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ON THE ROAD TO CONSERVATION: STATE CONSERVATION STRATEGIES AND APPLICATIONS FOR TRANSPORTATION PLANNING

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Abstract: Since 2001, the Department of Interior has been supporting state-based wildlife conservation via the State and Tribal Wildlife Grants Program (SWG). Funds are appropriated annually for state fish and wildlife agencies to address the broad range of their state's wildlife and associated habitats in a comprehensive fashion.

As part of the SWG, state fish and wildlife agencies are developing statewide comprehensive wildlife conservation strategies in partnership with a broad array of partners including other government agencies, conservation organizations, landowners, and the public. Each strategy will establish a vision and plan of action for limited state wildlife conservation funding. The finished product will be a strategic vision for conserving the state's wildlife–not just a plan for the fish and wildlife agency.

The strategies are due for completion in October 2005 and will be reviewed at least every 10 years to ensure conservation success over the long term. For the first time, we can look to a nationwide vision for wildlife conservation.

By design, Congress directed that the strategies focus on the "species in greatest need of conservation," yet address the full array of wildlife and wildlife-related issues. In that context, each strategy is required to include information on the distribution and abundance of species of wildlife and locations and relative condition of key habitats and community types. Most states will utilize GIS technology and many will produce maps of prioritized habitat throughout the state. For the first time, transportation agencies will have access to this information at the planning stage, rather than waiting until environmental review.

Over the last decade, transportation agencies have struggled to find ways to reduce costs and unnecessary delays to accelerate project delivery. Several legislative, policy, and procedural fixes have been attempted with mixed success. The statewide comprehensive wildlife-conservation strategies have great potential in aiding state transportation departments in streamlining project delivery. By utilizing natural-resource data in early stages of planning, they can avoid, minimize, and mitigate many impacts early and steer clear of costly delays later in the life of their projects. As an added bonus, the transportation agency adopts a proactive approach to conservation and becomes a full partner in implementing the conservation strategy for the entire state.

Introduction

The most significant threat to America's biodiversity is habitat loss and the greatest consumer of habitat is poorly planned, sprawling development. Low density, automobile-dependent development that spreads beyond the edges of existing communities and alongside highways devours and degrades the habitat that wildlife relies upon for its existence. The Natural Resources Inventory estimates that 2.2 million acres are lost to development each year (NRCS 2000). In a recent study of listings under the Endangered Species Act, researchers found that urbanization endangers more listed species than any other cause (Czech 2000).

Roads and highways enable the mobility necessary for development; hence the transportation-planning decisions that are made today will determine the location, direction, and shape of the urbanization that happens tomorrow.

Unfortunately, conservation, and growth efforts often happen in isolation and can then confound one another. For example, transportation projects are often planned without detailed information on core conservation areas, sensitive resources, or important habitat that might lie within the selected corridor. These conflicts do not come to light until the environmental review process, which then becomes more expensive and time consuming as transportation and resource officials attempt to reconcile infrastructure and conservation activities. If conservation efforts are taken into account at the earliest stages of transportation planning, both priorities can be realized and at less expense of time and money.

Two new and perhaps serendipitous developments from Capitol Hill may help states achieve this lofty goal. By Congressional mandate, state fish and game agencies are completing statewide conservation strategies in 2005. The new transportation bill signed in August 2005 requires transportation planners to incorporate conservation information into early, long-range transportation planning. Through smart and effective coordination, transportation agencies can both improve project delivery and better protect vital natural resources in their state.

By understanding the history of both transportation and conservation planning, we gain a better understanding of how it works (and doesn't work) in the present day. State and federal agencies spend considerable time and capital both protecting natural areas and building transportation infrastructure. While these sometimes conflict, they need not be antagonistic. Transportation planning that integrates existing conservation efforts will save money, protect resources, and expedite project delivery.

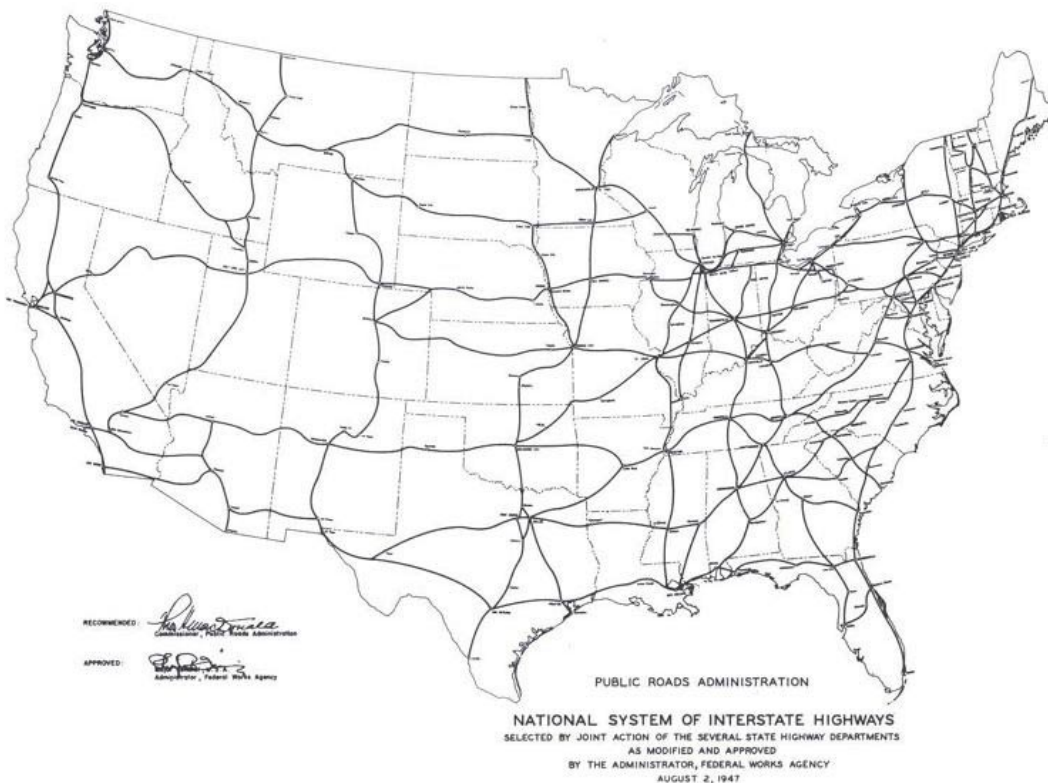## The Early Days "Let's Build It Before We're Too Old to Enjoy It"

Prior to the twentieth century, most of our roads were built and maintained by local governments. Some eastern states built turnpikes during the 1800s, connecting their major cities and ports. The federal government planned and sporadically built pieces of a "National Road" which was later abandoned and turned over to counties. By and large, Americans relied upon railroads for long distance travel and used roads only as necessary for local trips (Gutfreund 2004).

The first national survey of road conditions in 1904 revealed that only 7 percent of the country's roads were surfaced. Even those were surfaced with gravel or low-quality macadam, suitable for horse and carriage, but unsuitable for the faster, heavier automobiles. A burgeoning automobile industry recognized that poor road conditions would discourage auto travel, and consequently auto sales. Soon thereafter, they began clamoring for high quality, publicly financed, long distance highways (Holtz Kay, 1997).

THE INTERSTATE SYSTEM: "Broader Ribbons across the Land"

When Dwight D. Eisenhower took office in 1953, he brought a vision of an integrated national highway system that would "protect the vital interest of every citizen." Having volunteered for the U.S. Army's transcontinental convoy in 1919, a young Eisenhower embarked on a 62-day trek from Washington, D.C. to San Francisco. From tedious to treacherous, the convoy met with mud, dust, ice, and rickety bridges. Years later, while serving in Germany during World War II, General Eisenhower coveted their autobahn network and a system of "broader ribbons across the land."

Congress passed the Federal-Aid Highway Act of 1954, providing $175 million to correct the nation's inadequate and obsolete highway network. Two years later, $25 billion was authorized for the next decade of highway building to be built with uniform interstate design standards and controlled access. The Interstate System was to be a grand plan for a system of highways developed through a cooperative alliance amongst state and federal transportation officials (Weingroff 2005).

PUBLIC ROADS ADMINISTRATION

NATIONAL SYSTEM OF INTERSTATE HIGHWAYS
SELECTED BY JOINT ACTION OF THE SEVERAL STATE HIGHWAY DEPARTMENTS
AS MODIFIED AND APPROVED
BY THE ADMINISTRATOR, FEDERAL WORKS AGENCY
AUGUST 2, 1947

The Three Cs

As the new Interstate highways began snaking through and around communities, the need for collaborative transportation planning could no longer be denied. The Federal-Aid Highway Act of 1962 first created the federal requirement for urban transportation planning in the U.S. In order to receive federal funding, urbanized areas (50,000+ population) were required to plan all transportation projects cooperatively with state and local governments. The resulting planning process would be guided by the three Cs: continuing, comprehensive, and cooperative.

Despite the lack of qualified planning agencies in many urban areas, all 224 existing urbanized areas had nascent planning processes underway within three years. The Bureau of Public Roads (predecessor to the FHWA) quickly thereafter required the creation of agencies to carry out the planning process, what we now know as Metropolitan Planning Organizations or MPOs.

The technical foundation of the 3-C planning process was realized over the next two decades, along with a focus on increasing capacity within MPO staff. Plans are based on projected demand for transportation, based on a four-step mathematical model:

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 socioeconomic 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.

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 meet the needs of urbanized areas such as Chicago, Detroit, and New York in the 1960s.

ISTEA and TEA-21

Over the next 30 years, Congress repeatedly strengthened the planning process by further engaging local elected officials and expanding the original focus beyond travel demand to incorporate a wide range of social, economic, and environmental concerns. In 1991, Congress proclaimed a new era in transportation legislation with the Intermodal Surface Transportation Equity Act (ISTEA). ISTEA set forth groundbreaking reforms such as flexible funding, preservation of the existing system, multi-modal alternatives, and delegation of decision making within transportation planning to the metropolitan level.

The Transportation Equity Act for the 21st Century (TEA-21) reaffirmed these objectives in 1998 and consolidated ISTEA's lists of planning factors. Both metropolitan and statewide transportation planners are expected to consider projects and strategies that will:

- 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 non-motorized users.
- Increase the accessibility and mobility options available to people and for freight.
- **Protect and enhance the environment**, promote energy conservation, and improve quality of life.
- 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.

The planning factors call for plans that will "Protect and enhance the environment, promote energy conservation, and improve quality of life." However, the factors are merely guidance and not regulatory in nature. Failure to consider this or any factor is not reviewable in court and could be disregarded by any MPO or DOT planning office. Also, terms like "environment" and "quality of life" are exceptionally (and intentionally) vague. As a result, MPOs and DOTs are free to interpret these terms and their obligations to address planning factors in their own way or ignore them altogether.

Air Quality

In fact, the only environmental consideration that is required during the transportation planning process is air quality. The Clean Air Act established air-quality standards and regulations to meet those standards. Locations that fail to meet air quality standards 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.

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. Together, the Clean Air Act and ISTEA require that federally funded or approved transportation plans, programs, and projects conform to the regional air-quality objectives as outlined in the SIP. Transportation plans must demonstrate that projected motor-vehicle emissions from the 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 DOT 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 (FHWA).

Governance

Transportation planning occurs simultaneously at several different levels of government. According to the FHWA's *Citizens' Guide to Transportation Decisionmaking*, the major actors in transportation planning are:

- State Departments of Transportation (DOTs) are the largest units of government that develop transportation plans and projects. They are responsible for setting the transportation goals for the state. To do so, they work with all of the state's transportation organizations and local governments. They are responsible for planning safe and efficient transportation between cities and towns in the state.

- Metropolitan Planning Organizations (MPOs) represent areas with a population of 50,000 people or more. An MPO may have "council of governments" or "regional planning commission" in its official name. Each MPO is different because individual metropolitan areas are so different. A policy board, which is comprised of local elected officials, sets an MPO's policy. However, other groups, such as non-profit organizations, community organizations, or environmental organizations, can influence the direction an MPO follows. The MPOs' mission is to provide short and long-term solutions to transportation and transportation-related concerns.

- Local governments carry out many transportation planning functions such as scheduling improvements and maintenance for local streets and roads.

- Transit agencies are public and private organizations that provide transportation for the public. Public transportation includes buses, subways, light rail, commuter rail, monorail, passenger ferryboats, trolleys, inclined railways, and people movers.

- The Federal Government (U.S. DOT) oversees the transportation planning and project activities of the MPOs and state DOTs. The Federal Government also provides advice and training on transportation topics ranging from pavement technology to design to efficient operations of highway and transit systems. The Federal Government also supplies critical funding needed for transportation planning and projects. At least every two years, the Federal Government approves a program of projects submitted by State DOTs that includes projects proposed for Federal Funds.

Planning Products

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

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

- Transportation Improvement Program (TIP): A short-term program (approximately 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 (CMS): 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 non-attainment areas, projects that increase capacity for single occupancy vehicles (by adding new roads or widening existing ones) must conform to the area's CMS.

At the state level, DOT 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 which incorporates and integrates the MPO plans. Developed on at least a two-year cycle, STIPs contain individual transportation improvements and projects. To be implemented, all federally funded projects must be part of an improvement program.

- State Implementation Plan (SIP): As required by the Clean Air Act, the SIP outlines measures the state will take to meet the National Ambient Air Quality Standards (NAAQS).

  * 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.

Funding

State departments of transportation receive funding from the U.S. Department of Transportation through the authorization of federal transportation law (ISTEA, TEA-21, SAFETEA-LU) and annual appropriations. Revenue is generated from gas tax collected by federal government and redistributed to states based on a formula of population and land area. Planning funds are given to DOTs to distribute among their MPOs, again based on a formula. Funds for metropolitan planning are called Planning Funds (PL) and amount to 1.25 percent of highway and transit program funding. Funds for state planning are called State Planning and Research Funds (SPR) and amount to 2 percent of highway and transit program funding.

THE TRANSPORTATION PLANNING PROCESS
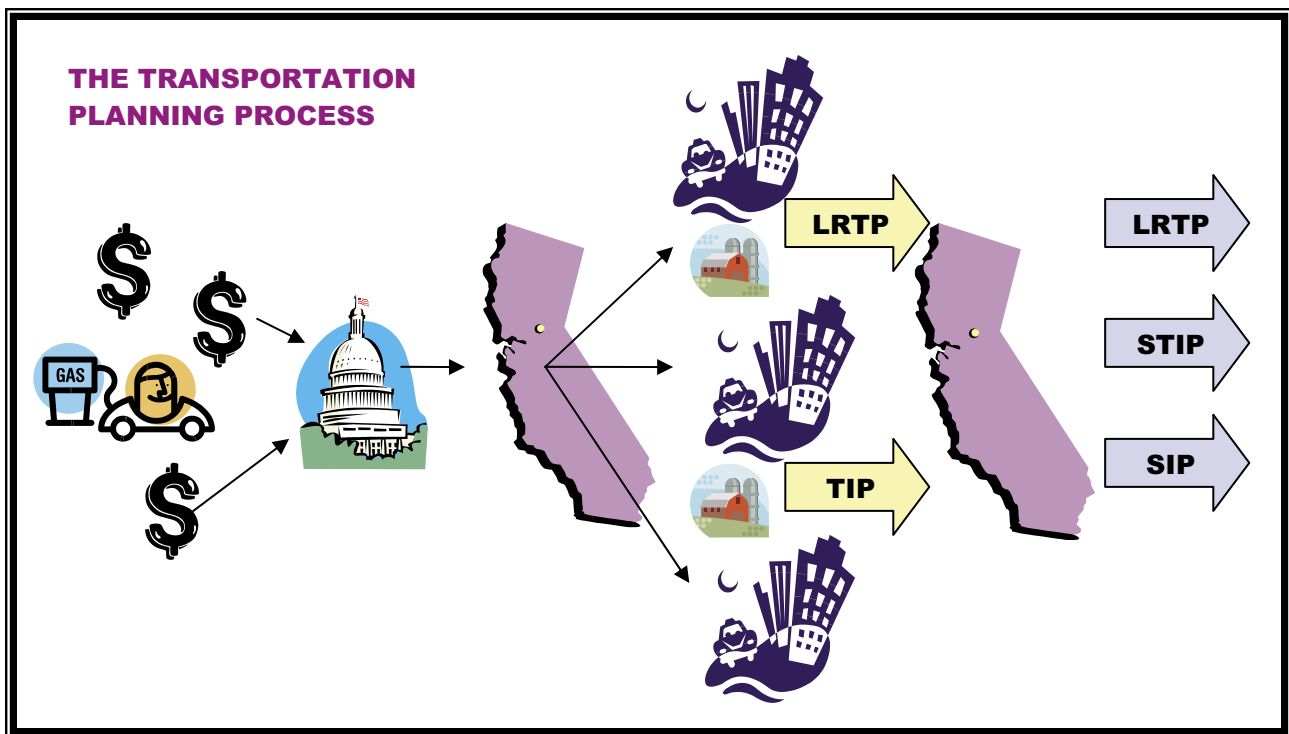
Prelude to Conservation Planning: The Legislative Framework

Much like the transportation sector, conservation practice predated conservation planning. Early conservation efforts were focused on controlling the excessive harvesting of game species and migratory birds. In the late nineteenth century, great strides were made in preservation of public lands. Ecology and conservation biology emerged in the twentieth century, teaching us that protecting species and land was not enough; conservation can only be successful when we understand and protect the ecosystem. It would take decades before concepts such as island biogeography and population viability would begin to influence conservation practice and policy, highlighting the growing need for conservation planning.

The Environmental Revolution

The 1960s and 1970s are perhaps best known for rock and roll music, civil unrest, and the sexual revolution, but there was another revolution afoot that would also influence American culture for decades to come.

Congress passed several environmental protection laws during this time, largely credited with the environmental quality we enjoy to this day and providing the foundation for a burgeoning environmental movement:

- **Clean Air Act of 1963**. To reduce air pollution and ensure that all Americans have air that is safe to breathe, the Clean Air Act set emissions standards for stationary sources such as power plants and steel mills. The original version did not take into account mobile sources of air pollution such as automobiles, which had become the largest source of many dangerous pollutants. Several amendments to the Clean Air Act were passed over the next 30 years, authorizing standards for auto emissions, local air pollution control programs, air quality control regions (AQCR), air-quality standards and compliance deadlines for stationary-source emissions.

- **Land & Water Conservation Fund of 1964**. The Land and Water Conservation Fund declared a Congressional policy that "present and future generations be assured adequate outdoor-recreation resources" and that "all levels of government and private interests . . . take prompt and coordinated action . . . to conserve, develop, and utilize such [their] resources for the benefit and enjoyment of the American people." The Secretary of the Interior was directed to inventory, evaluate, and classify outdoor-recreation facilities and formulate and maintain a comprehensive nationwide outdoor-recreation plan.

- **National Environmental Policy Act of 1969**. The National Environmental Policy Act (NEPA) was one of the first laws written that established the broad national framework for protecting our environment. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment. NEPA requirements are invoked when airports, buildings, military complexes, highways, parkland purchases, and other federal activities are proposed.

- **Clean Water Act of 1972**. Enacted in 1972, the Clean Water Act's primary objective is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals: eliminate the discharge of pollutants into the nation's waters and achieve water quality levels that are fishable and swimmable. The Clean Water Act was the first comprehensive national clean-water legislation, drafted in response to growing public concern for serious and widespread water pollution. It is the primary federal law that protects the nation's waters, including lakes, rivers, aquifers, and coastal areas.

- **Coastal Zone Management Act of 1972**. The Coastal Zone Management Act established a voluntary, national cost-share program to encourage coastal states to develop and implement coastal zone management plans. In order to be eligible for Federal approval, each state's plan was required to define boundaries of the coastal zone, to identify uses of the area to be regulated by the State, the mechanism (criteria, standards or regulations) for controlling such uses, and broad guidelines for priorities of uses within the coastal zone.

- **National Forest Management Act of 1976**. The National Forest Management Act reorganized, expanded, and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. The National Forest Management Act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of national forests.

- **Federal Land Policy and Management Act of 1976**. As the principal law governing how the Bureau of Land Management (BLM) manages public lands, FLPMA guides the BLM in management, protection, development, and enhancement of the public lands. FLPMA specifically requires the agency to manage for the multiple use and sustained yield of public land resources for both present and future generations.

ESA and HCPs

Among the class of environmental protection laws passed during this revolution, the Endangered Species Act of 1973 made perhaps the boldest step towards conservation planning, if only just for endangered species and their habitat. The ESA is intended not only to prevent the extinction of species listed as threatened or endangered, but provide for the conservation of the habitat on which they depend.

Once a species is listed, a recovery plan is developed and critical habitat is designated, including enough area for the species to expand its range and recover to healthy population levels. The Act authorizes land acquisition for the conservation of listed species, using funds from the Land and Water Conservation Fund. Efforts that reduce the amount or quality of habitat available to at-risk species are conditionally prohibited. In theory, this should constitute a conservation plan for the remaining habitat of each listed species. In practice, roughly 80 percent of listed species have recovery plans while only 30 percent have designated critical habitat (M. Senatore, pers. comm. 9/6/05).

Since the enactment of the ESA in 1973, the extinction of the bald eagle and the whooping crane were successfully averted. Thousands of acres of designated critical habitat have been preserved (USFWS 2002). However, we have also witnessed the extinction of the dusky seaside sparrow and hundreds more species have been added to the endangered list. In the past decade, at least 34 species of unique populations of plants and vertebrates have become extinct in the United States while awaiting federal protection (World Resources Institute). Most important, we have learned that a species-by-species approach to conservation is costly, time-consuming, and rarely successful. While maintaining a strong ESA is essential as a fail-safe mechanism, there are sensible ways to empower the states to play a greater leadership role in biodiversity conservation that, over time, could lessen the need for federal regulation. Moreover, the traditional role of states with regard to wildlife and other public resources and their role in land-use issues means the states are essential players in habitat-conservation efforts.

Responding to claims that the ESA was too restrictive for private landowners, the act was amended in 1982 to authorize the issuance of "incidental take" permits for private-sector land-development activities following the preparation and approval of a habitat-conservation plan (HCP). The permit can be issued only for otherwise lawful activities that will not appreciably reduce the likelihood of survival and recovery of the species if impacts are minimized and the plan is adequately funded. An HCP can cover a single development project or several projects within a multi-jurisdictional area. At a minimum, each HCP must specify:

1. The impact that will result from the taking
2. Steps that will be taken to minimize and mitigate the taking
3. Funding to implement the plan
4. An analysis of possible alternative actions including why they were not chosen
5. Other elements if found necessary or appropriate

Most HCPs set aside a certain amount of land in habitat preserves with long-term management, habitat restoration, and land-use controls. To date, more than 430 HCPs have been approved with many more in the planning stage. Early HCPs generally covered 1,000 acres or less. Today, 10 HCPs exceed 500,000 acres, with several larger than 1,000,000 acres (USFWS). HCPs continue to evolve and many serve more than endangered species. However, they are still set in motion by endangered-species regulation and are inherently reactive. As such, they fall short of true conservation planning.

What is Conservation Planning?

Conservation planning is proactive conservation of areas large enough to include whole communities of plants and animals in properly functioning ecosystems while taking into account natural disturbances, such as floods and fires. Plans generally use computerized mapping technology known as geographic information systems (GIS) to assess the status of species, habitats, and other conservation targets and to identify conservation priorities. A good plan includes a vision for the specified region and a conservation strategy to achieve defined goals and objectives. Regions may include areas defined by political boundaries, such as counties and regional governments or areas based on ecological attributes, such as watersheds or basins. Each region has unique technical, political, social, cultural, and ecological circumstances and challenges, and therefore, approaches vary considerably in primary emphasis, purpose, goals, technical sophistication, and level of participation. Successful conservation plans must involve partnerships among multiple, diverse stakeholders including local, county, state, and federal agencies, conservation organizations, academic institutions, and private landowners.

Ideally, regional strategies are nested within larger ones such as statewide or multi-state regional plans and connected to smaller plans that may fit within municipal or watershed boundaries. Although this integration may seem complicated, it is necessary to address resources at different scales. For example, the needs of some migratory birds can only be met with a global strategy, while the needs of small animals and plants that occur within a limited geographic range can best be addressed at small scales (The Biodiversity Partnership).
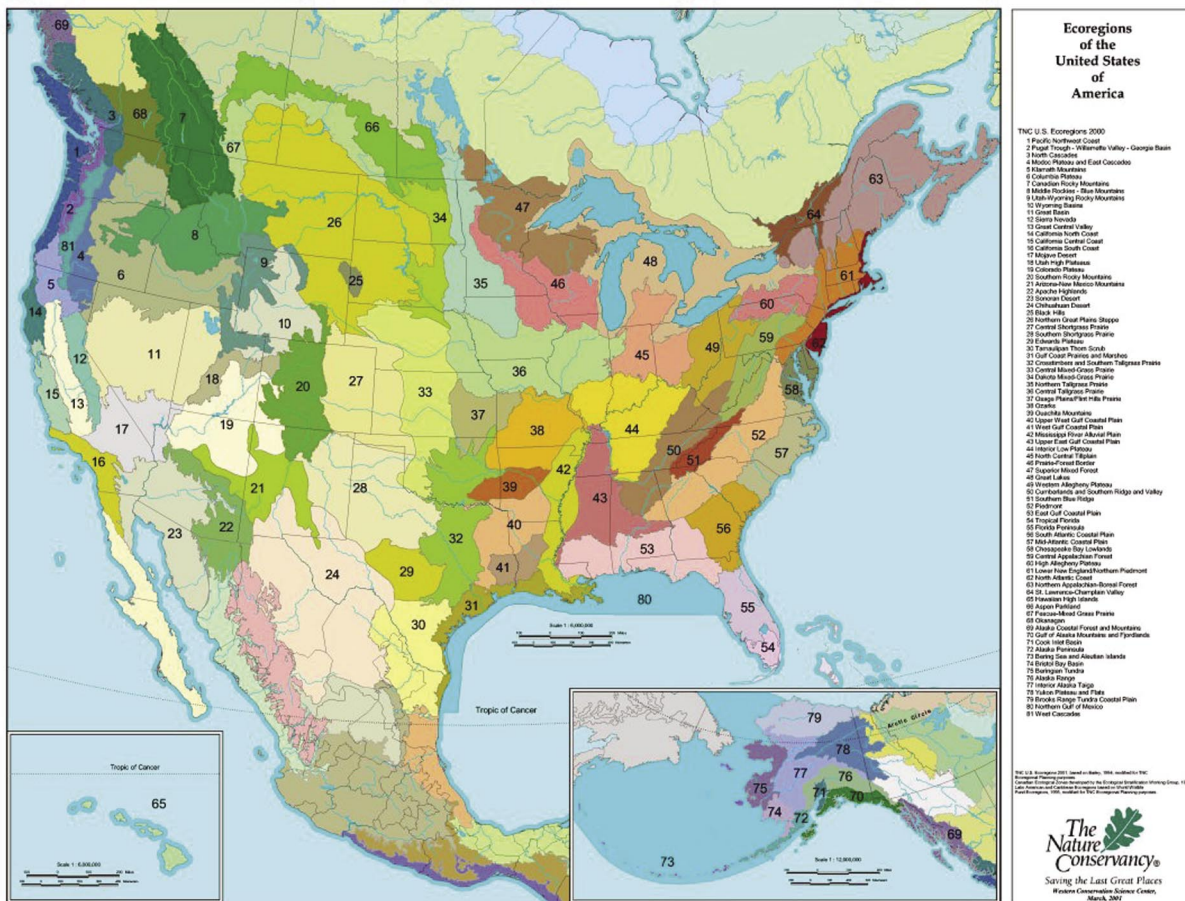
TNC Ecoregional Planning

Recognizing the need for a systematic, science-based approach to conservation, The Nature Conservancy (TNC) began developing ecoregional plans in the 1990s. Ecoregions are scientifically selected geographic locations representing Earth's 30+ major habitat types, often encompassing millions of acres. Plans are based upon careful review of the ecoregion's ecological significance, its concentration of different species of plants and animals, the overall quality of the natural communities, and the threats to the health of the area. Each ecoregional plan is a blueprint for conservation efforts to identify priorities and guide investment in the highest-quality conservation sites.

Ecoregional planning is defined by the following five steps:

1. **Identifying Conservation Targets:** Ecoregional planning teams identify the species, natural communities, and ecosystems in a given ecoregion.
2. **Gathering Information:** The teams gather data about the conservation targets such as location and health from a variety of sources, including the Natural Heritage programs, satellite images, and rapid ecological assessments.
3. **Setting Goals:** Ecoregional planning teams set goals for each of the conservation targets. Setting conservation goals involves determining how much of a particular target—a population or ecosystem, for instance—is needed to ensure its long-term survival. A conservation goal also includes how the target needs to be distributed across the landscape.
4. **Assessing Viability:** The team also assesses the health of each occurrence of each conservation target to ensure survival over the long term by choosing the best and most healthy examples of each target.
5. **Assembling Portfolios:** All this information is analyzed by the teams and expert partners and often through computer modeling to design an efficient network of conservation areas (or portfolio) that if protected in its entirety will ensure the preservation of biodiversity in the ecoregion (The Nature Conservancy, 2004).

Ecoregions
of the
United States
of
America

TNC U.S. Ecoregions 2000
1 Pacific Northwest Coast
2 Puget Trough - Willamette Valley - Georgia Basin
3 North Cascades
4 Modoc Plateau and East Cascades
5 Klamath Mountains
6 Columbia Plateau
7 Canadian Rocky Mountains
8 Middle Rockies - Blue Mountains
9 Utah-Wyoming Rocky Mountains
10 Wyoming Basins
11 Great Basin
12 Sierra Nevada
13 Great Central Valley
14 California North Coast
15 California Central Coast
16 California South Coast
17 Mojave Desert
18 Utah High Plateaus
19 Colorado Plateau
20 Southern Rocky Mountains
21 Arizona-New Mexico Mountains
22 Apache Highlands
23 Sonoran Desert
24 Chihuahuan Desert
25 Black Hills
26 Northern Great Plains Steppe
27 Central Shortgrass Prairie
28 Southern Shortgrass Prairie
29 Edwards Plateau
30 Tamaulipan Thorn Scrub
31 Gulf Coast Prairies and Marshes
32 Crosstimbers and Southern Tallgrass Prairie
33 Central Mixed-Grass Prairie
34 Dakota Mixed-Grass Prairie
35 Northern Tallgrass Prairie
36 Central Tallgrass Prairie
37 Osage Plains/Flint Hills Prairie
38 Ozarks
39 Ouachita Mountains
40 Upper West Gulf Coastal Plain
41 West Gulf Coastal Plain
42 Mississippi River Alluvial Plain
43 Upper East Gulf Coastal Plain
44 Interior Low Plateau
45 North Central Tillplain
46 Prairie-Forest Border
47 Superior Mixed Forest
48 Great Lakes
49 Western Allegheny Plateau
50 Cumberlands and Southern Ridge and Valley
51 Southern Blue Ridge
52 Piedmont
53 East Gulf Coastal Plain
54 Tropical Florida
55 Florida Peninsula
56 South Atlantic Coastal Plain
57 Mid-Atlantic Coastal Plain
58 Chesapeake Bay Lowlands
59 Central Appalachian Forest
60 High Allegheny Plateau
61 Lower New England/Northern Piedmont
62 North Atlantic Coast
63 Northern Appalachian-Boreal Forest
64 St. Lawrence-Champlain Valley
65 Hawaiian High Islands
66 Aspen Parkland
67 Prairie-Mixed Grass Prairie
68 Okanagan
69 Alaska Coastal Forest and Mountains
70 Gulf of Alaska Mountains and Fjordlands
71 Cook Inlet Basin
72 Alaska Peninsula
73 Bering Sea and Aleutian Islands
74 Bristol Bay Basin
75 Beringian Tundra
76 Alaska Range
77 Interior Alaska Taiga
78 Yukon Plateau and Flats
79 Brooks Range Tundra Coastal Plain
80 Northern Gulf of Mexico
81 West Cascades

The Nature Conservancy®
Saving the Last Great Places
Western Conservation Science Center,
March, 2001

Tropic of Cancer

This map was developed as a coordinated effort by TNC U.S. ecoregional planning teams. This set of ecoregions has been established in order to place each of TNC's conservation projects within an ecological context and to serve as a planning unit for Ecoregional Planning. Each ecoregional team reviewed the initial set of ecoregions established by the US Forest Service and recommended updates based on a variety of factors influencing conservation efforts. These updates have been compiled into a contiguous coverage.
See: http://gis.tnc.org/data/MapbookWebsite/map_page.php?map_id=27.

Early Conservation Planning: Filling the Gaps

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.

A handful of states took advantage of the Gap Analysis information and other relevant data to develop statewide conservation strategies:

- In 1994, Florida completed "Closing the Gaps," a statewide conservation analysis.
- The Oregon Biodiversity Project engaged public agencies and private organizations in the development of a statewide biodiversity assessment and strategy.
- California created the Legacy Program to provide biodiversity information to resource agencies and support broad-scale conservation planning.
- Pennsylvania, New York, New Jersey, Georgia, New Hampshire, Washington, and Maryland, each taking a slightly different approach, convened groups of resource professionals and stakeholders to discuss statewide conservation planning (The Biodiversity Partnership).

State Wildlife Grants Program (SWG)

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 sport hunting, fishing, and recreation communities. The federal resource and land-management agencies manage wildlife occurring on public lands and endangered species. Essentially, our conservation framework disregards all non-game, non-listed species and nearly all private landowners. Without protection, these species are vulnerable to overexploitation, habitat loss, 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 the 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 (SWG) providing 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. A non-federal match of 50 percent is required for SWG projects.

SWG projects include the restoration of degraded habitat, removal of invasive vegetation, reintroduction of native species, partnerships with private landowners, research, and monitoring (IAFWA, 2004).

Comprehensive Wildlife Conservation Strategies (CWCS)

Much like the earliest transportation planning, conservation planning began as a condition of receiving continued federal funding under the State Wildlife Grant Program. Congress charged state fish and wildlife agencies with completing a Comprehensive Wildlife Conservation Strategy (CWCS) by October 1, 2005. The strategies will not only address "species of greatest conservation need" but also the "full array of wildlife and wildlife issues" and establish a plan of action for conservation priorities with limited funding. To "keep common species common," all strategies are based on targeting resources to prevent wildlife from declining to the point of endangerment. Ideally, each strategy will create a strategic vision for conserving the state's wildlife, not just a plan for the fish and wildlife agency.

Fish and wildlife agencies have engaged and embraced diverse partners (public and private landowners, local, state and federal agencies, non-government conservation interests, and citizens) to develop strategies that reflect the conservation issues, threats, opportunities, and priorities unique to their individual state. While the strategies will be as diverse as the states themselves, Congress identified eight essential elements the strategies must contain in order to ensure nationwide consistency:

1. Information on the distribution and abundance of species of wildlife, including low and declining populations as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the State's wildlife
2. Descriptions of locations and relative condition 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 needed to identify factors which may assist in restoration and improved conservation of these species and habitats
4. Descriptions of conservation actions determined to be necessary to conserve the identified species and habitats and priorities for implementing such actions
5. Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4) and for adapting these conservation actions to respond appropriately to new information or changing conditions
6. Descriptions of procedures to review the Strategy at intervals not to exceed 10 years
7. Plans for coordinating (to the extent feasible) the development, implementation, review, and revision of the Strategy with Federal, State, and local agencies and Indian tribes that manage significant land and water areas within the State or administer programs that significantly affect the conservation of identified species and habitats
8. Broad public participation is an essential element.

The U.S. Fish and Wildlife Service will review and approve each strategy as they are completed and state fish and wildlife agencies are required to revisit and update strategies at least every 10 years to ensure conservation success over the long term.

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 ensured through continued federal funding, matched by additional sources. In theory, the strategies represent the

future of wildlife conservation in the U.S. Collectively, they will create–for the first time–a nationwide approach to wildlife conservation (Teaming with Wildlife, 2004).

Integrated Planning

If each strategy 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.

Utilization of the habitat-mapping data included in the strategies can serve as an effective early warning system to identify transportation projects that will have a major impact on wildlife. Planners can overlay conservation maps with existing roads and long-range transportation needs to discover potential conflicts before considerable resources are invested. Efforts to avoid sensitive areas are easier and less expensive during the planning phase than during review, permitting, and construction.

This is also a good opportunity to explore needs for mitigation 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.

Figures 1–3 represent a simplified scenario of incorporating conservation data into the transportation-planning process.
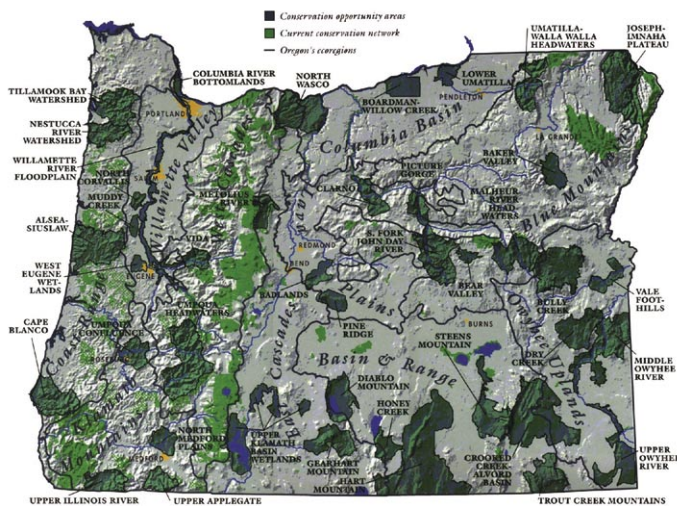

Figure 1. Oregon's Biodiversity Project. Light green patches indicate the existing conservation network. Dark green patches indicate "conservation opportunity areas," or those lands that have been identified as having conservation value and in need of special consideration.
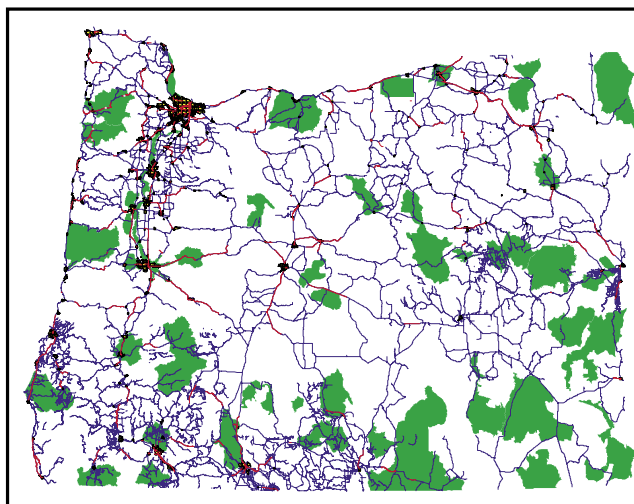

Figure 2. This map shows Oregon's conservation opportunity areas in green, overlaid with the existing road network in blue. In red, the map also indicates the projects in Oregon DOT's state transportation improvement program (STIP). At a glance, we can see precisely where transportation projects will intersect with and potentially impact valuable conservation areas.

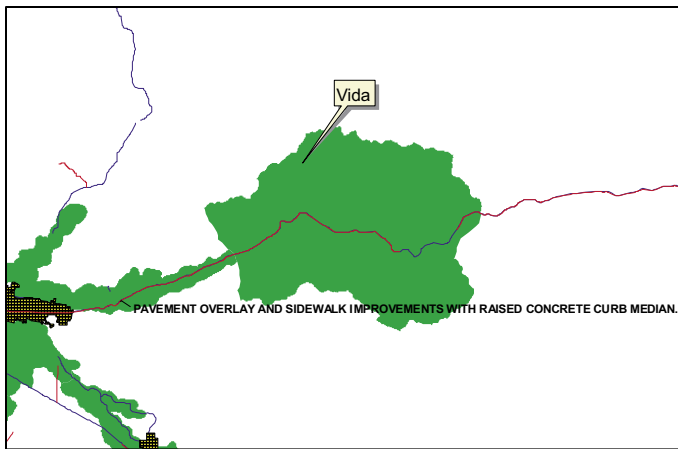PAVEMENT OVERLAY AND SIDEWALK IMPROVEMENTS WITH RAISED CONCRETE CURB MEDIAN.

Figure 3. Zooming in on individual projects within conservation-opportunity areas to explore possible measures to avoid or minimize impacts. For those impacts that cannot be avoided, the map also provides invaluable information on high-quality, available areas to meet mitigation requirements.
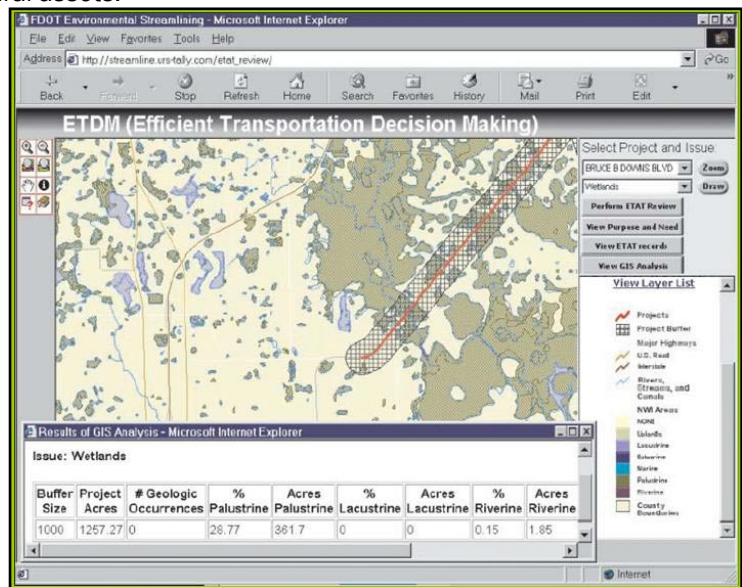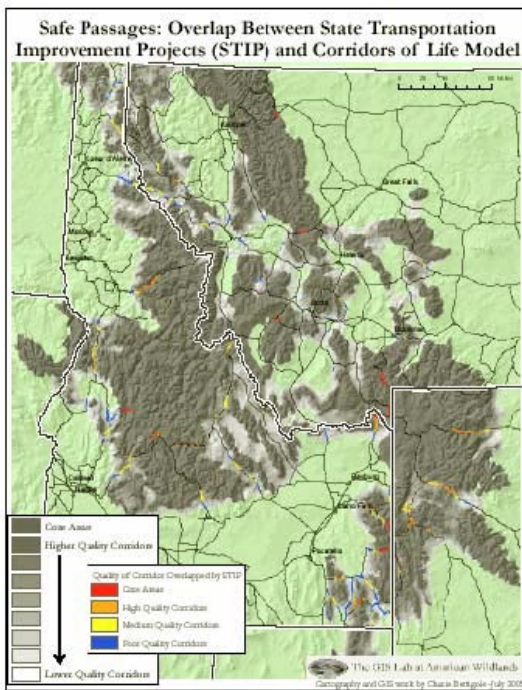
Florida DOT's ETDM Process

Over a decade ago, the state of Florida compiled a statewide plan which identified lands that must be conserved in order to sustain declining wildlife species and natural communities. The report, *Closing the Gaps in Florida's Wildlife Habitat Conservation System,* assessed the status of species and habitat that encompass Florida's biodiversity. The project mapped two categories of strategic land: areas that were already under some form of conservation protection (20 percent of the state's area) and areas that needed additional protection (an additional 13 percent). *Closing the Gaps* was the first statewide conservation program of its kind, built upon a sophisticated process with a strong scientific approach. Notably, it included the assembly and analysis of numerous data sets and assessments of focal species and population viability. The project has played a key role in guiding land-acquisition decisions. Since publication in 1994, the state has acquired 20 percent of the previously unprotected strategic-habitat areas.

Following the 1998 adoption of TEA-21, the Florida Department of Transportation (FDOT) began efforts to expedite projects without sacrificing environmental concerns. Building upon directives in TEA-21, FDOT teamed up with the Federal Highway Administration (FHWA) and other government agencies to develop a refined and improved methodology for making transportation decisions while complying with all federal and state environmental regulations. The result–FDOT's Efficient Transportation Decision Making Process (ETDM)–redefines how the state plans and builds transportation projects while protecting Florida's natural assets.

Each of the seven FDOT regions has an Environmental Technical Advisory Team (ETAT) composed of representatives from the relevant planning, consultation, and regulatory agencies. Proposed road projects are screened by the ETAT, based upon a checklist of criteria, including social and environmental impacts. GIS data are used to perform evaluations and are accessible to all agencies, as well as to the public through the Florida Geographic Data Library (FGDL).

One point of analysis is the compatibility of the proposed project with the state habitat plan. By overlaying maps of strategic habitats with FDOT's short- and long-range transportation plans, the ETAT can easily identify potential environmental concerns at the earliest stage of planning. At that time, options for avoiding or minimizing environmental impacts are greatest and the costs of addressing conflicts are nominal.

Safe Passages: Overlap Between State Transportation Improvement Projects (STIP) and Corridors of Life Model

NGO Contributions

American Wildlands' (AWL) GIS lab has developed two models to locate the highest priority areas for mitigating highways with crossing structures, fencing or other wildlife measures in local landscapes. To prioritize work, habitat cores and corridors from AWL's regional Corridors of Life model are overlaid with State Transportation Improvement Projects (STIP). State transportation departments rely on AWL's scientific methodology to justify expenditures of federal appropriations for wildlife mitigation.

AWL has created working groups to advocate for wildlife protection and habitat connectivity for six highway projects in critical wildlife cores or corridors, resulting in the development of wildlife underpasses, safety fencing, informational signs to warn drivers of wildlife hot spots, and other protective actions. To date, they have improved five different highway projects in Idaho, Wyoming, and Montana that have resulted in the commitment to construct seven wildlife underpasses and two bridges for fish passage in the region. So far, this includes over $2.7 million for wildlife mitigation and $2.2 million in private land conservation adjacent to highway mitigation.

Linking Colorado's Landscapes is a science-based approach to restoring landscape connectivity, led by the Southern Rockies Ecosystem Project (SREP) with the objective of identifying critical movement corridors for wildlife. Phase I produced a statewide assessment of these linkages. Through a series of expert workshops and computer modeling of wildlife-habitat connectivity, nearly 200 linkages were identified across the state. The linkages were then prioritized for further analysis based on their ecological significance. Phase II provides an in-depth assessment of the highest-priority linkages, focusing on the areas where these linkages intersect with major transportation routes. A highway-permeability analysis was conducted along these segments, providing the foundation for recommendations for improving the permeability of these roadways for wildlife. These recommendations are being supplied to the Colorado Department of Transportation for integration into highway projects and transportation planning.

SAFETEA-LU: Section 6001

After three years, two election cycles, and twelve extensions, on August 10, 2005, the President signed the federal transportation bill, funding highways and transit through FY 2009 to the tune of $286.5 billion. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) included provisions that integrate consideration of wildlife conservation into the transportation-planning process.

Under the new law, each metropolitan planning organization (MPO) and state department of transportation (DOT) will consult with federal, state, tribal, and local land-use management, natural-resources, wildlife, environmental-protection, conservation, and historic-protection agencies in developing their long range transportation plans. Each consultation will include a comparison of the transportation plan with conservation maps or inventories of natural and historic resources. Each plan will also include a discussion of potential environmental-mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan.

In light of this new requirement, the statewide conservation strategies will begin to demonstrate their full value and utility. Transportation planners can use the spatial data in the strategies to meet the requirement and more importantly, to make more informed early decisions about road building.

Conclusion

Our nation is approaching a crossroads–unimpeded urbanization may soon collide with the limits of our country's natural resources. The rate of urbanization surpasses population growth and threatens to overwhelm previous victories in environmental protection. Our natural heritage is in peril–threatened by habitat loss, and the greatest consumer of habitat is poorly planned, sprawling development.

Sec. 6001. Transportation Planning. The long-range transportation plan shall be developed, as appropriate, in consultation with State, tribal, and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation.
Comparison and Consideration
Consultation under clause (i) shall involve comparison of transportation plans to State and tribal conservation plans or maps, if available, and comparison of transportation plans to inventories of natural or historic resources, if available.
Mitigation Activities
A long-range transportation plan shall include a discussion of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan.
Consultations
The discussion shall be developed in consultation with Federal, State, and tribal wildlife, land management, and regulatory agencies.

Over the next few decades, America can avert this collision between growth and biodiversity. Because transportation infrastructure necessarily precedes development, decisions about where and how we build roads will determine the location, direction, and shape of future urban growth. State transportation agencies and planners can steer investment toward greater mobility for better communities and away from impacting our remaining natural areas.

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

White is also:

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

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

References

American Planning Association. *Habitat Protection Planning: Where the Wild Things Are*. Planning Advisory Service Report Number 470/471.

Czech, B., P. R. Krausman, and P. K. Devers. 2000. Economic Associations Among Causes of Species Endangerment in the United States. BioScience 50 (7): 593-601.

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

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

Gutfreund, O. D. 2004. *20th Century Sprawl: Highways and the Reshaping of the American Landscape*. Oxford University Press, New York.

Holtz Kay, J. 1997. *Asphalt Nation: How the Automobile Took Over America*. University of California Press, Los Angeles.

International Association of Fish and Wildlife Agencies. 2004. *State Wildlife Grants: The Nation's Core Program for Preventing Wildlife from Becoming Endangered*. http://www.teaming.com/pdf/State%20Wildlife%20Grants%20Overview.pdf,

Noerager, K. and W. Lyons. 2002. *Evaluation of Statewide Long-Range Transportation Plans*. Volpe National Transportation Systems Center. http://www.fhwa.dot.gov/hep10/state/evalplans.htm.

Senatore, Michael. September 6, 2005. Personal communication.

Shaffer, M. L. and B. A. Stein. 2000. *Precious Heritage: The Status of Biodiversity in the United States*.

Surface Transportation Policy Project. 1998. *TEA-21 User's Guide*.

The Nature Conservancy. http://www.nature.org/aboutus/howwework/about/conservation.html.

The Biodiversity Partnership. http://www.biodiversitypartners.org.

U.S. Department of Agriculture. Natural Resources Conservation Service. 2000. Natural Resources Inventory. http://www.nrcs.usda.gov/technical/NRI/.

U.S. Department of Transportation. 1988. *Urban Transportation Planning in the United States: An Historic Overview*.

U.S. Department of Transportation, Transportation Planning Capacity Building Program. 2004. *The Metropolitan Transportation Planning Process: Key Issues*. FHWA-EP-03-041.

U.S. Fish and Wildlife Service. 2002. *Critical Habitat: What is it?* http://www.endangered.fws.gov/listing/critical_habitat.pdf.

U.S. Fish and Wildlife Service. Endangered Species Habitat Conservation Planning. http://www.fws.gov/endangered/hcp/.

Weingroff, R. F. 2004. *Federal-Aid Highway Act of 1956: Creating the Interstate System*. http://www.fhwa.dot.gov/infrastructure/rw96e.htm.

World Resources Institute. *Species Extinctions: Causes and Consequences*. http://www.wri.org/biodiv/extinct.html.

Additional Resources

The American Association of State Highway and Transportation Officials (AASHTO) is a nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico. It represents all five transportation modes: air, highways, public transportation, rail, and water. Its primary goal is to foster the development, operation and maintenance of an integrated national transportation system.
http://www.transportation.org

American Wildlands (AWL) is a science-based, regional, conservation organization that has worked for on-the-ground change and has successfully led numerous Wilderness and Wild & Scenic River initiatives throughout the American west:
http://www.wildlands.org

The Association of Metropolitan Planning Organizations (AMPO) is the transportation advocate for metropolitan regions and is committed to enhancing MPOs' abilities to improve metropolitan-transportation systems:
http://www.ampo.org

The Defenders of Wildlife's Habitat & Highways Campaign seeks to reduce the impact of our road network on wildlife and to incorporate consideration for conservation into transportation planning:

http://www.habitatandhighways.org

The Florida Closing the Gaps Project: Florida Fish and Wildlife Commission identified the minimum amount of land in Florida that, if protected, will ensure the long-term persistence of most elements of Florida's biodiversity. The project included a biodiversity assessment, a map of Strategic Habitat Conservation Areas and a strategy to conserve Florida's biodiversity:

http://www.floridaconservation.org/oes/habitat_sec/Closing_Gaps.pdf

The International Association of Fish and Wildlife Agencies (IAFWA), founded in 1902, represents the government agencies responsible for North America's fish and wildlife resources. IAFWA applies expertise in coalition building, science, policy, and economics to serve its members as a national and international voice on a broad array of wildlife and conservation issues:

http://www.iafwa.org/

The Nature Conservancy (TNC) is a leading international, nonprofit organization with the mission of preserving the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive:

http://www.nature.org/aboutus/howwework/cbd/

NatureServe is a non-profit conservation organization that provides the scientific information and tools needed to help guide effective conservation action. NatureServe and its network of natural-heritage programs are the leading source for information about rare and endangered species and threatened ecosystems:

http://www.natureserve.org

The Southern Rockies Ecosystem Project (SREP) is a non-profit conservation-biology organization working to protect and restore large, continuous networks of land in the Southern Rockies ecoregion of Colorado, Wyoming, and New Mexico. SREP realizes this vision for a healthy ecoregion by connecting networks of people in order to connect networks of land:

http://www.restoretherockies.org

The Surface Transportation Policy Project (STPP) is a diverse, nationwide coalition working to ensure safer communities and smarter transportation choices that enhance the economy, improve public health, promote social equity, and protect the environment:

http://www.transact.org

Teaming With Wildlife: Recognizing the need to take action to prevent wildlife decline, more than 3000 groups came together as the Teaming With Wildlife coalition. This coalition includes wildlife managers, conservationists, hunters and anglers, businesses, and many others who support the goal of restoring and conserving our nation's wildlife:

http://www.teaming.com