.gov/environment/wildlifecrossings/

Safe Passage: A User's Guide to Developing Effective Highway Crossings for Carnivores and Other Wildlife
Bill Ruediger and Monique DiGiorgio
http://www.carnivoresafepassage.org/

Wildlife Habitat Connectivity Across European Highways
http://international.fhwa.dot.gov/Pdfs/wildlife_web.pdf
http://international.fhwa.dot.gov/wildlife_web.htm

Guidelines for Bridge and Culvert Construction to Accommodate Fish & Wildlife Movement and Passage
Arizona Game and Fish Department, Habitat Branch
http://www.azgfd.gov/hgis/pdfs/BridgeGuidelines.pdf
http://www.azgfd.gov/hgis/pdfs/CulvertGuidelinesforWildlifeCrossings.pdf

Evaluation of Wildlife Crossing Structures: Their Use and Effectiveness
Maureen Hartmann, for Wildlands CPR
http://www.wildlandscpr.org/resourcelibrary/reports/EvaluationByMaureenHartmann.htm

SOURCES OF FUNDING

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Mitigation of Impacts to Wetlands and Natural Habitat
Federal Register / Vol. 65, No. 251 / Friday, December 29, 2000 / Rules and Regulations
http://www.fhwa.dot.gov/environment/fr29de00.pdf

Federal Lands Highway Program
http://www.fhwa.dot.gov/flh/index.htm

Safety
http://safety.fhwa.dot.gov/

Transportation Enhancements
http://www.enhancements.org/misc/TEGuide2002.pdf
http://www.fhwa.dot.gov/environment/te/principles_pt1.htm
http://www.fws.gov/refuges/roads/transenhancements.html

Intelligent Transportation Systems (ITS)
http://www.itsoverview.its.dot.gov/Options.asp?System=CPS&SubSystem=AWSc&Tech=Animal
Transportation Community System Preservation (TCSP)
http://www.fhwa.dot.gov/safetealu/factsheets/tcsp.htm

ROADSIDE VEGETATION

Have you ever been to Yellowstone National Park? Yosemite? The Grand Canyon? Imagine all three of them put together and multiply that by four. That's how much land we have in our public rights of way! Seventeen million acres of land—an area roughly the size of Ireland—are found next to our roads and highways. Like it or not, that makes our transportation agencies land managers on a grand scale. Granted, our roadsides may not be high quality habitat like Yellowstone, but in many places roadsides provide some of the last vestiges of highly imperiled native habitat such as prairies and grasslands. Conservationists can't afford to overlook any opportunities for stewardship, much less a shot at 17 million acres. By partnering with transportation agencies, we can take advantage of new trends in ecologically sensitive roadside vegetation management.

AMERICA'S FRONT YARD

We live in our cars, so that makes our roadsides "America's front yard." And just like our own lawn care, early roadside vegetation managers were looking for something inexpensive, low-maintenance and attractive. If native flora failed to meet these objectives, non-native species such as kudzu and grasses were used. Some of these invasives spread beyond the right of way, onto adjoining private and public property, further degrading habitat and reducing biodiversity.

By the 1990s, the paradigm shifted from "do it fast" to "do it right." A new aesthetic began to take hold, suggesting that our country's roadsides reflect the natural beauty and biodiversity of each region, rather than the look of a manicured lawn. Can roadsides be more ecologically diverse, provide habitat for wildlife, showcase local character, control erosion, use less water, fertilizer and other chemicals, and require less maintenance?

FUNCTIONS OF ROADSIDE VEGETATION

- Traffic calming
- Stress reduction
- Buffer or shade for pedestrian or park-and-ride facilities
- Stream bank stabilization
- Wetland mitigation
- Water quality improvement
- Stormwater retention
- Air pollution mitigation
- Fire prevention
- Windbreak
- Noise abatement
- Wildlife habitat
- Enclose, screen, expose or blend the roadway with adjacent land uses
- Visual quality, quality of life
- Corridor continuity

Guest Column:

HOLISTIC SOLUTIONS FOR ROADSIDE VEGETATION

Bonnie Harper Lore, FHWA

ROADSIDES, The Front Yard of the Nation was written by J. M. Bennett in 1936. Apparently the book defined roadside development as we know it today, although it was not based on federal standards. Bennett wrote, "The necessity and popularity of grass cannot be questioned and its use along the roadsides invites little criticism." And with that comment, the idea of roadsides looking like front yards became the unwritten public policy and the expectation of the traveling public.

Grass does indeed fulfill the needs and constraints of modern roadsides across the nation. However, we can no longer afford—ecologically or economically—the costs of non-native grasses, fertilizers, irrigation or the fossil fuels used to maintain them. Every region has native grasses that can provide the ground cover, erosion control, aesthetics, small animal habitat and vehicle soft landings required by most highway engineers. Once native perennial grasses are established, they take care of themselves.

Bennett also said, "What is really desired, however, is attractive and useful roadsides which can be obtained by preserving or creating a natural or an approach to a natural condition in keeping with the adjacent or surrounding country. And the significant thing about this is that to follow a natural development is outright economy in road maintenance." Unfortunately it was the title of his book that caught on, not the practical substance of it. Four decades later, his counterparts were faced with the energy crisis of the 1970s and began looking for more holistic solutions to roadside development. This is when an ecological approach replaced the front yard approach to our nation's highways.

Partner with your transportation agency, garden clubs, community and civic organizations to develop educational programs and provide informational materials to the general public, landowners and other government agencies on the value of roadside vegetation.

"There is of course more to the wish to preserve our roadside vegetation than even such esthetic considerations. In the economy of nature, the natural vegetation has its essential place. Hedgerows along country roads and bordering fields provide food, cover, and nesting areas for birds and homes for many small animals. Of some 70 species of shrubs and vines that are typical roadside species in the eastern states alone, about 65 are important to wildlife as food."
—Rachel Carson

TYPES OF VEGETATION ON ROADSIDES

Some states have inventoried their roadsides in order to improve and prioritize management efforts, but for the most part we don't have an accurate picture of what is hiding (or lurking) in our public rights of way. From a highway operations perspective, roadside vegetation typically falls into one or more of these categories:

Desirable vegetation – species, preferably native, that complement the function of the road and are inexpensive, self-sustaining, attractive and fast growing.

Hazard vegetation – plants that are obscuring visibility, growing over guardrails, creating obstacles to signage or vehicular movement, posing windfall hazard over vehicles or pedestrians or creating persistent winter shade leading to prolonged icing conditions.

Detrimental vegetation – grasses and woody plants that are destructive to or compromise the function of highway structures, including grasses in pavement and bridge joints, medians, barriers, traffic islands and drainage structures.

Nuisance vegetation – plants with potential to cause problems to the general public or maintenance staff such as poison ivy and ragweed.

Invasive vegetation – exotic or non-native vegetation that displaces indigenous habitat and may compromise efforts to control soil erosion or reduce fire hazards. Certain species can even become entangled in and damage roadside mowing equipment.

Contact your local universities about conducting necessary research and monitoring of roadside vegetation.

ROADSIDE VEGETATION IN DESIGN AND CONSTRUCTION

Prior to roadway construction, the project area is clear-cut, scoured of all vegetation and grubbed to remove rooted material in the soil surface. Occasionally, desirable or valuable species may be salvaged prior to clearing, to be used after construction in the revegetation. Vegetation and topsoil are cleared from the future roadbed and shoulders. At curves, the area cleared may be wider to provide optimum visibility for drivers traveling in both directions. In colder climates, trees are removed that may contribute to snow drifting or shade the roadbed from sunlight needed to melt ice.

During the final design phase, engineers or landscape architects develop a landscaping plan. Landscape designers and engineers may conduct a preliminary field review, or "scoping," to identify conceptual locations for particular landscaping elements. Prior to construction, the design team settles on detailed landscape plans, conducts final field reviews and drafts maintenance agreements for the final roadside landscaping. Initial roadside landscape planning, design and development are generally considered part of highway construction projects, so the cost is included in the overall project budget. If plants are chosen based on their ability to be self-sustaining (requiring minimal water, fertilizer, pesticide, mowing) they will require less maintenance and resources in the future.

Landscape design should incorporate several existing and desired conditions, including:

- aesthetics
- erosion control
- minimizing maintenance requirements and costs
- screening undesirable views
- preserving desirable views
- shielding headlight glare
- preserving/enhancing the natural environment
- reducing noise volume.

Encourage your transportation agencies to coordinate and compile roadside vegetation inventories and classification systems. Volunteer to assist in data collection. You can also train volunteer "citizen scientists" to help with the inventory and future monitoring. The inventory data can then be used to establish a statewide invasives clearinghouse to provide data, information and technical assistance to land and resource managers, transportation agencies and developers.

VEGETATION MAINTENANCE

Maintenance crews have many responsibilities, including road resurfacing, shoulder maintenance, curb, gutter and sidewalk repair and replacement and snow removal. They also manage both planted and naturalized vegetation in the rights of way. Some typical maintenance practices are harmful to roadside vegetation and resident wildlife, such as mowing, herbicides and road-salt runoff. Emerging best practices can reduce these impacts and actually reduce maintenance costs. **For more information, see Maintenance and Operations.**

Many transportation agencies have developed comprehensive vegetation management plans, which include the full array of vegetation-related maintenance measures. Massachusetts' Highway Vegetation Management Plan states the objective as follows: "…to provide a safe, unobstructed roadway corridor and preserve the integrity of the highway infrastructure. Left uncontrolled, roadside vegetation can impede normal maintenance operations, obstruct motorists' line of vision, threaten pedestrian safety and cause damage to structures such as median barrier, pavements, guard posts, drainage lines and waterways. Other objectives include development of an aesthetically pleasing roadside, pest control, provisions of habitat, and stabilization of embankments and other areas prone to erosion."

Vegetation control consists of both mechanical and chemical control measures (i.e. mowing and spraying). To reduce wildfire hazards and promote healthy roadside ecosystems, some states also practice prescribed burning on roadsides where appropriate.

If your transportation agency has made great strides in improving roadside vegetation management for conservation, publicly recognize them for their efforts. Send a letter to your governor and transportation agency secretary with words of praise and encouragement for their efforts. And don't forget to send a copy to the maintenance division!

Mowing

How would you like to have to mow 17 million acres? Maintenance crews use several types and sizes of mowers; some specially designed for this purpose as well as ride-on and push mowers like the ones you might have at home. Mowing is typically used in all areas where it is safe and efficient to use the equipment. Weed whackers, trimmers and brush saws can also be used where mowing is impossible or impractical due to terrain, site size or sensitivity. In some instances, the cut vegetation may be "hayed" or baled for agricultural use. Mowing may be done by transportation agency staff or contracted out to a private landscape company.

When developing a mowing regime or policy, transportation agencies consider such factors as blade height, swath size, slope, frequency, timing, safety and cost. Vegetation is cut short enough to provide visibility for drivers, but not so short to "scalp" the plants and soils. The width of the mowed area depends on the type of highway and whether the area is a median or shoulder. Special attention is always given at intersections to create greater sight distance for motorists.

Depending on the weather and vegetation growth rates, maintenance crews may mow roadsides several times per year or only once every few years. Nebraska mows once before Memorial Day, once during summer and once more after Labor Day. Texas DOT warns against excessive mowing, which "leads to loss of desirable vegetation, fills drainage ways with silt and accelerates erosion." Mowing may be scheduled based on the growth, time of year and height of certain vegetation types and may be prohibited during certain times of the year to avoid disturbing sensitive species.

SAFETEA-LU's new research program will spend $50,000 to look into the economic and ecological benefits of reduced mowing. Minnesota and Michigan have already legislated reduced mowing and the idea is gaining ground. The final result of this research will be a published, peer-reviewed study that will affect state transportation agencies' mowing policies across the country. If the economic and ecological benefits exist as hypothesized, more environmentally sensitive vegetation management will become common practice.

HALL OF FAME: NEW YORK CONSERVES THROUGH MOWING PLANS

New York State DOT implemented Conservation Alternative Mowing Plans (CAMPs) designed to maintain existing standards for safety, aesthetics and routine maintenance yet do the following:

- Conserve staff hours spent mowing
- Conserve fuel usage and costs
- Conserve air quality through reduced spent fuel emissions
- Conserve habitat for protected and declining populations of ground nesting birds
- Conserve required equipment maintenance
- Conserve habitats through reduced fragmentation.

HALL OF FAME: NEBRASKA WON'T MOW DOWN PHEASANTS

Nebraska has taken steps to alter its mowing practices in order to protect pheasants. A Memorandum of Understanding between the Nebraska Game and Parks Commission and the Nebraska Department of Roads reads as follows:

Whereas, as research has shown that 25 percent of the pheasants are hatched in roadsides, and;

Whereas, the right of ways along Nebraska's road systems managed by the Department of Roads are of significant importance as wildlife habitat, and;

Now, therefore, That total roadside mowing be done on a scheduled rotational basis and that no more than one-third of a district

shall be mowed out in any one year. The term "total roadside mowing" is defined as mowing all areas within the right of way, including, but not limited to, the median and the road shoulder.

"Once it had been a joy to follow those roads through the evergreen forests, roads lined with bayberry and sweet fern, alder and huckleberry. Now all was brown desolation." **—Rachel Carson**

Herbicides

Chemical herbicides are used to control vegetation on roadsides, and can be used at different strengths to kill unwanted vegetation or simply retard growth rates. Generally, these chemicals are sprayed onto vegetation using truck-mounted spray booms, pressure sprayers, portable pressurized canisters, squirt bottles, paintbrushes or sponges. Droplet size can be controlled to keep spray drift to a minimum. Herbicides can either be sprayed over the entire plant when fully grown or applied to cut stumps immediately following a cutting operation to prevent re-sprouting.

To reduce the amount of herbicide use, spraying can be limited to areas where mowing is deemed unsafe or difficult. Using mowing equipment near roadways with higher speeds and traffic volume can put both motorists and maintenance personnel in danger. Herbicides are often used around guardrails and signs where mowers cannot reach.

"To date, there is no environmentally, economically feasible and safe right of way management program that eliminates the use of herbicides altogether. In particular, guardrails, medians and traffic islands on high-speed, high-volume roads present conditions unsafe for personnel hand-cutting operations." **MASS HIGHWAY Vegetation Management Plan 2003-2007**

Controlled Burning

Fire is a natural and essential part of ecology and controlled burning is an increasingly accepted practice used to manage natural areas such as prairie, oak savanna, wetlands and oak woodlands. Rights of way contain important remnant native grasslands, best managed through a strong fire regime.

Prescribed burns offer numerous ecological and cultural benefits, such as:

- Controlling weeds and woody invasive species
- Stimulating seed generation and growth of many native plants
- Removing thatch and heavy accumulation of leaf litter
- Recycling nutrients
- Warming the soil and giving warm-season plants an earlier start
- Control biting and disease carrying insect populations

To bee or not to bee: Roadside Management for Pollinators

Roadside restoration creates valuable refugia for bees and other pollinators. Marginal linear habitats (roadsides, crop margins) may provide valuable habitat for bees by supplying foraging and nesting opportunities in landscapes in which resources are otherwise scarce. Recent trends in roadside management practices—reduced use of pesticides, altered mowing regimes, reseeding with native prairie plants and abundant floral resources—are providing potential sites for ground-nesting bees (Hopwood, 2006).

Tree Maintenance

Trees, shrubs and other woody vegetation found in rights of way are often pruned, trimmed, burned or sprayed with herbicides to maintain sight distances for drivers, to widen roadway clearance, improve visibility of signage or to protect utilities and adjacent property from falling limbs. In colder climates, thick shrubs contribute to snow drifting on roads and trees can shade the road surface, reducing the amount of sunlight needed to melt ice on roads. "Brush control" involves mechanical mowing, trimming, spraying and removal.

YOU MAKE THE CALL: KILLER TREES?

Trees have become unwelcome residents on roadsides. In the name of safety and in fear of lawsuits, maintenance divisions often remove everything taller than grass from roadsides. Many communities have had to fight to preserve trees as historic and scenic resources during the construction and reconstruction of highways. Meanwhile, transportation agencies continue waging war on what they consider "killer trees," removing any tree larger than four inches in diameter from the rights of way.

The American Association of State Highway and Transportation Official's (AASHTO) Strategic Highway Safety Plan, Goal 15 is *Keeping Vehicles on the Roadway,* and Goal 16 is *Minimizing the Consequences of Leaving the Road.* Subsequently, three emphasis areas evolved from these two goals:
-Run-off-road crashes
-Head-on crashes and
-Crashes with trees in hazardous locations.

According to Ohio Department of Transportation's design guidelines, "While it is a policy within ODOT to increase the amount of aesthetics on the state highway system, and these guidelines attempt to encourage that end, it cannot be understated: trees are proven killers when placed by the roadside."

What is the risk of a tree accident? The U.S. accident count is about 6 billion annually, and more than 43,000 people die on roads each year. About 80 percent of accidents are car-to-car collisions, while collisions with roadside fixed objects (including trees) account for about 10 percent of these accidents. Of those, collisions with poles and signs (2.1 percent) outnumber tree crashes (1.9 percent).

Design guidelines and standards for safe roadside design should take into account the full range of tree benefits. Tree-lined streets have been shown to calm traffic, reduce motorist stress, reduce accidents, boost pedestrian use and increase shopping. Context Sensitive Design (CSD) encourages transportation designers to regard the AASHTO "Green Book" as a set of design guidelines rather than as standards.

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University of Washington,
College of Forest Resources
Study reports and information at:
www.cfr.washington.edu/research.envmind/transportation.html

INTEGRATED ROADSIDE VEGETATION MANAGEMENT PROGRAMS

Sometimes being cheap and lazy really pays off. In searching for ways to cut costs and save time, maintenance departments discovered that Mother Nature just might be onto something. By preventing disturbance in the first place, self-sustaining native plant communities can naturally discourage the establishment of unwanted plant species. This new philosophy came to be known as Integrated Vegetation Management or Integrated Roadside Vegetation Management (IRVM). The approach employs manual activities, mechanical tools and chemical applications combined with cultural and biological methods to develop a vegetation community that requires minimal maintenance and benefits wildlife and its habitat.

If your transportation agency has not yet adopted an IRVM plan, encourage them to do so. Explain the benefits to them, to citizens and to wildlife. Ask how you or your organization can help them achieve this goal. Perhaps you can lobby for additional funding or send letters of encouragement to leadership. AASHTO's Center for Environmental Excellence has guidance for IRVM planning and implementation.

–Not all IRVM plans are created equally. Does yours adequately and appropriately incorporate conservation? If not, suggest improvements.

INVASIVE SPECIES

Invasive species are like the in-laws of vegetation. They're somehow related, but they're irritating, they move in where they're not wanted and they're almost impossible to uproot. Our rights of way have been inundated with non-native species—mostly by accident, some times by design, and often in well-intentioned but harmful attempts to "beautify" the roadside. Because they disturb natural habitats, road systems can facilitate the spread of plant and animal species. Roads transport "hitchhiker" seeds and make it easier for foreigners to lay roots by disturbing the ground or importing soil that holds water. Invasives also sneak in via mulches, seed mixes, contaminated soils and construction equipment. A recent study by the University of California at Davis and the U.S. Geological Survey found that invasive species were more likely to be found near roads and that their spread was wider with each improvement to the roadway, such as grading and paving (Gelbard, 2003).

The real problem with roadside invasives is they don't stay on the roadside—hence the name. They invade adjacent properties, wreaking havoc on agriculture and habitat. Introduced species are a significant threat to biodiversity, contributing to the decline of 42 percent of U.S. endangered and threatened species. At least

three of the 24 known extinctions of species listed under the Endangered Species Act were wholly or partially caused by hybridization between closely related exotic and native species. Invasive species degrade habitats and threaten natives through predation, disease, competition and hybridization (Schmitz, 1997).

Roadside maintenance is the domain of state transportation agencies with very little federal oversight. However, because invasive species have gone from a nuisance to a very expensive ecological crisis, Congress considered measures to address the use of invasives in roadside vegetation management in crafting SAFETEA-LU. Bowing to pressure from the seed industry and property rights advocates, Congress fell short of naming or defining invasive species in the bill. Early drafts of the bill included restrictions on the use of invasives on roadsides that drew fire from the seed industry that objects to any restrictions on what their clients (like transportation agencies) can purchase. Private property advocates saw the draft provision as a threat to their right to use or own non-native species on privately owned land. Together, they successfully defeated the provision. In the final bill, SAFETEA-LU contained a provision that makes transportation funds available to control "noxious weeds" and establish native vegetation as part of any transportation project.

SAFETEA-LU allows transportation funds to be used for "establishment of plants selected by state and local transportation authorities to perform one or more of the following functions: abatement of stormwater runoff, stabilization of soil, and aesthetic enhancement," and "management of plants which impair or impede the establishment, maintenance, or safe use of a transportation system."

In 1999, President Bill Clinton signed Executive Order 13112 "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause." Soon after, FHWA developed a framework for preventing the introduction of new invasives on rights of way and controlling those invasives that already existed.

Encourage your transportation agencies to provide additional training in removing invasive species and re-establishing native flora on rights of way for maintenance crews, contractors and landowners. Offer logistical support for training including use of facilities or providing copies of training documents.

–Partner with your transportation agency on a pilot project to remove and prevent roadside invasives and to restore native species.

YOU MAKE THE CALL: ARE ROADSIDES CONSIDERED HABITAT?

Rights of way have traditionally been managed for safety and aesthetics, with little or no consideration for wildlife. Recent trends in roadside vegetation management can restore and create habitat for wildlife. But is creating habitat adjacent to roads and highways a good idea? Some people believe that we can't afford to overlook the potential for 17 million acres of land. In highly disturbed landscapes, the roadsides may hold the last remaining vestiges of important ecosystems such as prairies. On the other side, many biologists argue that creating habitat near roads can do more harm than good. Animals near roadsides are exposed to pollutants, increased predation and human interaction and are more likely to be involved in vehicle collisions

YES

Roadsides if managed properly can provide habitat for various wildlife species. Development of these areas is relatively inexpensive and requires very little maintenance. Wild turkeys will use these areas for nesting, brood rearing and foraging. Deer will be attracted to the increase in forage production. To further enhance and diversify roadsides, food plots and mast-producing trees can be planted along portions of the roads.
Roadside Management For Wildlife
Claude Jenkins, Wildlife Biologist Alabama Wildlife Federation

"Wildlife benefits are not the primary goal of roadside vegetation but they could be," according to Leslie Ries of Northern Arizona University. Restoring prairie along roads has great conservation potential. Iowa alone has more than 600,000 acres of roadside vegetation and there are millions more nationwide.
Retrieved from:
http://www.eurekalert.org/pub_releases/1999-06/SfCB-Btir-280699.php

NO

"Roadsides are death traps," says Ron Mumme of the Department of Biology at Allegheny College in Meadville, Pennsylvania. Florida scrub jays that nest along a highway die in greater numbers than they reproduce. Three times as many fledglings die on road territories than on non-road territories. "I think the best of the politically acceptable alternatives would be, oddly enough, clearing all vegetation of the right of way and keeping it mowed," says Mumme.
Journal of Conservation Biology, April 2000

"Although roadsides provide some benefits to some species, those benefits must be balanced against ecological effects of roadsides. For example, in Banff National Park, the increased habitat quality for bears along roads must be weighed against the increased probabilities of bears being road killed or (as threats to visitors) removed from the park."
Richard T.T. Forman, et al
Road Ecology: Science and Solutions, page 129

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http://www.nrvma.org/

INVASIVE SPECIES

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AQUATIC RESOURCES

Roads and water don't mix. Period. In fact, the history of road building can be told as a battle between roads and water. Our early dirt roads were no match for water; a good rain could reduce them to mud pits or wash them out altogether. Water was clearly winning the war. But eventually, roads gained the upper hand with the advent of pavement. Networks of paved roads increased the amount of impervious surfaces, disrupting the natural flow and circulation of water. But water does not give up so easily. Groundwater strikes back by destabilizing roadbeds from below and ice uses freeze-thaw cycles to deteriorate road surfaces. In counter-attacks, roads choke streams, block fish passage and deliver harmful pollutants into watersheds. Not to be outdone, water attacks roads with flooding, erosion and landslides. It's a classic man vs. nature struggle and both sides are losing the battle. Our aquatic resources are severely degraded by roads and roads continue to take a beating from water. With advances in science and technology, transportation agencies plan, design, build and maintain roads with water in mind. This chapter examines the many ways transportation agencies protect roads from water and vice versa.

ROADS vs.	WATER
Disrupt natural flow and circulation	Flooding
Affect material transportation	Destroy bridges and culverts
Cause sedimentation	Erosion
Transport pollution	Landslides
Block absorption in soil with impervious surfaces	Deteriorate road surface with freeze-thaw cycle
Choke off fish passage	Destabilize roadbed by discharging groundwater
Accelerate water flow	

IMPACT OF ROADS ON AQUATIC ECOSYSTEMS

- Loss or degradation of habitat
- Erosion and sedimentation
- Stormwater runoff contamination
- Altered hydrology—pooling, scouring, excessive velocity and turbulence
- Restricted passage of debris and deflectors
- Impeded movement of animals
- Disruption, fragmentation and isolation of populations
- Reduced access to vital habitats
- Altered abundance and diversity of aquatic organisms (Jackson, 2003):

BRIDGES AND CULVERTS

There are only three ways that roads cross water—they either bridge over the water or they go through it, and in a few urban settings, roads are tunneled under water. In many places, entire streams have been moved to make room for a road. The most common methods of crossing streams and rivers are bridges, culverts and fords. Bridges are more expensive to build and maintain, but are considered the least detrimental to the surrounding aquatic ecosystem.

Rather than spanning over the natural flow of rivers and streams, many roads are built through the water and culverts are put in place to allow for water flow. Culverts are less expensive so are used whenever conditions permit. Fords are generally only used as temporary measures during construction.

Bridges

Bridges come in all shapes and sizes and have been built to cross over water bodies as small as a meander and as large as an ocean channel. There are four main types of bridges: beam bridges, cantilever bridges, arch bridges and suspension bridges. Because of the expense, bridges are generally considered an option only over wider streams and rivers, or if water is too deep to accommodate culverts. Though not totally benign, bridges are considered the most ecologically sensitive method for roads to cross streams and rivers. In some regions, bridges serve as habitat for certain migratory birds and bats. Aesthetically, bridges can also be the distinguishing feature in a landscape; contributing to the scenic and cultural value of the community.

There are no minimum size standards for bridges. When deciding between a bridge and a culvert, designers and engineers consider cost, topography, navigation and the presence/absence of endangered species. When designing a bridge, engineers consider the following factors:

- Length of the span (How long is it from one side to the other?)
- Width of the deck (How many lanes will it support?)
- Functional classification
- Average daily traffic volume
- Vehicle weight and size
- Scale
- Surroundings and context
- Topography
- Weather
- Cost

There are 591,707 bridges more than 20 feet in length located on public roads in the United States, carrying nearly four billion vehicles per day. Bridges provide special opportunities for wildlife habitat connectivity. Riverine systems serve as movement corridors and habitat linkages for many species of terrestrial wildlife, and they provide essential habitat functions in and of themselves. Bridges are often built to span the water but not the adjacent land, thwarting any attempts by terrestrial species to pass below them. The movement and flow of the water continues, yet the movement and flow of the terrestrial animal community along the riverbanks is abruptly constricted. When bridges are being replaced or rehabilitated, they should be extended to span enough unsubmerged land to provide habitat and a movement corridor for terrestrial wildlife. Lengthening existing bridge spans also costs far less than building separate wildlife crossings under existing roadways.

Survey the bridges in your area of interest. Do they span beyond the water's edge to allow terrestrial wildlife species to use them as crossings? Contact the bridge division in your state transportation agency and ask about the status of the bridges. Ask if, and when, they plan to replace the bridges. Suggest they consider building a wider span to allow for terrestrial passage.

Pile driving, Bioacoustics and Barotrauma

Bridges are often built on concrete or steel foundations driven into the surface with pile drivers. The noise (bioacoustics) and sound impulses (barotrauma) generated from pile driving have profoundly adverse effects on fish, marine mammals and diving sea birds. Fish kills, disruption of foraging behavior and altered migratory patterns are among the documented concerns.

Because pile driving impacts endangered salmon, the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration Fisheries have implemented terms and conditions for pile driving. Transportation agencies are experimenting with cofferdams and bubble curtains to reduce impacts of pile driving on aquatic species.

Culverts

Because culverts are less expensive to build and maintain than bridges, they are the preferred method of crossing water when conditions permit. Culverts are designed with the principal objective of moving water under a road alignment; they are not intended to simulate a natural waterway or provide habitat for aquatic organisms. In fact, streams are often straightened and deepened near a culvert to increase water flow speed so the culvert can be self-cleaning. Until recently, hydrology, sediment

transport, movement of woody debris, and fish and wildlife passage were given little consideration. As a result, more than half of the culverts assessed on U.S. Forest Service and Bureau of Land Management (BLM) lands in Oregon and Washington are considered barriers to juvenile salmonid fish passage (U.S. Government Accountability Office, 2001).

From a conservation perspective, all water crossing are not created equal. The ecological hierarchy of preferable structure types is as follows:

1. Bridge (with no approach embankment into the main channel)
2. Streambed simulation using a bottomless arch or embedded culvert design
3. Streambed simulation using an embedded round metal or concrete box culvert design
4. Nonembedded culvert, placed at less than 0.5 percent slope
5. Baffled culvert (various designs); placed at 0.5 percent to 12 percent slope or a structure with a fishway.

Survey the culverts in your area of interest. Are they functional? If not, contact your transportation agency and ask if, and when, they plan to retrofit the culverts for fish and aquatic organism passage.

FISH PASSAGE

We've all pondered the question, "Why did the chicken cross the road?" But have you ever thought about how a fish crosses a road? According to the U.S. Fish and Wildlife Service, an estimated 2.5 million culverts, dikes and dams exist throughout the country. All of them, from small culverts to massive dams have altered the features and hydrology of our waterways, blocking the migration of fish and other aquatic organisms. The issue of fish passage is certainly much larger than just transportation—many wildlife and resource organizations are working to restore adequate fish passage where it has been lost. For its part, the transportation sector has recently begun accepting responsibility and taking action.

Suboptimal culverts have taken their toll on migratory fish in rivers and streams. High water velocity, shallow water depth within culverts, excessive vertical drop at the culvert outlet, and debris blockages are the most common causes of fish passage problems at culverts. Fisheries have always been important economic and recreational resources, and some species (salmonids) are now federally listed as threatened or endangered, bringing a sharper focus to the issue of fish passage for migratory species. Transportation agencies are now spending a considerable amount of time and money undoing the damage created by a century of poorly designed culverts, while also creating better design standards for new and replacement culverts.

To assist fish passage, transportation agencies can make the following modifications to existing culverts:

- Increase culvert size to decrease water velocity.
- Use a different shape culvert to accommodate fish passage.
- Lower the invert level to allow natural substrate on the culvert bottom.
- Increase "roughness" within culverts to slow water velocity.
- Install gradient controls or "resting areas" upstream and downstream of culverts.

For new structures, the following culvert designs are used to reduce the impacts to fish passage:

- Active Channel Design Method uses a culvert size large enough and embedded deep enough into the channel to allow the natural movement of debris and formation of a stable bed inside the culvert.
- Stream Simulation Design Method uses bottomless culverts placed over a natural streambed, and makes them wide enough to include banks on either side. By not restricting flow, this method mimics the natural stream processes within a culvert.
- Hydraulic Design Method tailors the hydraulic performance of the culvert to the swimming abilities of target species of fish.

SAFETEA-LU provides $10 million per year to the U.S. Forest Service to "pay the costs of facilitating the passage of aquatic species beneath roads in the National Forest System, including the costs of constructing, maintaining, replacing, or removing culverts and bridges, as appropriate."

HALL OF FAME: MAINE DEPARTMENT OF TRANSPORTATION'S FISH PASSAGE POLICY AND DESIGN GUIDE

Maine DOT issued guidance in 2002 that established a policy, process and design guide for fish passage on all projects with bridges, culverts, pipes or pipe arches. The guidance was developed in coordination with resource agencies and established a clear protocol for addressing fish passage.

STREAMBANK STABILIZATION: RIPRAP

Wherever you see bridges and culverts, you're sure to see the dreaded riprap: a permanent cover of rocks intended to control erosion, stabilize streambanks and protect them from high velocity water flow. This streambank stabilization process requires heavy equipment to clear vegetation and smooth the banks before a blanket of boulders is poured onto the slope—a process that is

also called "armoring." The large, jagged rocks used for riprap slow down the flow of stormwater runoff, reducing streambank cutting and decreasing sediment loads. Riprap can be fieldstone, quarry stone, scree or broken concrete. Complex mathematical formulas are used to determine stone size and feature dimensions. If stones are not available or are too expensive, fabricated alternatives can be used, such as articulated concrete block mats. To prevent water from removing underlying soil, a layer of geotextile or a stone filter must be placed beneath the riprap. The use of riprap is limited by steepness of slope; slopes steeper than 2:1 tend to lose l riprap to erosion and sliding.

IMPACTS OF STABILIZATION MEASURES

1. Hinder morphologic evolution–the natural changes in stream characteristics, energy processes and riparian succession that occur in healthy stream and riparian ecosystems.
2. Alters the hydrologic balance of a river by changing resistance, altering channel geometry and modifying water exchange and hydrodynamic character.
3. Reduce or eliminates sediment yield and tends to generate local scour, usually at the toe or immediately downstream.
4. Alter the channel geometry, flow field, riparian vegetation conditions and a host of other habitat elements, creating preferential habitat for some organisms at the expense of others.
5. Impact chemical and biological processes provided by natural stream channels and their associated riparian zones, such as soil and water quality, nutrient cycles and source and sink areas for maintaining population equilibrium of some plant and animal species.

Effects of Riprap on Riverine and Riparian Ecosystems
U.S. Army Corps of Engineers

Did You Know? Water flowing at the rate of two feet per second can move a cobblestone weighing half a pound, but an increase in velocity to 10 feet per second can move a rock that weighs 150 pounds (Ohio Department of Natural Resources, 2007).

What's wrong with Riprap?

Make no mistake, most stabilization measures are intended to protect the built environment from the natural environment, not the other way around. Healthy aquatic systems *are* dynamic and unstable, wrought with erosion, deposition, flooding and drought. In a natural state, rivers will regularly overflow banks to move within the floodplain, creating new channels, distributing seeds and stems, leaving behind ghost channels, wetlands and oxbows that nourish a variety of species. It's an incredibly complex system. But confined, the river has only two places to go: scour down its own channel or deliver the water faster downstream. The floodplain loses connectivity to the river itself; becoming smaller and drier as wetlands disappear and side channels go dry.

Stabilization measures have been used in the United States for more than a century now, largely unregulated and without recognition of potential ecological impacts. Consequently, thousands of miles of stream have been stabilized with riprap and the cumulative impact to our aquatic ecosystems has yet to be calculated or mitigated. Moratoriums on the use of riprap have been pursued by the National Marine Fisheries Service, the U.S. Fish and Wildlife Service and some state departments of environmental quality.

"Soft" techniques, like the use of trees and rootwads, provide a good alternative to riprap by helping to slow the erosion rather than stop it completely. The challenge is to successfully stabilize the streambank without significant impacts to the natural functions of the river itself.

"It is yet another of the paradoxes of living in the modern West. We move to places like…Montana, drawn by the lure of a wild river. We build our homes close to what we love. But for us to stay there, through year after year of spring flood, the river must be controlled. And a river like the Yellowstone, like any force of wild nature, cannot be controlled and remain that which attracted us, and thousands of others, in the first place." **Wild Rivers and Riprap: The Case of the Yellowstone Hal Herring**

Survey the streambank stabilization measures used in your area of interest. Is riprap the primary measure used? Contact the appropriate authority and suggest the less harmful alternatives listed in this chapter. Volunteer your organization to help remove the old riprap and replace it with less harmful alternatives.
-Check on the land use or zoning restrictions in floodplains and riverbanks. Support restrictions on development in floodplains that lead to riprap and other habitat alterations used to protect human structures from natural processes.

STORMWATER RUNOFF

What goes up must come down, but where does all that water go? Water from rain or melting snow that enters waterways rather than soaking into the ground is called stormwater runoff. Impervious surfaces like roads and parking lots decrease the amount of water absorbed by the ground and increase the amount and velocity of stormwater runoff that is directed into storm drains that carry the water far from its place of origin. As stormwater flows, it collects and transports debris, chemicals, sediment, excess nutrients, pathogens and other pollutants into either a storm sewer system or directly into streams, lakes, wetlands or coastal water. Untreated, polluted stormwater threatens drinking water supplies for humans and degrades aquatic habitat for fish and wildlife. Nonpoint source pollution accounts for 80 percent of the degradation of waters in the United States (Smoot, 1997).

Federal environmental regulations under on the Clean Water Act require the control of pollutants from municipal separate storm sewer systems, construction sites and industrial activities. Contaminants come from a variety of origins called point and nonpoint sources. Stormwater runoff and discharge can be both point and nonpoint sources, so transportation agencies must go through the general permit process of the Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES). Also, each state has an environmental agency with water quality oversight (often called the Department of Environmental Quality) and state health departments oversee drinking water issues. In addition, state wildlife agencies have jurisdiction over water quality issues relating to aquatic ecosystems.

As such, addressing stormwater runoff is serious business for transportation agencies. Almost every state transportation agency has developed guidance and uses best management practices (BMPs) on stormwater management, and many states have sophisticated programs with full-time staff devoted to addressing stormwater issues. California has four department-wide Stormwater Advisory Teams or SWATs to evaluate new and improved BMPs and to develop procedures and guidance for implementing their statewide stormwater management plan. All districts have designated NPDES Storm Water Coordinators to facilitate implementation of a Storm Water Management Program.

The most common contaminants in highway runoff are heavy metals, inorganic salts, aromatic hydrocarbons and suspended solids that accumulate on the road surface. Salting and sanding practices leave chloride, sodium and calcium on the roadway surface. Our cars leave behind grease, rust, hydrocarbons, rubber particles and other solid materials. These materials are often washed off the highway during rain or snow storm events.

Stormwater BMPs can be incorporated into the planning, design and construction of new projects or reconstruction of existing facilities. In planning and design, the project engineer can consider proactive, technology-based, nontreatment controls to reduce pollutant discharges. Stormwater run-on at the project site can be calculated using the peak flow rate, runoff velocities and erosive characteristics of the soils in the area, so that appropriate control measures can be implemented.

"Highway runoff is generally not harmful."
Federal Highway Administration

Contact your transportation agency and ask if they are currently using stormwater best management practices.

Roads are built in such a way to direct stormwater from the roadway surface into drainage systems within or adjacent to the right of way. Drainage systems discharge either to municipal drain systems or directly into receiving waters such as creeks, streams, lakes, estuaries, wetlands and coastal waters. To minimize adverse impacts of highway runoff, transportation agencies can take measures to clean the water as it comes off the roadway surface and before it reaches creeks and streams and other receiving waters. Structural measures such as filtering systems and porous pavements trap runoff until the contaminants settle out or are filtered through the underlying soils. Detention/retention ponds and wetlands are used to temporarily store runoff and remove contaminants but are considered expensive and require annual maintenance. Vegetated swales are wide, shallow ditches with thick vegetation designed to trap pollutants and slow the flow of stormwater. Nonstructural measures such as street sweeping and vegetated buffers control contaminants at the source and reduce the pollution concentration in runoff.

SAFETEA-LU includes funding eligibility for environmental restoration and pollution abatement, including retrofitting and construction of stormwater treatment systems.

DEICING SALT

If you have ever had to drive in snow or icy conditions, you may welcome the sight of the salt trucks. But that excess salt is not welcome in the surrounding environment. Transportation agencies use salt and other chemicals to melt snow and ice on roadways either prior to storms (anti-icing) or after storms (de-icing) to melt ice. The two most commonly applied salts are sodium chloride (NaCl, rock salt) and calcium chloride (CaCl2), which are often mixed with abrasives like sand, ash or sawdust to improve traction. Deicing chemicals are often combined with other substances to prevent caking and inhibit corrosion. Calcium chloride is more effective at melting ice but sodium chloride is more widely used because it costs less.

Did You Know? Deicing chemicals work by lowering the freezing point of water. A 23.3 percent concentration of salt water freezes at minus 6 F, while a 29.8 percent solution of calcium chloride freezes at minus 67 F.

What's wrong with salt?

Ironically, the salt used to protect motorists from hazardous driving conditions is the very substance that rusts automobiles and corrodes the rebar used to reinforce concrete bridges. Salt also wreaks havoc on the surrounding environment, including aquatic ecosystems.

Salt is highly soluble and quickly washes from the road surface to the roadside where it eventually finds either groundwater or surface water. Increased salinity can have a detrimental effect on drinking water supplies in reservoirs and aquifers and on wildlife.

Beyond the salt itself, the additives have detrimental impacts as well. Sodium ferrocyanide, added to prevent caking, releases cyanide ions that are extremely toxic to fish. Rust inhibitors contain phosphorus compounds that stimulate the growth of undesirable aquatic plants, weeds and algae in freshwater lakes. Abrasives (sand, cinders, gravel and sawdust) can accumulate along roadways and clog stormwater inlets and sewers. And all these materials may wash downstream and end up in streams and lakes.

Contact your transportation agency and ask what kind of deicing chemicals they use and how much they use. Suggest less harmful alternatives. Volunteer your organization to help plant a living snow fence.

SALT ALTERNATIVES

Transportation agencies are getting the message: Road salt is costly. Some communities use salt only in ice-related emergencies and adjust spreading equipment so less salt is used. Trees can be planted to establish a "living snow fence," to keep snow from blowing onto the road. In Minnesota, farmers leave corn stalks standing through the winter in fields along the highway to hold blowing snow. Other proposed methods to remove snow include the use of external melting systems, pavement that stores solar energy for melting, and improved tire/vehicle design.

The most common chemical alternatives are calcium magnesium acetate (CMA) and potassium acetate (KAc). Verglimit is a mixture of deicing chemicals that are bonded with asphalt during paving, allowing very little runoff and maintaining effectiveness even in very cold temperatures. Unfortunately, these alternatives are often deemed cost prohibitive. CMA is approximately 20 times more expensive than salt and Verglimit installation doubles the cost of surfacing a road.

Some reports have estimated that the damage to automobiles done by salt ranges from six to 30 times the initial cost of the salt, with 90 percent of the damage due to corrosion. With the corrosive damage to bridges, highways and vehicles factored in, one study concluded that the actual cost of salt may be close to $775/ton.
Michigan Department of Environmental Quality

IN THE NEWS: STUDY: SALT IN NORTHEAST STREAMS SHOWS SHARP INCREASE

(AP) WASHINGTON, Sept. 5, 2005 The amount of salt dissolved in streams in the Northeast is rising and chemicals used to clear snow and ice from the roads are being blamed. "We're basically hardening the watersheds and feeding them a high-salt diet. There is a direct connection between the number of driveways and parking lots we have and the quality of our water," said Sujay Kaushal of the University of Maryland Center for Environmental Science in Frostburg, Maryland.

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http://onlinepubs.trb.org/onlinepubs/sr/sr235/00i-012.pdf

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http://www.dnr.state.oh.us/water/pubs/fs_st/stfs16.htm

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AQUATIC RESOURCES

BRIDGES

Bridge and Road Construction Guidelines for Wetland and Riparian Areas New Mexico Department of Game and Fish
http://www.wildlife.state.nm.us/conservation/habitat_handbook/documents/BridgeandRoadConstructionGuidelines.pdf

TRB Committee AFH40: Construction of Bridges and Structures
http://www.trb.org/directory/comm_detail.asp?id=1406

CULVERTS_AND FISH PASSAGE

USFWS National Fish Passage Program
http://www.fws.gov/fisheries/FWSMA/FishPassage/
http://library.fws.gov/Pubs9/fishpassage.pdf

USFS National Inventory and Assessment Procedure For Identifying Barriers to Aquatic Organism Passage at Road-Stream Crossings
http://www.stream.fs.fed.us/publications/PDFs/NIAP.pdf
http://www.stream.fs.fed.us/fishxing/index.html

USGAO *Restoring Fish Passage Through Culverts on Forest Service and BLM Lands in Oregon and Washington Could Take Decades*
http://www.gao.gov/new.items/d02136.pdf

Washington State Highway System Fish Passage Program
http://www.wsdot.wa.gov/environment/fishpass/state_highways.htm

RIPRAP

Effects of Riprap on Riverine and Riparian Ecosystems
J. Craig Fischenich, U.S. Army Engineer Research and Development Center
http://el.erdc.usace.army.mil/wrap/pdf/trel03-4.pdf

Michigan Department of Environmental Quality, Riprap Fact Sheet
http://www.deq.state.mi.us/documents/deq-swq-nps-rip.pdf

Mats, Concrete, Blocks and Rocks: The Lowdown on Riprap
http://www.forester.net/ecm_0207_mats.html

STORMWATER

EPA, National Pollutant Discharge Elimination System (NPDES)
http://cfpub1.epa.gov/npdes/home.cfm?program_id=6
VII. Management Measure for Roads, Highways, and Bridges
http://www.epa.gov/OWOW/NPS/MMGI/Chapter4/ch4-7a.html

American Rivers Stormwater Systems Toolkit
http://www.americanrivers.org/site/PageServer?pagename=AMR_content_39bf

Alternative Practices to Manage Highway Runoff, Webcast Series – Resources and Links
The Izaak Walton League of America
http://www.iwla.org/index.php?id=223

Is Highway Runoff a Serious Problem?
http://www.tfhrc.gov/hnr20/runoff/runoff.htm

CalTrans Stormwater Management Plan
http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-008.pdf

NCHRP 25-30 Temporary Bridging to Avoid or Minimize Impacts to Waters and Wetlands During Highway Construction
http://www.trb.org/trbnet/projectdisplay.asp?projectid=765

DEICING SALT

De-Icing Salt is here to stay, but can be used more wisely
Todd Paddock and Cynthia Lister, Academy of Natural Sciences
http://www.saltinstitute.org/nas.html

Using Salt and Sand for Winter Road Maintenance
Wisconsin Transportation Bulletin No. 6: Using Salt and Sand for Winter Road Maintenance
http://www.usroads.com/journals/p/rmj/9712/rm971202.htm

Michigan Department of Environmental Quality, Winter Road Management
http://www.deq.state.mi.us/documents/deq-swq-nps-wrm.pdf

Advocacy

Your most valuable tool for advocacy is knowledge. Now that you have a better understanding of how highways happen, this chapter compiles some good advice on how to put your newfound knowledge to work. If you find yourself in a situation where it is no longer appropriate to chain yourself to a tree, this information will help.

ADVOCACY

If you've taken the initiative to read this guide, I don't have to convince you that this is a worthwhile issue for you, your organization or your community. Whether you are currently embroiled in a highway fight or just—wisely—trying to prevent one, there are certain steps you can take to prepare yourself.

- Reading this guide is an important first step—you're already on your way! Now find a place on your desk for it and keep it handy.
- Download or request copies of your state's long-range transportation plan and statewide transportation improvement program. If you live in a metropolitan area, obtain copies of your MPO plans as well. Request they put you on their mailing list.
- Learn the organizational structure of your state's transportation agency. Does it have a commission? What authority do they have? Do you have local or county transportation agencies too? How do they all interact? Does the governor run the show?
- Download or request a copy of your State Wildlife Action Plan. Contact the implementation coordinator and ask to be put on their mailing list.
- Take an inventory of public and protected resources in your area of interest (historic, natural, cultural, etc.). Read up on your forest, refuge and park plans and get on their mailing lists.
- Get to know your local land use planning and zoning policies. Do you have growth management? Do you have a town plan? Does it say anything about roads?
- Check state law for transportation related law that would help or hurt your cause. How much is the gas tax in your state and where does the money go?
- Bookmark your transportation agencies' and MPO's websites.
- Make a list of your elected officials. Find out if any of them serve on transportation related committees either in your state legislature or Congress.
- Make a list of other non-governmental organizations that share your values. Meet with these allies.
- Sign up for the Wildlife, Fisheries and Transportation listserv http://www.itre.ncsu.edu/CTE/gateway/WFTlistserv.asp
- Sign up for the Federal Register *http://listserv.access.gpo.gov/*.

CASE STUDY: IT TAKES A VILLAGE

When the Vermont Agency of Transportation (VTrans) proposed a bridge replacement project in the small village of Tunbridge, citizens and public officials rallied together. The project was unnecessarily large and out of scale for a small village setting. They spent a year negotiating with VTrans and eventually agreed on a modified and improved project design. Following the victory, citizen Jim Wick wrote, "*A State Highway Project in Your Town?: A Primer for Citizens and Public Officials*." In this publication, Mr. Wick shares some of his wisdom as a veteran road warrior:

1. Build local support and be ready to do some work.
2. Build the discussion early.
3. Make a clear, simple case.
4. Get expert help (free).
5. Keep aware of project status.
6. Participate actively in the scoping process.
7. Influence your local regional Transportation Advisory Committee.
8. Attend hearings.
9. Obtain support from your legislative delegation.
10. Influence the Transportation Board.
11. Address transportation issues in your Town Plan.
12. Talk to your state wildlife or natural resources agency.
13. Identify historic resources on or near the project site.
14. Question the need for the project:
    a. Gather data (traffic counts, accident records, sufficiency ratings, growth projections, freight needs, scenic/natural/historic features, tourism and recreation).
    b. Insist on documentation.
    c. Ask if the project will improve safety. Will it reduce safety elsewhere?
    d. Offer alternative suggestions.
15. Do the project yourself.
16. Vote the project down.
17. Appeal to the National Advisory Council on Historic Preservation.
18. Mediate.
19. If all else fails, litigate.

If you are preparing your own campaign to stop or significantly improve a road project in your state or area of interest, use our handy "Watchdog Worksheet" at the end of this chapter to organize your information, resources and activities.

WORKING WITH COALITIONS

"Americans are a peculiar people…If, in a local community, a citizen becomes aware of a human need that is not met, he thereupon discusses the situation with his neighbors. Suddenly a committee comes into existence. The committee thereupon begins to operate on behalf of the need, and a new community function is established. It is like watching a miracle." **Alexis de Tocqueville, 1840**

It's true; there is strength in numbers. The conflict between wildlife and transportation is so complex and so very daunting, no single citizen, group or interest can tackle it alone. Any worthwhile and successful attempt to make progress will require many and diverse interests. Coalitions harness the resources of member organizations to achieve common goals. Together, you can avoid duplication of effort and multiply your power. Don't go it alone—conservationists unite!

Before forming a coalition, do some research and find if another organization is already in place. You may find that joining and revitalizing an existing effort is more effective than starting from scratch. Also keep in mind that a coalition need not be a formal affair; informal alliances can be just as effective without additional layers of bureaucracy.

The TransWild Allianace

And speaking of coalitions, a handful of conservation organizations currently working on wildlife and transportation issues across the country established the TransWild Alliance in 2005. Conservation advocates have been struggling with the impacts of poorly planned highways for decades. Yet this issue is still new to the field of conservation, and many organizations have had difficulty learning and navigating the complicated world of transportation. With limited resources—staff, time and money—we have needed to partner with each other to affect change on Capitol Hill and on the ground. Together, we have developed an informal alliance among conservation organizations striving to influence transportation projects and policy and reduce impacts on wildlife. For our part, Defenders of Wildlife hopes to secure funding to develop support and networking tools necessary to formalize and strengthen the alliance.

COMING SOON!
http://www.TransWildAlliance.org

FINDING PARTNERS

As a conservation advocate, you are almost certainly familiar with coalitions and probably a member of several. Conservation coalitions generally form around a particular region, resource, species, subject area, project or threat. Those of us who work on wildlife and transportation issues often find ourselves addressing all of the above at once. A highway project may pose a threat to a region that is home to precious resources, such as rivers or a national forest, and imperiled species—such as grizzly or salmon.

Highways touch everyone's lives though–not just conservationists. As taxpayers, we all have a say in how our tax dollars are spent. As drivers, we seek mobility and safety. As citizens, we are invested in quality of services provided and our quality of life. We all have a stake in making the best decisions for our communities. There may be "neutral" or dormant groups who have yet to realize their ability to affect change. Some potential partners may be:

- Recreation enthusiasts (hiking, biking, climbing, birding, hunting/fishing)
- Citizen groups (Lions Club, Girl/Boy Scouts)
- Friends of refuge groups
- 1000 Friends groups
- Neighborhood associations
- Wildlife rescue/rehabilitators
- Highway safety proponents
- Species-specific protection or appreciation groups (Rocky Mountain Elk Foundation)
- Ecosystem-specific protection or appreciation groups (Southern Rockies Ecosystem Project)
- National and local conservation organizations (Defenders of Wildlife)
- National and local humane organizations (Humane Society of the United States)
- National and local smart growth organizations (Smart Growth America)
- Tax watchdog organizations.

Instead of asking, "Who is like us?" ask "Who wins when we win?" Don't rule out groups with different motivations.
Robin Hood Marketing

BUILD A COALITION

FORMING: Define the coalition, develop the team, identify and recruit the right members.

STORMING: Create your vision and mission statements, decide on the right structure and leadership and organize around an appropriate structure.

NORMING: Manage volunteers and activities, communicate well and run effective meetings.

PERFORMING: Prioritize activities, develop, implement and review plans.

REFORMING: Celebrate success, review your mission and goals and share leadership.

Tobacco Control Partners, 2007

COALITION HALL OF FAME

Tijeras Canyon Safe Passage Coalition

- Mission statement: *TCSPC is a group of organizations, agencies, and individuals working to provide safe crossings for wildlife and safer travel for people through Tijeras Canyon in New Mexico.*
- Coalition makeup: 25 groups, 23 citizen members
- Web address: *http://www.safepassagecoalition.org/*

I-90 Wildlife Bridges Coalition

- Mission statement: *Advocating high quality wildlife passage in the I-90 Expansion east of Snoqualmie Pass in the Cascade Mountains of Washington*
- Coalition makeup: 7 groups on the steering committee, 25 endorsing organizations, 11 endorsing businesses
- Web address: *http://www.i90wildlifebridges.org/*

Coalition for Sonoran Desert Protection

- Mission statement: *The Coalition's mission is to achieve the long-term conservation of biological diversity and ecological function of the Sonoran Desert through comprehensive land-use planning, with primary emphasis on Pima County's Sonoran Desert Conservation Plan.*
- Coalition makeup: 36 conservation and neighborhood groups, representing nearly 30,000 people
- Web address: *http://www.sonorandesert.org/*

WORKING WITH GOVERNMENT AGENCIES

"You can catch more flies with honey than with vinegar." **-Proverb**

As conservation advocates, we are accustomed to working with government agencies, but all too often as combatants, rather than allies. Perhaps more than others, the issue of wildlife conservation and transportation lends itself to working collaboratively with government agencies, at the local, state and federal level. We have all been in situations where we want to reach across those physical, political or ideological boundaries and just do *something*. When faced with an impasse, why not try a non-traditional approach? If you are fortunate enough to have positive relationships with your agencies, you understand the value of good communication. If your group has quarreled with agencies in the past, building communication and relationships may be more difficult. Extend the olive branch. They may be looking forward to mending ties with the public and just waiting for the chance.

"One of the first issues that arose was a defensive nature from the agency because they were used to being attacked by conservation organizations. They weren't prepared to sit down for brainstorming and open discussions." **Conservation advocate**

"Personally, I prefer partnerships, but our state just wants to build more and more roads and flat-out disagrees with us ideologically. While other advocates have been focused on partnerships, our role has been more adversarial." **Conservation advocate**

While oversight and opposition should remain important tools in every advocate's toolbox, here are some tips on improving your working relationship with government agencies:

1. Understand the agency's mission

Transportation agencies have an important mission—safely and efficiently moving people and goods from one place to another. Yes, they have a moral, if not legal obligation to do so in the least environmentally destructive way possible and it's our job to continue reminding them of that fact. But if we are going to be effective in *our* mission, it is in our best interest to remember *their* mission.

Keep in mind, transportation professionals are not typically conservationists. They did not study wildlife biology in college and protecting wildlife is not necessarily their priority. They studied civil engineering, traffic dynamics, physics, statistics or community planning and their priority is building infrastructure. But we all have one thing in common—none of us went to school to sit behind a desk, write memos, fill out forms or sit through endless meetings.

2. Find allies within the agencies

Just because they didn't go to school to be wildlife conservationists doesn't mean there are no transportation professionals who care about wildlife or natural resources. In fact, there is a growing cadre of trained biologists and ecologists working within transportation agencies, most of whom are working in the environmental compliance divisions. Others may be outdoorsmen, recreationists or simply conscientious citizens who recognize the devastating impacts of highways, and actively seek solutions. Depending upon the agency and their position within the agency, they may or may not be in a position to publicly vocalize their concerns. As such, they may welcome the chance to forge an alliance with a proactive group such as yours that can help them realize their ambitions. Agency allies can also be valuable sources of information on how the organization functions, who is who, where to find answers and when the best time is to act. When working with agency allies, always respect their time, position and anonymity, at their request. Finally, be sure to show gratitude and recognize their contributions.

"Many people within the transportation world care deeply about the environment and are conservation advocates themselves—from engineers to receptionists. Just because we work for a transportation agency doesn't mean we're not also conservation-minded."
State transportation agency biologist

3. Learn their language

As conservationists, we have our own language. We know a Section 7 from a Section 9, we know a BO from a CE, and we can spot a Section 404 violation from twenty paces. But do you know LOS from ADT? Do you know the shelf life of a LRTP? Probably not—but hopefully you will after reading this guide! Take time to understand some basic fundamentals of the world of transportation. Be an informed participant with credibility on the subject matter. Be prepared, consistent and articulate in all your communication with agency staff.

4. Keep lines of communication open

Throughout the course of your campaign or project, your relationship with the agency may hit an occasional snag. For instance, perhaps a draft EIS doesn't contain language that you had hoped for, essential funding fell through or maybe a negative story appears in the local paper and causes hard feelings between your group and the agency. Don't lose hope and don't let the issue fester–contact the agency as soon as possible and request a meeting. Without losing sight of your ultimate conservation goal, ask yourself if this unforeseen event will completely derail your campaign. Be honest about your disappointment, but discuss how to move forward productively.

5. Be aware of power imbalances

You may find yourself with seemingly little or no influence over key decision-makers or crucial outcomes. You will never have more money than your government counterparts. You may never know more about the inside game of road-building or transportation policy than they do. However, power comes in many forms and you might have more than you think. Understand the law pertaining to the issue, mobilize diverse partners and stay in the game.

Agencies You Should Get to Know

- State transportation agency
- Federal Highway Administration (FHWA)
- Metropolitan Planning Organizations (MPO)
- Transportation Advisory Committee (TAC)
- Local planners
- State wildlife agency (Fish & Game department, division of wildlife, department of natural resources)
- U.S. Fish and Wildlife Service (FWS), Department of Interior
- U.S. Forest Service (USFS), Department of Agriculture
- National Park Service (NPS), Department of Interior

Keep in mind that these agencies don't always see eye to eye either. Suggest a truce with a Memorandum of Agreement (MOA), a non-regulatory agreement between two or more agencies. See the MOA template at the end of this chapter that can be tailored for their needs.

–One of the best ways to improve interagency coordination is a transportation-funded liaison or coordinator in your state resource or wildlife agencies. If your state transportation agency does not support liaison staff, suggest that they do.

–If your transportation agency is improving on wildlife issues, recognize their efforts. Consider nominating them for one of the many transportation award programs. See the Appendix for a list of the many transportation-related award programs.

Helpful Hints From Agency Staff

Several transportation and resource agency professionals generously offered the following nuggets of wisdom and advice to conservationists working on wildlife and transportation conflicts:

- Have an understanding of the limitations of agency personnel and advocate effectively with your actions (e.g., volunteer to help where appropriate) rather than by rhetoric.
- There is a lot of potential to achieve good things, but it will take many years and lots of persistence by advocates and agencies.
- Be patient, polite and persistent.
- Become a local and be sensitive to local values.
- Try not to consider negotiations as an "Us vs. Them" scenario.
- Get past stereotyping. Don't be overly pessimistic about working with transportation agencies.
- Look for conservation opportunities at the planning, corridor and project levels.
- Be clear about what you want. Don't just ask for less impacts and more mitigation. Be clear about the goals you are seeking, the specific outcomes or project attributes you support and why.
- Be willing to invest in the solution. What are you bringing to the table to help create a solution?
- I'm here to help. Call if you need me.

HALL OF FAME: VERMONT IS KEEPING TRACK

A walk in the woods can open up a whole new world, if you have the right guide. To enlighten staff from all departments and levels, Vermont Agency of Transportation's (VTrans) conducts annual habitat connectivity training with Keeping Track®, a non-profit conservation organization based in northern New England. Since 2002, approximately 65 VTrans staff completed a special "Habitats and Highways" program. Participants are introduced to the habitats and needs of various native species, from moose and black bear to wood turtles and salamanders. Exposure to wildlife allows staff to see their work in another context and empowers them to reduce the impacts roads have on wildlife and habitat. "Far beyond my expectations, each department brought to the program a great diversity of personnel, from planners to engineers and executives down to junior staff. Not all of them were card-carrying natural resource enthusiasts when they began!" remarked Keeping Track director, Susan Morse. Inspired by Vermont's success, New Hampshire and Maine recently began their own Keeping Track programs.

Contact Keeping Track about providing training in your state or area of interest. http://www.keepingtrack.org Offer to help with this and other similar training, field trips or interdisciplinary, cross-training exercises among transportation, resource and conservation interests.

WORKING WITH PUBLIC OFFICIALS

At some point in the course of your campaign, you might find it necessary to call upon the powers that be for support. Elected officials, from your town mayor to state legislators to Congress, can influence decisions regarding transportation and its impact on wildlife. You donít have to be a K Street lobbyist or high-dollar campaign contributor to meet with lawmakers. You just need to be informed, prepared and professional. In fact, elected officials would rather meet with you as a constituent than meet with a paid lobbyist.

If you can't get to Washington DC or your state capitol to meet with lawmakers, you can always call them, send a letter or meet with them in person when they return to their home districts on weekends, holidays or during district work periods. Legislators often hold town meetings or listening sessions to solicit constituentsí input. You may also find elected officials willing to come to you. Do you have a meeting, event or perhaps a field trip to a project site that would be of interest to a local lawmaker? By inviting them to visit you, they can talk directly to other stakeholders, gain a greater understanding of the issue and see the impacts firsthand.

When is it appropriate to contact public officials about wildlife and transportation issues?

Elected officials are powerful, but they arenít omnipotent. Before you contact your lawmakers, recognize the difference between what they can do and what they cannot. If you are trying to influence the intra-agency policies of your state transportation agency, or reverse a decision in an EIS, it is unlikely that your state senator can do much to help you. (See ìWorking with Government Agenciesî above.) However, there are occasions when lawmakers can be your best friends. You may want to contact your public officials for the following:

- Voice your support for a conservation project or program funded or administered through his/her office.
- Voice your opposition to a road project or program funded or administered through his/her office.
- Ask the official to sponsor or co-sponsor a bill, amendment or rider.
- Ask for support or opposition to a bill, amendment or rider.
- Ask the official to send a letter on your behalf.
- Invite him/her to attend or speak at an event.
- Ask your legislative representative to make a floor statement.
- Request funding for wildlife and transportation related research.
- Request funding or support for wildlife crossings.

What is the best way to communicate with public officials about wildlife and transportation issues?

There are several ways to make contact with your elected officials. Depending upon your needs, you may choose to call, send a letter or meet with them in person. If you are simply inquiring about their position on a particular matter or you want to voice your opposition to a bill, a phone call or letter will suffice. If you have more substantial requests, you may want to schedule a face-to-face meeting.

In any communication with public officials on wildlife and transportation issues, keep in mind that while this is an age-old problem, solutions are still relatively new. Your lawmakers may not be familiar with the subject, may not understand the importance or the relevance to them and their constituents. Be prepared to provide a quick primer on the issue.

E-mail

Many of us have become so dependent on e-mail, we no longer use other methods of communication. However, e-mail may not be the most effective way to correspond with public officials. Since the meteoric rise in electronic communication, many special interests (including conservationists) have used e-mail and fax to bombard elected officials with information and bulk messages. As such, bulk or blast e-mails have lost effectiveness with elected officials.

A 2002 survey of Minnesota legislators found that e-mail is effective only under certain circumstances. If a legislator recognizes that the e-mail was personally written by a constituent, it can be almost as effective as sending a letter. However, "the problem with e-mail," as one Minnesota legislator put it, "is that one does not have the time to respond to nonconstituents, but there is no easy, non-offensive way to sort out the 'political spammers.'"

Once you've established a rapport with the official's staff, e-mail may become a more appropriate and effective method of communication. Most staff use Blackberry devices and can respond to your message quickly. Do not abuse this by e-mailing too often. They are busy people and are likely to be working on a myriad of matters beyond yours.

"Canned language is fine for letting me know there are a lot of people out there who are interested in this, or that some group has a following, but if you really want me to believe you care about this a lot, tell me in your own words." **Congressional staffer**

Phone call

If you want information and you want it fast, nothing beats the old-fashioned phone call. You may not get the chance to speak directly to the public official, but his or her staff can answer questions and relay information. Phone calls are a good way to find out the lawmaker's position on an issue, and a good way to voice your support or opposition on an issue or piece of legislation. As with any contact with public officials, be prepared before you begin. You may even want to script the call before you dial and have pen and paper ready to jot down notes.

When you call…

- Tell them your name and where you live.
- Get straight to the point. Be clear about what information you are seeking or what action you wish your elected official to take.
- Be prepared to answer questions and support your point.
- Have specific information. The person answering the phone may not know the details of your issue, so make sure you give them specifics and make it clear where you stand.
- Be polite. You are an ambassador for your group, your position and your cause.

"Remember that there are just a very few people answering phones and they take tons of calls. Kindness goes a long way for the folks who often have to deal with angry callers."
Former Senate Chief of Staff

HOW DO I FIND CONTACT INFORMATION FOR MY ELECTED OFFICIALS?

Local government offices are listed in telephone directories and many have informational web pages. For contact information for everyone from the President, U.S. Congress (both House of Representatives and Senate) and your state legislators, go to: *http://www.firstgov.gov/Contact/Elected.shtml* or call 1 (800) FED INFO (1-800-333-4636).

Writing a Letter

One letter from a conscientious constituent will carry more weight than hundreds of form e-mails. Handwritten letters are surprisingly rare and therefore more effective. For real results, write a letter to your public officials and make your case. The same general rules apply for letter writing as for phone calls:

- Address the letter correctly.
- Get right to the point. In the first paragraph, tell them who you are, where you are from and why you are writing. You need not include detailed personal information. If you actually wrote them a letter, you had them at "hello."
- Stick to one issue per letter. No laundry lists.
- Support your point with facts and background information.
- Be specific about what action you want your elected official to take.
- Be polite. Do not preach or scold.
- Be brief. If possible, limit your letter to one page.
- Be sure to include your contact information.

"The communication that Sen. Gramm values most certainly does not arrive by wire. It is the one where someone sat down at a kitchen table, got a sheet of lined paper and a No. 2 pencil, and poured their heart into a letter." **(Alperin, 2003)**

Schedule a Meeting

So you've made calls, sent letters and exercised your First Amendment rights. Are you ready for a face-to-face meeting with an elected official? Personal visits are an excellent way to communicate on a personal level and reinforce that someone other than lobbyists are paying attention to the issues that effect your town or state. But keep in mind that they are busy people, just like you. Take ample time to prepare for an effective and productive meeting.

Make an appointment. Walk-ins might be welcome at the local salon, but they are less popular with elected officials. Call the office well in advance to request a meeting and tell the scheduler what the meeting will be about. Ask for a meeting during recess or district visits. Due to their tight and often fluctuating schedules, be flexible. Your appointment may be rescheduled or, more likely, you will be asked to meet with a staff person instead. Keep in mind that meeting with staff can be as productive as seeing the elected official in person.

Be prepared. Know your issue inside and out—have detailed fact sheets and background information ready to share. Bring informational materials you can leave with them, but don't overwhelm them with long documents they don't have time to read. Find out if this public official has already taken a stand on the issue, either by vote or a public statement.

Bring allies. Bring a *small* group of stakeholders, either from your coalition or representatives from other like-minded groups. If possible, bring an expert or community leader who can reinforce your position. Meet and rehearse with the group before the actual meeting. Choose one spokesperson that will spearhead the discussion and act as point person for any follow-up. Assign key messages to group members so that everyone is heard.

Be professional. Be punctual, polite and dress appropriately. Introduce the group and thank them for taking time to meet with you.

Be brief. Stick to the subject and be respectful of their time. Save time to listen to what they have to say and answer questions. If you don't have all the answers, commit to finding them and follow up.

Make it local. Explain how the issue will affect the official's home district or issues he or she has shown interest in.

Make "the ask." Don't leave that meeting without asking the elected official to take action. Once you have informed them about your issue, tell them what to do about it. Make a direct request and get an answer. If you get a no, politely ask why and find out what it would take to get to yes.

Make a graceful exit. End the meeting on time. Sum up your main point, restate your "ask" and thank them again for their time. Leave them with your materials, contact information and a promise to follow up with additional information.

Follow up. Send a thank you note to the public official and any staff with whom you met. This will build a positive rapport with your legislator and his or her staff.

"Meetings are fine, but come prepared and please try to make an appointment. I have people on my staff who know the details of this issue and it serves me and you better if they can be in the meeting and be prepared to hear you out. I really would like to see someone from back home, rather than a DC lobbyist. I want to know how this helps my home state/district first and foremost." **Congressional staffer**

What not to do when communicating with public officials

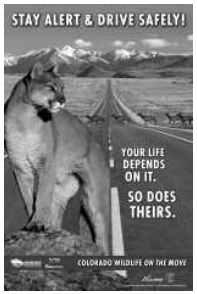
- Don't bother them with issues outside their jurisdiction or issues that don't apply to their district or state.
- Don't just educate the lawmaker. Tell them specifically what you want them to do.
- Don't assume that access guarantees results.
- Don't assume they are experts on the subject.
- Don't assume they aren't. Know your stuff.
- Don't preach.
- Don't threaten.
- Don't forget to make "the ask."
- Don't overstay your welcome.

COMMUNICATING YOUR MESSAGE

Now that you have partners, allies and friends in high places, you'll need some public support. The problem is, the general public knows very little about the conflict between wildlife and transportation. A 2006 study by the University of Denver found four major barriers to effective citizen participation in wildlife-sensitive transportation projects:

1. Lack of awareness—citizens are only minimally aware of wildlife and transportation issues
2. Public apathy or a lack of citizen interest in wildlife and transportation issues
3. Ineffective citizen participation techniques and processes
4. Poor communication with citizens.

While millions of people are involved in wildlife-vehicle collisions, very few people understand the full scope of ecological effects of roads upon wildlife. Even fewer are aware of methods to reduce these impacts or understand their own ability to participate in the process. It's our job to wake this sleeping giant and cultivate an informed citizen constituency.



The Southern Rockies Ecosystem Project (SREP) spearheaded an education and outreach campaign in Colorado that focuses on the human safety issue, while drawing attention to the plight of wildlife on our highways. The *Colorado Wildlife on the Move* campaign urges drivers to watch for wildlife on Colorado highways, especially during times when animals are migrating. SREP held a media conference with Colorado State Patrol and other partners that reached millions through television, radio and newspaper coverage. Campaign posters and driver tip sheets are displayed in rest stops, tourist information centers, rental car offices and other locations across the state.

The I-90 Wildlife Bridges Coalition educated elementary students across the state of Washington about issues surrounding wildlife and our roads with a specific focus on the I-90 Snoqualmie Pass East Project. They asked the children to express their thoughts through drawings that show how we can collaborate to benefit both animals and people in the I-90 Project. Coalition Director Charlie Raines and Washington's Secretary of Transportation Doug MacDonald selected the winning drawings.

"The problem the environmental community has is they don't listen to their opponents. When I do my research, I spend more time studying the opposition argument because that's what I need to respond to. The environmental community never listens. If they listened, they would have realized very early on that they would find common ground with other allies."
Republican pollster, Frank Luntz

"If it's birds versus jobs, you're dead. You lose. If it's corporate greed versus protecting the forests, that's good."
Jon Haber of Fleishman-Hillard, strategic communications firm

FUNDRAISING

Unless you're independently wealthy, you may need to raise money to run your campaign. Fundraising is nothing new to conservationists; it can mean everything from "tin cupping" to receiving major, multi-year grants. But don't be overwhelmed. Reduced to its simplest expression, fundraising is the act of asking a person for a gift of money.

Research prospective donors Ask yourself, "Who would give us money to work on this issue?" List all the people, organizations, businesses, foundations and agencies that are touched by the wildlife and transportation conflict. Get creative.

Now just ask Send an introductory letter and follow up with a friendly phone call. Offer to meet over coffee to tell them more about your activities.

Use the internet to raise funds and build relationships with donors. Develop a website to tell the world about your campaign and add a mechanism for accepting donations.

Host fundraising events at or near your area of interest. Bring people to see the area, the species and the project site for themselves.

Government Grants

Federal, state and local governments award hundreds of millions of dollars every year to nonprofit organizations. Winning a grant is a competitive process, and the best grant writers are the ones who know how to read a request for proposals (RFP), address the funder's goals, and provide the right documentation to support their plans.

The United States government provides "direct" and "pass through" grants. Direct grants, as the name implies, go directly from the government to your organization. Competition for direct grants is fierce. The federal government also gives monies to individual states for distribution as pass through grants. To be

considered for a pass through grant, you must go to the appropriate state agency. Since only in-state applicants are considered, competition is less intense. Government grants are either "competitive," meaning applicants must compete for a share of the money or they are "formula," meaning grants are allocated on the basis of a specific formula.

CAUTION: BE CAREFUL WHAT YOU ASK FOR
Government agencies may support your efforts to the extent that they are aligned with the agency's priorities. They may not be so keen to give you money to support your efforts to oppose them. Once you accept money from a government agency, the dynamic of your relationship may change dramatically from advocate to employee.

Where do I find information on government grants?

The best source is the Catalog of Federal Domestic Assistance. Grants are divided into 20 main categories and almost 200 subcategories. Each entry includes the following information:

- Name of the federal agency distributing the grant
- Federal legislation that authorized the funds for the grant program
- Program's goals and objectives
- Financial assistance the program offers
- Non financial assistance
- Restrictions and eligibility requirements
- Application and selection processes
- Examples of projects that have been funded in the past
- Other government programs with similar objectives.

Grants.gov has information on 900 individual grant programs that provide more than $350 billion in grants each year. The Federal Register, published by the U.S. Government Printing Office has announcements about federal grant programs and opportunities.

Writing a grant proposal

So you want to write a proposal? Now that you have defined your objectives and researched your potential funders, you're ready for the next step. A proposal is a short, narrative document that describes your organization and pitches your idea to the granting agency. Proposals come in three forms:

1. Letter of intent – Typically two to three pages long, the letter of intent (LOI) describes your program in a nutshell and explains how it fits the needs of the granting agency. Based on the LOI, the granting agency can decide whether to ask for a longer, more detailed proposal.
2. Short proposal or letter proposal – Similar to a letter of intent, the letter proposal describes the project, the need and requests funds.
3. Long proposal – Most often used by foundations and government granters, the long proposal includes a cover letter, a proposal summary, and as many as ten pages of proposal text, followed by appendices that provide greater detail about the project.

The Red Wolf Coalition and Defenders of Wildlife partnered with North Carolina Department of Transportation to install informational kiosks at rest stops to educate visitors about the ecological and economic benefits of red wolf restoration.

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Survey of Minnesota legislators, 2002. Retrieved from: *http://www.e-democracia.cl/revista/datos/ftp/m.pdf*

E-Democracy: Legislative-Constituent Communications in Minnesota and Wisconsin. Retrieved from: *http://www.e-democracia.cl/revista/datos/ftp/m.pdf*

Andresen, Katya. *Robin Hood Marketing: Stealing Corporate Savvy to Sell Just Causes*. Jossey-Bass. San Francisco, California. 2006.

Advocacy

ADVOCACY RESOURCES

Defenders of Wildlife's Citizen Advocate Handbook
http://action.defenders.org/site/DocServer/AdvocateHandboo.pdf?docID=1001

Take Back Your Streets: How to Protect Communities from Asphalt and Traffic
Conservation Law Foundation
http://clf.org/general/index.asp?id=386

COALITION BUILDING

Little Black Book: Coalition Building
People for the American Way Foundation
http://www.youngpeoplefor.org/pdf/COALITION_BUILDING_LBB.PDF

Coalition Building
Brad Spangler
http://www.beyondintractability.org/essay/coalition_building/

TransWild Alliance: *non-profit conservation organizations striving to influence transportation projects and policy and reduce impacts on wildlife*
To join, email *twhite@defenders.org* and stay tuned for
www.TransWildAlliance.org

WORKING WITH GOVERNMENT AGENCIES

Collaboration: A Guide for Environmental Advocates
http://www.audubon.org/campaign/pdf/collaboration.pdf#search='collaboration%20a%20guide%20for%20environmental%20advocates'

Red Lodge Clearinghouse Newsletter: *to support, nurture and connect collaborative natural resource groups*
http://www.redlodgeclearinghouse.org/newslist/Subscribe.cfm

How to Complain: Guidelines for Resolving Complaints
http://www.in.gov/dfi/education/how_to_complain.htm

WORKING WITH PUBLIC OFFICIALS

How to Make the System Work for We, the People
Global Exchange
http://www.circleoflifefoundation.org/education/sustainable/things/work_electedoffic.pdf

Working with Elected Officials
American Civil Liberties Union
http://action.aclu.org/site/DocServer/working_with_officials.pdf?docID=103

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http://www.wiley.com/WileyCDA/WileyTitle/productCd-0787981486.html

Designing a Communication Strategy: the 4-P Workshop
Conservation International, Washington, DC
http://www.conservation.org/ImageCache/CIWEB/content/downloads/4p_5fworkshop_2epdf/v1/4p_5fworkshop.pdf

Now Hear This: The Nine Laws of Successful Advocacy Communications
Fenton Communications, Washington, DC
http://www.fenton.com/pages/5_resources/pdf/Packard_Brochure.pdf

The Environment: A Cleaner, Safer, Healthier America
Leaked memo from GOP messaging guru Frank Luntz
http://www.ewg.org/briefings/luntzmemo/pdf/LuntzResearch_environment.pdf

FUNDRAISING

EPA and Purdue University's Grant Writing Tutorial
http://www.purdue.edu/dp/envirosoft/grants/src/title.htm

CONVIO: Using the Internet to Raise Funds and Build Donor Relationships
http://www.convio.com/site/PageServer?pagename=reg_SEMfrGuide&s_src=Yahoo&s_subsrc=701000000000REa&s_key=180-2407#

GROUNDSPRING: Offers online fundraising solutions for nonprofits
http://www.groundspring.org

Klein, K. 2000. *Fundraising for the Long Haul*. Jossey-Bass, San Francisco, California.
http://www.josseybass.com/WileyCDA/WileyTitle/productCd-0787961736.html

Robinson, A. 2004. *Grassroots Grants: An Activist's Guide to Grantseeking, Second Edition*. Jossey-Bass, San Francisco, California.
http://www.josseybass.com/WileyCDA/WileyTitle/productCd-0787965782.html

Robinson, A. 2004. *Big Gifts for Small Groups: A Board Member's 1-Hour Guide to Securing Gifts of $500 to $5,000*. Emerson & Church, Medfield, Massachusetts.

Advocacy

SAMPLE LETTER TO YOUR TRANSPORTATION AGENCY

Transportation agency
Division of Planning
Address
City, State, Zip

I am writing today to express my concern about the rapid rate of loss of natural areas in our state/county. Unchecked development is claiming countless acres of land, and essential wildlife habitat. New roads and highways enable and encourage this loss by providing unmitigated access to once wild places.

In addition to the loss of habitat, roads and highways have extreme adverse effects on ecology. Countless animals are lost in collisions with vehicles. Once a road is built, the surrounding physical and chemical environment is so altered, many species will avoid the area. Transportation corridors can effectively wall off habitat for migratory species.

Transportation planners can go a long way to alleviate or aggravate this problem. In designing new roads, do you take wildlife and the preservation of natural areas into account? What steps do you take to avoid causing more damage and loss? How closely do you work with our state and federal wildlife agencies to prevent further endangering our wildlife?

I am one of a growing number of citizens who are concerned about the loss of irreplaceable natural areas and the corresponding pressure on wildlife. We support continued economic growth, but not at the expense of irreplaceable habitat and the unique beauty of our state/county.

Thank you and I look forward to receiving your response.
Sincerely,
Your handwritten signature
Name
Address
City, State Zip

WATCHDOG WORKSHEET

Name: Project name, number and designator

State(s): State or states in which the project takes place

Project Lead: Lead agency on the project

Participating Agencies: Other participating agencies

Participating NGOs: Local/regional/national conservation and other organizations with interest in project

Project description: All relevant information, including type of project, length, location, purpose and need

Concerns: Description of the potential impacts to wildlife

Status: Planning, design, review, permitting, construction phases. Give relevant dates for expected reviews, permits, comment periods, etc.

Contacts: Name, title, organization, address, phone, fax, e-mail for those involved

Project Websites: Links to all Web sites pertaining to the project

Organization Websites: Include websites of lead and participating agencies and organizations

Media: List of all media stories about the project, the area, impacts or species of concern

Action: List of actions, both completed and planned

Additional information: Photos, maps and documents pertaining to the project, the area of interest and impacts to species of concern

SAMPLE BLANK MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT
BETWEEN AGENCY OF TRANSPORTATION
AND AGENCY OF NATURAL RESOURCES,
FISH AND WILDLIFE DEPARTMENT
REGARDING TRANSPORTATION INFRASTRUCTURE
AND FISH AND WILDLIFE RESOURCES

THIS MEMORANDUM OF AGREEMENT ("Agreement" or "MOA"), is entered into this [*date*] day of [*month*], [*year*], by and between the Agency of Natural Resources, Fish and Wild Department (["*state F&W Dept. abbreviation*"]), and the Agency of Transportation (["*state Transportation Dept. abbreviation*"]);

WHEREAS, the parties desire to improve accommodation of wildlife and aquatic organism movement around and through transportation systems and to minimize habitat fragmentation resulting from the presence of transportation infrastructure; and

WHEREAS, the parties desire to reduce the potential for wildlife collisions along transportation infrastructure through improved planning for fish and wildlife impacts from transportation infrastructure;

NOW, THEREFORE, the parties agree as follows:

1. Inter-agency Committee. The parties will convene an inter-agency committee co-chaired by the Secretary of Transportation and the Commissioner of Fish and Wildlife or their designee(s). The Committee will include representatives from the ["*state F&W Dept. abbreviation*"] Wildlife and Fisheries divisions [*or other appropriate division*] and the ["*state Transportation Dept. abbreviation*"] Program Development and Policy Planning division [*or other appropriate division*] and will meet quarterly or as needed to oversee the activities identified below.

2. Identification of Transportation Impacts on Fish and Wildlife Resources. The parties will identify the impacts of highways on the state's fish and wildlife resources, including but not limited to: (a) wildlife mortality from vehicle collisions; (b) direct and indirect effects to habitat from the existing transportation system; (c) increased traffic; (d) proposed highway expansions; (e) reducing wildlife and aquatic organism passage; and (f) effects of vehicle emissions on ecological health.

3. Minimization of Transportation Impacts on Fish and Wildlife Resources. To address the issues identified in Paragraph 2, above, the parties will work together to minimize transportation impacts on fish and wildlife resources. This effort will include the following:
(a) Investigating use of underpasses, bridge extensions, culvert installations and modifications and associated fencing, land conservation and other techniques to facilitate and guide wildlife movement across highways.
(b) Continuing GIS and other modeling techniques to help predict wildlife movement and associated linkage habitats.
(c) Coordinating between the agencies to better plan, predict problems, and evaluate resources in advance of project design to help minimize conflicts regarding specific species, habitats, and indirect and cumulative impacts during regulatory and environmental review processes.
(d) Planning for mitigation at the watershed or bioregional level when feasible and appropriate, rather than mitigating transportation impacts on a case-by-case basis, with the goal of reducing mitigation costs and achieving greater overall ecological benefit.
(e) Conducting research and establishing policy regarding culvert installation practices and design guidance for aquatic organism passage.
(f) Participating in inter-agency and other efforts to address air quality and its effect on the state's wildlife, fisheries and ecological health.
(g) Keeping up-to-do on national and international developments, by sharing information, exploring research and funding opportunities from governmental and non-profit sources, and participating in relevant regional, national and international conferences.
(h) Continuing to facilitate regional conferences and workshops among the New England states on matters relating to the interaction between transportation planning and development and fish and wildlife conservation.

4. Duration; Termination. This MOA will remain in effect for an indeterminate period. Either party may terminate this MOA upon ninety (90) days' notice to the other party.

AGENCY OF TRANSPORTATION _____ (signature)

ACENCY OF NATURAL RESOURCES _____ (signature)

DEPARTMENT OF FISH & WILDLIFE _____ (signature)

Advocacy

HOW TO WRITE A LETTER TO YOUR ELECTED OFFICIALS

Letter writing is still the most popular choice for communicating with elected officials. You can write a personal letter, or participate in an organized campaign and send a signed postcard. You can mail, fax or e-mail your letter. Each method has its positives and negatives and is treated differently depending on the office. The most important thing is that your message is getting to your elected officials.

Regardless of the method you use to write your legislator, you must include the following basics:

- **The purpose of your communication.** Address only one issue in each letter, and, if possible, keep it to one page.
- **Your personal perspective.** Tell your representative why you care about this issue and why they should.
- **The associated bill number if there is one (for example H.R.#, or S.#)**
- **Your full name and return address.**

The general form for a letter to an elected official is:

Date

The Honorable Joan Doe
United States Senate
Washington, DC 20510
RE: Wildlife and highways

Dear Senator Doe,

First paragraph: I am a resident of Anytown, State and I am writing today because I am concerned about…

Second paragraph: This is important because…(facts, specific examples)

Third paragraph: Specifically, I am writing to ask you to…

Thank you for your kind consideration of this matter.

Sincerely, (your handwritten signature)

Name
Title
Address
Phone number

HOW TO WRITE A GRANT PROPOSAL

Most grantors will provide their own application forms or basic guidelines, but in some cases you will need to start from scratch. While grants can come from a variety of sources such as foundations or government agencies, most require the same basic information in the grant proposal. Here are the most common sections of a grant proposal and the information you should include:

- Your **cover letter** should include a two to three sentence summary of your proposal. Give a brief description of your organization, mission, and an overview of your accomplishments. Make your case for why the grantor should invest in your vision.

- A **problem or needs statement** should demonstrate the importance, urgency and relevance of your proposal. Be clear and assume that the reader doesn't already know everything about the issue. Convince the grantor that you are the right organization for the job.

- The bulk of your proposal is found in the **work plan**, which includes your target audience and any planning or research you may have done to prepare. Describe the proposed activities, when and where they are to take place and project start and end dates. List the project lead and other involved staff along with their qualifications.

- Tell your prospective grantor your anticipated **outcomes** and how the project will improve the situation.

- Include information on **other funding** you can use for the proposed project. Grantors rarely want to be the sole source of support for a project. Be sure to mention any in-kind contributions such as supplies or work space.

- Attach a **budget** showing the various project costs including staff salaries, direct expenses and administrative or overhead expenses.

- Grantors are likely to request **additional materials**, such as proof of your tax-exempt status, a list of your board members, last year's financial statement and budgets for the current fiscal year.

HOW TO WRITE A PRESS RELEASE

Are you doing something newsworthy and want to tell the world about it? Then a press release may be just the ticket. A press release is a written statement to announce a news item such as a scheduled event, a victory or to generate a feature story. While nothing will guarantee your story will be picked up, you can improve your chances with a well crafted, professional press release.

Is your news newsworthy? Just because you're excited about it doesn't make it news.
Give your story a news hook by being unique, unusual or by tying it to a current event or issue.
Start strong. Tell your story succinctly in the headline and first paragraph.
Just the facts, ma'am. Don't embellish. Answer the who, what, when, where, why and how.
Keep it short. Avoid unnecessary adjectives and make every word count.
Use correct grammar and spelling. No jargon, no acronyms, no CAPS and no exclamation points!!!
Make it easy. Journalists are busy people; the easier you make their jobs, the more likely they are to cover your issue.

IMMEDIATE RELEASE
Date
Contact: Provide contact info for the story

Headline Announces Story at the Top, Keep it Under 80 Characters

Subheadline: One short sentence on why the headline matters; brief elaboration on main message or introduction of secondary message.

City, State – Use the lead sentence to provide a brief synopsis of the information you are presenting. Don't assume that the reader has read your headlines; the first one or two sentences have to capture the reader's attention immediately.

First quote: 2-3 sentence quote from an identified source explaining your organization's position/reaction/comment on the main message of the release.

Use the next 1-2 paragraphs to expand on the opening paragraph and provide backup data or history that further underscores your message.

Secondary quotes: These further expand upon your organization's position or give other stakeholders an opportunity to comment.

Optional additional factual "context" paragraphs.

About Conservation Group: Close with organizational information and website.
###
Remember: Just like news stories, press releases use short sentences and paragraphs. Keep paragraphs to four lines or less. The entire press release should ideally be no more than one page or a page and a half at the most. The tone should be objective and neutral except within quotes; if you find "I," "you," or "we" outside a direct quote, start over. And when crafting your quotes, remember that the average newspaper reader absorbs information at an eight grade reading level, so avoid overly "wonky" words or phrases.

Advocacy

HOW TO WRITE A LETTER TO THE EDITOR

Letters to the editor are great advocacy tools. They reach a large audience, including elected officials. They can bring up information not addressed in a news article and illustrate more widespread support for or against an issue. Following are some tips to help ensure success in getting your letter published and a sample outline to guide you as your write your own:

- **Know the newspaper's policy.** Call the newspaper or check its Web site for its requirements for printing letters from readers. Some newspapers have strict word-count limits; others only accept letters from people who live in the community. Many newspapers even have forms on their Web sites for submitting letters.

- **Focus on the message.** As you write, always keep in mind what you want the reader to come away with after reading your letter. Don't make the editor wonder what you're trying to say.

- **Be concise.** Keep your letter brief (150 to 200 words) and limited to one topic. If your letter is too long or complicated, it may be edited or discounted altogether. You can be direct, engaging and even controversial, but never defamatory or obscene—no matter how provoked you are.

- **Type and proof it.** Handwritten letters can be tough to read. Don't chance it—type your letter and proofread it carefully; letters with mistakes may be discarded quickly.

- **Refer to specific articles in the paper.** While some papers print general commentary, your chances of getting printed increase if your letter refers to a specific article. However, don't do a lengthy rehash of the article, simply refer to it briefly. For example, "I strongly disagree with (author's name) narrow view on habitat protection (op-ed title, date)"... "I am deeply saddened to read that Representative Doe is supporting this destructive and unnecessary road project (article title, date)"... "I am happy this paper has taken up the charge for protection of endangered species (op-ed title, date) and I hope Senator Doe listens to this message when casting her vote."

- **Be timely.** When responding to an article, submit your letter to the editor as soon as possible. You want the original article to be fresh in the mind of the audience.

- **Get personal.** The best letters contain attention-getting information or personal anecdotes. Refer to personal stories to make your point. Use personal examples whenever you can.

- **Include your contact information.** Many newspapers will print a letter only after verifying the identity and address of the author. Provide your full name, address, ZIP code and daytime telephone number so the newspaper can easily contact you to verify your letter or to discuss editorial changes prior to publication.

- **Don't give up.** Most publications are very selective. The smaller the newspaper's circulation, the better your chances of getting your letter printed. Don't keep calling to check on the status of your letter. If your letter isn't selected, don't be discouraged. You can send a revised letter with a different angle at another time. Be aware, too, that many publications have guidelines about repeatedly printing letters from a single individual, so don't expect to have your letters printed on a regular basis.

- **Share your success.** If your letter is published, don't stop there. Send the clip to your elected officials so they see what their constituents are writing and reading about. Don't forget to send a copy to Defenders of Wildlife, too. It's your voice that helps us all succeed in our work and we want to hear it.

Advocacy

HOW TO WRITE A RESEARCH PROBLEM STATEMENT

Research institutions and government agencies often solicit problem statements to identify ideas for research that is needed to address existing or anticipated issues. Submitted problem statements form the basis of their research program and are then funded and implemented. Conservationists can contribute by suggesting research problems regarding wildlife-transportation conflicts and by participating in or conducting the research. Research is conducted in all areas of transportation, including policy, planning, engineering, operations, maintenance, mitigation and administration.

Problem title - The title should be no more than 10 words.

Research problem statement - In no more than three paragraphs, provide a general description of the problem or need.

Objectives - Include a clear, concise statement of the objectives (anticipated products) that are expected to be met by this particular research.

Research proposed - Provide a statement of the specific research proposed, how it relates to the general problem statement and, if possible, the research approach and the tasks envisioned.

Estimate of the problem funding - Include an estimate of the funds necessary to accomplish the objectives. A detailed budget is generally not necessary.

Research period - Provide an estimate of the period of time needed to complete the research, including 3 months for review and revision of a draft final report.

Urgency and payoff potential - Include a statement concerning the urgency of this particular research. Identify and, if possible, quantify the potential and magnitude of payoff from the achievement of the project objectives. Any institutional, political, or socio-economic barriers to implementation of the anticipated research products should also be identified.

Relationship to sponsor's strategic goals and policy initiatives - Categorize this problem statement using the sponsoring agency or organization's strategic initiatives and priorities.

Related research - If available, provide information on other research—completed, in progress, or pending—that is closely relevant to the proposed problem.

Person(s) developing the problem - Provide the specifics (i.e., name, title, address, telephone, and fax numbers) for the person(s) who developed the problem.

Process used to develop problem statement - State whether this problem statement is the product of an individual or group.

Date and submitted by - Provide the specifics of the person(s) who submitted the problem and the date of submission.

Appendix

Who's who: Agencies and Organizations

What's what: How Roads are Classified

Federally Funded Transportation Programs

Acronyms

Websites

Listservs

Books

Academic journals

Conferences

Awards

Transportation metaphors

WHO'S WHO: AGENCIES AND ORGANIZATIONS

From behind the wheel, we may see only a fraction of the many people, organizations and efforts that go into funding, planning, designing and maintaining the roads beneath us. On occasion we see construction workers in orange vests or maintenance crews mowing grass in the medians. But look behind the curtain and you will see a vast and diverse set of professionals from all disciplines work at all levels of government and private enterprise, making the decisions and setting the policies that determine where, when and how you and I get around. There are also several professional and industry associations that represent the private sector making their living from road building and making important decisions at the national policy level through aggressive lobbying. To effectively influence those decisions and policies, conservationists need to have a greater understanding of the many players involved.

STATE AND LOCAL TRANSPORTATION AGENCIES

Local transportation agency / Public Works

- Manages and operates local roads, streets, bridges, and a share of Federal-aid Highways (varies by state)

Regional Planning Organization (RPO)

- Assist local planning organizations in developing and implementing transportation strategies and solutions for a given area
- Can encompass several local regions and sometimes multiple states

Metropolitan Planning Organization (MPO)

- Primarily a planning body; and usually does not control land use or operate transportation facilities
- Governed by a board of local elected officials, local and state transportation agency representatives and state representatives
- Prepares a Long Range Transportation Plan (LRTP) and a Transportation Improvement Program (TIP) that meet the air quality emission budget (in non-attainment areas)
- Directly controls only a limited amount of federal funds for projects

State transportation agencies (DOTs)

- Largest units of government that develop transportation plans and projects
- Responsible for setting transportation goals for the state
- Responsible for planning safe and efficient transportation between cities and towns in state

STATE TRANSPORTATION BOARD/COMMISSION

- Plans, designs, builds and maintains state highway systems
- Owns and operates other transportation facilities—ferries, airports, transit services, rail lines
- Develops statewide long-range transportation plan and transportation improvement program

Transit agencies

- Public and private organizations that provide transportation for the public. Public transportation includes buses, subways, light rail, commuter rail, monorail, passenger ferryboats, trolleys, inclined railways and people movers.

Air Quality Planning Agency

- Develops regional emissions budget for each metropolitan area where air quality fails to meet national standards established to protect public health
- Determines emissions budgets for mobile sources that must be reflected in the Long Range Transportation Plan (LRTP) adopted by the Metropolitan Planning Organization (MPO)

FEDERAL TRANSPORTATION AGENCIES

U.S. Department of Transportation (USDOT)

- Oversees the transportation planning and project activities of the MPOs and state transportation agencies
- Provides advice and training on transportation topics, ranging from pavement technology to design to efficient operations of highway and transit systems
- Supplies critical funding needed for transportation planning and projects
- Approves a program of projects submitted by state transportation agencies that includes projects proposed for federal funds

Federal Highway Administration (FHWA)

- Interprets transportation law, develops guidance, rules and regulations
- Manages several programs and provides technical assistance, training and research to state transportation agencies

Federal Lands Highway Program (FLHP)

- Oversees all phases of highway policy, planning, research, design, operations, construction and maintenance in cooperation with federal land-managing agencies to provide access to federally owned lands

Federal Transit Administration (FTA)

- Administers federal funding to support a variety of locally planned, constructed and operated public transportation systems throughout the country, including buses, subways, light rail, commuter rail, streetcars, monorail, passenger ferry boats, inclined railways and people movers

STATE AND LOCAL AUTHORITIES

Mayor/City and County Council

- Control local revenues but have little authority over federal highway dollars (except in California), even though their jurisdictions own and operate roads, streets, bridges and nearly one-half of all federal-aid highways (varies by state)
- Serve on MPO Board with state transportation agency, regional transit agency and others appointed by the governor

Local Planning body

- Develops local comprehensive land-use plan including elements for transportation that the MPO is supposed to consider in setting priorities

Governor

- Appoints the head of the state transportation agency and often members of a state transportation board
- Submits legislation to the state legislature
- Initiates the state budget process

State Legislature

- Enacts state transportation laws and annual transportation appropriations
- Approves funding levels for state programs
- Maintains oversight for implementation

U.S. CONGRESS

The United States Congress

- Responsible for enacting national transportation laws and overseeing implementation
- Approves funding levels for transportation programs and enacts annual transportation appropriations

House of Representatives – Committee on Transportation and Infrastructure

- Has jurisdiction over public infrastructure, including such major projects as highways, bridges, airports, locks and dams, and public transit systems

Senate – Environment and Public Works Committee

- Has jurisdiction over all matters relating to environmental protection and resource utilization, including everything from air and water pollution to highways, bridges and dams

Appropriations committees: House and Senate

- Annually appropriates transportation funding according to the authorization legislation (ISTEA, TEA-21, SAFETEA-LU)

FEDERAL RESOURCE AND LAND MANAGEMENT AGENCIES

U.S. Fish and Wildlife Service (FWS)

- Conserves, protects and enhances fish, wildlife and plant habitats
- Manages the refuge system
- Enforces the Endangered Species Act
- May be consulted during early long-range transportation planning at the state and metropolitan levels
- May participate in the environmental review of highway projects, as required if the project has potential impacts to threatened or endangered species
- Jointly administers Refuge Roads program with FHWA
- Conducts refuge planning that includes transportation elements

National Park Service (NPS)

- Oversees a network of nearly 400 natural, cultural and recreational sites and helps communities preserve and enhance important local heritage and recreational opportunities
- May be consulted during early long-range transportation planning at the state and metropolitan levels
- May participate in the environmental review of highway projects, particularly those with potential impacts to national parks
- Jointly administers the Park Roads and Parkways program with FHWA
- Conducts park planning that includes transportation elements

U.S. Forest Service (USFS)

- Manages public lands in national forests and grasslands and provides technical and financial assistance to state and private forestry agencies
- May be consulted during early long-range transportation planning at the state and metropolitan levels
- May participate in the environmental review of highway projects, particularly those with potential impacts to national forests
- Jointly administers the Forest Highways program with FHWA
- Conducts forest planning that includes transportation elements

U.S. Environmental Protection Agency (USEPA)
- Develops and enforces regulations, offers financial assistance, performs environmental research and education
- May be consulted during early long-range transportation planning at the state and metropolitan levels
- Reviews all environmental impact statements and posts information in the *Federal Register*

U.S. Army Corps of Engineers (USACE)
- Provides engineering services including planning, designing building and operating water management resources and other civil works projects
- May be consulted during early long-range transportation planning at the state and metropolitan levels
- Participates in the environmental review of highway projects
- Issues permits under the Section 404 of the Clean Water Act

PROFESSIONAL ASSOCIATIONS

American Association of State Highway Transportation Officials (AASHTO)
- Serves as the professional association for state transportation agencies
- Sets standards and guidelines for building, maintaining and operating roads
- Lobbies state and federal legislature for more transportation funding and less environmental protection restrictions
- Operates in quasi-governmental fashion in that they set policy and practice standards that must be followed by any organization that provides transportation services

Association of Metropolitan Planning Organizations
- Serves as the professional association for all metropolitan planning organizations
- Lobbies state and federal legislature for a larger share of transportation funding and authority at the metropolitan level

National Association of Regional Councils
- Serves as the professional association for regional councils and MPOs
- Lobbies state and federal legislatures for a larger share of transportation funding and authority at the regional council and MPO level

U.S. Conference of Mayors (USCM)
- Serves as the official nonpartisan organization of cities with populations of 30,000 or more, each represented in the Conference by its chief elected official, the mayor.
- Lobbies state and federal legislature for a larger share of transportation funding and authority at the city level

American Planning Association (APA)
- Serves as the professional association representing planners at the urban, suburban, regional and rural level and within all disciplines, including transportation planners.
- The American Institute of Certified Planners conducts research on advances in the art and science of planning
- Serves as a forum for exchange of information among planning professionals
- Lobbies for better planning in transportation, land use and smart growth

American Society of Landscape Architects (ASLA)
- Serves as the national professional association representing landscape architects
- Lobbies for landscape planning, design and preservation and improved water resources management
- Lobbies for sustainable, safe and multi-modal transportation choices as part of landscape design

American Society of Civil Engineers (ASCE)
- Serves as the national professional association representing civil engineers
- Publishes the "Report Card for America's Infrastructure"
- Lobbies for increased transportation funding

American Road & Transportation Builders Association (ARTBA)
- Serves as the lobby arm of the transportation construction industry
- Lobbies for increased transportation funding and fewer environmental and other restrictions

Associated General Contractors of America (AGCA)
- Serves as the lobby arm of the construction industry
- Lobbies for increased funding for construction and fewer environmental and other restrictions

National Society of Professional Engineers (NSPE)
- Promotes engineering licensure and ethics, protects legal rights of engineers, provides continuing education and distributes industry news to the profession

National Stone, Sand and Gravel Association (NSSGA)
- Serves as the lobby arm of the stone, sand and gravel industry that supplies the raw materials for road building and other development.
- Lobbies Congress for increased funding for construction and fewer environmental and other restrictions
- Member of the National Endangered Species Act Reform

Coalition, seeking substantial weakening of the act
Transportation Construction Coalition (TCC)
- Group of 27 national associations and labor unions that make their living from federal transportation programs
- Formed during the reauthorization of TEA-21 to lobby for more funding and less restrictions on road building

TRANSPORTATION RELATED ADVOCACY ORGANIZATIONS

American Highway Users Alliance (AHUA)

- Nonprofit advocacy organization representing automobile related businesses, including Ford Motors, AAA and Goodyear
- Lobbies Congress for additional road building and less environmental protection restrictions
- Tracks a list of the most congested roadways

American Public Transportation Association (APTA)

- Advocates for public transportation programs and initiatives
- Lobbies local, state and federal government in favor of increased funding for public transportation improvements and new systems

Surface Transportation Policy Partnership (STPP)

- Nonprofit coalition striving for improved safety, more equitable distribution of funding and multi-modal solutions through better transportation policy and practice

REFERENCES

Surface Transportation Policy Partnership (STPP). *From the Margins to the Mainstream*: *A Guide to Transportation Opportunities in Your Community*. 2007.

WHAT'S WHAT: HOW ROADS ARE CLASSIFIED

Have you ever wondered why we drive on a parkway and park on a driveway? Despite their names, U.S. routes and interstates are the responsibility of the state transportation agencies where they are located. Our roads aren't always named in a way that makes sense to us, but if you learn a little about the naming and numbering systems, you'll see the method to the madness.

TYPES OF ROADS

By definition, functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of traffic service that they are intended to provide. The next time you take a drive, notice the different roads and types of roads you use. Do you use just one road or even just one type of road? More likely, you use a combination of roads and road types to complete your entire journey. Each type of road has a specific purpose or function, either providing access to destinations or mobility through entire areas. Transportation planners use functional classification to determine how travel can best be channelized within the roadway network in a logical and efficient manner. Therefore, the definitions for functional classification relate to the role that a given route plays in facilitating the flow of trips through a highway network.

All streets and highways are grouped into one of three classes: arterial, collector and local roads. Which class a road is assigned depends entirely on the *character of the traffic* (i.e., local or long distance) and the *degree of access* that the road allows to adjacent properties. Arterials provide a high level of mobility but very little access, while local roads provide a high level of access to adjacent properties but a low level of mobility. Collector roadways provide a balance between mobility and land access. In other words, arterials are meant to move a lot of cars quickly so they are built wide, straight and fast with fewer places to get on and off. Local roads are meant to get you from your house to the grocery store, so they are generally narrower and slower, with less traffic and plenty of access to driveways, shopping and other roads. Collectors are somewhere in between; meant to "collect" you and others from the small, local roads and get you quickly and safely to the big, fast arterials.

Arterial

Arterials are those classes of highways emphasizing a high level of mobility for the through movement of traffic; land access is subordinate to this primary function. Generally, travel speeds and distances are greater on these facilities compared to the other classes. The highest classes of arterials—interstates and freeways—

are limited-access to allow the free flow of traffic.
Percent of entire system: 11 percent (but serve 72 percent of all travel)

Collector

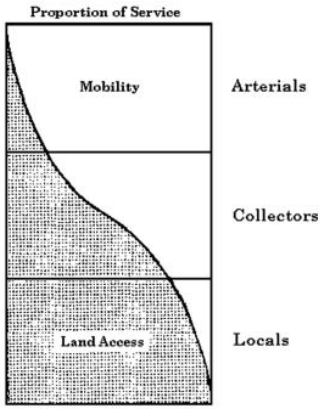
These roads collect traffic from the lower facilities and distribute it to the higher. Collectors provide both mobility and land access. Generally, trip lengths, speeds and volumes are moderate.
Percent of entire system: 20 percent

Local

Local streets and roads provide land access. Travel speeds, distances and volumes are generally low, and through traffic is usually discouraged.
Percent of entire system: 69 percent

Figure II-4

Relationship of functionally Classified Systems in Serving Traffic Mobility and Land Access



But wait, there's more. Roads are also divided into rural and urban designations, as defined by the landscape setting that they serve. As the name suggests, the rural functional classification system covers all streets, roads and highways that are not located within the demographic boundaries of urbanized areas. The urban functional classification system covers all streets, roads and highways located within urban and suburban boundaries designated by the U.S. Census Bureau. The characteristics of each class are as follows:

Rural Principal Arterial
-Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.
-Connect all, or nearly all, urban areas with 50,000 or more people and the majority of urban areas with 25,000 or more people.
-Provide an integrated network of continuous routes.

The Rural Interstate Highway System constitutes a subsystem of Rural Principal Arterials and is composed of those routes specifically designated as Interstate highways. All other non-interstate principal arterials are included in the subsystem Rural Other Principal Arterials.

Rural Minor Arterial
-Connect cities and larger towns (and other major destinations such as resorts capable of attracting travel over long distances) and form an integrated network providing interstate and inter-county service.
-Spaced at intervals so that all developed areas are within a reasonable distance of an arterial.
-Provide service to corridors with trip lengths and travel densities greater than those served by rural collectors and local roads and with relatively high travel speeds and minimum interference to through movement.

Rural Collectors
-Serve primarily intracounty rather than statewide travel.
-Serve more moderate travel speeds and distances than those on arterial routes.

Rural Major Collectors
-Provide service to any county seat, larger towns and other county destinations such as consolidated schools, parks and important mining and agricultural areas not served by an arterial.
-Connect these places with nearby larger towns and cities or with arterial routes.
-Serve the most important intra-county travel corridors.

Rural Minor Collectors
-Are spaced at intervals to collect traffic from local roads and bring all developed areas within reasonable distance of a collector.
-Provide service to smaller communities not served by a higher class facility.
-Connect locally important traffic generators with rural hinterlands.

Rural Locals
-Provide access to adjacent areas.
-Serve travel over relatively short distances.

Urban Principal Arterial
-Serve major activity centers, highest volume corridors and longest trip demands.
-Carry high proportion of total urban travel on minimum of mileage.
-Interconnect and provide continuity for major rural corridors to accommodate trips entering and leaving urban areas and movements through urban areas.
-Serve demand for intra-area travel as between the central business district and outlying residential areas.

The Urban Principal Arterial system is further divided into the following subclasses: Urban Interstate consisting of principal arterials designated as part of the interstate system; Urban Other Freeways/Expressways consisting of non-interstate principal arterials with controlled access; and Urban Other Principal Arterials without controlled access.

Urban Minor Arterials

- Interconnect with and augment the principal arterials.
- Serve trips of moderate length at a somewhat lower level of travel mobility than principal arterials.
- Distribute traffic to smaller geographic areas than those served by principal arterials.
- Provide more land access than principal arterials without penetrating identifiable neighborhoods.
- Provide urban connections for rural collectors.

Urban Collectors

- Serve both land access and traffic circulation in residential and commercial/industrial areas.
- Penetrate residential neighborhoods.
- Distribute and channel trips between local streets and arterials.

Urban Locals

- Provide direct access to adjacent areas.
- Provide access to higher systems.
- Carry no through traffic movement.

FHWA requires state transportation agencies to cooperate with local officials to develop and update statewide highway functional classifications in rural and urban areas to determine functional usage of the existing roads and streets. The results must be mapped and submitted to FHWA for federal-aid highways and serve as the basis for designation to the National Highway System. Many transportation agencies post their state's functional classification maps on their Web sites.

The Interstate Highway System

The Dwight D. Eisenhower National System of Interstate and Defense Highways, commonly referred to as the Interstate Highway System was authorized by the Federal-Aid Highway Act of 1956. Interstate highways receive federal funding, but they are owned and operated by the states in which they are located. Interstates are characterized by controlled access and high speed limits. The entire network covers the 48 contiguous states, serves all major U.S. cities and is a whopping 46,837 miles.

The National Highway System

All men might be created equal, but all roads are not. Certain highways in our system are considered more important than others to the nation's economy, defense and mobility. In an effort to make sure that states take extra special care of these important roads, the U.S. Department of Transportation, in cooperation with the states, local officials and MPOs, established the National Highway System (NHS) in 1995. Once designated as part of the NHS, state transportation agencies receive federal funding to maintain and improve these high-priority routes that would otherwise be the state's responsibility. The NHS is approximately 160,000 miles of highway, including:

- All interstate highways. (The interstate system still retains a separate identity within the National Highway System.)
- Other principal arterials that provide access between an arterial and a major airport or public transportation facility.
- The Strategic Highway Network that provides access, continuity and emergency capabilities for the U.S. military.
- Major strategic highway network connectors that provide access between major military installations.
- Intermodal connectors that provide access between major intermodal facilities and the other four subsystems making up the NHS.

NOTE: A specific highway route may be on more than one subsystem.

Scenic Byways

The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991. Under the program, the U.S. Department of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational and scenic qualities. There are 126 such designated byways in 44 states. Designated byways enjoy certain benefits characterized as the four Ps: promotion, preservation, partnerships and pride.

Conservationists should note that the "natural" quailities that may qualify for a Scenic Byway do include wildlife, but do not necessarily mean quality habitat. While the traveling public may appreciate the scenic values, they don't necessarily translate to conservation values for wildlife.

Toll roads

As if roads weren't expensive enough, some of them charge a fee just to use them. A toll road or turnpike is managed by a toll authority that collects a fee from each driver for use. Tolls are used to generate funds for repayment of the bonds that were used to finance construction and operation of the road. Bridge or tollway authorities can be created by a state legislature to build politicians' pet projects or those projects that the state transportation agency can't complete for various reasons. The Orlando-Orange County Expressway Authority, for example, was created to develop infrastructure in central Florida because it could build expressways faster than the state transportation agency. Toll projects generally operate outside the transportation planning structure with few, if any opportunities for public participation.

Freeways and Expressways

To be considered a freeway, a highway must be divided with fully controlled access. Adjoining property owners do not have a legal right to access the highway by means of driveways. If an existing highway is converted to a freeway, all driveways must be removed and access to adjacent land blocked with walls or fencing. Freeways are also "free-flowing," meaning there are no intersections with traffic lights. All cross traffic is diverted using overpasses, underpasses, bridges and ramps. An expressway is a divided highway with only partially controlled access, and may have a few driveways and at-grade intersections.

Causeways and Viaducts

Some roads that cross wetlands or bodies of water, elevated by banks are called causeways. If the road is supported by a series of arches instead of a bank, it is called a viaduct. A short viaduct is called an overpass. The Causeway in Louisiana is more than 20 miles long and crosses Lake Pontchartrain. Florida has several causeways connecting man-made islands with bridges or connecting barrier islands with the mainland.

HOW ROADS ARE NUMBERED

Highways in the United States are organized in an integrated and numbered grid. The American Association of State Highway and Transportation Officials (AASHTO) and U.S. Department of Transportation coordinate the numbers and locations.

Routes that run from north to south are odd numbered, and routes that run east to west are even numbered. Numbers generally increase from 1 in the east to 101 in the west, and from 2 in the north to 98 in the south. The interstates do just the opposite, increasing from west to east and from south to north. When a two-digit route splits, the "spurs" are assigned three-digit numbers. Initially, the first digit of the spurs increased from north to south and east to west along the parent route.

And if you just can't get enough numbering, each state also has its own highway numbering system, some more systematic than others. Your state has its own design for highway markers, usually with an outline of the state with the number in a circle.

HOW ROADS ARE NAMED

If you do something spectacular, maybe someday they will name a street after you. Besides famous people, roads are often named after landmarks, landscapes, trees and destinations. Roads and streets are given two-part names—the individual name and an indicator of the type of street, for example: Main Road or Park Avenue. In cities with a grid-numbering system, street names can also include a direction (east, west, north, south) or a quadrant (NW, SW, NE, SE).

Directional designations are used to differentiate the two sections of a street on either side of a central point or line.

Some communities categorize roadways according to direction. Both Manhattan and Seattle use a grid system whereby east-west roadways are "streets" and north-south roadways are called "avenues." St. Petersburg, Florida uses the exact opposite system. In the District of Columbia, north-south streets are numbered and east-west streets are alphabetically ordered.

STREET TYPE DESIGNATIONS

Major roads	Small roads	Culs de sac	Named for their shape	Named for geographical attributes	Named for their function
Avenue	Alley	Court	Circle	Hill	Esplanade
Boulevard	Bay	Place	Crescent	Causeway	Park
Road	Drive	Cove	Square	Canyon	Promenade
Street	Gate		Loop		Bypass
	Grove				
	Heights				
	Lane				
	Pathway				
	Terrace				
	Trail				
	View				
	Way				

REFERENCES

FHWA *Flexibility in Highway Design*
http://www.fhwa.dot.gov/environment/flex/ch03.htm

FHWA Functional Classification Guidelines
http://www.oim.dot.state.mn.us/funclass-update/pdf/FHWA%20Guidelines.pdf

FEDERALLY FUNDED TRANSPORTATION PROGRAMS

I. CORE FEDERAL HIGHWAY FUNDING PROGRAMS

Bridge Program
http://www.fhwa.dot.gov/safetealu/factsheets/bridge.htm

Congestion Mitigation and Air Quality Improvement Program (CMAQ)
http://www.fhwa.dot.gov/environment/cmaqpgs/

Equity Bonus
http://www.fhwa.dot.gov/safetealu/factsheets/equitybonus.htm

Highway Safety Improvement Program (HSIP)
http://www.fhwa.dot.gov/safetealu/factsheets/hsip.htm

Interstate Maintenance (IM)
http://www.fhwa.dot.gov/safetealu/factsheets/im.htm

National Highway System (NHS)
http://www.fhwa.dot.gov/hep10/nhs/
http://www.fhwa.dot.gov/safetealu/factsheets/nhs.htm
http://www.fhwa.dot.gov/hep/envrestore.htm

Surface Transportation Program (STP)
http://www.fhwa.dot.gov/safetealu/factsheets/stp.htm
Transportation Enhancements (TE)
http://www.enhancements.org/

II. MAJOR FEDERAL TRANSIT FUNDING PROGRAMS

Bus and Bus-Related Equipment and Facilities
http://www.fta.dot.gov/grant_programs/specific_grant_programs/buses_facilities/4249_7958_ENG_HTML.htm

Elderly and Persons with Disabilities Grants
http://www.fta.dot.gov/legal/federal_register/2004/16290_17889_ENG_HTML.htm

Fixed Guideway Modernization Program
http://www.fta.dot.gov/funding/grants/grants_financing_3558.html

Job Access and Reverse Commute Program (JARC)
http://www.fta.dot.gov/documents/FTA_JARC_Fact_Sheet_Sept05.pdf

New Freedom Program
http://www.fta.dot.gov/17003_ENG_HTML.htm

New Starts Program
http://www.fta.dot.gov/documents/FTA_New_Starts_Fact_Sheet_Sept05.pdf

Non-Urbanized Area Formula Program
http://www.aot.state.vt.us/publictrans/5311appropriation.htm#5311

Urbanized Area Formula Grants
http://www.fta.dot.gov/17003_ENG_HTML.htm

III. SPECIFIC PURPOSE TRANSPORTATION FUNDING PROGRAMS

Programs in this section cover funding sources for environmental, historic, financing, limited purpose, or limited recipients programs.

Alternative Transportation in Parks and Public Lands Program
http://www.nps.gov/transportation/alt/ats-study.htm

Appalachian Development Highway System Program (ADHS)
http://www.fhwa.dot.gov/safetealu/factsheets/appalachia.htm

Capital Grants for Rail Line and Relocation Projects
www.ruraltransportation.org/library/crstealu.pdf

Clean Fuels Grant Program
http://www.fta.dot.gov/grant_programs/specific_grant_programs/clean_fuels_formula/4535_7990_ENG_HTML.htm

Federal Lands Highways (FLH)
http://www.fhwa.dot.gov/safetealu/factsheets/fedlands.htm

Ferry Boats and Terminals
http://www.apta.com/government_affairs/safetea_lu/brochure.cfm#link42

Freight Intermodal Distribution Pilot Program
http://www.fhwa.dot.gov/freightplanning/safetea_lu.htm

Idling Reduction Facilities on Interstate Rights-of-Way
http://www.fhwa.dot.gov/safetealu/factsheets/idlereduction.htm

National Corridor Infrastructure Improvement
http://www.fhwa.dot.gov/safetealu/factsheets/corridors.htm

National Historic Covered Bridge Preservation Program
http://www.fhwa.dot.gov/safetealu/factsheets/histcovbridges.htm

National Scenic Byways Program
http://www.byways.org/
http://www.bywaysonline.org/grants/guidance/categories

Public Transportation on Indian Reservations
http://www.fta.dot.gov/17003_ENG_HTML.htm

Railroad Rehabilitation and Improvement Financing
http://www.fra.dot.gov/us/content/268

Recreational Trails
http://www.fhwa.dot.gov/environment/rectrails/

Roadway Safety Improvements for Older Drivers and Pedestrians
http://safety.fhwa.dot.gov/older_driver/index.htm

Safe Routes to School Program
http://safety.fhwa.dot.gov/saferoutes/index.htm

State Infrastructure Banks (SIB)
http://www.fta.dot.gov/17003_ENG_HTML.htm
http://www.innovativefinance.org/topics/finance_mechanisms/state_credit/statecredit.asp

Tax-exempt Financing of Highway Projects and Rail Truck Transfer Facilities (Private Activity Bonds)
http://www.fhwa.dot.gov/safetealu/summary.htm

Facilities (Private Activity Bonds)Transportation, Community, and System Preservation (TCSP)
http://www.fhwa.dot.gov/safetealu/factsheets/tcsp.htm
http://www.fhwa.dot.gov/tcsp/

Transportation Infrastructure Finance and Innovation Act (TIFIA)
http://www.fhwa.dot.gov/safetealu/factsheets/tifia.htm

Truck Parking Facilities Program
http://www.fhwa.dot.gov/safetealu/factsheets/truckpark.htm

Value Pricing Pilot Program
http://www.fhwa.dot.gov/policy/otps/valuepricing.htm

Appendix

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ARTBA	American Road and Transportation Builders' Association
BLM	Bureau of Land Management
BTS	Bureau of Transportation Statistics
CAA	Clean Air Act
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
ICOET	International Conference on Ecology and Transportation
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation System
LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization
NCHRP	National Cooperative Highway Research Program
NEP	National Environmental Policy Act of 1969
NHS	National Highway System
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRC	Natural Resource Council
NRHP	National Register of Historic Places
R&D	Research and development
ROD	Record of Decision
ROW	Right of way
STIP	State Transportation Improvement Program
T&E	Threatened and endangered (species)
TE	Transportation Enhancement program
TEA – 21	Transportation Equity Act for the 21st Century
TRB	Transportation Research Board
TRIS	Transportation Research Information Service
USACE	Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Appendix

WEBSITES

GOVERNMENT

Arizona Game and Fish Wildlife Crossing Guidelines
http://www.azgfd.gov/hgis/guidelines.aspx
Includes bridge and culvert guidelines for wildlife passage.

Critter Crossings: Linking Habitats and Reducing Roadkill
http://www.fhwa.dot.gov/environment/wildlifecrossings/
This DOT/FHWA web site describes transportation's impacts on wildlife and highlights exemplary projects and processes that are helping to reduce these impacts.

Department of Transportation Homepage
http://www.dot.gov/
The mission of the department is to: serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future.

Directory of State Departments of Transportation
http://www.fhwa.dot.gov/webstate.htm
Links to each state.

Exemplary Ecosystem Initiatives
http://www.fhwa.dot.gov/environment/ecosystems/index.htm
Examples of how exemplary ecosystem initiatives in eight states are reducing habitat fragmentation and barriers to animal movement, encouraging the development of more sustainable mitigation sites, stimulating *early* ecosystem planning and fostering ecosystem-based research.

Federal Highway Administration Homepage
http://www.fhwa.dot.gov/
FHWA is charged with the broad responsibility of ensuring that America's roads and highways continue to be the safest and most technologically up-to-date. Although state, local, and tribal governments own most of the nation's highways, FHWA provides financial and technical support to them for constructing, improving and preserving America's highway system.

Federal Register
http://www.gpoaccess.gov/fr/index.html
Published by the Office of the Federal Register, National Archives and Records Administration, the Federal Register is the official daily publication for rules, proposed rules and notices of federal agencies and organizations, as well as executive orders and other presidential documents.

FHWA Environmental Guidebook
http://www.environment.fhwa.dot.gov/guidebook/index.asp
Provides information on a variety of environmental and transportation planning topics and includes the following: FHWA contact information, training opportunities, FHWA policy and guidance, state practices from the Streamlining and Stewardship Practices database, transportation and environment websites, list of related *Successes in Stewardship* newsletters, and related documents.

FHWA Environmental Research Program Projects Database
http://itre.ncsu.edu/fhwa-erp/fhwa-erpsearch.htm
Tracks and documents active and completed research from 1990 to present that has been funded by FHWA Environmental Research Program.

FHWA Planning and Environment Linkages
http://www.environment.fhwa.dot.gov/integ/index.asp
Offers information developed and compiled by the FHWA and its partners to assist in strengthening planning and environment linkages.

FHWA Tool for Integrating Land Use and Transportation Decision-Making
http://www.fhwa.dot.gov/planning/landuse/index.htm
A web-based source of methods, strategies, and procedures for integrating land use and transportation planning, decision-making and project implementation.

Forest Service-Fish Passage Through Culverts Annotated Bibliography
http://www.stream.fs.fed.us/fishxing/biblio.html
Annotated bibliography of 96 articles pertaining to fish passage through culverts.

Forest Service Road Management Website
http://www.fs.fed.us/eng/road_mgt/
The Forest Service's road management policy directs the agency to maintain a safe, environmentally sound road network that is responsive to public needs and affordable to manage.

House Committee on Transportation and Infrastructure
http://www.house.gov/transportation/

Oversees highway, aviation, rail and maritime transportation systems, the Coast Guard, the Smithsonian Museum and all of the nation's public buildings, and constructs environmental infrastructure.

Keeping it Simple: Easy Ways to Help Wildlife Along Roads

http://www.fhwa.dot.gov/environment/wildlifeprotection/index.cfm
Highlights easy ways of reducing highway impacts on wildlife.

National Park Service – Transportation in the Parks

http://www.nps.gov/transportation/
This site includes links to find out more information regarding both the Park Roads and Parkways Program and the Alternative Transportation Program.

National Wildlife Refuge System

http://refuges.fws.gov/
The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of the present and future generations of Americans.

Senate Environment and Public Works Committee

http://epw.senate.gov/

Subcommittee on Transportation and Infrastructure

http://epw.senate.gov/public/index.cfm?FuseAction=Subcommittees.Subcommittee&Subcommittee_id=674f3658-3031-4d47-b4ad-5308cb97e7f5

U.S. Army Corps of Engineers

http://www.usace.army.mil/
The Corps's mission is to provide quality, responsive engineering services to the nation including navigation, flood control, environmental protection, disaster response, military construction and support for other defense and federal agencies.

U.S. Environmental Protection Agency

http://www.epa.gov/
EPA's mission is to protect human health and to safeguard the natural environment—air, water and land—upon which life depends.

U.S. Fish and Wildlife Service

http://www.fws.gov/
The U.S. Fish and Wildlife Service is a bureau within the Department of the Interior. Its mission is to work with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.

U.S. Forest Service

http://www.fs.fed.us/
Established in 1905, the Forest Service is an agency of the U.S. Department of Agriculture. It manages public lands in national forests and grasslands "to provide the greatest amount of good for the greatest amount of people in the long run."

National Park Service

http://www.nps.gov/
Promotes and regulates the use of the national parks so as to conserve scenery, natural and historic objects, and wildlife such that the parks will be unimpaired for the enjoyment of future generations.

Washington Department of Transportation's Ecological Retrofit Program

http://www.wsdot.wa.gov/environment/fishpass/default.htm
Washington state's DOT Ecological Retrofit Program has been established to address impairments to fish habitat associated with the state's transportation infrastructure. Its two components are: removing fish passage barriers and retrofitting chronic environmental deficiencies.

Wildlife Collision Prevention Program

http://www.wildlifeaccidents.ca/
The Wildlife Collision Prevention Program seeks to save human lives and prevent injuries, protect wildlife species from unnecessary death and injury, and reduce the economic losses to society caused by wildlife vehicle collisions.

NON-GOVERNMENTAL ORGANIZATIONS

American Farmland Trust

http://www.farmland.org/default.asp
Founded in 1980, American Farmland Trust works to stop the loss of productive farmland and to promote farming practices that lead to a healthy environment.

American Wildlands

http://www.wildlands.org/
Using science and state-of-the-art computer mapping, Wildlands identifies and prioritizes the wild lands, waters and species habitat most in need of conservation. They also work with decision makers to shape policies and projects.

Defenders of Wildlife Habitat and Highways Campaign

http://www.defenders.org/habitat/highways/
The campaign works to reduce the impact of roads and highways on wildlife and habitat by advocating for modifying existing

roads, and for reducing future impacts by incorporating wildlife conservation into transportation planning.

Defenders of Wildlife Habitat and Highways Campaign Guide to SAFETEA-LU

http://www.defenders.org/habitat/highways/safetea/
An in-depth look at the policies of the 2005 bill and how it affects the environment and wildlife.

Environmental Defense-Transportation

http://www.environmentaldefense.org/cleanairforlife.cfm?subnav=ps_traffic
From influencing policy at the national, state and regional level to organizing local carpools, Environmental Defense focuses on the best, most equitable way for America to get from here to there without harming the environment.

Environmental and Energy Study Institute

http://www.eesi.org/
Environmental and Energy Study Institute promotes environmentally sustainable societies. EESI produces public policy initiatives that encourage social and economic patterns that sustain people, the environment and the natural resources.

Foundation Center

http://www.foundationcenter.org/
The Foundation Center is the nation's leading authority on philanthropy, connecting nonprofits and the grantmakers supporting them to tools they can use and information they can trust. The center maintains the most comprehensive database on U.S. grantmakers and their grants. They also operate research, education and training programs designed to advance philanthropy at every level.

Friends of the Earth

http://www.foe.org/camps/eco/r2r.html
Friends of the Earth works with conservative taxpayer groups and community activists across the nation to oppose many unneeded and unwise roadways.

Groundspring

http://www.groundspring.org/
Groundspring provides integrated services for small to medium-sized nonprofit organizations to help them become more effective users of internet technology in their fundraising and management of donors and supporters.

I-90 Wildlife Bridges Coalition

http://www.i90wildlifebridges.org/
Works with a diverse set of organizations and agencies to ensure the I-90 expansion in Washington state meets a high standard for wildlife connectivity as well as human safety and transportation efficiency.

The Humane Society of the United States: Give Wildlife a Brake

http://www.hsus.org/wildlife/issues_facing_wildlife/wildlife_crossings_wild_animals_and_roads/suggestions_for_driving_with_wildlife_in_mind.html
Suggestions for driving with wildlife in mind.

Izaak Walton League of America-Alternative Practices for Highway Stormwater Management

http://www.iwla.org/index.php?id=397
A four-part Webcast series outlines the latest techniques available to help transportation agencies save money, comply with water quality and water supply regulations, and improve water quality with context-sensitive stormwater management practices.

Land Trust Alliance

http://www.lta.org/
Promotes voluntary land conservation and strengthens the land trust movement by providing the leadership, information, skills and resources land trusts need to conserve land for the benefit of communities and natural systems.

Land Trust Alliance – National Land Trust Census

http://www.lta.org/census/
For several decades, the Land Trust Alliance has been tracking national trends in private land conservation, with each five-year report showing dramatically more land protected than ever before.

National Trust for Historic Preservation

http://www.nationaltrust.org/index_flash.html
The National Trust for Historic Preservation provides leadership, education and advocacy to save America's diverse historic places and revitalize our communities.

Natural Resources Defense Council

http://www.nrdc.org/land/forests/roads/eotrinx.asp
Annotated bibliography from 1999 provides an overview of primary research documenting the adverse impacts of roads and logging on North American forest ecosystems.

Natural Resources Defense Council: Smart Growth
http://www.nrdc.org/cities/smartGrowth/default.asp
Through a range of projects, NRDC is working on smart-growth solutions that can help curtail sprawl and build more sustainable communities for the 21st century.

NatureServe
http://www.natureserve.org
NatureServe and its network of natural heritage programs are a high-quality source for information about rare and endangered species and threatened ecosystems.

Rails-to-Trails Conservancy
http://www.railtrails.org/
Rails-to-Trails Conservancy is creating a nationwide network of trails from former rail lines and connecting corridors to build healthier places for healthier people.

Scenic America
http://www.scenic.org/
Scenic America is dedicated to preserving and enhancing the scenic character of America's communities and countryside.

Sierra Club Challenge to Sprawl Campaign
http://www.sierraclub.org/sprawl/
Works to fight poorly planned runaway development and promotes smart growth communities that increase transportation choices, reduce air and water pollution, and protect our natural places.

Smart Growth Network
http://www.smartgrowth.org/
Encourages development that better serves the economic, environmental and social needs of communities. The Network provides a forum for information sharing, education, tool development and application, and collaboration on smart growth issues.

Southern Rockies Ecosystem Project
http://www.restoretherockies.org/about.html
Founded in 1992, the Southern Rockies Ecosystem Project is a non-profit conservation science organization working to protect, restore and connect ecosystems in the Southern Rockies of Colorado, Wyoming and New Mexico.

Southern Rockies Ecosystem Project ARC Internet Map Server
http://www.restoretherockies.org/arc_ims.cfm
Internet Map Server is a mapping tool which provides important data to local groups that are working on behalf of wildlands in the Southern Rockies.

Surface Transportation Policy Project
http://www.transact.org/
Surface Transportation Policy Project's goal is to ensure that transportation policy and investments help conserve energy, protect environmental and aesthetic quality, strengthen the economy, promote social equity, and make communities more livable.

Surface Transportation Policy Project-Guide to TEA-21
http://www.transact.org/report.asp?id=74
This users guide to TEA-21 gives an in-depth look at policies and funding, explains major features and key opportunities for making progress, and explores potential pitfalls.

Tri-State Transportation Campaign
http://www.tstc.org/
The Tri-State Transportation Campaign is an alliance of public interest, transit advocacy, planning and environmental organizations working to reform transportation policies in the New York-New Jersey-Connecticut metropolitan region.

Urban Land Institute
http://www.uli.org/
The mission of the Urban Land Institute is to provide leadership on the responsible use of land to enhance the total environment.

Utahns for Better Transportation
http://www.utahnsforbettertransportation.org/index.html
The purpose of this organization is to balanced transportation choices that will serve our neighborhoods, respect our environment and provide access for all Utahns while enhancing our future quality of life.

Wildlands Center for Preventing Roads
http://www.wildlandscpr.org/
Wildlands Center for Preventing Roads works to protect and restore wildland ecosystems by preventing and removing roads and limiting motorized recreation. We are a national clearinghouse and network, providing citizens with tools and strategies to fight road construction, deter motorized recreation, and promote road removal and revegetation. We seek to protect native ecosystems and biodiversity by recreating an interconnected network of roadless public wildlands.

World Environmental Organization-100 Top Transportation Sites
http://www.world.org/weo/transportation
Editors at the World Environmental Organization have located over 1,000 of the most useful environment related web sites. These sites have been arranged into several categories, each containing 100 web sites.

ACADEMIC/RESEARCH

Banff National Park (Canada) Highway Effects on Wildlife: A Research, Monitoring and Adaptive Mitigation Study

http://www.praxis.ca/banfftwinning/pdfs/ProgressReport3.PDF
In 1996, park ecologists began a research and monitoring program that addresses the potential effects of highways on wildlife populations along the Trans-Canada corridor in the park.

The Center for Transportation and the Environment

http://www.itre.ncsu.edu/CTE/
Center for Transportation and the Environment is a U.S. Department of Transportation university transportation center, located at North Carolina State University. CTE seeks to mitigate the impacts of surface transportation on the environment through programs of research, education and technology transfer.

Conservation GeoPortal

http://www.conservationmaps.org/index.jsp
A collaborative effort by and for the conservation community to facilitate the discovery and publishing of geographic information systems (GIS) data and maps.

Deer-Vehicle Crash Information Clearinghouse (DVCIC)

http://www.deercrash.com/
The Deer-Vehicle Crash Information Clearinghouse is a project funded by the Wisconsin Department of Transportation that cooperatively involves transportation departments of the five states in the region: Illinois, Iowa, Michigan, Minnesota and Wisconsin.

Environmental Stewardship Practices, Procedures and Policies for Highway Construction and Maintenance

http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/
This report presents a compendium of environmental stewardship practices in construction and maintenance, developed from the literature, state transportation agency manuals and procedures, and the contributions of state DOTs and practitioners. Sponsored by the American Association of State and Highway Transportation Officials (AASHTO) in cooperation with FHWA and conducted by the National Cooperative Highway Research Program.

ICOET: International Conference on Ecology & Transportation

http://www.icoet.net/index.asp
Conducted every two years, ICOET is designed to address the broad range of ecological issues related to surface transportation development, providing the most current research information and best practices in the areas of wildlife, fisheries, wetlands, water quality, overall ecosystems management and related policy issues. ICOET is a multi-disciplinary, inter-agency supported event.

Infra Eco Network Europe

http://www.iene.info/
A European network of authorities and experts involved in the phenomena of habitat fragmentation caused by the construction and use of linear transport infrastructure, especially motorways, railways and canals.

Jack H. Berryman Institute

http://www.berrymaninstitute.org/
Based in the Department of Wildland Resources at Utah State University and the Department of Wildlife and Fisheries at Mississippi State University, the Berryman Institute is dedicated to improving human-wildlife relationships and resolving human-wildlife conflicts through teaching, research, and extension.

Mineta Transportation Institute

http://www.transweb.sjsu.edu/
Established by Congress in 1991, Mineta Transportation Institute focuses on international surface transportation policy issues as related to three primary responsibilities: research, education and technology transfer.

Turner-Fairbank Highway Research Center

http://www.tfhrc.gov/
Turner-Fairbank Highway Research Center is a federally owned and operated research facility in McLean, Virginia. TFHRC is the home of the FHWA's Office of Research, Development and Technology.

University of California Davis Road Ecology Center

http://johnmuir.ucdavis.edu/road_ecology/
The center brings together researchers and policy makers from ecology and transportation to design sustainable transportation systems based on an understanding of the impact of roads on natural landscapes and human communities.

University of California Davis Road Ecology Center – eScholarship Repository

http://repositories.cdlib.org/jmie/roadeco/
Catalogues and makes available for download papers on road ecology.

Victoria Transport Policy Intitute

http://www.vtpi.org/
The Victoria Transport Policy Institute is an independent research

organization dedicated to developing innovative and practical solutions to transportation problems to help improve transportation planning and policy analysis.

The Volpe Center
http://www.volpe.dot.gov/
Helps decision-makers define problems and pursue solutions to lead transportation through research and development, engineering and analysis.

Western Transportation Institute
http://www.coe.montana.edu/wti/
A University Transportation Center specializing in rural transportation research and education.

Wildlife Crossings Toolkit
http://www.wildlifecrossings.info/
A searchable database of cases where wildlife crossing problems have been attempted to be solved. It also provides links, a glossary of terms and a selection of articles that discuss wildlife and highway issues.

Wildlife and Roads:
http://www.wildlifeandroads.org/
A resource for mitigating the effects of roads on wildlife using wildlife crossings such as overpasses, underpasses and crosswalks. This website is a dynamic part of a National Cooperative Highway Research Program sponsored research project titled: Evaluation of the Use and Effectiveness of Wildlife Crossings. Includes search engine.

World Bank – Roads and the Environment
http://www.worldbank.org/transport/publicat/reh/toc.htm
The objective of this handbook is to provide a description of practical methods which are useful in designing and executing effective environmental assessments (EAs) to those who are involved in various aspects of road projects, from planning to construction to maintenance.

PROFESSIONAL ASSOCIATIONS

Association of Fish and Wildlife Agencies
http://www.fishwildlife.org/
AFWA represents all of North America's fish and wildlife agencies.

Association of Metropolitan Transportation Organizations
http://www.ampo.org/
Association of Metropolitan Transportation Organizations is a nonprofit, membership organization established in 1994 to serve the needs and interests of Metropolitan Planning Organizations (MPOs) nationwide. MPOs are responsible for urban planning, programming and coordination of federal highway and transit investments.

INFORMATION, MAPPING, AND DATABASES

Bureau of Transportation Statistics
http://www.bts.gov/
Bureau of Transportation Statistics was established as a statistical agency in 1992 to administer data collection, analysis, and reporting, and to ensure the most cost-effective use of transportation-monitoring resources.

Bureau of Transportation Statistics – Pocket Guide to Transportation 2007
http://www.bts.gov/publications/pocket_guide_to_transportation/2007/pdf/entire.pdf
Designed as a quick reference to the changes in the U.S. transportation system since 1970 and how they have affected the nation's economy, safety, energy use and the environment.

Center for Transportation and Environment-Wildlife, Fisheries and Transportation Research Database
http://itre.ncsu.edu/CTE/gateway/wildlife.htm
Searchable database.

Context Sensitive Solutions
http://www.contextsensitivesolutions.org/
Context Sensitive Solutions is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.

ESRI GIS and Mapping Software
http://www.esri.com/industries/transport/index.html
GIS is useful for managing, planning, evaluating, and maintaining transportation systems. Here you can learn about what GIS has to offer for transportation.

National Transportation Enhancements Clearinghouse
http://www.enhancements.org/
The National Transportation Enhancements Clearinghouse is an information service sponsored by FHWA and Rails-to-Trails Conservancy. Communities across America use Transportation

Enhancements funds from the federal government to expand travel choice, strengthen the local economy, improve the quality of life and protect the environment.

National Transportation Library

http://ntl.bts.gov/
The National Transportation Library was established in 1998 and serves as a repository of materials from public, academic and private organizations. NTL's mission is to increase access to the information that supports transportation policy, research, operations and technology transfer activities.

State DOT Search Engine by Google

http://www.google.com/coop/cse?cx=006511338351663161139%3Acnk1qdck0dc
This website allows users to search all 50 DOTs at once, as well as search other transportation-related groups such as public transit agencies, university transportation centers and metropolitan planning organizations.

Thomas: The Ultimate Guide to Congress

http://thomas.loc.gov/
Launched in 1995, Thomas makes federal legislative and other information freely available to the public online.

Wildlands Center for Preventing Roads Bibliographic Database

http://www.wildlandscpr.org/databases/index.html
Bibliographic database of over 10,000 citations documenting the physical and ecological effects of roads and off-road vehicles. Search by keywords at
http://www.wildlandscpr.org/Search/search.php

LISTSERVS AND NEWSLETTERS

The BEAT News

Berkshire Environmental Action Team is an all-volunteer organization dedicated to protecting the environment of Berkshire County, Massachusetts. They are supported by contributions from citizens like you and by a small grant from the New England Grassroots Environmental Fund.

To subscribe visit:
http://www.thebeatnews.org/News/news.html

BNA Transportation/Environment Alert.

Transportation/Environment Alert is a weekly e-mail news service published by the Bureau of National Affairs, Inc., in Washington, and sponsored by the American Association of State Highway and Transportation Officials' Standing Committee on the Environment, Environmental Technical Assistance Program.

For customer service including subscriptions, address changes and retransmission, call 1-800-372-1033, Option #4; fax: 202-452-4644, e-mail; *bnaplus@bna.com*.

CARGO-L

Discussion list for anyone involved in international transactions or that have to move cargo to and from anywhere. CARGO-L should debate the future of transportation, goods and information flows, legal, practical and theoretical aspects in transportation.

Address to subscribe: maiser@trasporti.cineca.it
Message to send: subscribe cargo-l (Your First Name) (Your Last Name)

Context Sensitive Solutions Newsletter

The bi-monthly CSS newsletter keeps you up-to-date on the latest CSS-related news and information in the transportation community.

To subscribe visit: *http://www.contextsensitivesolutions.org/*

Defenders Wildlife eNews

E-mailed once a month, the newsletter is filled with great stories and features on the animals we all care about. Also featured are timely action alerts with exciting new ways to help protect wildlife and the habitat it needs to survive.

To subscribe visit:
http://action.defenders.org/site/Survey?SURVEY_ID=1220&ACTION_REQUIRED=URI_ACTION_USER_REQUESTS

DOT
A privately run mailing list for transit supporters and anti-road activists.

Address to subscribe: dot@t3ew.dot.ca.gov
How to subscribe: Put the word "subscribe" (without quotes) in the "Subject:" line. Note that this is different than most lists. Subscriptions are handled manually.

E&E Daily, Greenwire and Land Letter
Environment & Energy Publishing is the leading source for comprehensive, daily coverage of environmental and energy politics and policy. Every day, E&E's hard-hitting, original reporting plugs subscribers into the issues facing the White House, Congress, the courts, federal agencies and the states.

Visit *http://www.eenews.net/* and start a free trial or subscribe to one or more of its many services and newsletters.

Environmental Law Institute National Wetlands Newsletter
Six times a year, this newsletter takes you behind the headlines and reports on issues dominating the wetland agenda.

To subscribe visit: *http://www.elistore.org/nwn.asp*

Federal Highway Administration Successes in Stewardship Newsletter
FHWA's monthly newsletter highlighting current environmental streamlining practices from around the country.

To read previous newsletters or to subscribe visit:
http://www.environment.fhwa.dot.gov/strmlng/es4newsltrs.asp

Federal Register Daily Notice
The *Federal Register* (a daily publication of the Federal government) is a legal newspaper published every business day by the National Archives and Records Administration. It contains: Federal agency regulations, proposed rules and public notices, executive orders, proclamations and other presidential documents.

To subscribe to a daily email version of the Federal Register visit:
http://www.archives.gov/federal-register/the-federal-register/email-signup.html

Fish and Wildlife Service National and Regional Listserves
Provides the latest news releases, bulletins, and other information issued by the Office of Public Affairs in Washington about U.S. Fish and Wildlife Service activities. Everyone interested in fish and wildlife conservation is invited to subscribe.

To subscribe to national or regional newsletters visit:
http://www.fws.gov/news/NewsReleases/listser.html

GIST-L
Discussion list about Geographic Information Systems and transportation.

Address to subscribe: listserv@ukacrl.bitnet
Message to send: subscribe gist-l (Your First Name) (Your Last Name)

Greener Roadsides
Greener Roadsides is a quarterly publication of the Federal Highway Administration, Office of Planning, Environment and Realty. It focuses on: information sharing, noxious weeds, native plants, restoration, vegetation management and public policy.

To subscribe:
Send an email to *mj2@lists.ncsu.edu*
Leave the subject header blank
In the body, type "subscribe roadsides"
Do not include a signature

Grist Magazine: Environmental News & Commentary
Daily and weekly environmental news with a sense of humor.

To subscribe to any of Grist's six free newsletters, visit:
http://www.grist.org/cgi-bin/signmeup.pl

Headwaters News
Headwaters News provides news about politics, conservation, development, water and endangered species issues in the western United States

To subscribe visit:
http://www.headwatersnews.org/HeadwatersSub.html

HerpDigest
Free weekly electronic newsletter that reports on the latest news on herpetological conservation and science.

To subscribe visit *http://www.herpdigest.org/*

Izaak Walton League of America Highway Stormwater Management Listserv

An open forum for the posting and discussion of news, information, ideas, success stories and questions about alternative practices to manage highway runoff, including low-impact development techniques.

To subscribe visit: *http://www.iwla.org/index.php?id=253*

Inside Transportation News E-Newsletter

The purpose of the newsletter is to share information with transportation and planning professionals and other National Park Service partners.

To subscribe visit:
http://www.nps.gov/transportation/alt/toolbox.htm

International Association for Bear Research and Management, International Bear News

For information on subscription please visit: *http://www.bearbiology.com/membrshp.htm*
or email *grizzly-commons@rockies.ca*

ITS-Davis E-News

ITS-Davis e-news is the electronic newsletter of the University of California Davis Institute of Transportation Studies. Written for alumni and friends, this newsletter reports information from ITS-Davis and affiliated campus departments that host transportation-related programs.

To subscribe visit: *http://www.its.ucdavis.edu/news/*

National Transportation Enhancements Clearinghouse Connections newsletter

NTEC's quarterly newsletter contains Transportation Enhancements-related news from Capitol Hill, technical articles on TE project development; new TE-related resources; and examples of outstanding new TE projects. The archive contains PDF versions of all Connections quarterly newsletters.

To subscribe for paper or email versions visit:*http://www.enhancements.org/connections.asp*

New West

New West is a network of online communities devoted to the culture, economy, politics, environment and overall atmosphere of the Rocky Mountain West.
To subscribe visit: *http://www.newwest.net/index.php/member/register/*

Red Lodge Clearinghouse Newsletter

The mission of the Red Lodge Clearinghouse is to support, nurture and connect collaborative natural resource groups. It is a forum for collaborators -practitioners, policy-makers, elected officials, agency leaders and field staff, donors and conservationists - to better understand the realities of collaborative work in resource management where it happens, on the ground.

To subscribe to the periodic e-mail newsletter visit:
http://www.redlodgeclearinghouse.org/newslist/Subscribe.cfm

Road Ecology Center listserv

The University of California Davis Road Ecology Center brings together researchers and policy makers from ecology and transportation to design sustainable transportation systems based on an understanding of the impact of roads on natural landscapes and human communities.

To subscribe visit: *http://roadecology.ucdavis.edu/listserv.html*

Roadsides

Roadsides is a moderated listserv for transportation officials, scientists and practitioners - universities, public interest groups and private consultants, and agency partners at all levels of government, working in vegetation management relevant to highway corridors. The list includes subscribers who work in the areas of landscape, maintenance, environmental services, erosion control and turf establishment, noxious weeds and native plants to increase information-sharing and networking. In addition, the list includes subscribers who are active in the Federal Interagency Committee for the Management of Noxious and Exotic Weeds along with Weeds Across Borders. Roadsides is an activity of the Federal Highway Administration and is hosted by the Center for Transportation and the Environment.

To subscribe:
Send an email to *mj2@lists.ncsu.edu*
Leave the subject header blank
In the body, type "subscribe roadsides"
Do not include a signature

Rural Transportation

Rural Transportation, originally developed by the National Association of Counties and the National Association of Development Organizations, serves as an information clearinghouse for regional development professionals, local government officials and others interested in rural transportation planning and development issues.

To subscribe visit:
http://www.ruraltransportation.org/peers/index.shtml

Transit
Transit issues discussion list.

Address to subscribe: listserv@gitvm1.gatech.edu
Message to send: subscribe transit (Your First Name) (Your Last Name)

Transit - Alternatives
Discussion list for transit alternatives such as personal rapid transit, people movers and monorails.

Address to subscribe: majordomo@bga.com
Message to send: subscribe transit-alternatives (Your First Name) (Your Last Name)

TransEnviro
TransEnviro is a moderated listserv for government officials, public interest groups, and people in the private sector working in the transportation and environmental fields. The list serves as an informal network for the exchange of news about current research, discussion of problems and solutions, requests for advice and assistance and announcements of upcoming conferences and events. This list covers a very broad range of environmental topics related to surface transportation planning, project development and construction and maintenance.

To subscribe: Send an email to *mj2@lists.ncsu.edu*
Leave the subject header blank
In the body, type "subscribe transenviro"
Do not include a signature

Transp-l
Transportation discussion list hosted by the George Mason University Institute of Public Policy.

Address to subscribe: listproc@gmu.edu
Message to send: subscribe transp-l (Your First Name) (Your Last Name)

TransWild Alliance
Founded in November, 2005, TransWild Alliance is an informal alliance among conservation organizations striving to influence transportation projects and policy and reduce impacts on wildlife.

To join, email *twhite@defenders.org* and stay tuned for *www.TransWildAlliance.org*

Transportation Research E-Newsletter
The Transportation Research Board (TRB) Transportation Research E-Newsletter regularly covers transportation research developments in the United States and abroad.

All articles appearing in the E-Newsletter are also available on TRB's web page *http://www.TRB.org* To begin receiving the E-Newsletter send an e-mail note to *rhouston@nas.edu* with "TRB E-Newsletter" in the message's subject field.

Victoria Transport Policy Institute
The Victoria Transport Policy Institute is an independent research organization dedicated to developing innovative and practical solutions to transportation problems. It provides a variety of resources available free at this website to help improve transportation planning and policy analysis.

To subscribe to the quarterly newsletter go to:
http://www.vtpi.org/ scroll to the bottom and select "Click to receive our quarterly newsletter" in the lower right.

Wildlife, Fisheries and Transportation (WFT) Listserv
The WFT Listserv provides professionals with the opportunity to post queries and share information about new research, best practices, and policy issues that are improving the way ecological issues are addressed in surface transportation planning and project development. The listserv is managed by the Center for Transportation and the Environment at North Carolina State University. For more information about the list, please visit NCSU's Information Technology website at *http://lists.ncsu.edu*.

To subscribe to the WFT Listserv:
Send an email to: *mj2@lists.ncsu.edu* Leave the subject line of the e-mail blank. In the body, type: subscribe wftlistserv *your email address* (Note: Listserv software is case sensitive.) Do not include a signature with the message.

The Y2Y Daily Conservation News Service
The Y2Y news is a daily compilation of news stories collected from over 85 national, regional and local newspapers profiling the wildlife, people and places within the Yellowstone to Yukon Ecoregion. It also include other useful content such as: stories featuring *Y2Y network groups*, editorials, job postings, upcoming events, political cartoons, featured Y2Y supporters and other items. The Y2Y news is delivered every morning to subscribers' inboxes free of charge.

To subscribe visit *http://www.y2y.net/media/news.asp*

BOOKS

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Ecology, monthly. The Ecological Society of America. Washington, DC.

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Journal of Environmental Management, monthly. Thomson Scientific. Philadelphia, Pennsylvania.

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Nature, weekly. Nature Publishing Group. London, England.

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Appendix

Science, weekly. American Association for the Advancement of Science. Washington, DC.

TR News, bi-monthly. Transportation Research Board, National Research Council. Washington, DC.

Wild Earth, quarterly. The Wildlands Project. Richmond, Vermont.

Wildlife Society Bulletin, quarterly. The Wildlife Society. Bethesda, Maryland.

CONFERENCES

American Association for the Advancement of Science
http://www.aaas.org/meetings/Annual_Meeting/
A gathering for the growing segment of the science, technology and engineering communities interested in—or impacted by—interactions among a range of topics and disciplines.

American Association of State Highway and Transportation Officials (AASHTO)
Annual Meeting, and subcommittees and regional associations
http://www.transportation.org/meetings/

American Farmland Trust's National Conference
http://www.farmland.org/news/events/
Commits to protecting the nation's best farm and ranch land and improving the economic viability of agriculture.

American Fisheries Society Annual Meeting
http://www.fisheries.org/afs/annualmeetings.html
Promotes the sustainability and sound stewardship of fisheries resources and aquatic ecosystems, and encourages members to be recognized by decision makers and natural resource professionals.

American Institute of Biological Sciences Annual Meeting
http://www.aibs.org/annual-meeting/
Provides focused discussion of timely subjects at the science-policy interface for an audience of professionals, educators, students, non-governmental organizations staff, government scientists, members of Congress and the media.

American Planning Association National Conference
http://planning.org/conferences/future.htm
Chapter conferences
http://www.planning.org/chapters/conferences.html

American Society of Civil Engineers Annual Conferences
http://www.asce.org/conferences/

Association of Conservation Engineers Annual Conference
http://conservationengineers.org/conferences/
Engineering developments, problems and solutions of common interest to conservation agencies.

Association for Conservation Information Annual Meeting
http://www.aci-net.org/conferences.htm
ACI trains and informs the staffs of member agencies and provides forums to exchange ideas and new concepts, and to improve skills and craftsmanship.

Association of Fish and Wildlife Agencies Annual Conference
http://www.fishwildlife.org/annualmeet.html
Northeast regional conference
http://www.neafwa.org/
Midwest regional conferences
http://mafwa.iafwa.org/meetings.htm
Southern regional conferences
http://www.sdafs.org/events/events.htm
Western regional conference
http://www.wafwa.org/4.2.1.html

Association of Partners for Public Lands
http://www.appl.org/News_Events/calendar.htm
Dedicated to public understanding, appreciation and stewardship of America's natural and cultural heritage.

Annual Conference on Ecosystems Restoration and Creation
http://www.hccfl.edu/depts/detp/ecoconf.html

Congress for New Urbanism
http://www.cnu.org/
Deals with new urbanist networking, collaboration and education.

Construction Superconference
http://www.constructionsuperconference.com/
For the construction industry.

Contact Sensitive Solutions National Conference
http://www.contextsensitivesolutions.org/community/calendar/view
Features national CSS leaders reviewing progress in applying CSS principles to key projects throughout the country and discussing the future of CSS.

Defenders of Wildlife Habitat and Highways Campaign Workshops
http://www.defenders.org/habitat/highways/workshops/home.html
The FHWA Project Development and Environmental Review Office, NatureServe and Defenders of Wildlife hosted workshops to improve linkages between conservation and transportation planning.

Defenders of Wildlife Carnivores Conference
http://www.carnivoreconference.org
Brings together academics, activists and wildlife professionals to discuss a wide array of issues involved in carnivore conservation.

Ecological Society of America Annual Meeting
http://esa.org/member_services/eventsCalendar/

Annual Global Biodiversity Information Forum Science Symposium
http://www.gbif.org/GBIF_org/gbif_symposia
Facilitates digitization and global dissemination of primary biodiversity data.

Global Environmental Change: Regional Challenges – Open Science Conference
http://www.essp.org/en/open-science-conferences.html
The conference brings together researchers from diverse fields to undertake an integrated study of the Earth system's structure and functioning, the changes occurring to the system, and the implications of those changes for global sustainability.

GreenBuild-U.S. Green Building Council
http://www.greenbuildexpo.org/
Greenbuild is an industry gathering to advance the transformation of the marketplace.

International Association for Landscape Ecology Annual Conference (U.S. Chapter)
http://www.usiale.org/

International Conference on Ecology and Transportation
http://www.icoet.net
Held biennially, addressing a broad range of ecological issues related to surface transportation development, including wildlife, fisheries, wetlands, water quality, overall ecosystems management and related policy issues.

International Conference on Roads and the Environment
http://www.irfnet.org/cms/pages/en/ViewPage.asp?id=84&mTitre=%20-%20Conferences%20&%20Seminars
A global platform for public and private entities committed to road development. International Road Federation promotes social and economic benefits that flow from well-planned and environmentally sound transportation networks.

Land Trust Alliance National Land Conservation Annual and Regional Conferences
http://www.lta.org/training/index.html
Over 1,700 land trust professionals, volunteers, board members, public agency staff, attorneys, appraisers and land conservation advocates.

Massachusetts Association of Conservation Commissions Annual Conference
http://www.maccweb.org/edu_aec.html
Over 1000 New England Conservation Commissioners, other local officials, state and federal environmental officials, consultants, attorneys and others.

Mississippi Valley Conference of State Highway and Transportation Officials
Website to be found at host state's DOT website each year.

National Association of Conservation Districts Annual Meeting
http://www.nacdnet.org/meetings/
A national group to unify districts concerned with conservation.

National Caucus of Environmental Legislators
http://www.ncel.net/
Three times a year coincident with the national and Washington, DC meetings of the National Conference of State Legislatures

National Conference on Science, Policy and the Environment
http://www.ncseonline.org/NCSEconference/
Each year, NCSE convenes a topical conference that brings together hundreds of scientific, educational, business, civil society and government leaders.

National Conference of State Legislatures
http://www.ncsl.org/annualmeeting/

National Environmental Partnership Summit
http://www.environmentalsummit.org/
The summit has evolved into a national community of activists committed to making the world a better place through collaboration of environmental professionals and assistance providers from diverse sectors.

National Mitigation and Conservation Banking Conference
http://www.mitigationbankingconference.com/

Appendix

National Roadside Vegetation Management Association Conference
http://www.nrvma.org/conferenceinformation.html

National Sustainable Design Expo
http://es.epa.gov/ncer/p3/expo/index.html
The expo is held in the spring each year on the National Mall in Washington, DC. It brings together professional scientists, engineers and business leaders around innovations designed to advance economic growth while reducing environmental impact.

Natural Areas Association – Annual Natural Areas Conference
http://www.naturalarea.org/conference.asp
The association works to inform, unite and support persons engaged in identifying, protecting, managing and studying natural areas and biological diversity across landscapes and ecosystems.

New Partners for Smart Growth Annual Conference
http://www.newpartners.org/
Promoting safe, healthy and livable communities.

North American Wildlife and Natural Resources Conference
http://www.wildlifemanagementinstitute.org/
Dedicated to the conservation, enhancement and professional management of North America's wildlife and other natural resources.

Northeast Association of State Transportation Officials Annual Conference
https://www.nysdot.gov/portal/page/portal/nasto/repository/index.html
Brings together representatives from the state transportation departments of the northeastern United States and the Canadian provinces of Ontario and Quebec.

NatureServe International Annual Conferences
http://www.natureserve.org/visitLocal/conferencesTraining.jsp
NatureServe and its network of natural heritage programs are a good source for information about rare and endangered species and threatened ecosystems.

Northwest Transportation Conference
http://kiewit.oregonstate.edu/nwtc/

National Transportation Product Evaluation Program Annual Meeting
http://www.ntpep.org/ContentManagement/PageBody.asp?PAGE_ID=34
State DOTs and industry work side-by-side to discuss national policy as it relates to proprietary, engineered products.

Northeastern Transportation and Wildlife Conference
http://www.maine.gov/mdot/ntwc/
In Vermont, New Hampshire, or Maine. Biennially on the years the International Conference on Ecology and Transportation (ICOET) is not taking place. It is the regional equivalent of ICOET.

Organization of Fish and Wildlife Information Managers Annual Meeting
http://www.ofwim.org/meetings/index.html
Topics vary widely from year to year, and the meeting is held in a different state each year.

Organization of Wildlife Planners Annual Meeting
http://www.owpweb.org/AnnualConf/
Hosted annually to help fish and wildlife agencies improve their management effectiveness.

Regional Planning Comes of Age
http://www.rpa.org/
Serves the New York-New Jersey-Connecticut region, and helps shape transportation systems, protect open spaces, and promote better community design for the region's continued growth.

Society for Conservation Biology Annual Meeting
http://www.conbio.org/Activities/Meetings/
Dedicated to promoting the scientific study of the phenomena that affect the maintenance, loss and restoration of biological diversity.

Annual Meeting of the Society for Integrative and Comparative Biology
http://www.sicb.org/meetings/
Research is presented in numerous symposia during the society's Annual Meeting.

Soil and Water Conservation Society's Annual Conference
http://www.swcs.org/en/swcs_conferences/

Student Conference on Conservation Science
http://www.sccs-cam.org/
Helps young conservation scientists gain experience, learn new ideas and make contacts that will be valuable for their future careers.

Transportation Resource Board Annual Meeting
http://www.trb.org/meeting/
Attracts approximately 10,000 transportation professionals from around the world. The meeting covers all transportation modes, with more than 2,800 presentations in 500 sessions addressing many various topics.

U.S. Green Building Council – Events Calendar
http://www.usgbc.org/Events/EventsConferenceCalendar.aspx?CMSPageID=143

The Wildlife Society's Annual Conference and Trade Show
http://www.wildlife.org/conference/index.cfm
Aims to enhance the ability of wildlife professionals to conserve diversity, sustain productivity and ensure responsible use of wildlife resources for the benefit of society.

World Conference on Transport Research
http://www.uctc.net/wctrs/
Every three years, the conference brings together transportation managers, policy analysts, advisers, operators and academics, all with a common interest in promoting state of the art and state of the practice in all areas of transport research.

Kathryn Fuller Symposium on Ecosystem Services
http://worldwildlife.org/fellowships/fuller_symposium.cfm
Each Science for Nature Symposium, sponsored by the World Wildlife Federation, is designed to result in a practical research agenda that would most benefit conservation work on a particular topic; a number of specific collaborations among scientists and conservationists to pursue that agenda; and summary documents on the content of the symposium.

TRAININGS

U.S. Fish & Wildlife Service
http://training.fws.gov/

Bureau of Land Management
http://www.ntc.blm.gov/

U.S. Forest Service
http://www.fs.fed.us/biology/education/

Land Trust Alliance
http://www.lta.org/training/index.html

AWARDS

American Association of State Highway and Transportation Officials
http://www.transportation.org/?siteid=37&pageid=1981
- Alfred E. Johnson Achievement Award
- Thomas H. MacDonald Memorial Award
- President's Transportation Awards
- 25-Year Award of Meritorious Service
- Value Engineering Awards

The American Road & Transportation Builders Association
http://www.artba.org/pdf/2007_Globe_Award_Brochure.pdf
- Globe Award
  - Major Highways
- Local or Secondary Roads
- Bridges
- Public Transit
- Airports
- Railroads
- Waterways and Ports

Environmental Law Institute
http://www2.eli.org/nwa/nwaprogram.htm
- National Wetlands Awards

Federal Highway Administration
http://www.fhwa.dot.gov/eihd/index.htm
http://www.fhwa.dot.gov/environment/eea.htm
- Excellence in Highway Design
- FHWA Environmental Excellence Awards

Air Quality Improvement
- Cultural and Historical Resources
- Ecosystems, Habitat and Wildlife
- Environmental Leadership
- Environmental Research
- Environmental Streamlining
- Livable/Sustainable Communities
- Non-motorized Transportation
- Recycling and Reuse
- Roadside Resource Management and Maintenance
- Scenic Byways
- Wetlands, Watersheds and Water Quality

Federal Highway Administration and Federal Transit Administration

http://www.fhwa.dot.gov/planning/tpea/

- Transportation Planning Excellence Awards
  - Asset Management and Planning
  - Education and Training
  - Freight Planning
  - Homeland and Personal Security
  - Linking Planning and Operations
  - Modeling and Technology Applications
  - Planning Leadership
  - Public Involvement and Outreach
  - Safety Planning
  - Transportation and Land Use Integration
  - Transportation Planning and Environment
  - Tribal Transportation Planning

Institute for Transportation and Development Policy

http://www.itdp.org/events.html

- Sustainable Transport Award

International Road Federation

http://www.irfnet.org/cms/pages/en/ViewPage.asp?id=67&mTitre=%20-%20Global%20Road%20Achievement%20Awards

- Global Road Achievement Awards program

Advocacy and Lobbying

- Construction
- Design
- Environmental Mitigation
- Innovative Finance
- Maintenance Management
- Program Management
- Quality Management
- Research
- Safety
- Technology, Equipment and Manufacturing
- Traffic Management and Intelligent Transportation Systems

National Association of Environmental Professionals

http://www.naep.org/displaycommon.cfm?an=12

- President's Environmental Excellence Award
- National Environmental Excellence Award

National Partnership on Highway Quality

http://www.nphq.org/awards_success.cfm

- National Achievement Award
- Special Recognition for a Small Project
- Special Recognition for a Structure Project
- Gold Level Winners
- State Winners
- Making A Difference
  - Partnering
  - Breaking the Mold
  - Risk Taking
  - Public Communication
  - Star Quality Partnership

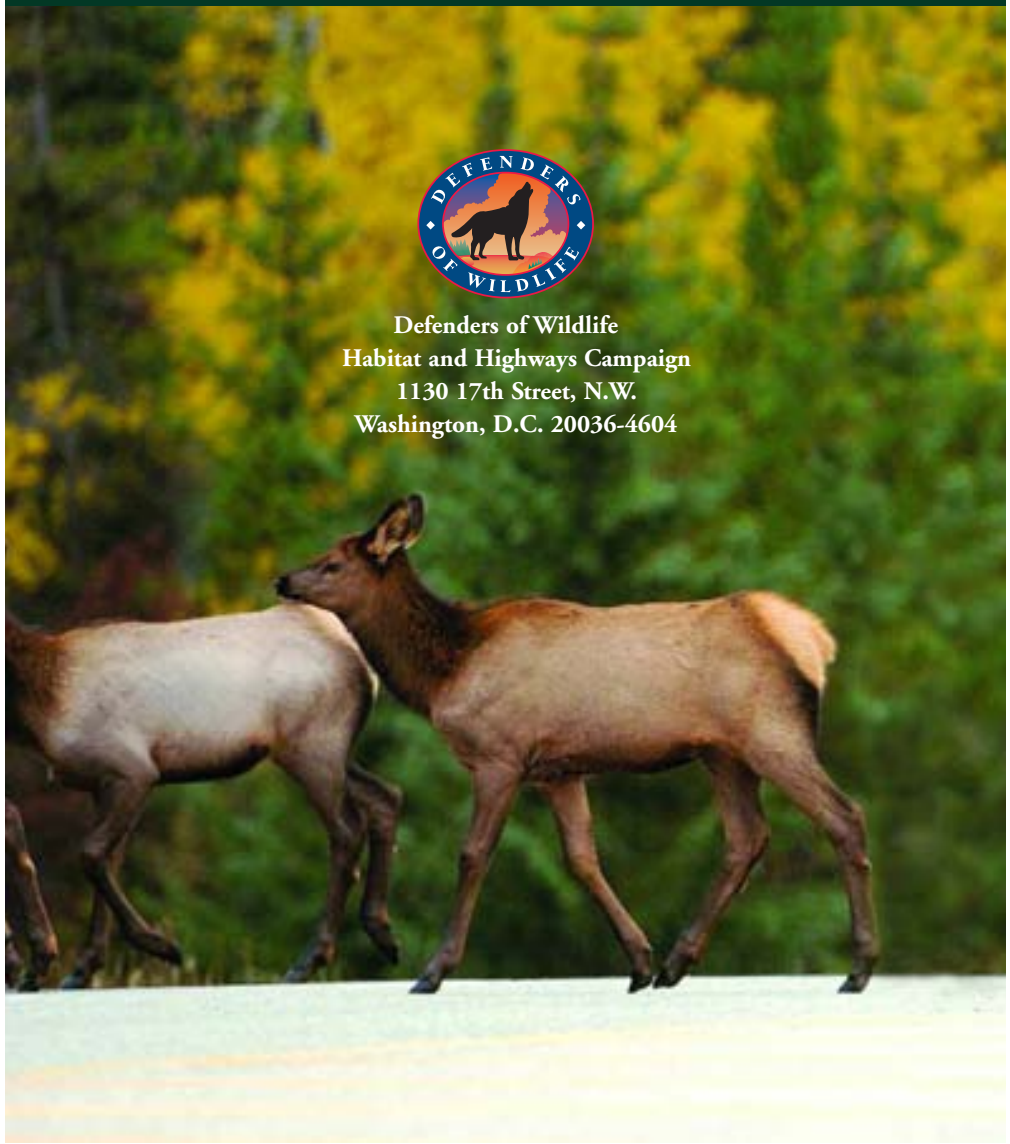
Preserve America

http://www.preserveamerica.gov/presidentialaward.html

- Presidential Award

TRANSPORTATION METAPHORS

Getting up to speed
Reinventing the wheel
Where the rubber meets the road
On the right track
From the wrong side of the tracks
Cross that bridge when we get there
Burning bridges
Spinning out of control
Pedal to the metal
Highway to hell
Bridge to nowhere
Light at the end of the tunnel
That train has left the station
My way or the highway
Take it for a spin
Take the wheel
Taking the high road
Put the brakes on
Further down the road
Dead end
Keep on truckin'
Hit the road, Jack!
Get your kicks on Route 66



Defenders of Wildlife
Habitat and Highways Campaign
1130 17th Street, N.W.
Washington, D.C. 20036-4604