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NATIVE VEGETATION

The single greatest threat to biodiversity in the United States is loss or degradation of habitat; a contributing factor in the decline of 85 percent of the species currently listed by the Department of the Interior as threatened or endangered.¹ Introduced species are the second greatest cause of species endangerment and decline in the U.S. and also worldwide — far exceeding all forms of harvest. Nearly 50 percent of species on the endangered or threatened species lists are at risk because of non-indigenous species.

Invasive species degrade habitats and threaten natives through predation, disease, competition and/or hybridization. At least three of the 24 known extinctions of listed species were wholly or partially caused by hybridization between closely related exotic and native species.²

Quietly, insidiously — and often by invitation — the U.S. has been invaded. More than 50,000 species of non-native plants, animals and microbes have taken up home here — most in the past 70 years. Many are valuable crops or useful plants that humans brought from other countries. Others are pests that have overtaken the habitats of native species, pushing many towards extinction, causing extensive crop damage and human and animal disease.³

Native species have evolved and adapted

within an ecosystem that contains competing species, predators, and diseases, all of which limit their abundance. In other words, they are part of an ecological dynamic that has evolved over thousands of years. In the absence of these checks, many non-natives can spread rapidly and dominate an area, altering habitats and evicting native plants and animals. Species that are not native at a site are variously called non-native, exotic, alien, adventive, or non-indigenous species.⁴

COSTS OF INVASIVES

The ecological cost of invasive species is rivaled only by the economic cost. In a 2000 damage assessment study, *Environmental and*

BENEFITS OF NATIVE SPECIES

1. Erosion control
2. Vegetation management
3. Biodiversity
4. Wildlife habitat
5. Wetland mitigation
6. Endangered species
7. Water quality
8. Hardy vegetation

Adapted from "Reassessing Beautification: More Than an Aesthetic Goal" by Bonnie L. Harper Lore, FHWA

Economic Costs of Nonindigenous Species in the United States, a team of researchers from Cornell University estimated that invasive species are responsible for at least \$137 billion a year in economic losses.

The losses related to plants alone total \$36.6 billion annually, as follows:

- Crop losses cost \$23.4 billion a year and an additional \$3 billion is spent on herbicides to control them.
- In grazing and pastureland, invasives result in a loss of forage that amounts to \$1 billion a year. Ranchers spend about \$5 billion each year to control invasive and toxic weeds in pastures and rangelands, but they continue to spread.
- Homeowners spend an estimated \$500 million a year and golf courses spend \$1 billion a year to control weed invaders.
- An estimated \$100 million is also spent to control aquatic weeds that clog waterways and alter natural ecosystems.⁵

Today, as much as 17 percent of North American flora, and up to 33 percent of individual state floras are made up of exotics. Each day, approximately 4,600 acres of land is invaded by invasive plants.⁶ Nowhere is this more evident than along the four million miles of roads and highways that crisscross the country. Because they disturb natural habitats, transportation systems can facilitate the spread of plant and animal species outside their natural range. With 12 million acres of land contained within public rights-of-way, transportation agencies are also land managers on a grand scale. Even along some of the most



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Purple loosestrife, a European native popular as an ornamental plant in the early 1800s, has invaded wetlands in 48 states, and is blamed for crowding out 44 native plants and endangering wildlife that depends on those natives. The economic damage of purple loosestrife is estimated at \$45 million a year for control and loss of forage crops.

remote roads, evidence abounds of introduced species. Since roadbuilding began, our rights-of-way have been inundated with non-native species — mostly by accident, some times by design, and often in well-intentioned but harmful attempts to “beautify” the roadside.⁷

The management of roadside vegetation has always been a reflection of prevailing attitudes and the current level of understanding of ecology. During the 1930s, roadsides were maintained as if they were the nation’s front yard. The labor-intensive planting and mowing that

this required was significantly reduced in the 1950s with the introduction of agricultural herbicides. Beautification became a major objective of state highway agencies in the 1960s. During the 1970s, a growing appreciation for the environment led to a more ecological approach to roadside management. By the 1990s, it was understood that none of these previous aesthetics were mutually exclusive or

"Extinction by habitat destruction is like death in an automobile accident: easy to see and assess. Extinction by the invasion of exotic species is like death by disease: gradual, insidious, requiring scientific methods to diagnose."

*E.O. Wilson
Harvard University*

necessarily incompatible with ecology. The idea grew that the country's roadsides should reflect the natural beauty and biodiversity of each region, and that a new aesthetic could be built through better planning based on an understanding of natural heritage. The benefits of this include roadsides that are more ecologically diverse, that provided suitable habitat for wildlife, that showcase local character, that control erosion, that require reduced use of water, fertilizer and other chemicals, and that also require less maintenance.⁸

When highway construction began in the

early 20th century, the objective of roadside vegetation management was to establish an inexpensive, attractive and fast-growing slope stabilizer. Depending on the region, native species may or may not have met all of these objectives. Where native flora was too costly, grew too slowly, or was deemed unattractive, non-native species were often planted. As a result, public rights of way became clogged with invasive species such as kudzu and grasses. Some of these invasives spread beyond the right of way, onto adjoining private and public property, further degrading habitat and reducing biodiversity. Decisions based only on cost, ease of use and driver safety fail to consider the negative consequences for the roadside environment and beyond.

Many of these practices and attitudes about roadside vegetation management continue today. Roadsides provide a buffer between the roadway itself and the adjacent commercial, industrial, agricultural or residential lands, protecting the private landowner and the highway user from one another. Roadsides also provide opportunities for the movement of invasive species through the landscape. Invasive plant or animal species can move on vehicles and in the loads they carry. Invasive plants can be moved from site to site during spraying and mowing operations. Weed seed can be inadvertently introduced into the corridor aboard construction and maintenance equipment, through the use of mulch, imported soil or gravel, and sod. Some invasive plant species might be deliberately planted in erosion con-

trol, landscape, or wildflower projects. Very often, such weeds not only threaten the economic activities of adjacent landowners, but also fail to protect the interests of the highway users. Millions of miles of highway rights-of-ways traverse public and private lands. Many of these adjacent lands have weed problems and the highway rights-of-way provide corridors for further spread.

On February 3, 1999, Executive Order 13112 was signed “to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.” The executive order builds on the National Environmental Policy Act (NEPA) of 1969, the Federal Noxious Weed Act of 1974, and the Endangered Species Act of 1973, to prevent the introduction of invasive species, provide for their control and take measures to minimize economic, ecological, and human health effects. The order established an Invasive Species Council, called for an Invasive Species Management Plan and outlined federal agency duties as follows:

- Identify actions which affect invasive species
- Detect and prevent introductions
- Monitor populations and conduct research
- Restore native populations
- Promote public education
- Discontinue authorization, funding and execution of all actions which promote introductions
- Consult with the Invasive Species Council and stakeholders

The executive order reflects great concern

about the impacts of invasive species, and also the need for action on a national scale. Shortly after the executive order was signed, then Secretary of Transportation Rodney E. Slater issued a “Policy Statement on Invasive Alien Species,” which directed state DOTs to actively implement the order. DOTs were given a new directive to address issues related to roadside vegetation management, from both the construction and maintenance aspects. Guidance developed by the FHWA provided a framework for preventing the introduction of new invasives on rights-of-way and controlling those invasives that already existed. Control can be a complex effort involving various governmental jurisdictions, adjacent landowners, and the general public. The FHWA guidelines were developed with the goal of promoting improved cooperation, communication, and joint eradication efforts with agencies at all levels and with the private sector. To reduce economic and ecological costs and to improve eradication effectiveness, states are encouraged to incorporate elements of this guidance into their planning and implementation of construction, erosion control, landscaping, and maintenance.⁹

IOWA’S LIVING ROADWAY PROGRAM

Beyond the preventative and reactive, there is also great potential for state DOTs to become proactive stewards in roadside management. In many regions, roadsides provide some of the last vestiges of native habitat. Prairies and

grasslands are our most highly imperiled native habitats. Roadsides offer excellent opportunities for restoring some components of the prairie ecosystem. Together, the Iowa Department of Transportation and the Roadside Management Program at the University of Northern Iowa are making strides in restoring roadside prairies. In Iowa alone, where 98 percent of the native prairie habitat has been lost, the 600,000 acres of roadside habitat provide more area than all the state, county, and city parks combined.¹⁰ In 1988, the Living Roadway Trust Fund was established to provide funds for the development and implementation of Integrated Roadside Vegetation Management (IRVM) plans. The purpose of these plans is to preserve, plant, and maintain Iowa's roadside vegetation so that roadways are safe, visually interesting, ecologically integrated, and useful for many purposes. On roadside projects, a minimum of 50 percent by count of newly planted trees and shrubs must be considered native to Iowa or be improved hardy cultivars of a native species. All grasses and forbs (plants and/or seeds) must be considered native to Iowa. Introduced species, other than annual grasses used specifically as cover crops, will not be funded.¹¹

CONCLUSION

Twelve million acres of land are contained within our public rights-of-way — an area roughly half the size of Indiana. Given the widespread threat of invasive species, resource

managers and transportation agencies have a responsibility to first stop adding to the problem. Second, they must attempt to repair the damage that has already been done. Finally, where possible, roadsides should be enhanced to restore the ecological value they once had. Our nation's rights-of-way must be managed as a valuable resource with the most positive impact on the environment and the economy.

RECOMMENDATIONS

- Develop and adopt integrated roadside vegetation management plans.
- Coordinate and compile vegetation inventories, classification systems, plans and implementation strategies for roadsides.
- Establish a statewide invasives clearinghouse to provide data, information and technical assistance to land and resource managers, action agencies, and developers.
- Provide additional training in removing invasive species and reestablishing native flora on rights-of-way.
- Develop educational programs and provide informational materials for the general public, landowners, government employees, and board members as part of a program for integrated roadside vegetation management. The public does not support what it does not understand. Through public service announcements and instructional materials, state DOTs can shore up the public support necessary to successfully address invasive species issues.

- Sponsor pilot projects on the removal and prevention of roadside invasives, as well as native species restoration.
- Conduct research and monitoring of project sites for invasives.
- Reward managers and communities for exemplary efforts in the eradication of invasives and restoration of native species.

RESOURCES

Roadside Use of Native Plants, by Bonnie Harper-Lore and Maggie Wilson. Island Press, 2000.

Gateway to Federal efforts concerning invasive species <http://www.invasivespecies.gov>

Federal Highway Administration Guidance on Invasive Species

http://www.fhwa.dot.gov/environment/rdsduse/rdus3_13.htm

Iowa's Living Roadway Program <http://www.iowalivingroadway.com/>

<http://www.uni.edu/irvm/web/>

Invasive Species in Transportation Rights of Way: "You Wouldn't Plant Kudzu, Would You?" <http://itre.ncsu.edu/cte/TC27HANDOUT.pdf>

Executive Order <http://www.invasivespecies.gov/laws/execorder.shtml#sec2>

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10. Noss, Reed F. (Conservation Biology Institute) *Restoring Grassland Ecosystems: An Opportunity to Save the Pieces.* Available at: http://www.fhwa.dot.gov/environment/rdsduse/rd_use17.htm
11. Iowa's Living Roadway Trust Fund, <http://www.iowalivingroadway.com>.

NATIVE VEGETATION AND TEA-21

TEA-21 does not contain any provisions to assist or encourage states to discontinue using invasive species or to establish native roadside vegetation management programs.

OPPORTUNITIES FOR REAUTHORIZATION

- Provide funding for statewide inventories of vegetation in rights-of-way. Statewide inventories will document invasions and aid in statewide planning and management of this issue.
- Require discontinuation of the use of non-natives in roadside vegetation management. Compile state lists of target species and appropriate replacements.
- Support native species restoration. The executive order on invasive species required federally funded projects to not only prevent the spread of invasive species, but also to actively plant and manage native plants. Vegetation managers need incentives to move from current practice to a native vegetation management plan.
- Institute a start-up, small business loan program for growers to establish native seeds and stock for use in roadside vegetation. Businesses would be given a five-year grace period before reimbursement is expected. Reimbursement would be in the form of native seed and stock to be used by state DOTs.
- Provide funding to educate practitioners on native vegetation. State DOTs vary widely in their capacity to make positive changes in vegetation management. Additional training is needed to make these changes the standard, rather than the exception.