

# **Iowa's Living Roadway Trust Fund and Integrated Roadside Vegetation Management Program**

Jean Eells, PhD. E Resources Group, LLC

This document describes the history of the Living Roadway Trust Fund (LRTF) developed in the Iowa Department of Transportation and the Integrated Roadside Vegetation Management Program (IRVM) that followed. These programs were created by legislation first enacted in 1989 and have distinct but linked histories. Following a brief introduction and some definitions, this report has three main parts: a discussion of the early development of roadside programs in Iowa; a discussion of roadside plantings research; and a summary of the legislative actions that established and govern the LRTF and IRVM programs and that contributed to the development of native ecotype seed businesses.

## **Introduction**

Many individual Iowans planted the seeds for the extensive network of roadsides now growing with native plant species. This network grew, literally and figuratively, during a time of rapidly increasing public awareness of the value and benefits of native plants.

The roots of the network of native plant roadsides reach to the early 1900s and the work of Iowa botanist Ada Hayden (1884–1950) who is credited with identifying Iowa prairie areas and advocating for prairie preservation. Iowa prairie enthusiasts also leaned on the work of John. E. Weaver (1884–1956), a Nebraska botanist who published *North American Prairie* (1956) that literally showed the roots of prairie plants and detailed the complex community of plant species. The basis for Iowa Living Roadway Trust Fund (LRTF) and Integrated Roadside Vegetation Management program (IRVM), was built during Iowa's more recent prairie movement that began in the 1960s.

## **Definitions**

Understanding the development of the LRTF and IRVM programs involves understanding the key players and their roles. The *state department of transportation* and the system of *county secondary road departments* are typically headed by engineers who oversee the hard surfaced, gravel, or no-maintenance roads (level/Class B and C roads).

There also is a system of county-based conservation departments that is unique to Iowa. These *county conservation boards* are appointed citizen volunteers who guide the establishment of conservation programs that meet the needs of their county. Over time the term county conservation board has come to mean the overall conservation department and activities in addition to the boards themselves.

*County weed commissioners* are tasked with receiving complaints about state listed noxious weeds that are growing in their counties and taking steps to get the weeds eradicated. This means asking landowners to get rid of the weeds, but it is rarely that simple because weeds and their control is politically sensitive in areas where farming is the dominant industry.

### **Early Roadside Programs**

The Iowa Department of Transportation (DOT) has always sought ways to improve the safety of the traveling public and to effectively use the human and economic resources in its charge. At the most basic level, the roadside or right-of-way (ROW) keeps roadbeds dry. ROW ditches were formed when the roadbed was elevated by digging soil from either side of the road to help drain the road of water and minimize mud that impeded travel. The ditch collected and sometimes conveyed water to another location. The ROW also provides a clear zone for drivers to recover.

The Roadside Design Guide defines a **clear zone** as the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area. The desired minimum width is dependent upon traffic volumes and speeds and on the roadside geometry. Simply stated, it is an unobstructed, relatively flat area beyond the edge of the traveled way that allows a driver to stop safely or regain control of a vehicle that leaves the traveled way. (FHWA 2017)

After ditches were dug to elevate the road beds, vegetation was needed to hold the ROW together.

It is declared to be in the general public welfare of Iowa and a highway purpose for the vegetation of Iowa's roadsides to be preserved, planted, and maintained to be safe, visually interesting, ecologically integrated, and useful for many purposes.

That is the opening line of Section 314.22 of the Iowa Code, legislation adopted in 1988 that outlines the state's Integrated Roadside Vegetation Management (IRVM) program. (Henderson 2005)

Roadsides bordered private land and, in Iowa, much of that land was used for agriculture where weed control was a concern. Roadsides needed to be kept free of weeds that were potential invaders of neighboring pastures or crop fields, so the DOT employed control efforts that included mowing the vegetation or using herbicides when they became available. Of particular concern to farmers was Canada thistle (*Cirsium arvense*) that formed thick patches of prickly vegetation and spread by roots and seed.

### **Roadside Parks**

Efforts in the 1930s to enhance the traveler's experience included developing roadside parks. Roadside parks consisted of a short road to where a traveler could park safely off the highway, an area with mowed grass, and some amenities such as picnic tables or electricity as evidenced in 1959 photos of an exhibit at the Home and Garden Show. These areas along state highways were maintained by road maintenance workers who were employed by the Iowa Department of Transportation. These workers also periodically mowed the roadside vegetation.

The roadside parks were popular on all levels of roads, and today you can still see small one- or two-acre irregularly shaped areas with a short pull off road and a picnic table. In 2017, travelers can visit the first roadside park developed by the Iowa DOT along Highway 65, nine miles south of Iowa Falls at Logsdon Park. This roadside park is maintained by the Hardin County Conservation Board. Other county conservation boards maintain roadside parks that often bear the name of a donor, such as those in Grundy County.

In the 1960s, nationwide transportation research focused on a comprehensive look at the traveler's experience to go beyond safety and consider how roadways could foster tourism or traveling for pleasure. "Both the general public and those charged with building and maintaining our Nation's highways have become increasingly aware of the importance of roadside development as an integral part of any truly progressive highway program and as a major step in the preservation of a precious American heritage – scenic beauty" (National Research Council 1966).

## Roadside Plantings Research

Evidence exists that in the early 1960s, Iowa DOT personnel created sample projects to research the best ways to include native plants in roadsides (Landers 2016). An early project near Iowa City in a rest stop became a weedy failure and drew criticism, so future plantings were more carefully located where vegetation managers could develop better management practices. John Aikman, a botany professor at Iowa State University, had a small research grant from the Iowa DOT for roadside plantings in the early 1960s (Landers 2016). Aikman turned the project over to a new faculty member, Roger Landers who started in 1962, and Landers's graduate student, Paul Christiansen, who were interested in prairie. Landers, a tall, soft-spoken Texan had range management experience and Paul Christiansen, a former high school teacher, had grown up on a farm in northeastern Iowa.

The early work by Landers and Christiansen occurred between 1958 and 1975 when the interstate highways in Iowa were being finished. The Iowa DOT rest areas needed plantings and the newly graded roadsides needed vegetation. The Iowa DOT investigated plants that were self-sustaining and that didn't need to be mown, such as crown vetch (*Coronilla varia*). Landers applied for more Iowa DOT funding and was given access to a rest area in Story County to develop procedures for establishing native prairie plants "but not such that people could see it yet," he said, "we [Landers and Christiansen] were criticized a lot for the weeds that grew in our plots." The early years of experimentation were difficult. Landers reported, "we tried transplanting plugs [prairie plants grown in pots to start them] into one of the western rest areas and without water they didn't make it so that was a little bit discouraging" (Landers 2016).

According to Landers, one challenge of planting roadsides or experimenting with native prairie plants was finding a source for seed. The first commercially available native plant seed was from Kansas and Nebraska and was mostly a mixture of native prairie grasses that had been developed for their strong benefits as forage in western pastures. The resulting plantings were unreliable in Iowa's rich soils that had more rainfall. Grasses tended to grow taller than the Iowa native varieties and were alarmingly aggressive at first. Over time many, if not most, of the species from the southwestern states declined in planted areas and have disappeared due to their unsuitability.

Daryl Smith, a professor of botany at the University of Northern Iowa (UNI), became interested in prairies in 1967 and began to research methods of starting native plants in small plots. He said that, “a group on campus decided they wanted to start a preserves system that sort of replicated some of the ecosystems of Iowa” (Smith 2016). Smith proposed a tall grass prairie planting on campus that was seeded in 1973. The planting was mostly seeding mixtures from cultivated varieties that had been developed in Kansas, Nebraska, and Oklahoma.

Smith worked hard to get the planting methods to work well by using plugs of prairie plant starts, using seeds, and learning how to control weeds, and he was having just enough success that the university supported him. One of his graduate students, Pauline Drobney, needed a project, so he had her conduct an inventory of native plants in roadside vegetation in Black Hawk County in 1976. This work was important for the eventual development of the IRVM program at UNI, and Smith continued research prairie planting throughout his career at UNI.

In 1967 Paul Christiansen became a professor at Cornell College in Mount Vernon, Iowa, and continued to conduct research in roadsides. His applied research contributed a great deal to the cause of learning how to start and maintain native plants in a challenging environment. In 1971, he and David Lyon, also a biology professor at Cornell College, planted one of the first roadside research plots in Linn County along North Washington Street in Mount Vernon. In 2017 the IRVM manager for Linn County, Rob Roman stated that this plot is one of the best examples of how well prairie keeps out weeds. He said, “It’s better than ever after 40 years, and we’ve resurfaced that road twice in that time but the prairie is still going strong.” The plot was planted with collections of seed that had been hand gathered from around the state since at that time seed for native prairie forbs was not available. That planting has diverse species that persist today such as white prairie clover and a variety of native grasses from Iowa seed.

Christiansen and Lyon devised a research project to compare roadsides that had been spot sprayed with herbicide for localized weed problems with those that had been blanket sprayed overall. According to Roman, they found more native species in the spot sprayed areas and fewer weeds with less overall cost (2017). Christiansen’s roadside research

continued for many years and contributed to the development of the IRVM programs in counties across the state.

### **DOT Increases Demonstration Areas**

In the mid-1970s a gasoline crisis, a fuel shortage with subsequent rise in fuel prices, catalyzed nationwide investigations into methods to save money spent on fuel. Up to this point, roadsides in Iowa were mostly mowed. The search for vegetation that did not require mowing or driving miles while blanket spraying with herbicides was in large part due to the desire to save fuel in the short term but also avoid those on-going costs for the long term. In 1979, Mark Masteller, a landscape architect, joined the Iowa DOT. In 1983 he began working in the Roadside Development section where he had the opportunity to put native plants into sample projects, he said, “such as a borrow area pit that wasn’t going back to a farmer to be farmed, we would seed a native mix on it.” The problem of acquiring appropriate seed continued to be a problem into the early 1990s, especially when the projects involved acres instead of small plots. Masteller stated in an interview that:

Dr. Landers work, you know, even in—I’m going to say it was in the 1950s [1960s per Landers]—the DOT commissioned research from Iowa State to look at a couple species of native grasses, particularly switch grasses. We have this scenic overlook area out on interstate 680 that is only open seasonally—it’s closed during the winters—but there are several acres out there and there might have been other spots but that’s the one spot I know of where some of that research took place. And they had great success with switch grass, which was really the only native grass widely available in any kind of quantity at the time. But you know, even in his research, I read through those in the past and they saw where those native grasses were out competing thistles. So where there were large robust thistles to begin with they seeded these natives in there and at the end of the test period, those thistle plants had diminished in size and vigor. Not totally gotten rid of, but you know, they weren’t becoming a problem like they were before. So you know, the, my ancestors at the DOT, I think, kind of knew that this was the way to go but the resources really weren’t there and you know, mowing was so cheap. Blanket spraying was cheap. The conditions just weren’t right to make that jump at that time. (Masteller 2016)

Masteller, and Ole Skaar, an Erosion Control Specialist, were in positions within the Iowa DOT where they were able to specify native plant use in projects from the mid-1980's and require Iowa seed sources be used. Kirk Henderson, who would become the IRVM State Roadside Specialist, recalled that Skaar had been using native grasses in plantings in 1985 as directed by Iowa Code at that time (1985 Iowa Code). This necessarily required contractors and vendors to learn how to source native seed, plant it, and manage it to get it established. This was no small task and Masteller, Skaar, and others spent time inspecting job sites to be sure the seed was planted properly (i.e., not drilled too deep or in areas with poor seed bed preparation); that the proper amount of seed was used per acre; and that the sources of seed were verified. Contractors who were competing for bids were used to entirely different systems of establishing vegetation on projects, and for some, the learning curve was quite steep.

Two Roadside Development Specialists, Evelyn O'Loughlin a horticulturalist and Jim Carpenter a Landscape Architect responded to a 1999 directive from the Iowa DOT Commissioners to revegetate the ROW with more sustainable plants, more native plants than the cool season grasses and plants that were established. They began with multiple projects with acres of seeding which put some stress on the seed markets and also the roadside contractors. The contractors were responsible for acquiring the seed for the plantings and the two main seed suppliers responsible were controlling the market by requiring contractors to buy all or nothing from them. The prices were high and the suppliers were requiring the contractors to buy their seed mixes. That shut out smaller seed dealers who could supply specific species but not all that were required in specific plans. In 2003 the DOT started their own seed purchase for Iowa Ecotype seed and that helped integrate what the Roadside Vegetation Program and Tall Grass Prairie Center at UNI were doing. The influx of money at that time meant there were 1,500 to 2,000 acres of roadsides planted to native prairie species per year, as much as four to five million dollars in projects at one point, which eventually helped establish more stable seed supplies in Iowa.

O'Loughlin and Carpenter, who developed internal projects, and consultants, who developed outsourced projects, utilized herbicide to first kill existing vegetation then plant native wildflowers and grasses. This was not popular with some landowners who

believed they owned to the center of the roads and who objected to “killing vegetation that was perfectly good” according to O’Loughlin and Carpenter (O’Loughlin 2017). As the DOT Commission members changed through expiring terms, support for revegetation changed and there was less money for projects, fewer acres planted. The projects began to give landowners the ability to opt out of having native grass and wildflowers adjacent to their land. By 2010 there were fewer of the projects to revegetate the roadsides in areas other than controlled access freeways. Native plants are still specified and the DOT team has continued to refine the seed purchasing process. They are more conscious of the weed seed content with the emergence of more serious weeds to farming enterprises, such as Palmer amaranth (*Amaranthus palmeri*) which has some resistance to glyphosate herbicide and is difficult to eradicate. Between 2000 and 2017, 14,400 acres were revegetated.

### **County Conservation Boards Join the Effort**

In the 1980s, Iowa’s Farm Crisis triggered an economic decline that, among other things, impacted county government funding. The Black Hawk County Board of Supervisors, which oversees programs using county tax funds, approached the Black Hawk County Conservation Board with a money-saving request. The supervisors requested that one of their full-time staffers, a wildlife conservationist, Bill Haywood, take on the role of weed commissioner. Haywood was given a truck with large spray booms to use herbicides on broadleaved plants including trees and brush.

Haywood, a keen observer of plants and a photographer, saw how weedy patches occurred when existing vegetation was damaged one year and weeds sprang forth the next year and covered the bared ground. He photographed areas where undamaged, diverse native plants held areas against weeds year after year. He could see that the benefits of native plants were economical and real. He also captured images of locations where herbicide overspray from agricultural fields, deep layers of wind or water erosion from fields, and tillage into the right of way each caused patches of weeds to occur in subsequent years. Spraying herbicides that could weaken the native plant systems—so many are broad leaf plants like the weeds—went against everything Haywood wanted to implement as a conservationist.



Armed with his own photos and documentation, the support of Smith from UNI, and Drobney's plant inventory of prairie roadsides in Black Hawk County, Haywood began to talk with the county engineer in charge of secondary roads and his own county conservation director about changing the program. He proposed discontinuing the program of blanketing the county ditches with herbicide and creating a more strategic program that integrated native prairie species into how roadsides could be managed. This coincided with ideas coming from state and federal transportation managers that native plants can save long-term maintenance costs because they do not require mowing and are effective at suppressing weed competition.

Haywood also began to talk about his work at conferences and meetings where other county conservation board staffers were curious and eager to increase native plant diversity for wildlife habitat and to keep herbicide use to a minimum. Individual county conservation boards can set policies and implement programs quickly, so ideas about roadside management to increase plant diversity spread quickly. Soon a handful of counties were embarking on similar efforts.

During this same time period, private non-profit organizations got involved at local levels and encouraged county conservation boards and county secondary road departments to investigate native plant management of roadsides. Pheasants Forever and the Isaak Walton League, each with local chapters across the state, got behind the effort based on the potential to increase wildlife habitat. The Iowa Prairie Network, the Iowa Chapter of the Nature Conservancy, and the Iowa Native Plant Society saw the benefit of reduced herbicide spraying that would permit native plants that were hanging on in road ditches to survive. Trees Forever encouraged native plantings for all the same reasons and touted the beauty of the blooming native plants along roadways and gateways into communities.

### **Legislative Action**

The Iowa DOT is governed by laws and rules set forth by the Iowa Legislature that authorized an Interim Study Committee on the Future of Iowa's Recreation, Tourism, and Leisure Delivery System. Gerry Schnepf was the first Executive Director of the Iowa Natural Heritage Foundation (INHF) and he became the chair of the Legislative Interim Study Committee that produced a set of Legislative Recommendations in December

1985. The INHF had been formed in 1979 (Butler 1989), and Schnepf was known and respected by legislators for work done by the non-partisan INHF to help landowners protect their land. The study committee worked on many topic areas over three years and in the process helped educate a number of legislators on the value of natural resources to the state.

In 1989, those legislators eventually created some of Iowa's landmark legislation known as REAP (Resource Enhancement and Protection) that still stands today in 2017. The REAP legislation includes a funding stream for the LRTF to help educate Iowans about the benefits of the native plants they were starting to see in the roadsides across the state. Multiple funding streams support the LRTF, including a portion of road use tax funds, utility access payments, and 3% of REAP funding. In 1995 funds were directed annually to "the University of Northern Iowa to maintain the position of the state roadside specialist and to continue its integrated roadside vegetation management program providing research, education, training, and technical assistance" 314.21 Iowa Code (LRTF 2017). The legislation also provides for the position of an integrated roadside vegetation management coordinator, and 3% of REAP funds allocated each year go to the Iowa DOT LRTF for IRVM activities including the establishment of native prairie vegetation in rights-of-way.

Another part of the legislative study report recommended the urgent acquisition of open spaces for public protection, many of these with native prairie remnants. This recommendation became part of the Open Spaces portion of funding available through REAP and helped protect prairies and in so doing helped educate a number of people about the benefits of native plants.

The growth of the county programs and emerging work from roadside researchers and Iowa DOT pilot projects caught the attention of the Iowa Legislature that authorized the Alternative Roadside Vegetation Steering Committee to study and make recommendations on roadside management policies and laws (Butler 1989, 1). Among the recommendations made by Butler and Associates was to direct "state revenue gained through the annual leasing of utility corridors along interstate highways is dedicated to the Living Roadway Trust Fund" (1989, 3). Butler and Associates also recommended, "creating and funding a professional staff position of Roadside Vegetation Management

(RVM) Coordinator; establishing an advisory RVM Task Force to carry on the work of this Steering Committee; and funding public education, research and demonstration programs as well as purposeful planting and reseeded projects for all types of roads” (1989, 3).

During the 1980s legislative action, there were people who influenced the protection of prairies around the state that also heightened public awareness and supported the legislative actions underway. Individuals such as “Buzz” Brenton and David Hurd helped the Iowa Chapter of the Nature Conservancy (TNC) to acquire properties such as Broken Kettle Preserve. Brenton and Hurd’s work with TNC expanded their knowledge of prairie and helped them effectively encourage legislators to get behind more protection for and to support the benefits of native plants. Also leading the way within the State Conservation Commission (now the Iowa Department of Natural Resources) was State Ecologist Dean Roosa who worked for the State Preserves Board and identified prairie remnants for protection. Roosa and colleague Sylvan Runkel, retired from the Soil Conservation Service (now Natural Resources Conservation Service) traveled throughout the state identifying remnants and talking to local landowners about the benefits of native plants. Together and individually they gave numerous presentations to groups. Another strong influence on prairie adoption for roadsides and wildlife benefits was Larry Stone, the outdoor writer for the *Des Moines Register*, who wrote articles featuring Roosa, Runkel, Haywood, Henderson, Smith, Landers, Christiansen, Holland, and many others. This widely read column was popular with hunters, anglers, campers, and outdoor enthusiasts who learned about these important efforts to save prairies and about the LRTF and IRVM programs. Before the Internet, the *Register*, which was the state’s paper of record, was a vital source of information and functionally kept many environmentally aware readers on the virtual, if not literal, same page.

### **LRTF Program**

The Living Roadways Trust Fund (LRTF) program provided crucial funding to fully support and expand the practices of managing roadside vegetation using native prairie plants through grants to the UNI RVM program. The LRTF program also initially funded a roadside vegetation office within the Iowa DOT (Holland 2016; Henderson 2016). Steve Holland was the first LTRF coordinator. He was hired in November of 1989 after

legislation passed authorizing the position. A steering committee was organized with people from Iowa DNR, communities, county conservation boards, and county roadside programs. The 1989 report sponsored by the INHF assembled by George Butler and Associates and detailed what the program should do and that functioned as a blueprint for the LRTF program and was written in the authorizing legislation (1989).

Holland (2017) credits the program's long-term success to funding that helped put projects on the ground. He said, "People could see how it [native prairie plantings] acted in the roadsides versus just telling them how good it would be. I think that was one of the main reasons that we kept going and were supported well enough. People that didn't like it who got to see a small section of road and how it acted in the winter time, all of a sudden would want more." He credits others like Smith and Christiansen in "trying to help guide and select projects that would make a good impact and show what the natives could do in the roadside."

Holland felt he needed to implement programs that would make the biggest impact on people and he chose to "have plantings in the ground so people could see them—get used to them, that made the biggest difference" (Holland 2016). Not all the plantings worked well and he recognized the limitations were in part due to the very harsh conditions for establishing plants in roadsides.

Holland worked closely with Kirk Henderson and the UNI program to help build a learning community of roadside managers and vendors. Holland also recognized the need for getting both city and county roadside managers together in conferences and supporting the exchange of information as much as possible. This entailed bringing equipment for seeding in challenging roadside conditions to the conferences and helping support purchase of specialized equipment and seed in the early years. Narrower seed drills, for example, were needed to plant native prairie seeds at the proper depth for successful growth whereas the more common seed drills available were designed for flat farm fields. Because some roadsides are too steep for equipment that usually provides the best seed to soil contact, a hydroseeder is helpful for spraying seed combined with a wet mulch onto steep areas such as backslopes of road ditches (Masteller 2016; Roman 2017).

Other recognizable products from the 24 years (1989–2013) when Holland was the LRTF Coordinator are prairie identification material such as posters by artist Mark

Müeller that are found in classrooms and nature centers everywhere. Holland supported their production and distributed many of these materials at conferences. LRTF financial support was essential to promoting efforts to train teachers, naturalists, scout leaders, and volunteers about the benefits of prairie plants. Holland encouraged groups that provided prairie and native plant education to apply for funding to support their own conferences and other efforts to spread the word about all the benefits of native plants.

Surprisingly, Holland said that although he understood spraying and weed management when he was first hired, he didn't know what prairie was. He said, "My first introduction was actually with Carl Kurtz. . . . he came to our herbicide training schools and gave a half hour presentation on prairie, how to plant it, how to nurture it, and what it was." Holland further explained that the roadside workers just didn't know about these plants, that they didn't know they weren't weeds. After a few years, he explained, "it was fun for me to be at the training sessions and have a guy come and say, 'yeah my kid's really proud of me. We go by and see wildflowers and they say, my dad had something to do with that'" (2016). Holland said it was a slow process to convince people, but little things helped make a difference.

### **IRVM Program**

The concept of managing roadside vegetation using native plants eventually became known as Integrated Roadside Vegetation Management and became the formal title for the program at UNI and was used by county conservation boards and secondary road departments. There is no clear recollection or documentation of who was the first IRVM manager but Bill Haywood of Black Hawk County Conservation Board and Treelan Wilson of the Story County Conservation Board are recognized for their work, and Scott Zager who was also with Black Hawk county played a role in the earliest development. Bill Haywood is recognized by Smith as "putting meat on the program," and Henderson as the real "lightning in the bottle" for his ability to get people excited about adopting this new practice. Henderson recalled:

I'm picturing him at one of the county conservation board state-wide events and he's got you know, a group of people around him and he's waving his arms and he's talking away and he's smiling and he's generating all this excitement and he's got just the right audience—that was a big part of how this program took off was Iowa had

this wonderful system of county conservation boards where every county has one and you've got these employees who are managing county parks—recreation area. And these people they were—a lot of them were sportsmen you know, they liked to hunt and fish, they understood habitat and just they were very receptive—they were the ones who could appreciate the idea of prairie restoration, they'd hear of that by then, just the idea that it's cool to re-introduce your native plants and know that that's a neat thing, and then to have all this additional land to manage for prairie and every county in the state had at least some amount of actual prairie remnants here and there in their roadsides and these guys were the ones who might know where those were. And they were the ones who—they'd get really upset when the spray crew went by one more time and took out a few more of those plants and you know, they, they understood the value of protecting—were preserving, even these puny little roadside prairie remnants that might have one or two native species, you know, so here was this audience and it was this guy who was just—you know, he could speak, he could write, and he had this charismatic side to him that made people want to do whatever Bill Haywood was doing. That's how he was. (2016)

The relationship between the IRVM program at UNI and that within the Iowa DOT required some coordination between Holland and Kirk Henderson who became the State Roadside Specialist for the UNI program. Henderson felt that some of the tension in the beginning came from the choice of position titles. Henderson's title carried the implication that he was an expert who would tell the Iowa DOT personnel how to manage roadsides when in reality he was coordinating educational outreach and services to help start programs in counties. Holland and Henderson worked out a very amicable and productive relationship between the programs. Holland originally had funding to develop an IRVM program with 2–3 staff that operated only a short time when the Iowa DOT chose to limit funding in (estimated in 1994) and some program responsibilities shifted to UNI.

Daryl Smith saw the opportunity to expand and build on prairie utilization when Bill Haywood from the Black Hawk County Conservation Board in 1987 began to develop what later became the county's IRVM program. Smith helped Haywood put together a grant utilizing Exxon overcharge money to reduce chemicals in roadsides and to establish

an office at UNI to provide information for counties that were interested in starting programs. The grant combined the efforts of UNI, Black Hawk County, and the Soil Conservation Service (SCS, which is now called Natural Resources Conservation Service, NRCS) to help organize the office to help counties develop roadside programs of their own. The SCS provided a half-time staffer, Al Ehley, and the Exxon overcharge money grant funds rounded out a full-time salary for two years and eventually a one-year extension, from 1988–1992 (Ehley 2017). Ehley recalled that Bob Dayton, State Agronomist for SCS had attended the second roadside conference in 1988 (Henderson 2016) organized by Haywood and Smith and had an interest in learning more about establishing prairie and through his contacts with the plant materials center in Ellsberry, Missouri, he desired to work with expanding sources of native plant seed.

Smith let Ehley and Haywood develop the program to help Iowa counties adopt their own IRVM programs as rapidly as they could but was caught up short staffed when Ehley's contract was up at about the same time Haywood left to start his own forestry consulting business. Smith was teaching full time and couldn't run the office that had become well established as a source for information so he hired Kirk Henderson full time to run the office. Henderson had been a biology student at UNI who had experience working with the roadside office in a part-time co-op position in 1989 prior to Ehley being hired. Smith recalled, "Henderson and Steve Holland, [who would be the first LRTF coordinator] developed a working relationship over the years that became very effective in advancing the cause of the Integrated Roadside Vegetation Management in the state" (2016).

After Ehley went back to NRCS, Kirk Henderson worked with counties from 1992 to 2008 and helped them use LRTF grants to conduct vegetation inventories and purchase specialized seeding equipment and native grass and wildflower seed. LRTF grants also paid for education and research. Henderson and Haywood spoke of the remarkable energy and excitement that surrounded the expansion of the IRVM as more counties started implementing practices. Part of the task of the IRVM program was to support the counties in sharing research, techniques, and technical knowledge of equipment. This allowed the counties to work together to coordinate requests for LRTF funding for equipment, seed, and funds for researching new methods for establishing native plants

within the diverse and usually very harsh roadside environments. Henderson coordinated efforts to acquire large volumes of native seed that were distributed to the counties that had active IRVM programs.

The excitement of creating something new, of being the first to try something, kept the counties working together and helped spread the ideas of integrated roadside vegetation management across the state. LRTF funding was key to funding and fostering this excitement, according to Henderson and others. Annual IRVM conferences were key to helping the groups stay in communication and to transfer knowledge. Bill Haywood stated that at the conferences, even in the evening when people were sitting around talking, it was all about their work. How to do it better, what didn't work, what problems people were trying to solve. He said, "Everyone shared what they knew. Everyone learned from each other." This was prior to widespread use of Internet communications and a hard copy newsletter was essential to help people learn from each other. People signed up for the newsletter whether they had a roadside program or not so they could learn about planting native plants and maintaining them. Newsletters went to readers out-of-state and to Canada.

Henderson continued to develop the program and ran into the same problems of helping counties locate enough of the appropriate native plant seed for planting roadsides. During his tenure, part of the federal program known as the Inter-modal Surface Transportation Efficiency Act (ISTEA) made grant money available for transportation projects. Henderson successfully wrote for funding in 1988 to purchase a large quantity of seed on behalf of the counties within the program at that time to divide it equally among them. He recalled,

I put in for \$142,000 on behalf of all the counties in the program to make one large purchase of seed that the counties then would each take home their share for that year's plantings and by doing that one, two, three years in a row, you know, buying a large amount of seed. That amount increased from \$142,000 the next year until it was \$320,000 and \$382,000. A couple of years were giant \$461,000 seed purchases.

(2016)

Overall during his tenure, Henderson brought in more than a million dollars of transportation money that was used to purchase prairie seed for Iowa counties.



## **Native Seeds Businesses**

Locating sources of native seed for large scale plantings was a problem from the beginning of Iowa's prairie research in the 1960s. Roger Landers noted that the only commercially available seed for his early research came from out of state sources. Daryl Smith reflected,

that was the only seed available if you didn't have the patience to wait and collect your own seed over a period of years, and I was very impatient at that time so I used those cultivated varieties of grasses. . . . It would have been better if we would have planted Iowa seed and the forbs all at the same time but I guess you learn by doing something wrong and making sure you don't do it wrong the second time. . . . So yeah, that was a real problem and that problem continued. We'll come back to that because that problem didn't go away very rapidly. The seeds that Jim Wilson [Wilson Seed Farms, Polk, Nebraska] and others were promoting were the cultivated varieties that had been developed primarily for range restoration in Kansas, Nebraska, Oklahoma, and a bit further west of here, and that was the only seed that was available in quantities and reasonably priced. That seed was more selected for forage capabilities than it was for native plantings and so as a result they selected seed that germinated readily. Grew vigorously, competed well and this sort of thing.

Beginning in 1985, Masteller and Skaar, who were DOT personnel specified that native or Iowa local ecotype seed (i.e., seed from native plants that came from regions in Iowa) be used in roadway plantings. This created a large market for local ecotype seed, which supported the growth of the prairie seed industry. Through UNI, the IRVM program was also creating a large market for seed, especially after Henderson was granted federal funds through the ISTEPA program. (Houseal and Smith 2000).

Between about 1980 and 2000, native seed gradually became available in Iowa. Two kinds of native seed businesses emerged simultaneously and with varying degrees of success. Some businesses created sources for single species of seeds that were individually harvested and then mixed together according to a buyer's specifications. Other businesses gathered a multitude of seeds by using an older model of grain harvester—a combine—through a diverse prairie planting or a prairie remnant in the fall. The two types of seed businesses remain today and serve different purposes for both

roadside vegetation and the many other reasons people are planting native prairie plants in Iowa. However, creating businesses as viable economic enterprises proved to be just as complicated as learning how to plant native vegetation.

Prairie seed dealers needed reliable markets for their products, but the agencies that could require that native plants would be planted were reluctant to require native plantings until they knew their vendors or clients could purchase appropriate seed in the quantities needed. This conundrum plagued not only the Iowa DOT, but also the Department of Natural Resources which needed seed to plant in new wildlife areas and the Natural Resources Conservation Service (NRCS), which provided technical assistance to farmers and landowners who wanted to establish prairie plantings through participation in Farm Bill programs such as the Conservation Reserve Program. Another large seed buyer emerged in Iowa with the 1991 creation of the Walnut Creek National Wildlife Refuge (later renamed the Neal Smith National Wildlife Refuge) that had been charged with recreating a native prairie landscape of several thousand acres near Prairie City, Iowa. Pauline Drobney was charged, as she was told by her supervisor, “to find seed and get it here” (2016). The demand for prairie seed for plants native to Iowa increased when several county conservation roadside or secondary road roadside programs sought to expand their use of native plants.

Questions were raised about the influx of seed bred for grazing forages that came from out of state seed companies, specifically the near western states. Daryl Smith had conversations with many people who studied prairies and reported a consensus that the best source for new plantings was local ecotype seed. This consensus was informed by prairie ecologists such as Smith and Christiansen and others who not only were interested in maintaining the genetic diversity within existing prairie remnants, but who also recognized that plantings grown from naturally adapted plant seeds would form plantings with more integrity. These integrated plantings would keep out weeds, which was a goal of all of the organizations that supported native prairie plantings.

1991 was an ideal time for Daryl Smith at UNI to use LRTF funding to create the Iowa Ecotype Project. His idea was to create a source for seed that Iowa seed businesses could use to grow out supplies of the plants most commonly used for roadside plantings and thereby promote the growth of seed businesses that would benefit other organizations

beyond roadside programs. Other groups that managed land or helped private landowners develop prairie plantings, such as Iowa DNR, NRCS, US Fish and Wildlife Service, county conservation boards, and non-profit organizations such as The Nature Conservancy and Iowa Natural Heritage foundation, wanted to use native Iowa ecotype seed.

In 1999, Smith received funding from the Federal Highway Administration that had been supported by an earmark by then Senators Tom Harkin and Charles Grassley. This funding was used to renovate a warehouse that would become the Native Roadside Vegetation Center. This center made it possible to pull in programs under one roof such as the Iowa Ecotype Project, and, Smith recalled, additional earmark funding enabled them to provide a solid footing for various statewide activities, such as a greenhouse and more ecotype research projects. Funding for this work continued through July 31, 2017, to support ongoing prairie planting research along roadways and elsewhere.

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