

NIATT

TECH  
BRIEF

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## VEGETATION MANAGEMENT PRACTICES

**T**o most people, transportation means cars, trains, buses or planes. To James Kingery, transportation means roadside soil stability, erosion control and slope maintenance. This issue focuses on Jim's work as an affiliate faculty member in NIATT's Center for Transportation Infrastructure.

Shallow-seated slope failures on roadsides, with their accompanying surface erosion and soil loss, present a challenge to highway construction and maintenance in Idaho. The loss of topsoil from these slopes depletes an important natural resource, causes adverse affects on water quality, increases the need for ditch maintenance and diminishes the aesthetics of the environment. Regulatory, environmental and economic pressures in the state are forcing construction crews to pay greater attention to erosion control, slope stability and sedimentation management. To assist them in their efforts the Idaho Transportation Department (ITD), NIATT and the Department of Rangeland Ecology and Management at the University of Idaho began working together to determine the most successful revegetation techniques for assuring the integrity of the road system and to provide training for ITD personnel responsible for the design, construction and maintenance of roadways.

Early work practiced by Dr. James Kingery on establishing and managing vegetation on roadside slopes provided the foundational data needed to address more specific objectives.

These objectives include

- ✓ Developing literature reviews on soil amendment and topsoil applications for revegetation purposes on roadsides.
- ✓ Compiling an Idaho roadside vegetation handbook.
- ✓ Developing training modules for use at statewide workshops for ITD.
- ✓ Assessing various nurse crop treatments for their ability to facilitate establishment of long-lived perennial plants.



Training ITD and DEQ Personnel  
on site at Horseshoe Bend  
Grade, Idaho

### Graduate Student Participation

Three graduate students have worked with Dr. Kingery and ITD in meeting these goals--Angela Cotter, MS '99, Kendra Moseley, MS '03 and Mitchel Thomas, MS '01.

Angie is working in Anchorage as an environmental consultant; Mitch is a range conservationist with the BLM; and Kendra is a research technician at the University of Nevada.

NIATT publishes two newsletters. The **Tech Brief** provides updates on Institute activities. The **Focus** features the institute's personal side.

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### **Keeping Topsoil Where It Belongs**

Angela Cotter undertook the task of researching all available sources on soil amendment and topsoil application practices on roadsides. Taking information from both scientific publications and actual case studies of projects throughout Idaho, particularly along Bryden Canyon in Nez Perce County and Horseshoe Bend in Boise County, she produced two publications. Both documents--“Soil Amendment Application to Roadsides” and “Topsoil Application for Revegetation of Roadsides”--were used by ITD to update the revegetation portion of their *Best Management Practices* manual.

### **A “Must-Have” Guide**

The work of Kendra Moseley carried forward Angela Cotter’s efforts and resulted in the July 2003 publication of the *Idaho Roadside Revegetation Handbook*. This extensive guide summarizes the characteristics and preferred environments of commonly-used grass, grass-like, forb, legume, shrub and tree species for roadside revegetation. The species list was developed from the ITD design manual, Natural Resource Conservation Service soil surveys, several seed companies and other published and non-published work.

In addition to the species descriptions, the handbook provides helpful tips for general plant identification and contains a glossary of plant terms and an index of both common and scientific names. ITD personnel use the handbook as a training tool to assist them in their revegetation efforts and as a reference for updating the seed mixes used in the different regions in Idaho.

### **Training Equals Greater Revegetation Success**

Kendra Moseley developed two training modules for use at statewide ITD district workshops. Module One is entitled “The Role of Vegetation for Roadside Restoration.” This module is designed to teach the role of vegetation in erosion control, reduced sedimentation and slope stabilization on areas affected by



**From Module One: Illustrating nurse crops and showing the rapid growing annual plants grown in the spring with slower growing perennial plants Mitch Thomas pictured in June 2000 (left) and June 2001 at a site in Juliaetta, Idaho.**

highway construction. Specifically, it addresses the optimal vegetational and physical site characteristics that contribute to the long-term establishment of desirable perennial vegetation for roadside stability. Module Two is entitled “Soil Management: Soil Characteristics, Soil and Vegetation, and Soil Amendments and Modifications.” This module expands on the information presented in the first module concerning the necessity of soil to provide the water, nutrients, temperature moderation and protection from some toxins that plants need for germination, establishment and longevity.

### **The Potential for Nurse Crops**

Using vegetation as a means of stabilizing slopes is only effective if the plants become firmly established. Establishment can often be enhanced by the use of rapidly-growing annual plants called nurse crops. Mitch Thomas undertook a two-year study to compare different species of annual plants for their ability to assist the establishment of perennial plants, control erosion and reduce weeds. The species he chose were hairy vetch, annual ryegrass, triticale and rose clover. Each of these was planted along with perennial



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species on newly-created roadsides in three locations in Idaho: Juliaetta in Nez Perce County, Potlatch in Latah County and McCammon in Bannock County. Mitch's results indicated that nurse crop treatments

- ✓ Had no affect on the density or cover of either annual or perennial plants;
- ✓ Resulted in a reduction of weed canopy coverage and reduced bare ground at the north Idaho sites; and
- ✓ Reduced bare ground and increased biomass production which may aid in controlling soil erosion.

This research is scheduled for publication in an ITD bulletin, "The Use of Nurse Crops for Roadside Revegetation."



**Hydroseeding project demonstration on Highway 9 between Deary and Princeton: a slurry of native plant seed and wood fiber mulch.**

"I think the research work [of Dr. Kingery and his graduate students] is very beneficial and has helped us update and develop many of our erosion and sediment control practices.

"Their work will help ITD provide a better understanding of vegetation establishment and slope stabilization, as well as provide a more diverse and environmentally sound practice to promote both native species and beneficial non-native species."

*Cathy Ford*  
ITD Roadside Programs Administrator

## About James Kingery

James Kingery received his B.S. and M.S. degrees from the Department of Rangeland Ecology at the University of Wyoming, and his Ph.D. from the University of Idaho. His thesis work examined mine reclamation practices; his dissertation explored the relationship of animal use and reforestation.

Jim has been at the University of Idaho since 1977. As an associate professor in the Department of Rangeland Ecology and Management, his main research interest is restoration ecology.

Jim enjoys all outdoor activities especially archery, hiking, and hunting.



**Jim with one of his good friends, Maggy the Tractor**