



Roadside Weeds, Brush, and Erosion

How your county or city can manage them to
create safe, healthy roadsides and roads



Roadside Weeds, Brush, and Erosion: How Your County or City Can Manage Them to Create Safe, Healthy Roadsides and Roads

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Introduction

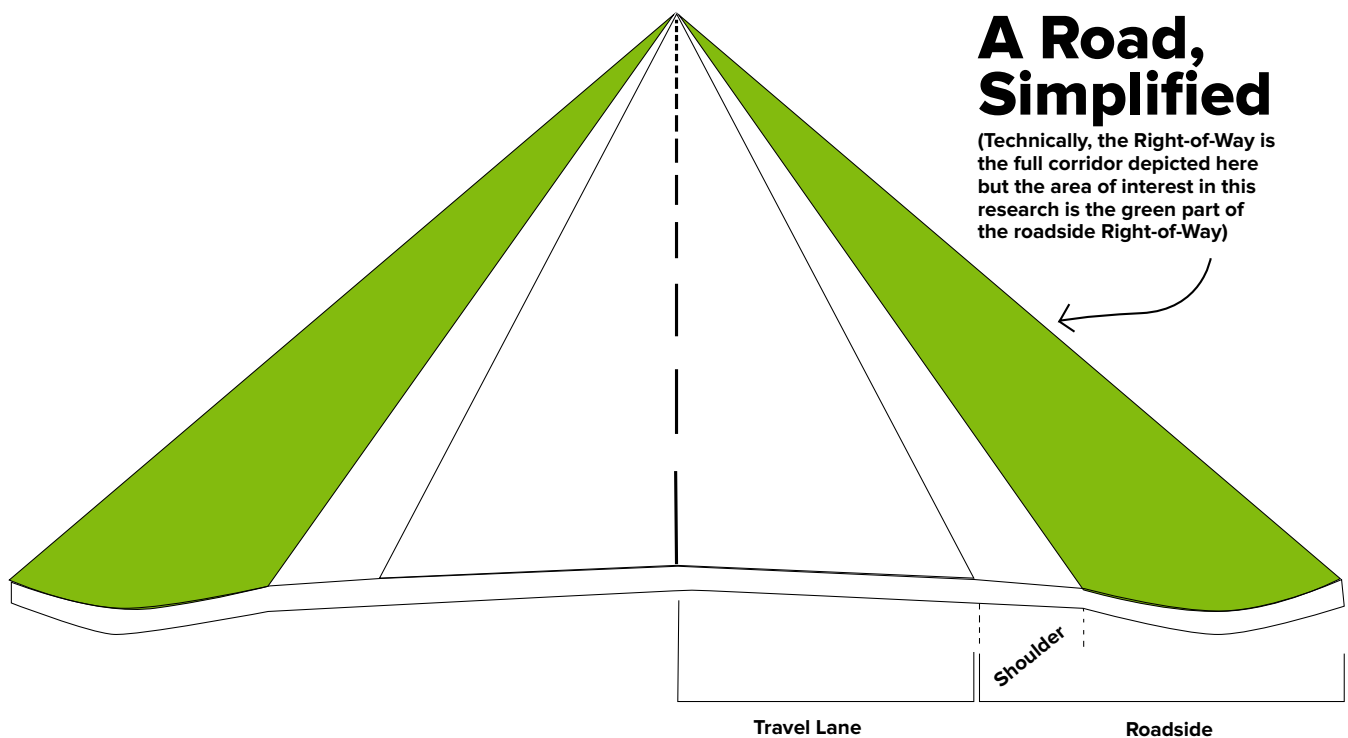
Roadside weeds, brush, and soil erosion can damage roads and bridges, causing costly repairs and safety issues. Local governments also have legal obligations to maintain healthy roadside vegetation. Fortunately, the Living Roadway Trust Fund (LRTF) and the Iowa Roadside Management Program offer counties and cities resources for addressing these challenges to create safe, healthy, and functional roadsides and roads.

Without a comprehensive, strategic program for managing roadside vegetation, small areas of brush and weeds can develop into large patches that are

expensive and difficult to remove.

Heavy rainfall events are becoming more frequent and severe in Iowa, increasing the potential for erosion problems and weed growth.^{1,2,3,4} Some types of vegetation can make soil erosion on steep roadside slopes more likely after heavy rainfall.^{5,6,7}

The August 2020 derecho that swept across Iowa uprooted roadside trees and brush, creating a large mess for counties and cities to clean up.^{8,9} Managing roadside vegetation is clearly becoming increasingly complex.



Counties and cities are responsible for maintaining all parts of the roadway, including the road, shoulder, and roadside right-of-way. The kind of roadside vegetation in the right-of-way can affect road condition and in turn, water runoff from the road can affect roadside vegetation. Graphic courtesy of the Rockefeller Institute of Government.

Roadside Weeds

Counties are legally required to eradicate or control noxious weeds, which are plants that are especially damaging to crops, public roads, desirable plants, fish or wildlife, or the public health.¹⁰ According to the current noxious weed list in the Iowa Administrative Code, counties must eradicate populations of palmer amaranth and control Canada thistle, teasel, leafy spurge, bull thistle, multiflora rose, European morning glory or field bindweed, and all other species of thistle belonging in the genus of *Carduus*.¹¹

Although Japanese knotweed is not currently on the noxious weed list, its thick woody roots are notorious for growing through cracks and damaging bridge abutments, roads, and other man-made structures.¹² Other weeds may not be on the noxious weed list but can outcompete desired roadside vegetation and increase erosion.^{12,13} Although the dominant weeds vary in each county and city, one commonality is that changing rainfall and temperature patterns can exacerbate some of these species' negative impacts.^{4,14} County and city officials must prioritize which weeds to manage with limited resources.



Japanese knotweed growing through pavement and in a dense stand near a road. Photos courtesy of Japanese Knotweed Solutions Ltd.

Roadside Brush

How did brush become a roadside problem in Iowa? Birds sit on fence lines to sing, depositing seeds for shrubs and trees when they defecate. County budgets may not include much money for brush control. Some residents value trees and oppose removing woody vegetation from roadsides.¹⁵

However, roadside trees and brush can pose a safety problem. According to the Federal Highway Administration, trees larger than four inches in diameter are a safety hazard for vehicles that leave the road, with those closer to the road or near curves and intersections posing the greatest danger.¹⁶

Erosion

Iowa's average annual rainfall has been increasing by 1.25 inches per decade since the 1970s, the largest increase in the United States.¹ Extreme rainfall events are also becoming more frequent. From 1958-2016, within the Upper Midwest there was a 40 percent increase in the number of two-day precipitation

events whose totals set a five-year record.¹⁷ Both of these trends are projected to continue in the coming decades, posing a challenge for reducing erosion on steep roadside slopes. Increased erosion destabilizes road pavement.^{6,12}

Blanket Spraying of Herbicides to Control Weeds and Brush

In the past, many road departments favored blanket, also known as broadcast, spraying herbicides along large sections of roadside to control weeds and brush. However, routinely broadcast spraying herbicides over large areas can weaken existing desired vegetation, which will have a harder time competing against weeds and result in increased weed infestation.^{18,19}

For example, in Fayette County, the effects from blanket spraying were “short term and contributed to extensive off-site damage...The result of blanket spraying was exposed soil zones which were pioneered by new vegetation. Unfortunately, the new

vegetation was Canada thistle and other weeds not eliminated by the blanket spraying.”²⁰

Since the 1980s many other Iowa counties have discontinued large-scale blanket spraying not only because of its long-term ineffectiveness but because of public concerns about excessive herbicide use.^{21,22} According to a survey of Iowa counties, only 16% of county engineers and 6% of roadside managers use blanket herbicide spraying to manage roadside weeds.²³ Targeted, small-scale blanket spraying may be appropriate with dense stands of some types of weeds like teasel.

Frequent Mowing to Control Weeds and Brush

Frequent mowing is another tactic to control weeds and brush. Regularly mowing outside of the portion of the clear zone that needs to be mowed for safety purposes or to control certain weed species is

expensive.^{24,25,26,27} Mowing steep slopes too often can also cause soil compaction and slope failure and rutting, increasing soil erosion.²⁸

Planting of Smooth Brome and Fescue

Road departments often plant shallow-rooted species such as smooth brome and fescue when vegetation coverage is needed. Both are inexpensive and establish quickly. While these species may be appropriate on some areas of the roadside, on

other sites planting native grass species with more fibrous, deeper root systems would be more effective at reducing erosion and resisting invasion from weeds.^{5,6,7,12}

Using a Strategic and Integrated Approach to Managing Roadsides

Over fifty Iowa counties and twelve Iowa cities have adopted a strategic approach to managing roadside weeds and brush to create safe and healthy roadsides. They have a roadside vegetation manager on staff or have an integrated roadside vegetation management (IRVM) plan on file with the Iowa Department of Transportation (DOT)'s Living Roadway

Trust Fund; many counties and two cities have both a roadside manager and a plan. These counties and cities use integrated management techniques to enhance public roadsides by planting native species, strategically spraying weeds and brush, strategically mowing, and conducting prescribed burns.

What a Roadside Manager Does

A roadside manager provides leadership and efficient use of government resources by

- being the one-stop shop, the go-to person who is familiar with a county or city's roadside vegetation; using their knowledge, roadside managers prioritize smart ways to manage weeds and brush, mow, and manage native plantings that are cost-effective and reduce environmental impacts;
- being available to manage weeds and prairie plantings during windows of opportunity when weather conditions are best; especially on many small roadside projects, contractors might not have the flexibility to show up quickly when conditions are right for managing a given weed, producing better results that don't have to be fixed later on;
- saving money by applying for free native prairie seed from the Tallgrass Prairie Center and grants from the Living Roadway Trust Fund to help cover the costs of roadside management equipment and

roadside vegetation inventories;

- serving as a resource for residents who have questions about their own conservation and land management projects, for example knowing where to buy supplies such as erosion control products or tips for planting on slopes.



Click the image to watch Wes Gibbs explain what he does as a roadside manager for Jones County.

Grants Available

Counties and cities with an approved IRVM plan are eligible to apply for competitive LRTF grants for a roadside vegetation inventory and items such as specialized spray, brush control, prescribed burn, and seeding equipment. Most grants will cover 80% of the cost of the inventory or equipment. Counties and cities with an IRVM plan can also apply to receive

free native prairie seed for their roadsides from the Iowa Roadside Management Program, which is based out of the Tallgrass Prairie Center at the University of Northern Iowa (UNI). The seed mixes have a value of \$250–\$350 per acre; the county provides the equipment, materials, and labor to plant it.

Educational Assistance



Roadside managers learn about the best roadside management practices from each other and experts at two annual meetings organized by UNI's Iowa Roadside Management office. Free educational resources and safety gear are provided at these meetings. An e-mail list and e-newsletter help facilitate networking and information exchange in between the two annual meetings.

Attendees of a recent roadside conference learn about the features of a hydroseeder.

Saving Money Through an In-House, Targeted Approach to Spraying Weeds

Counties that have an IRVM plan can apply for LRTF grants toward their purchase of specialized spray equipment that is precise at targeting specific plants, reducing the impact on desired plants. Some new spray equipment has the technology to automatically record when and where an area was sprayed, which protects the county or city if a resident raises a concern about overspray. Counties and cities that strategically use herbicides rather than blanket spraying roadsides can save a lot of money on the cost of herbicides.



In this brief interview, Jones County engineer Derek Snead explains how hiring a roadside manager has helped his county save money on herbicides—with better results. [Click the image to view.](#)

Proactively Identifying and Managing Brush



Singed cedar trees after a prescribed burn in a county roadside. Prescribed burns are a cost-effective way to control trees and shrubs before they form large stands.

An LRTF grant can help fund a roadside vegetation inventory map for prioritizing brush control. As former Scott County engineer Jon Burgstrum said, with a roadside inventory “We have a real good base to know where the good areas are and the areas that we may need to work on.”²⁹ A strategic and efficient brush spraying program significantly reduces the need for mechanical brush control, which is money in the bank. If a county or city does need brush control equipment, LRTF grants can be used toward items such as wood chippers.

Around half of counties with a roadside manager conduct prescribed burns of some of their roadside vegetation.²³ Having a roadside manager on staff with the certification and experience to conduct prescribed burns can help reduce the amount of brush present in a cost-effective way; it is cheaper and more proactive to remove brush when it is just emerging with prescribed burns than to cut and treat it with herbicides.¹⁵

Reducing Erosion

Roadside managers use many techniques to reduce erosion and sedimentation. They know how to use the best management practices for hydromulching and installing silt logs and erosion mats. Reducing erosion helps maintain the integrity and longevity of the road. Effective erosion control also prevents water pollution and ensures compliance with environmental regulations so the county or city does not get turned into the Environmental Protection Agency.

Roadside managers also reduce erosion by planting deep-rooted native plants. Native warm-season grasses grow the most in the summer, compared to cool-season grasses such as fescue and smooth brome that grow the most in the spring and fall. Warm-season grasses that are included in the seed mixes provided to counties with an IRVM plan include big bluestem, Indiangrass, and switchgrass; these grasses have fibrous, extensive roots that can be



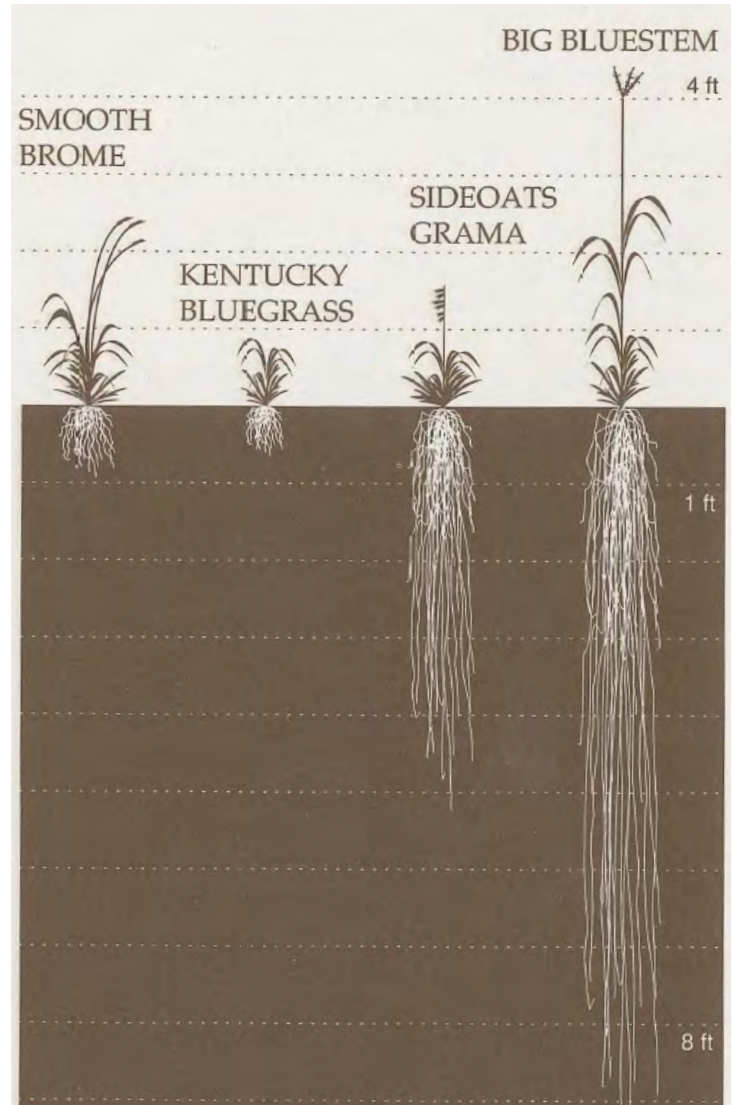
The roots of native prairie grasses protected the Mormon Bridge Embankment from erosion during the 2011 Missouri River flood; these photos were taken shortly after the floodwater receded. Photos courtesy of Dustin Ausdemore.



Roadside technicians install erosion mats in Dallas County. Photo courtesy of Kirk Henderson.

six to nine feet deep.³⁰ These extensive roots make them especially suitable for reducing soil erosion, in comparison to shallow-rooted cool-season grasses such as tall fescue, with roots two to three feet deep^{31,32} and smooth brome, with roots mostly in the top foot of soil.³³ According to video footage recorded by Iowa State University and the UNI Tallgrass Prairie Center, the roots of native prairie plants such as grasses do not plug tile lines.^{34,35}

Some erosion control specialists think seed mixes with warm-season grasses are too complicated to plant and take too long to establish. However, a stand



With their fibrous, deep root systems, native prairie grasses such as sideoats grama and big bluestem are more effective at holding the soil and reducing erosion than shallow-rooted grasses such as smooth brome and Kentucky bluegrass. Drawing courtesy of the Minnesota Department of Transportation.

of native grasses and wildflowers can be established successfully without increased erosion if proper seeding depth is used when planting, weeds are effectively controlled with herbicides and mowing during the first year to reduce weed competition, and quickly-establishing cover/nurse crops such as oats, wheat, or rye are planted with the seed mix.^{36,37,38,39,40,41}

As the Jasper County Secondary Road Department observes, the benefits of native vegetation in the roadside include “improved erosion control, improved water infiltration, the low maintenance of natives, and the beauty of the roadsides with colorful wildflowers and rich golden colors of grasses.”⁴²

Cost Savings from Reduced Mowing

Roadside workers mow vegetation close to the road for safety. However, counties and cities can save substantial money on fuel and the cost of maintaining and repairing mowing equipment by mowing the area further away from the road less often.

For example, over the last 15 years, a growing number of state departments of transportation have reduced mowing to both save money and create habitat for bees and butterflies. Many of these state efforts are summarized in a 2021 report by the Kentucky

Transportation Center (KYTC).²⁷ The KYTC concluded that eliminating even a single cycle of litter mowing could save the department \$5 million over a five-year period. When roadside personnel spend less time mowing they have more time for higher priority tasks. As Minnesota DOT research engineer John Siekmeier says, “We only have so much staff. When we’re spending a lot of time needlessly mowing, we could be doing things that would actually help the road to last longer.”⁴³

Iowans Value Roadside Management

In 2016, 610 rural and urban Iowans and 840 members of Iowa stakeholder groups were surveyed to understand how they view the LRTF’s mission.⁴⁴ Respondents perceived the biggest impact of the fund’s initiatives to be the preservation of native plant species for generations to come. Both groups highly valued pollinator habitat creation and initiatives

that address water quality management, particularly stormwater runoff.⁴⁴ Planting native seed mixes that include wildflowers used by bees and butterflies is likely to have widespread public support.

Prairie roots are also effective in improving water quality, acting like a sponge to absorb nutrients and pollutants in water runoff.⁴⁵

Safety Benefits

Managing roadsides using a strategic, integrated approach also provides safety benefits. Reduced mowing practices means roadside personnel are spending less time mowing steep slopes, providing fewer opportunities for accidents. Tall herbaceous vegetation in the roadside might provide a softer landing to slow down vehicles that leave the road compared to grass that is mowed short.⁴⁶

Because deer prefer to forage on young, green grasses, which occurs after mowing, reduced mowing may also reduce the attractiveness of roadside vegetation to deer.^{25,46} Studies have found no effect of reduced mowing on deer-vehicle or other wildlife-vehicle collisions.^{46,47} The factors affecting deer-vehicle collisions are complex, but in Midwestern areas with a lot of agriculture, variations in traffic volume and the abundance of deer may be better predictors of deer-vehicle collisions than landscape composition.⁴⁸

Living Roadway Trust Fund grants can be used toward equipment that efficiently removes brush that is too close to the road, improving driver sight lines. Before and after photos courtesy of Ben Hoskinson.



Conclusion: Resources for Managing Current and Future Roadside Conditions

Changing rainfall and temperature patterns will likely continue to exacerbate roadside weed, brush, and erosion issues in coming years, which can damage roads and bridges.

Since 1988, the LRTF and IRM program have helped create and support a community of county and city roadside managers who are equipped to manage roadside vegetation and adapt to changing conditions. Over fifty Iowa counties and cities are currently using these resources provided by the Living Roadway Trust Fund and the Iowa Roadside Management program to manage their roadside vegetation. Counties and cities who want to strategically manage for safe, healthy, and functional roadsides in the years to come would do well to join this community and take advantage of resources such as grants and seed for their roadsides.

To Learn More

To learn more about creating an integrated roadside vegetation management (IRVM) plan or what Living Roadway Trust Fund (LRTF) grants can be used for, contact Roadway Trust Fund coordinator Tara Van Waus at tara.vanwaus@iowadot.us or 515-239-1768.

The Living Roadway Trust Fund website includes a list of what must be included in Integrated Roadside Vegetation Management (IRVM) plans at their website: <https://iowadot.gov/lrtf/integrated-roadside-vegetation-management/irvm-plan-requirements>

To learn more about native seed, attend our annual roadside conference, or obtain example job descriptions and interview questions for a roadside manager, contact IRM program manager Kristine Nemec at kristine.nemec@uni.edu or 319-273-2813.



Roadside prairie grasses retaining snow. Prairie grasses are better able to retain snow under certain topographical and weather conditions. Photo courtesy of Lakota Kirst.

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Dense, fibrous prairie roots are effective at slowing down the spread of weeds, improving water quality, and reducing soil erosion. Photo courtesy of Willow Creek Nature Center.

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