USE OF NATIVE VEGETATION IN ROADSIDE LANDSCAPING: A HISTORICAL REVIEW

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Abstract. Today many midwestern states are experimenting with the use of prairie plantings along their highways. The rationale behind these programs varies but often includes maintenance concerns, erosion control, aesthetics, and recovery of regional identity. In this paper, we explore the ideas of individuals who, in the first three decades of this century, proposed planting our highway rights-of-way with native plants. We look at their goals, compare them to our own, and see how they apply to the future of naturally landscaped roadside programs.

INTRODUCTION

The conference theme, "Recapturing a Vanishing Heritage," expresses the sense of urgency and delight that lies at the heart of our current attempts to preserve, restore, and manage our midwestern prairie landscape. In a similar sense, it also highlights the increased interest that state transportation departments have in planting ecologically appropriate groupings of native species on state and county highway rights-of-way. The promotion of native species for rights-of-way landscaping, however, is not a new phenomenon but rather a return to ideas and policies first promoted when automobile travel began to flourish in the 1920s and 1930s.

In this paper, we explore ideas espoused by landscape architects and plant ecologists, regarding the natural landscaping of roadways, and how those themes have changed over time. We suggest that historic arguments based on aesthetics, function, and ecology each have merit and can provide us with a reliable platform upon which to build, rather than simply re-learn, constructive ways to incorporate indigenous vegetation into our lives.

METHODS

We reviewed more than 50 papers about highway landscaping published in popular magazines, professional journals and proceedings, newsletters, short-course materials, and books during the period from 1910 through 1989. We then drew themes from the central ideas of the authors and related them to current thinking about rights-of-way planting.

DISCUSSION

Early Landscape Themes and Proponents

Between 1900 and 1940, various individuals advocated and implemented a regional style in the midwestern prairie states—a style that emphasized native plants in homes, campuses, parks, and along newly constructed roadsides. These men and women sought, first, to protect existing native plants and, second, to use native plants and plant groupings in landscaping situations, such as roadside development.

In our examination of written documents, we found three themes emerged throughout the writings of these early supporters of naturally landscaped roadsides. First, these advocates saw roads and roadside development as part of a larger social issue—the necessity for a stable, aesthetically pleasing, and economically healthy rural America. Second, many envisioned the engineered road and its impeccable roadside as a symbolic loss of the region's identity and its pioneer spirit. Last, some recognized that the then emerging science of plant ecology could, when combined with artistic purpose, lead to some very exciting opportunities to recapture the aesthetic appeal and symbolic strength of the prairie landscape.

Roadside development in the rural landscape.

The first theme has natural ties to the Jeffersonian ideals of agriculture and to the farmer as a mainstay in the American economy and way of life. By the end of the 19th century, the Country Life Movement, an organization whose members feared this ideal was slipping away, had formed and began to gain influence in both national government and at many Land Grant colleges (Kirkendall 1986). One of the many improvements they worked for was the betterment of rural roads. With the passage of the Smith-Lever Act in 1914, which the Movement strongly supported, came the growth of the college Extension Service: the scientific and educational tool necessary to communicate the group's ideas to the rural community. Advocates of naturalistic roadside planting, such as Wilhelm Miller (University of Illinois at Urbana), Frank Waugh (Massachusetts State College), Franz Aust (University of Illinois at Urbana as Miller's assistant, and later University of Wisconsin-Madison), and P. H. Elwood, Jr. (Ohio State University and Iowa State College), worked within the Extension setting to enhance the rural landscape for those who lived and visited there.

In 1912, Wilhelm Miller, who was trained as an editor and horticulturalist, came to the University of Illinois with definite ideas about the prairie landscape and its importance in developing a rural midwestern "sense of place" among agricultural settings and along roadsides, a program he called "The Illinois Way". In a speech to the Illinois Highway Commission, he said:

> It is a mistake to suppose that our greatest financial asset is something rare, remote and spectacular, like Niagara, Yosemite and Yellowstone...To the ninety million inhabitants of the United States, the most important scenery is the common, everyday, familiar scenery in which we pass our lives...The most important scenery in the world is roadside scenery, because it affects the most people.
>
> Miller 1913

Arguing for functional as well as aesthetic transportation routes, Miller portrayed the needs of a county in Illinois as follows:

> [Its] roads are muddy enough to kill a horse, and there is nothing to see along the highway; every shrub and flower has been cut down. There is nothing to soften or relieve the cast iron system that laid out the country in absolute, unvary-

ing squares....How can this be improved...and at the least expense?

Miller 1913

Miller demonstrated through his extension work how fundamental planning and planting could improve the rural landscape and thus, rural life. He and Franz Aust developed the "Illinois Way" into a variety of planting motifs and implemented them in rural models, such as the prairie motif they employed at the farm of Harvey J. Sconce in northeastern Illinois. Miller wrote of the situation:

> The main problem of the Sconce planting is to idealize the prairie views, for although these are very fine from the standpoint of farm management, they are perfectly flat, and like other extremely valuable agricultural land, are generally devoid of trees and shrubs. To restore as much as possible the old prairie magic, Mr. Sconce is framing broad views of corn and wheat with `symbols of the prairie,' i.e. plants with strongly marked horizontal branches such as Scarlet Haws, Prairie Crab Apples, Honey Locust, and Sassafras.
>
> Miller 1915

Miller also publicized the ideas and work of landscape artists Ossian Simonds and Jens Jensen, both of whom had much earlier used native plants in their designs. Simonds emphasized the need to create a harmony between the roadside and adjacent properties, especially by providing openings that displayed distant views (Simonds 1915). Jensen, meanwhile, stressed that

> Roadsides are all important in the development of the rural country. It is from our highways that we get acquainted with our country—from our highways we see its beauty and are inspired by it.
>
> Jensen 1924a

P. H. Elwood, Jr. oversaw one of the first college courses devoted to training young people in roadside development and planting. While he believed in the power of beauty, Elwood viewed the roadside landscape first as functional, then artistic:

> Successful landscape extension must first of all satisfy practical and economic requirements before it becomes a work of art. We have already had too much hitching `the cart before the horse,' trying superficially to beautify something organically and fundamentally bad.
>
> Elwood, Jr. 1922

Loss of regional identity and pioneer spirit.

The need to balance the engineered road and its manicured roadside with the pioneer spirit and thereby avoid the symbolic loss of the region's identity also concerned many of the writers. Among those we read, Jensen set the overriding tone when he wrote

> It is a fine art to paint beautifully, but it is a greater art to produce a living picture where the cultivated and the primitive have been merged into a great ensemble
>
> Jensen 1924a

Miller's "Illinois Way" was based on an idea of maintaining strong, symbolic ties with the past, as he emphasized when he wrote:

> The guiding principle is to restore and intensify the native beauty of each locality....Every soil type tends to have its characteristic trees, shrubs, and flowers
>
> Miller 1913

But he was disturbed about the obsession to control our natural surroundings:

> Our present law encourages the destruction of every native bit of roadside beauty because it puts the work of destroying weeds into the hands of men who make no distinction between pests and harmless wild flowers. These men have only one conception of beauty—a neat, close-cropped strip of grass....Therefore, the control of roadside weeds and roadside planting should be put in the hands of public spirited men of knowledge and taste....
>
> Miller 1913

Jensen also saw the region as forming the basis for roadside development:

> All roadside planting should be determined and based on the country and its native vegetation through which the road winds its way. In this way the roadside planting will become a part of the general landscape and enhance the beauty of its surroundings as far as this is possible for a highway to do
>
> Jensen 1924b

In particular, and to an extent that exceeded Miller's, Jensen made it clear that such plantings must be exclusively native:

> To make the roadside planting a part of the native landscape means to plant native plants—such plants as grow in the region of which the road is a part....Where the highway runs through open country framed by imposing landscapes, groves or groups of trees are the only solution. These groves should consist of one tree type with low-growing shrubs or flowers at intervals....On sandy lands we may have an entirely different picture with such plants as pines, cedars, creeping juniper, bittersweets, grapes, numerous grasses, butterfly weeds, lupines and prairie clover.
>
> Jensen 1924a

Despite this advocacy for a midwestern motif and the aesthetic elements of the prairie—its openness, horizontal lines, the grasses and wildflowers as they changed over the seasons—little actual planting with prairie species took place along newly developed roads. It appears that a growing urban population and its appreciation for a highly engineered, streamlined aesthetic merged with technical advances in turf propagation and management to supplant the prairie motif.

Jensen, nevertheless, remained hopeful when he wrote in 1932:

> They have long vanished from along our highways, but perhaps someday the Department of Highways will restore our prairie flowers along our roads and it is hoped they will restore many of our other interesting prairie plants that once grew there.
>
> Jensen 1932

Frank Brandt, a student of Aust's at Wisconsin, reviewed writings that promoted naturally landscaped rights-of-way prior to 1930. He also conducted a survey of 14 state highway commissions to determine their philosophies and roadside landscaping practices (Brandt 1931). His findings testify that a truly rural, prairie right-of-way landscape had become a static idea that was quickly losing ground to mechanized progress. In a series of recommendations Brandt proposed

1. Each state should develop a number of planting motifs based on the individuality and character of the particular physical environment through which the highway might pass.

2. Highway rights-of-way should be wider with shallower, broader, meandering ditches. This width would encourage cluster rather than single row tree planting.

3. Roadside planting should be carefully planned so as to bring the surrounding landscape into the roadside design instead of trying to form a separate design within the rights-of-way limits.

4. Plants for rights-of-way plantings should be judged with regard to their fitness and hardiness, potential for artistic design, and maintenance costs. Foreign plants should be discouraged since they would not harmonize with surroundings nor always adapt or be easy to maintain.

5. Existing native plant growth including community remnants should be preserved.

Thus, in the 18 years between Miller's (1913) and Brandt's (1931) writings, no one had addressed the means or developed the policies to go beyond simply hoping to use indigenous plants as part of roadside plantings.

Plant ecology and roadside design.

The third theme is the potential for plant ecology to contribute scientific support for landscaping roadsides with native plant groupings. Plant ecology came into its own during the first two decades of this century, producing researchers and scholars such as Frederick Clements and Henry Cowles in the Midwest (McIntosh 1985, Tobey 1981). These men and their colleagues developed theories (such as physiographic ecology, succession, association, and climax) and sampling methodologies (quadrat sampling, frequency indices) to explain and investigate the relationship of plants to their environment. Others then began the slow process of incorporating the principles of plant ecology into roadside planning and design. Two of these individuals were Wilbur Simonson and Frank Waugh.

Simonson, a senior landscape architect with the United States Bureau of Public Roads, wrote numerous articles during the 1930s on right-of-way landscaping. Whereas previous landscape architects talked about roadside plantings in terms of preservation and aesthetics, Simonson emphasized the need for naturalistic plantings as a matter of economics, based on an understanding of conservation and an area's ecology (Simonson 1934, 1936). According to Simonson, a systematic pre-construction survey of the native flora on rights-of-way and the lands adjacent to highways would indicate the most appropriate plant materials to use (Simonson 1936). This would assure that the highway would not only fit into the landscape but that the landscaping would be cost-effective.

Waugh not only taught, he spent considerable time during the 1920s and 1930s doing pioneer work siting and landscaping U.S. National Forest roads, including the Mount Hood scenic drive in Oregon (Taylor 1943). As early as 1917, he began to include plant ecology in his aesthetic writings (Waugh 1917). While others, like Miller and Jensen, discussed the need to place plants where best adapted, Waugh used the scientific concepts of plant community ecology to become much more specific. In 1931, he wrote an article entitled "Ecology of the Roadside" in which he described the ecological influence of the roadway on the surrounding flora. The article emphasized the zonal distribution of flora as influenced by "edaphic conditions, moisture, and light relations...." Using this idea of plant group zones, Waugh suggested that the highway landscaper "should be able to achieve a result at least scientifically more accurate than the planting plan developed...in the drafting room" (Waugh, 1931). Waugh was the first to propose that ecological studies were necessary to restore or create natural plant communities along roadsides.

Waugh was also influenced by a book written by a plant ecologist and a landscape architect, *American Plants for American Gardens*. Its introduction states

> The study of native plants in relation to their environment brings out the fundamental principles upon which the indigenous vegetation is established, and the contribution that an understanding of these facts can make in the retention or recreation of the natural landscape.
>
> Roberts and Rehmann 1929

One of its authors, Elsa Rehmann, later argued that roadside engineers and managers needed an education in plant community ecology to properly perform their tasks. She further suggested that these professions needed to develop a respect for native vegetation, and she was critical that they tended to be "overactive in clearing along roadsides."

Rehmann 1933

Aust, as Chairperson of the Wisconsin Chapter of the Friends of Our Native Landscape, led that group to cooperate "with the Highway Commission in the protection of the existing scenic beauty along our highways." Aware of the problem posed by Rehmann, he opted for an ecological solution:

> Educational talks should be given on the things along the highway which should be saved and also instructions given regarding the time of the year that certain rights-of-way may be cut without injuring the wild flowers.
>
> Aust 1932

While these ideas were sound, they were only pioneering attempts. Certainly, the limited availability of propagules for many native plants and a lack of understanding of how to establish and manage such plantings may explain the lack of enthusiasm in many state transportation departments. However, professional designers and engineers also lacked the ecological understanding necessary to make the prairie roadside a reality. For example, a roadside planting plan by Charles Le Sure, an Illinois landscape architect inspired by Miller and Aust's work, demonstrated little knowledge about how to establish and maintain native prairie species (Le Sure 1923). Many of the prairie wildflowers and grasses that Le Sure depicted in a plan for a natural roadside would not have been able to thrive due to the shade cast by the plan's dense tree canopy.

It was not until the late 1930s that prairie ecologists, like Ted Sperry, along with Civilian Conservation Corps workers, began the first known prairie restoration, now the Curtis Prairie at the University of Wisconsin-Madison Arboretum. Work and research on this prairie slowly and quietly began to answer some of the questions concerning prairie establishment and maintenance, especially the importance of fire as a management tool. Shortly thereafter, at the same arboretum, University of Wisconsin botanist Henry Greene single-handedly created the prairie that bears his name. It, too, provided a welcome source of information regarding the possibility of restoring the beauty of the prairie environment. Other restorations in Illinois, at Knox College, at the Morton Arboretum, and at Fermilab, followed during the 1950s and 1960s. Information from these restorations was used by others to conduct restorations for numerous conservation parks, nature centers, schools, and residences. This activity swelled interest in the prairies and other native communities tremendously, encouraging the development of private native plant nurseries and providing a better understanding of how to recreate the prairie community. With this knowledge and support, planners could now realistically begin to assess the use of prairie species as useful vegetation for highway plantings.

Present and Future Right-of-Way Planting and Policy

Today, the public assumes that roads will be safe, allow rapid traffic movement, and be relatively economical in their construction and maintenance. Within those constraints, a variety of reasons have been given to justify the use of native plants instead of traditional plantings along roadsides. These include greater erosion control, lower maintenance costs, greater adaptability to climatic

extremes, enhanced aesthetics, and the ability to reclaim, if only symbolically, a state's regional context or heritage. Thus, it appears that earlier themes of social health, regional heritage, and aesthetics, while still viable, have been diminished by more functional purposes. Nevertheless, even traditional management techniques that focus on controlling instead of encouraging vegetation may no longer be applicable. James Ritzer recently suggested that our perspective of roadside management needs to change:

> A roadside program dedicated to preservation of the roadside resource should place as much or more importance on plant performance as on plant control. A program emphasizing controls presumes that there is something to control.
>
> Ritzer 1990

To place emphasis on preservation and management of existing vegetation, however, managers must begin to re-educate themselves as to consequences of their actions on that vegetation: an idea Elsa Rehmann suggested nearly 60 years ago.

Beginning in 1968, midwestern prairie ecologists, entomologists, landscape architects, and other prairie enthusiasts began to meet at biennial conferences to share their experiences in creating artificial grasslands and managing extant sites. The energy and ideas of this group helped spark what has since come to be known as restoration ecology. This new discipline is based on the premise that we can learn more about species and their ecosystems by asking questions and testing ideas about how to actively restore them to a previous condition (Aber and Jordan 1985).

One interesting use of the restoration ecology approach to roadside development is the program described by Gayle Weinstein in her report for the Denver Botanic Gardens (Weinstein 1988, 1989). Her paper, at the 1988 North American Prairie Conference about establishing a research program for the restoration of short to midgrass prairie along Colorado Highway 121, included several recommendations that begin to bring the role of restoration ecology into rights-of-way landscaping:

1. Establish plant selection criteria based on ease of establishment, availability, aesthetics, erosion control capability, adaptability, genetic purity, and natural community composition.
2. Evaluate previous research, methods, and techniques and their costs.
3. Specify the successional stages of the plant community desired and understand its dynamics and limitations.
4. Evaluate, monitor and maintain records of planting attempts, their success and cost.
5. Publish the results.

CONCLUSIONS

It appears that since 1910 the reasons for promoting naturally planted rights-of-way have changed in emphasis but not in content. Conceivably, this is because erosion control and lower maintenance costs are more tangible than aesthetics, social well-being, and regional identity to politicians and agency heads. And yet, some state programs, like Minnesota and Texas, have found a major part of their focus is in proclaiming their regional identity through their roadside vegetation.

Despite our advances in ecological knowledge, the greater availability of prairie propagules, and the increased enthusiasm of state transportation departments, the urgency for action that earlier proponents felt remains. In fact, it is even greater now than it was 60 or 80 years ago because then many of the roadsides were still in prairie and native shrubs. Commenting on this change, Aldo Leopold wrote

> Our grandfathers...killed off the prairie fauna and they drove the flora to a last refuge on railroad embankments and roadsides. To our engineers this flora is merely weeds and brush. Through processes of plant succession predictable by any botanist, the prairie garden becomes a refuge for quack grass.
>
> Leopold 1953

Naturalist May Watts tells a story that is a pertinent reminder to all advocates of the naturally landscaped roadside, past, present, and future:

> It so happens that while inspecting a new historical marker near Plainfield, Illinois, I met a local politician who said, "This, to me, is Illinois," as he stretched out his arm to the landscape. My eyes followed the arc of his gesture. "Illinois? Just exactly where?" Not the granite marker. That was Vermont. Not the expensive evergreen planting that had been hastily installed. That consisted of Mugo pine from the mountains of Switzerland. Not the big basket of garden flowers set at the base of the marker. The flowers were marigolds and zinnias and dahlias, whose ancestors all came to us from Mexico. Not the sparrow that alighted long enough to mark the marker. He was English. Not the freshly clipped grass at our feet. That was bluegrass from Eurasia. Not the weeds in the grass.
>
> Watts 1957

Today we are witnesses to, and participants in, the reversal of losses to our natural environment. This endeavor will take considerable energy, but should reap substantial rewards for ourselves and for future generations who will travel the pathways we leave for them.

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