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.*

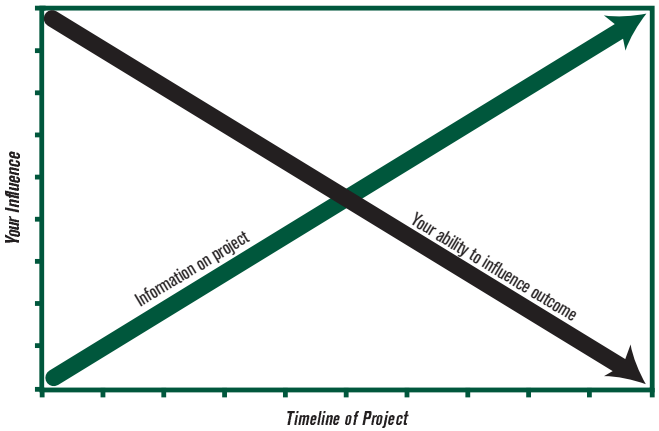
TRANSPORTATION PLANNING

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

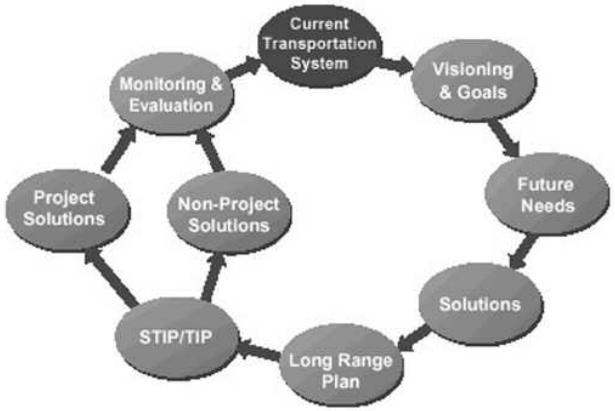
Don't be confused when you discover that your town or state does things its own way—they all do. Federal transportation law lays out some guidelines and standards, but for the most part, the process differs from state to state and continues to evolve with every new highway bill. Each town and state has 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.

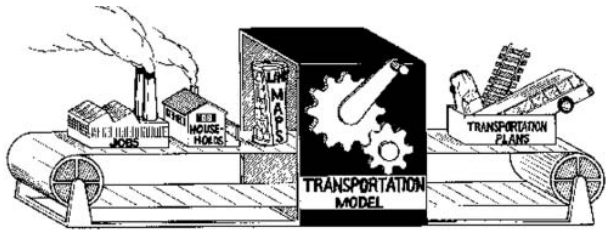
1. **Trip generation**: Estimate the number of trips generated in each zone, destined for locations in other zones. Trip estimates are based on assumed relationships among socio-economic factors, land use patterns and the existing number of trips.
2. **Trip distribution**: Develop a trip table showing 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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http://www.fhwa.dot.gov/planning/citizen/citizen4.htm

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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.

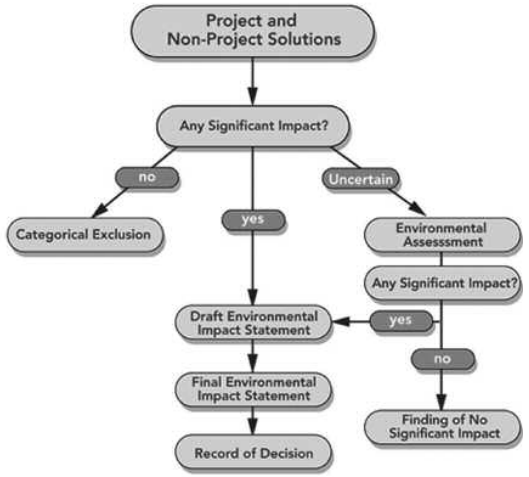
Unfortunately, environmental review does not apply to highway planning and doesn't kick in until the project level—after many crucial decisions have been made. Despite our strict laws and cumbersome reviews, you can still damage the environment, but it's going to cost you. A major industry in environmental 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:

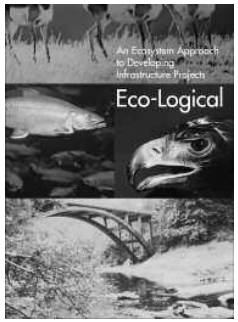
- The impact for which the mitigation is proposed actually resulted from the project
- The proposed mitigation represents a reasonable public expenditure considering the extent to which the mitigation results in compliance with a federal statute or other regulation or policy

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-

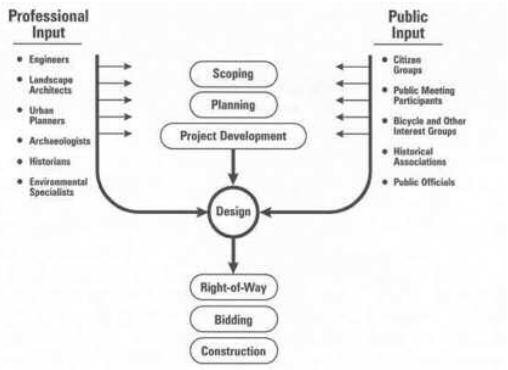
struction of highways through parks—only the most unusual situations are exempted." (Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402 (1971)) **For more information on 4(f), see Public Roads and Public Lands**

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.

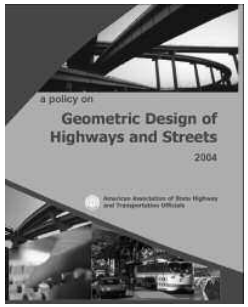
2. **Reconstruction** typically involves a major change to an existing highway within the same right of way corridor. Two lane, "farm-to-market" roads have been systematically reconstructed over the past few decades into multi-lane, divided arterials to accommodate or generate development and economic 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

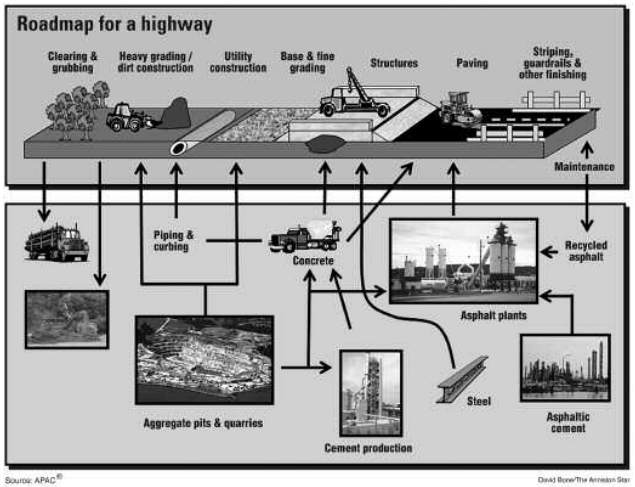
If the project has made it this far, construction itself is a simple matter. Construction staging plans are prepared to show the sequence of operation, work to be performed, materials to be used, and the routes to be utilized by traffic during each construction phase. Traffic handling plans show long-term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