

Transportation: Protecting Species, Enhancing Ecosystems

Did you know?

Transportation agencies are developing innovative ways to protect animal and plant species—in many cases contributing to the preservation of entire ecosystems.

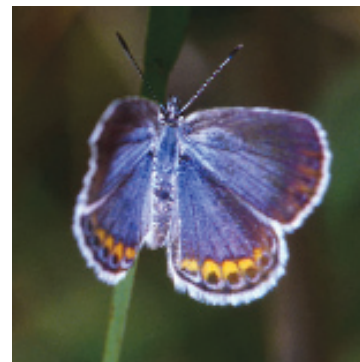
Transportation agencies across the country are developing ways to make roadways compatible with the plants and animals that share the land. From small efforts—like placing nesting houses on the back of highway signs, to broad-scale initiatives that aim to preserve entire ecosystems—transportation agencies are helping to protect and enhance plant and animal species and their habitats.

A growing field of top-notch environmental professionals at transportation agencies across the country is making a huge contribution to improve the state-of-the-art in protecting endangered species, preserving habitat, and developing tools like geographic information systems that map out vital areas for protection.

The transportation sector's behind-the-scenes contributions to conservation and species recovery are making a difference for plants and animals nationwide—helping provide a voice to our quiet neighbors from the natural world.

While responsible for complying with numerous laws and regulations, these transportation professionals are coming up with creative solutions to ensure that the nation's roadways are constructed and maintained in a way that protects and enhances native plants and animals.

Highway officials are developing new ways to allow animals to cross roads or to keep them safely to one side. Most people would not even



Opposite – A black bear underpass suite beneath Highway 46 in Florida consists of a bottomless rectangular cast-in-place concrete culvert, chain link fence, animal crossing signs, and vegetation management. At least 12 species, including the bears, are using the culvert. This keeps not only the animals, but motorists safer as well.

Above – In an effort to save the endangered Karner Blue Butterfly, the Wisconsin Department of Transportation has seeded an I-94 rest area with Blue Lupine (left) and other native prairie plants. The area is now a solid wall of blue flowers and the butterflies are everywhere.



notice a culvert designed specifically for black bears to cross, fences installed to keep frogs from jumping into the roadway, or a “ladder” constructed in a roadside stream to aid migrating fish.

Few people are aware of landmark government agreements to set aside huge tracts of land in a proactive effort to preserve habitat for numerous threatened or endangered species. And the average citizen is unlikely to recognize that beautiful purple flowers carefully maintained by transportation workers along a roadside are providing vital habitat for a delicate, endangered butterfly.

On a broader scale, identification and encouragement of “exemplary ecosystem” projects are among the priorities of the Federal Highway Administration. The agency is recognizing the increasing number of innovative approaches agencies are using to benefit to the environment—including development of conservation agreements, use of wetland banking, preservation efforts based on identification of wildlife movement corridors, partnering with other agencies and conservation groups, and development of ecological information databases.

Preserving the Short-Grass Prairie Ecosystem in Colorado

Considered an exemplary ecosystem initiative by federal transportation officials, Colorado transportation officials are partners in a broad-scale program of species recovery and ecosystem conservation on Colorado's shortgrass prairie. This award-winning effort aims to protect habitat of some 36 species—many of which have not yet been given endangered status. Officials are using a range of methods, including plans for conservation of up to 50,000 acres of land, via easements and management agreements in perpetuity.⁴¹

A recent decision by the U.S. Fish and Wildlife Service not to list as endangered the black-tailed prairie dog in Colorado was based in part on the successful implementation of Colorado DOT's initiatives to enhance the environment and protect rare species.



It's challenging trying to balance the need to protect the environment while providing a safe transportation system for a growing state. However, CDOT is committed to doing just that. We recognize how important it is to preserve short-grass prairie and protect the wildlife dependent upon it.

— Tom Norton,
Colorado Secretary of
Transportation

Working with other agencies and conservation groups, Colorado DOT (CDOT) is working to implement roadside maintenance techniques and is developing Geographic Information System maps and other tools to help preserve the prairie plants and animals. Methods to maintain and enhance ecosystem processes range from protection and care of rare species to control of competitors, promotion of pollinators, protection of riparian areas and wetlands, and maintenance of animal crossings.

Through this proactive approach, the transportation agency has achieved advanced compliance with Endangered Species Act requirements for transportation projects over the next 20 years, while protecting and enhancing the environment. This multi-species recovery effort is expected to promote the recovery of listed species, help prevent listing of additional species, use public funds more efficiently, improve the project development process, and offset permanent habitat loss through large-scale habitat protection.

A recent decision by the U.S. Fish and Wildlife Service not to list the black-tailed prairie dog in Colorado was based in part on the successful implementation of this initiative.

Preserving Native Prairie Plants in Wisconsin

Transportation workers in Wisconsin are using the state's roadsides as preservation corridors for endangered native prairie plant species. The project will involve eradicating most of the woody species that have invaded the prairie, selectively applying herbicides to invasive species (crown vetch, spotted knapweed, etc.), and conducting controlled burns. The burns will take place in early spring of 2003, 2004, and 2005, most likely in April. "We're doing this to be good stewards of a valuable natural resource that is part of our heritage," explained Dick Stark, Landscape Architect from WisDOT's Bureau of Highway Operations in Madison.

"Prairie and its related plant communities once covered millions of acres in the central United States, including about 2.1 million acres in southern and western Wisconsin," Stark added. "It is now one of the most endangered plant communities in the world. By preserving what we can of it, we safeguard the beautiful native grasses and wildflowers that are naturally adapted to the area. We also provide better cover for erosion control than the species that are typically used."⁴²

Planting a Few Seeds Pays Off for an Endangered Butterfly

Wisconsin supports the largest and most widespread populations of Karner Blue butterflies in the world, and the species is endangered because its sole host plant—wild blue lupine—has become scarce. The Wisconsin Department of Transportation has joined 22 public and private organizations across the state to preserve existing lupine patches and encourage new lupine growth.

For example, in Jackson County the department seeded an I-94 rest area with lupine and other native prairie plants. Three years later (it takes lupine three years to mature and flower) the area was a solid wall of blue



Photos courtesy of the Vermont Agency of Transportation

flowers and Karner blue butterflies were everywhere. In addition to planting lupine seeds, the department has modified its mowing cycles along 500 miles of state highway rights-of-way where the endangered butterfly lives.⁴³

Vermont Highway Engineers Look After Baby Falcons

Most travelers don't even notice the 19 small wooden boxes attached to the back of signs along Interstate 89 between Bethel and Highgate. But to a hand-full of winged travelers, these boxes are home sweet home—and a place to raise a family for the summer. These seasonal visitors are American Kestrels (*Falco sparverius*), blue-jay-sized falcons arriving in Vermont in the spring from wintering grounds that are as far away as South America. Since 1995, the Vermont Agency of Transportation (VTrans) has been collaborating with the Vermont Institute for Natural Sciences (VINS) in building, installing, and maintaining nesting boxes for kestrels.

Kestrels are the smallest and most colorful raptors in North America. They are graceful, fast, and powerful fliers, known for their remarkable ability to hover.

Kestrels—who like to nest in small cavities—consider nesting boxes on the backs of interstate signs prime real estate. They provide high, predator-proof locations with clear views of their surrounding hunting territory along the clear grassy rights-of-way. VTrans engineers built the first 10 boxes for less than one hundred dollars in materials and one day of their volunteer time. Today, the Kestrel Program continues to be a collaborative effort within VTrans. In the summer, the eggs and the young are counted



The Vermont Agency of Transportation collaborates with the Vermont Institute for Natural Sciences in building, installing and maintaining nesting boxes for American Kestrels—who consider the boxes on the backs of interstate signs prime real estate.



Photo courtesy of U.S. Fish and Wildlife Service



A black bear underpass in Ocala Florida where bears have a known travel corridor from the Ocala National Forest in the north, to the Wekiva River drainage in the south. The crossing structure was working even before construction was complete, with five bears known to use it.

and banded. Hopefully, the banding efforts will shed some light on the mysterious migrating habits of these birds. Since 1995, 76 kestrel fledglings have hatched and four orphaned young were fostered in the VTrans boxes—a significant return on a minimal investment. While this is only a very small portion of what the department’s environmental section does, the Kestrel Program is quickly becoming a symbol of VTrans’ commitment to conducting business in an environmentally sensitive way.⁴⁴

Wildlife Crossings

Black Bears in Florida

Black bears have few linkages connecting suitable habitat in Florida. In the central section of Florida, bears have a known travel corridor from the Ocala National Forest in the north, to the Wekiva River drainage in the south. This underpass suite beneath Highway 46 consists of a bottomless rectangular cast in place concrete culvert, chain link fence, animal crossing signs, and vegetation management. At least 12 species, including the design species, were recorded using the culvert. The crossing structure worked for bears even before construction was complete, with five bears known to use it. Up to 55 bears used it in the two years following installation. The structure is very well used in fall.⁴⁵



Photo courtesy of U.S. Fish and Wildlife Service

Mojave Desert Tortoise-Retrofitted Culverts and Barrier Fence

Barrier fences were installed on Route 58 in California's Mojave Desert to test their effectiveness in reducing highway mortalities for the state and federally protected desert tortoise. These specially designed fences directed the tortoises towards storm-drain culverts that spanned the highway and functioned as wildlife crossing structures for a variety of animals.⁴⁶

Amphibian-Reptile Lipped Wall and Culverts

Prairie State Preserve contains an incredible array of animals—particularly reptiles and amphibians—in the diverse wetland on either side of the four-lane US 441 south of Gainesville, Florida. A suite of structures including long-lipped concrete walls, concrete square box culverts, pre-cast concrete bottomless culverts, round concrete pipes, open median drains, and reverse mount guardrail barriers combine to reduce mortality and allow these animals to cross the highway.⁴⁷

Goat Underpasses in Glacier National Park, Montana

At one time, mountain goats had to cross US 2 to get to a salt lick on the other side of the canyon. Now they can get there on rocky passageways underneath these bridges, shielded from view by tree cover and the steep hillside.⁴⁸



Specially designed barrier fences in California direct Desert Tortoises to storm-drain culverts that span the highway, and function as wildlife crossing structures for a variety of animals.



Photo courtesy of U.S. Fish and Wildlife Service

Transportation planners in Florida use a GIS computer model to identify habitat corridors where wildlife/vehicle collisions are likely to occur. They can then adapt existing crossing structures, or build new ones like the highly-successful underpasses on I-75 designed for the Florida Panther.

A Computer Model for Exploring Highway/ Wildlife Relationships

Researchers in the University of Florida's Landscape Ecology Program have developed a Geographic Information System (GIS) computer model that captures, manipulates, displays, and combines spatial information such as hydrology, land use, species distribution, and existing roads and greenways.

The GIS model will help the Florida Department of Transportation integrate the need to improve transportation with the need to counteract habitat fragmentation by roads. Transportation planners can use it to identify habitat corridors where wildlife/vehicle collisions are likely to occur. They can then adapt existing crossing structures or build new ones like the highly successful underpasses on I-75—Alligator Alley—designed for the endangered Florida panther.⁴⁹

The Federal Highway Administration has compiled a long list of simple steps transportation agencies are taking to help protect wildlife along America's roadways. The list on the following page provides some of the highlights.

Keeping It Simple: Easy Ways to Help Wildlife Along Roads⁵⁰



- ▶ Auguring guardrail posts to protect listed birds from percussive noise
- ▶ Adding ledges to box culverts for Eastern Phoebe nesting
- ▶ Adding shelves in front of and inside frequently-flooded box culverts for easier amphibian entry and crossing
- ▶ Avoiding in-stream construction during the breeding seasons of protected fish
- ▶ Bark mulch berm along narrow causeway to protect lake fish from highway runoff
- ▶ Bat “dome” in culvert
- ▶ Birdboxes and platforms (bluebirds, falcons, kestrels, wood ducks, raptors, ospreys)
- ▶ Burying the inside bottom of oversized culverts below the stream bottom to create a more natural stream bed within the culvert
- ▶ Constructing an elevated boardwalk over the habitat of the Perdido Beach Mouse
- ▶ Constructing concrete fish barriers to keep out unwanted fish
- ▶ Constructing innovative sediment basins to protect listed fish species
- ▶ Creating small-animal habitats out of brush piles
- ▶ Creating bat roosts by retrofitting box culverts with rough-textured concrete forms
- ▶ Cutting trees at the roots at a bridge site to help keep sediment out of the water and away from endangered fish
- ▶ Designing longer-span bridges for wildlife passage along a stream or riparian corridor
- ▶ Designing a channel in the bottom of a stream box culvert to provide low-water fish passage
- ▶ Donating steel posts to FWS for “let’s help save sea turtles” signs
- ▶ Fencing to prevent turtle and tortoise roadkill
- ▶ Fish ladder “lip” to protect trout from the parasitic sea lamprey
- ▶ Including contract provision “protect existing vegetation” when that vegetation is wildlife habitat and is not protected by laws or regulations
- ▶ Installing metal poles on a high bridge to keep marine birds from flying into traffic
- ▶ Installing removable filter devices in bridge deck drains
- ▶ Installing translucent “shrouds” over the entrances to wildlife underpasses in high snowfall-areas
- ▶ Limiting blasting to protect caves used by endangered bats
- ▶ Limiting canopy removal near streams to preserve foraging habitat for endangered bats
- ▶ Limiting tree removal along trout streams
- ▶ “Living snow fence”
- ▶ Leaving old trees in the right-of-way for woodpecker habitat
- ▶ Leaving dead palm fronds untrimmed to protect the habitat of baby yellow bats
- ▶ Leaving standing dead trees on wetlands for egrets, hawks, and other birds to use as perches
- ▶ Leaving in place part of a bridge-project work platform to create rocky habitat for a variety of mussel species
- ▶ Ledges for Eastern phoebes
- ▶ Limiting planting along a topsoil-covered stream bank to encourage growth of natural plant communities and to reduce disturbance to fish and wildlife
- ▶ “Lip” on one barrel of two-barrel culvert for low-flow fish passage

- ▶ Locating wetland mitigation sites next to Department of Natural Resources-managed lands
- ▶ Low-sodium lights along road to protect endangered birds that fly into bright light
- ▶ Low- sodium lights on bridge to protect migrating sea turtles
- ▶ Modifying mowing cycles to protect the roadside habitats of ground-nesting birds, the Karner Blue butterfly, and other animals
- ▶ “Mound and pool” topography in wetlands for more natural habitats
- ▶ Mound-planting bottomland oak seedlings to jump-start their growth and production of acorns
- ▶ Netting or Bird-X gel to prevent swallows from nesting on bridges during construction
- ▶ Not planting wildlife-friendly vegetation along rights-of-way or in the medians of high-speed roadways
- ▶ Not power-spraying bridges to protect birds and fish
- ▶ Placing large woody debris and boulders in lakes and streams to enhance fish habitat
- ▶ Planting mass-producing hardwood trees to benefit hogs, squirrels, and other animals
- ▶ Planting native grasses to bring Bob White quail back to open rural areas beyond the ROW
- ▶ Plugging bridge deck drains with removable spray foam
- ▶ Preserving a sandy-soil section of wetland for turtle habitat
- ▶ Protective platform barriers to catch falling debris from bridge construction
- ▶ Purchasing and retaining non-economic remnants for wetland or upland wildlife habitat
- ▶ Reconnecting hydrology on large wetlands by putting in more culverts
- ▶ Relocating freshwater mussels
- ▶ Relocating osprey nests to artificial nesting platforms
- ▶ Replacing lost forest cover along highways
- ▶ Replanting coastal mangroves to stabilize the shoreline and preserve the food chain in estuaries
- ▶ Rock spurs to help stabilize stream banks
- ▶ Rock vortex fish weirs
- ▶ Saving topsoil and forest duff during construction to use later in habitat restoration
- ▶ Scarifying causeway ROWs for shorebird nesting
- ▶ Shading lights on walkway under bridge to protect migrating salmon fry from predators
- ▶ Start-holes for red-cockaded woodpeckers
- ▶ “Startling” fish away from blasting using sonar fish-startle devices
- ▶ Stockpiling construction-site boulders and placing them in strategic spots on streams to create pools and riffle areas for fish
- ▶ Streambank cattle fencing
- ▶ Streambank fish-cover devices that allow fish to rest and hide
- ▶ Taller lights at intersections near the home of endangered bats
- ▶ Topping low bridge rails with fences barriers to keep purple martins from flying into traffic
- ▶ Training highway maintenance and work crews on how to protect desert tortoises and kit foxes
- ▶ Using catch basins when cleaning road equipment so diesel-based emulsions and solvents do not drip onto the ground and endanger wildlife
- ▶ Using explosives in stream projects only in dewatered coffer dams
- ▶ Using fabric-wrapped foam for ditch checks instead of hay bales (an attraction to grazing animals)
- ▶ Using visual barriers to protect bald eagles from the sight of construction work
- ▶ Willow staking on stream banks for shading and soil stabilization
- ▶ Wood-top rail—not barbed wire—on fences in migration area