

# Roadside Revegetation: A New Frontier for Native Plant Growers

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**Abstract:** Roadside revegetation projects are an important and growing new niche for native plant suppliers. Recent shifts in public policy now require the use of locally adapted native plants as the first choice when roadsides are being revegetated. These shifts in policy recognize that the establishment of healthy native plant communities is the best defense against invasive plant problems, as well as the most economical means to achieve soil and water quality standards and protect environmental quality. Thus, roadside revegetation with native plants is an important ecological and societal goal that will require public and private sector cooperation to reach. A new partnership between the Western Federal Lands Highway Division and the USDA Forest Service has led to a more interdisciplinary approach to roadside revegetation that incorporates the needs for seed and nursery production into the road construction timeline. Better coordination and holistic planning is resulting in some exemplary projects. Challenges for native plant suppliers in working with roadside projects include harsh conditions, large scale needs, uses of heavy equipment, high public visibility, and pressure to meet water quality and erosion control standards with plant performance. Native plants and the people who grow them are meeting these challenges with innovative stocktypes and application methods that make roadside revegetation more effective. Examples of these innovations include: (1) hydroseeding applications of native seed mixes for not only grasses but also forbs, shrubs, and trees; (2) “expandable stinger” equipment and deep-rooted stocktypes to establish seedlings on previously inaccessible slopes; and (3) seed mat methods to establish plants on vertical gabion walls. Roadside revegetation represents an important and expanding frontier for native plant suppliers and ecological restoration efforts, and opportunities are expected to grow.

**Keywords:** revegetation, road ecology, stocktypes, restoration

## Introduction

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The federal government owns or controls about one-third of the total land area of the United States, and the highway network that serves these federal lands is one of the largest in the world (NRC 2005). These federal highways are in various stages of repair, decommissioning, updating, or expanding (NRC 2005). Roads are prominent features on the landscape and have wide-reaching, ecological effects on hydrology, soils, and animal and plant life. The establishment of functional, self-perpetuating communities of native plants on roadsides is one aspect of good management for road projects. This paper discusses lessons being learned and opportunities created through cooperation between the USDA Forest Service (USFS) and the Western Federal Lands Highway Division (WFLHD) on native roadside revegetation projects on forest highways in the Pacific Northwest region.

## New Policies and Partnerships

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The WFLHD and USFS have developed a new partnership in order to meet the common goal of roadside revegetation with native plants via more holistic processes for road planning and development. In the past, standard practice for roadside

revegetation emphasized exotic grasses, which were perceived as inexpensive, readily available, and easy to establish on the highly disturbed sites. However, roadsides are now recognized as corridors for noxious or invasive plants that become problematic for adjacent land management. In addition, revegetation is now expected not only to “green” the road scar in the short-term, but to meet longer-term goals for soil stabilization and protection of water quality, which means healthy plant communities must be in place. The larger goal of improving ecological function and supporting biodiversity is also a focus.

Recent shifts in public policy mandate the use of native plants as the first choice in revegetation efforts. These policy statements include the following:

- National Native Plant Materials Policy: “Native plant materials are the first choice in revegetation...” (USFS 2005)
- BAER Manual (FSM 2523): “... when practical, use genetically local sources of native species ...” (USFS 2003)
- National Fire Plan Strategy: “... promote the establishment of local sources of native seed and other plant material ...” (USFS/USDI 2001)
- R6 Revegetation Policy: “... use local native plants to the extent practicable ...” (USFS 2004)
- Northwest Forest Plan; Interior Columbia Basin Ecosystem Management Project: “...maintain and restore native species and ecosystems ...” (USFS/USDI 1994; USFS 2006)

Within the USFS of the Northwest Region, the mission is to use locally adapted native plant materials. The USFS also seeks to provide and apply the best science available to obtain the highest levels of revegetation success over a broad geographic area. To do this, the USFS recognizes it must develop and foster partnerships with local, county, state, private and other federal players in order to meet common objectives.

Road construction is a fairly complex process involving many people and organizations. Timelines for projects span many years. The WFLHD/USFS partnership allows planning, schedules, and budgetary issues to be synchronized to support revegetation efforts as an intrinsic part of the process. Nineteen projects are currently underway with approximately U.S. \$3 million being utilized for revegetation with native species. The shared goal to use native plants for revegetation and the cooperation behind the mission is leading to a steady demand for plant materials and innovative revegetation techniques for roadside projects.

## Challenges and Opportunities

Recently obliterated, re-aligned, or constructed roadsides are drastically disturbed landscapes. Severely compacted or eroded soils (more often subsoils), steep slopes, high exposure to wind and water, lack of beneficial microorganisms, constant interface with human movements along the road, and risks of invasive plants make projects challenging. However, working with drastically disturbed landscapes offers its own rewards. If effective processes can be developed to revegetate these sites, applications will be widespread for other disturbed environments. There are also some

interesting opportunities characteristic of working with forest highways. For example, long lead times for road projects allow for seed collection, salvage, nursery stock production, and seed increase with appropriate scheduling and budgets to meet the needs of the projects.

## Innovative Procedures

Innovation and cooperation are necessary to meet the unique needs of roadside revegetation projects. New procedures and partnerships are being developed to provide the volume of seeds needed for revegetation projects, as well as to create the stocktypes and application methods that are most suitable for harsh roadside conditions.

Roadside revegetation projects often cover large areas and have large demand for native seeds and plants. The concept of making small wildland collections and increasing the seeds to quantities sufficient to meet the needs of large projects is an unqualified success. The process starts with wildland collection, followed by cleaning, increase, certification, storage, and outplanting. USFS infrastructure and services, such as the seed cleaning facility at the Bend Seed Extractory, are working with private sector suppliers and nurseries to help meet plant requirements for roadside revegetation process.

Outplanting seeds on roadsides is a challenge. Hydroseeding has been commonly utilized to stabilize soils with exotic grass seeds. However, hydroseeding methods are now being expanded and modified to establish native plants. Hydroseeding methods have been effective in establishing seeds of native grasses, forbs, shrubs, and even trees on roadsides. New application methods, experiments with seeding rates, and improved mulch materials are helping to improve the effectiveness of hydromulch techniques (fig. 1). Another innovation has been the development of erosion control blankets that are seeded with the appropriate mix of native seeds (fig. 2a). These seeded blankets are then rolled out onto steep slopes, or even vertical gabion walls, to establish native vegetation (figs. 2b and 2c). Roadsides are also seeded by hand, by seeder-harrowers, and by many other methods, depending on the context (fig. 3).

Innovations in stocktypes and outplanting methods have also been facilitating effective revegetation with natives. One innovation includes the “expandable stinger,” a machine that can plant deep-rooted seedlings onto steep and otherwise inaccessible slopes (fig. 4a). The stocktype called the “longtube” is the key to this method. These are deep-rooted seedlings with containers that fit into the magazine of the stinger. The magazine is loaded with trees that are planted (“stung”) into the slope at the proper depth (fig. 4b). In general, large, deep-rooted stock is valuable on harsh sites because their longer root systems can reach water sooner; they may also be hardier and able to survive the difficult conditions better. Because of the high visibility of roadside projects, large stock also aid in improving the appearance of the roadside quickly.

Roadside revegetation projects encompass other opportunities for ecological design and restoration. Working together, engineers and plant specialists can ensure that road construction has a minimized footprint that sustains trees and existing vegetation as much as possible. Protection of water quality, safety for wildlife and people, restoration of creeks,



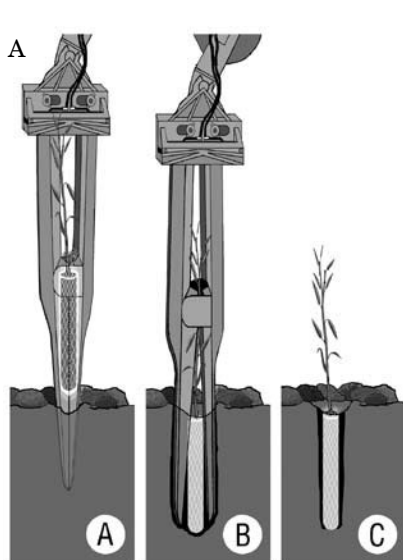
**Figure 1**—Hydroseeding is one of the best ways to revegetate highway cuts and fills and retard soil erosion. Hydromulch techniques have been modified to improve effectiveness with native species seeds (photo by David Steinfeld).



**Figure 2**—Revegetating steep slopes and gabion walls can be a challenge. Native grass and forb seeds can be glued to erosion control blankets (A) and installed on steep slopes (B) or on the outside of gabion walls (C) (photos by David Steinfeld [A, C], Pete Jones [B]).



**Figure 3**—Shallower slopes can be seeded with tractor-driven equipment, including a ripper modified to include a seed drill with a drag-chain to cover seeds with soil (photo by Scott Riley).



**Figure 4**—An expandable stinger allows deep-rooted seedlings to be planted on steep or otherwise inaccessible slopes (A). Deep-rooted seedlings can be loaded into the magazine and planted at the proper depth on the slope (B) (figure A by Steve Morrison; photo B by David Steinfeld).

riparian buffers, and wetlands, and the maintenance and expansion of biodiversity all fall within the field of roadside revegetation.

## Future Opportunities

Increasing private and public sector partnerships and cooperation will be a vital part of meeting the goal to establish native plants on our roadsides. The USFS, WFLHD, and private sector cooperators hope to continue to develop new revegetation strategies, stocktypes, and technologies in this effort. One challenge of this field is a lack of practical information regarding species and strategies for effective revegetation. The USFS and WFLHD are working together to develop holistic training tools and technology transfer methods, including an upcoming manual for practitioners entitled *Roadside Revegetation: An Integrated Approach to Establishing Native Plants*. Within the USFS, we are working to maximize Forest Service infrastructure already in place to help with challenge, and we often work hand in hand with contractors from the private sector to fill the demand for native seeds and plants for roadside projects. New opportunities continue to emerge. It is hoped that other native plant specialists will join the effort to meet the challenges of on this new frontier of ecology—revegetating drastically disturbed roadsides with native species (figs. 5A and 5B).

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A



B



**Figure 5**—In 2003, four months after gabion wall construction, seeded erosion mats were attached to the wire mesh at the face of the wall; compost amended soil was placed behind the screen and lightly tamped (A). Three years later (July 2006), the walls were fully vegetated and effectively screened from the road (B) (photos by David Steinfeld).