



Effective Establishment of Native Grasses on Roadsides in New England



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Introduction

Motor vehicle corridors of the United States comprise more than 10 million managed acres. Effective establishment and maintenance of roadside vegetation significantly impact the environment, regional ecology, and driver safety. For decades, state Departments of Transportation have used introduced cool-season turf grasses for quick cover along roads. However, recent policy changes require the use of native plants as the first choice in roadside revegetation efforts. While a considerable amount of literature exists on the subject of native plant establishment in various parts of the U.S., the practice of roadside native plantings remains relatively new to New England and the knowledge-base for this region has only started to develop.

The New England Transportation Consortium (NETC) commissioned research to find the most affordable, reliable, and expeditious methods for establishing native plant communities of warm-season grasses and forbs along New England roadsides. A Manual consisting of 283 pages was recently completed representing a comprehensive knowledgebase for a gradual transition toward sustainable native roadside vegetation, which supports transportation goals for safety and infrastructure reinforcement while providing ecological benefits. Given the unique ecological conditions of the region, the Manual provides specific information derived from literature reviews, interviews with experts and practitioners, and field experiences obtained during the establishment of the regional demonstration plots.

Manual Contents

- Chapter 1:** Plant specifications: selecting native species for roadside establishment in New England
- Chapter 2:** Site Inventory and assessment
- Chapter 3:** Establishment Methods for Native Plant Communities
- Chapter 4:** Focus Groups of New England DOT Managers
- Chapter 5:** Plant Profiles
- Chapter 6:** Conclusions and Initial Actions



DOT managers touring Rte. 6 demonstration sites during Sept. 30, 2015 field day

Establishment Methods

Three demonstration plots with differing topographical features were established along U.S. Route 6 in Tolland County, CT using several establishment techniques:

- Truax no-till seed drill operated by the Connecticut Department of Energy and Environmental Protection (DEEP)
- Hydroseeding of slopes bordering an overpass conducted by UConn's Department of Building and Landscape Services
- Jacobsen verticutter/overseeder used by the staff of Colonial Seeding Company
- Sawdust as a weed-suppressing seed mulch (a technique developed by Professor Susan Barton of the University of Delaware)
- no-till clay-based seedball technique

Two of the most effective techniques were the Truax seed drill and sawdust as a medium for seeds. The Truax drill performed best on sites where pre-existing undesirable vegetation existed. It drills seeds to the proper soil depth without causing soil disturbance, which is essential for preventing germination of dormant banks of weed seed. The technique using sawdust worked best in areas with bare soil because the breakdown of the sawdust deprives weed propagules the nitrogen they need to thrive while providing native species seeds a moist medium conducive for establishment.

Augmentation of existing native plant populations

Our research has found that sizeable populations of native plant communities already exist along New England roadsides. We have developed strategies for increasing these native plant populations by eliminating non-native species with specific herbicides applied at certain times of the year, thus decreasing cool-season grass competition and weed pressure. This technique allows existing warm-season plants to thrive, dormant root propagules to proliferate, and seed banks to germinate. Furthermore, we found that decreasing the frequency of mowing and eliminating mowing entirely during warm-season plant growing seasons – from late spring to early fall – allow existing native communities to outcompete cool-season grasses and weeds without the need to apply herbicides.

This management approach, called augmentation, is more effective than establishing native communities from scratch. First, it is less intensive, costs less, and displays higher rates of success. Second, it is ecologically more sound because it promotes the integrity of locally-adapted populations, limiting the introduction of species grown in and adapted to remote provenances. (Seed production in the New England region is currently very limited. Therefore, native seed supply for New England restoration projects originates from remote regions of the country.) Interaction between plants established using introduced native seed sourced from remote provenances and local natural populations results in interbreeding, which may disrupt locally-adapted gene complexes of native plant species.



On left: A roadside field near Rte 6 of naturally-occurring little bluestem (*Schizachyrium scoparium*) infested with the invasive species knapweed (*Centaurea maculosa*).

On right: A neighboring population of *Schizachyrium scoparium*, made more dense by the elimination of *Centaurea maculosa* using the technique of augmentation.



Above: A Truax drill seeding a site along Rte. 6.

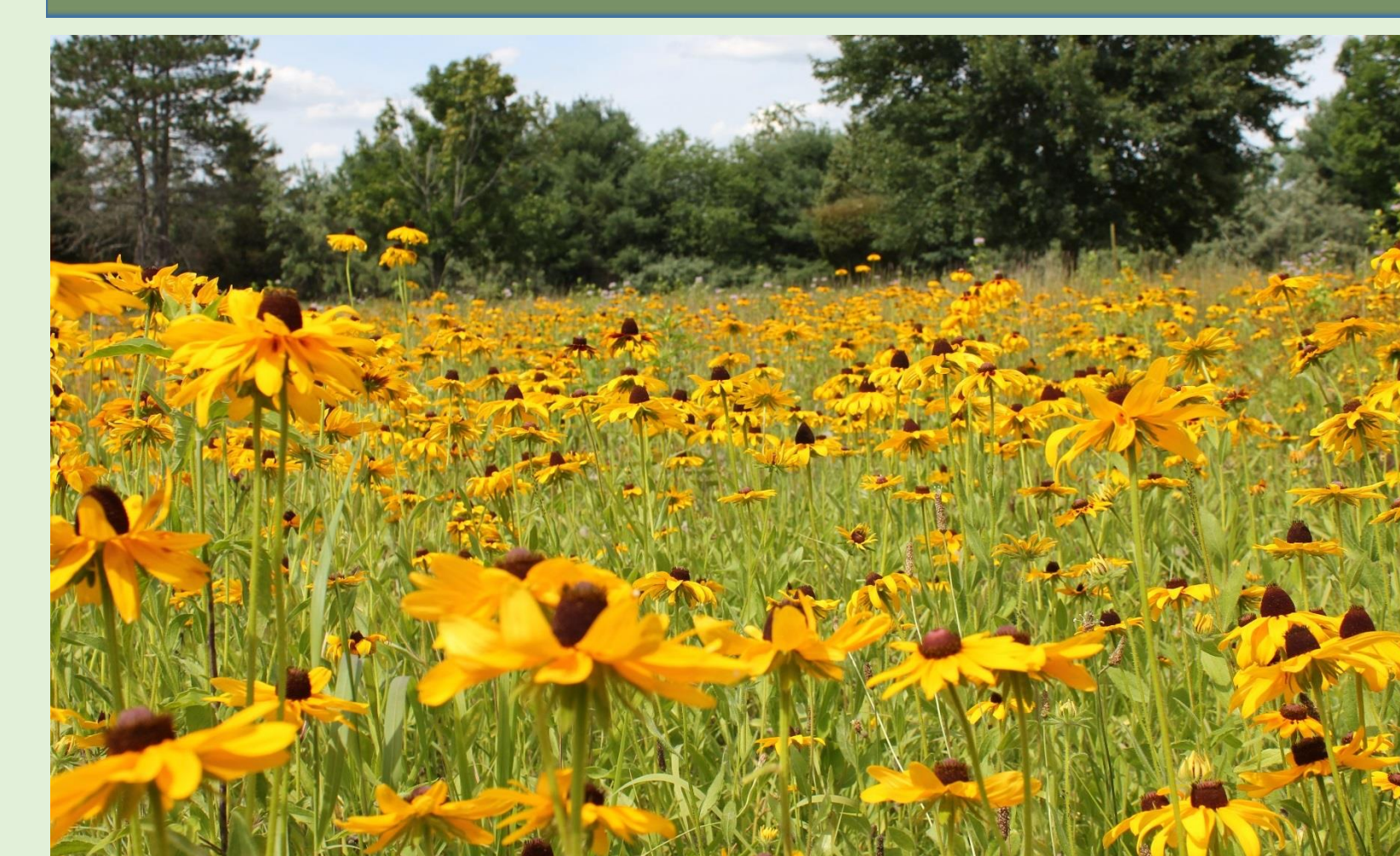


A site along Rte. 6 planted using sawdust



Above: A bucket of clay seedballs

Below: The same site shown above that was established using the Truax drill, in bloom a year later with *Rudbeckia hirta*, *Monarda fistulosa*, and *Schizachyrium scoparium*



Benefits of using native species

Native plant roadside communities provide more valuable ecosystem services than do introduced cool-season turf grasses, including:

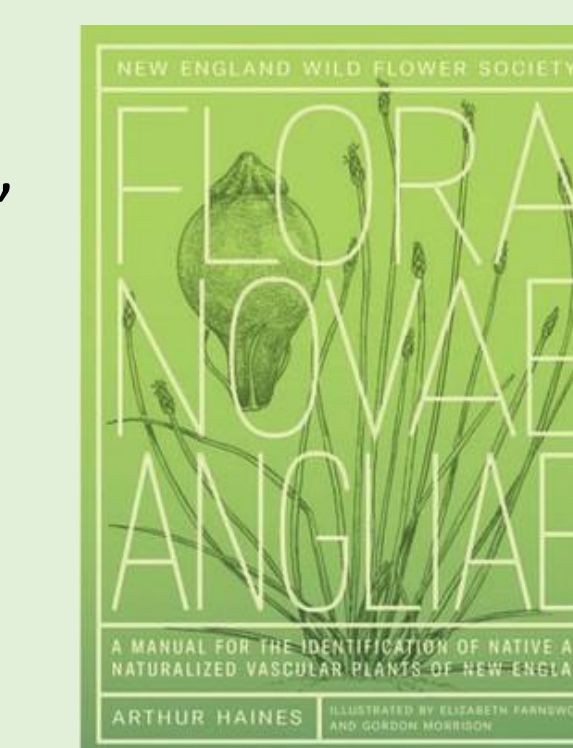
- Increased soil erosion control, slope stabilization, stormwater infiltration, and carbon sequestration resulting from the extensive root systems of warm-season native grasses
- Restoration of pollinator, beneficial insect, and wildlife habitats
- Increased removal of air pollutants, such as particulate matter, ozone, carbon monoxide, and nitrogen and sulfur dioxide
- Invasive species resistance as a result of the density of native plant populations and the acceleration of the ecological succession process
- Improved roadside aesthetics, which can contribute to greater driver awareness and increased sense-of-place



Species selection

In order to identify regionally appropriate native species, specialized references should be consulted. While there are many sources of information available on native plants in the U.S., regional treatments provide the most accurate information about species presence in each part of the country.

The most reliable, recent references for New England include “Flora Novae Angliae” (Haines, 2011) and the “Go Botany” website maintained by the New England Wild Flower Society (<https://gobotany.newenglandwild.org>).



A comprehensive master list of species appropriate for roadsides in New England, compiled with the assistance of botanists, is included in the Chapter 5 of the Manual. It contains 96 species of forbs and 39 species of grasses and grass-like plants (sedges, rushes etc.). This list should be narrowed down for each state or even portions of the state based on the species distribution maps at Go Botany and the EPA New England Level III Ecoregions map.

Conclusions

The shift toward planting native species along roadside manifests proactive environmental stewardship and provisions for healthy ecosystems. Exploiting the vast acreage of roadsides to create biodiverse native plant communities helps combat the deterioration in wildlife habitats resulting from invasive species encroachment: native plant communities provide long-term defense against invasive and noxious weeds while reducing maintenance costs associated with managing weedy vegetation. They improve slope stability and increase regional biodiversity. It is expected that by transitioning to these more sustainable management practices involving native plants, DOTs can reduce the frequency of mowing, save on fuel costs, decrease machinery emissions, while also adapting roadside vegetation to a changing climate.

Reference: Kuzovkina, Y., J. Campanelli, C. Schulthess, R. Ricard, G. Dreyer. 2016. Effective Establishment of Native Grasses on Roadsides in New England. New England Transportation Consortium. 283 p.