



Research Newsletter

Minnesota Department of Transportation
Research Services Section
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Office of Investment
Management

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Restoring and Managing Native Wetland and Upland Vegetation

The Department of Transportation has actively funded environmental research for many years. The Office of Environmental Services has initiated environmental research, provided technical liaisons and has implemented most of the research findings.

Several significant, but generally overlooked areas of interest for OES are the effects of the transportation infrastructure on ecosystems and ways to mitigate and/or reverse those effects. Ecosystem restoration has been a focus for Bob Jacobson (Botanist/Plant Ecologist, OES) since the early 1990's. Projects ranging from development of fungal and bacterial inoculants that are integral to soils on which native plant communities grow to ways to establish (previously difficult to establish) wetland communities from seed and then manage native plant communities to keep invasive species from running amok, have been contracted to the University of Minnesota and to Minnesota State University-Mankato. If Mn/DOT had not funded this research it would not have been done and our knowledge base would be significantly lower than it is today.



Minnetrissa wetland site

In 2003, Bob Jacobson collaborated with staff from the Minnesota Board of Soil & Water Resources to write the manual "Restoring and Managing Native Wetland and Upland Vegetation".

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Calendar of Events

May

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| 10-12 | MPWA Spring 2006 Conference, Grand View Lodge. Contact Oona Besse, 612/624-3492 or conferences3@cce.umn.edu |
| 24-25 | Seventeenth Annual CTS Transportation Research Conference, St. Paul. Contact Katie Kjeseth, 612-624-3708 or kkjeseth@cce.umn.edu |

June

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| 14-16 | District 4 Annual Meeting, Rochester Contact , Steve Manhart, 952-345-4117 |
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July-August

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| 30-3 | Second International Symposium St. Petersburg, Florida. For more information please visit www.t2symposium.org |
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Best Practices Handbook on Roadside Vegetation Management

Throughout Minnesota, all levels of government are concerned with the issue of maintaining their roadsides—for both safety and aesthetic reasons. A healthy roadside environment reduces maintenance needs and costs, aids in preserving the roadside surface, provides safety for vehicles and travelers, limits liability for the governing agency, maintains good public relations and improves the overall driving experience.

That is why the Minnesota Department of Transportation's Office of Environmental Services and Office of Research Services teamed with the Center for Transportation Studies at the University of Minnesota and the Local Road Research Board to research, study and analyze the process for managing roadside vegetation.

In accordance with Mn/DOT's Strategic Plan, under the Strategic Directions, Mn/DOT safeguards what exists. Our most important priority is to operate, maintain and preserve Minnesota's existing transportation systems by coordinating with local transportation partners and advancing investments that improve the safety of the traveling public.

As a result of surveys, studies and research that was done, the "Best Practices Handbook on Roadside Vegetation" was written to provide guidelines for effective management of roadside vegetation for local agencies. It highlights seven best management practices that were identified through research, surveys and discussions with agency and industry experts.

The seven best management practices for roadside vegetation fall into these seven categories:

1. Develop an integrated roadside vegetation management plan.
2. Develop a public relations plan.
3. Develop a mowing policy and improved procedures.
4. Establish sustainable vegetation.
5. Control noxious weeds.
6. Manage living snow fences.
7. Use integrated construction and maintenance practices.

"Best Practices Handbook On Roadside Vegetation Management" meets all of the requirements in Minnesota Legislature concerning roadside care and vegetation. It also incorporates the policies for maintenance of the right-of-way found in the Minnesota Department of Transportation's Maintenance Manual.

This booklet gives all of the essential answers concerning what, why, where, when and how for roadside vegetation management. So whether you are with the State, County, City, a Township or are a private citizen you can use it to help plan and create an environmentally friendly, pleasant looking, safe roadside that may become a habitat for small wildlife. Chapter 4, under Establish Sustainable Vegetation states: "Two primary objectives of roadside maintenance, weed prevention and erosion control, can be accomplished through the use of native grasses and wildflowers". Interestingly, an informal "Roadside Management and Wildlife Habitat"



Blazing Star

RC /TL Corner

Research Coordinator and Technical Liaisons

Robert Edstrom

Bob recently replaced Greg Busacker as the Research Coordinator for the Office of Environmental Services. Bob's main concentration is toxicology; specializing in the fate, effects, and transport of natural and man-made chemicals in the environment. Also, he evaluates the environmental impacts from the potential release of chemicals from Mn/DOT materials and activities. Bob may be reached at robert.edstrom@dot.state.mn.us or 651/ 284-0533.

Technical Liaisons:

Jason Alcott

Jason is the technical liaison for research projects involving wildlife. He is the technical expert in a number of areas including the NEPA and MEPA processes. Jason is the contact person for issues relating to Federal Threatened and Endangered Species, U.S. Fish and Wildlife Service coordination / consultant and wildlife issues. Jason may be reached at jason.alcott@dot.state.mn.us or 651/ 284-3747.

Dan Gullickson

Dan is the technical liaison for research projects involving forestry and living snow fences. He is the coordinator for Mn/DOT's Living Snow Fence Program where he is responsible for providing technical and interagency assistance for the design and deployment of blowing and drifting snow control measures. He provides professional and technical assistance for roadside vegetation management. Dan may be reached at daniel.gullickson@dot.state.mn.us or 651/ 284-3763.

Bob Jacobson

Bob is the technical liaison for research projects involving ecological research initiatives. He is Mn/DOT's Senior Botanist/Plant Ecologist and is currently working 70% of his time at the Board of Soil & Water Resources on an interagency agreement. He is responsible for the coordination of efforts relating to wetland restoration and management, vegetation impacts, rare plants, native species, invasive species and vegetation management. Bob may be reached at robert.jacobson@dot.state.mn.us or 651/ 284-3767.

Tina Markeson

Tina is the technical liaison for research projects involving noxious weeds and forestry. She is responsible for the biological control of noxious weeds on Mn/DOT roadsides, Hazard Tree Identification, valuation of trees and shrubs illegally removed off right-of-way, mapping of remnant prairies along Mn/DOT roadsides, and provides assistance to Mn/DOT district personnel with vegetation issues. Tina may be reached at tina.markeson@dot.state.mn.us or 651/ 284-3786.

Paul Walvatne

Paul is the technical liaison for research projects involving noxious weeds and forestry. He is the supervisor of the Forestry Unit. He provides leadership for Integrated Roadside Resource Management, Pesticide Applicator Re-certification training and Certified Landscape Specialist training. He also provides technical assistance and training to Mn/DOT's design, construction, and maintenance staff on all aspects of right-of-way vegetation management. Paul may be reached at paul.walvatne@dot.state.mn.us or 651/ 284-3793.

Recap of the 2006 Mn/DOT Environmental Stewardship and Streamlining Workshop

The Third Annual Environmental Stewardship and Streamlining Workshop was held on March 22 – 23, 2006 at the Earle Brown Heritage Center in Brooklyn Center, Minnesota. The event was sponsored by Mn/DOT's Office of Environmental Services, in coordination with the University of Minnesota's Center for Transportation Studies and College of Continuing Education. Approximately 200 people were in attendance. The workshop theme was "Delivering Transportation Projects in a Changing World." The focus of the workshop was to provide useful information to the transportation community on how to develop projects while maintaining stewardship of the natural environment.

Frank Pafko, Director of Mn/DOT's Office of Environmental Services, was the moderator for the opening general sessions.

Highlights included:

- A presentation by Don Shelby, WCCO-TV, on "Peak Oil and the Change in American Transportation"
- "Stakeholder Problem-Solving Process for the St. Croix River Crossing Project" panel moderated by Cheryl Martin, FHWA"
- "How Economics – Well, At Least One Economist – Looks at Wetlands" presented by Dr. Steven Taff, University of Minnesota"
- "Developing Complex Projects Under NEPA," presented by Bill Malley, Attorney, Akin Gump, Washington, DC"
- "Wildlife and Roads: The State of the Science and Practice" presented by Patty Crammer, Utah State University"

The Office of Environmental Services inaugurated the first annual Environmental Excellence Awards during this workshop. Recipients of these awards were:

- Metro District Design Squad 2 for Design of the TH169 Anderson Lakes and Pioneer Trail Interchanges
- District 8 for Construction of TH23 in Spicer
- District 6 Maintenance & Hydraulics for replacement of a culvert on TH30
- District 1 for continuing Stewardship of the TH61 Corridor along Lake Superior

The Program at a Glance can be found at http://www.dot.state.mn.us/environment/pdf_files/06program.pdf

Best Practices Handbook Continued from page 2.

survey of 555 people (primarily highway maintenance personnel), taken at the May 2005 Spring Maintenance Expo in St. Cloud, indicated a strong interest in establishing native vegetation. One of the many questions the survey asked was "If seed and equipment were available to plant more native grasses and wildflowers would you use them?" 78.5 % responded "Yes, if we had time." Another 15.5% responded "Yes, I would make the time."

We hope to feed that interest and help our transportation agencies comply with the 2005 revised mowing law (Minnesota Statute 2005, Section 160.232 (f)), which includes the clause: "When feasible, road authorities are encouraged to utilize low maintenance, native vegetation that reduces the need to mow, provides wildlife habitat, and maintains public safety."

For a copy of Manual No. 2000-19, "Best Practices Handbook On Roadside Vegetation Management", visit <http://www.lrrb.org/PDF/200019.pdf> and for more information on Minnesota Statutes 2005, 160.232, visit <http://www.revisor.leg.state.mn.us/stats/160/232.html>

Contact Paul Walvatne at 651/284-3793 or paul.walvatne@dot.state.mn.us

Current Research Projects Office of Environmental Services - Natural Resources Section

“Chemical Inventory and Database Development for Recycled Material Substitutes”

Principal Investigator: Paul Bloom
Technical Liaison: Bob Edstrom
Funding Source: Mn/DOT

Mn/DOT desires cost effective substitutes for natural aggregate, a material becoming more scarce and costly for road construction in Minnesota. To gain a better assurance of environmental compliance in future use of fly ash, the developed screening tool for waste utilization will require databases on fly ash, natural aggregate and soils. This study is producing chemical data on wastes, non-surface background soils and natural aggregates for use in this due-diligence screening tool.

“The Utility of Wildlife Crossings in Minnesota”

Principal Investigator: Brock McMillan
Technical Liaison: Jason Alcott
Funding Source: Mn/DOT

The impacts of roads on wildlife have been well documented. There are many positive impacts of roads, such as providing habitat or corridors for small mammals and ground nesting birds. However, negative impacts are receiving increasing attention. The purpose of this study is to determine if the wildlife crossing designs of the new bridges are effective at facilitating the movement of wildlife.

“The Road to a Thoughtful Street Tree Master Plan”

Principal Investigator: Gary Johnson
Technical Liaison: Dan Gullickson
Funding Source: Local Road Research Board

The goal of this manual or process is to guide any professional through the design and selection process. By leading them through the complete question/answer process and creating a criteria matrix that is satisfied during the design process, many of the current tree health and selection problems will be eliminated or tempered.

“Biological Control of Canada Thistle in Wetland Prairie Restoration”

Principal Investigator: Donald Wyse
Technical Liaison: Bob Jacobson
Panel Members: Paul Walvatne and Tina Markeson
Funding Source: Cooperative Program for Transportation Research and Studies

This project will investigate the effectiveness of a recently discovered native biological control agent *Pseudomonas syringae* pv. *tagetis* (PST) for the selective control of Canada thistle in prairie restoration systems. Current control methods consist of the use of herbicides and mowing, which can be effective but are expensive and can damage native species. Herbicides that are used to control Canada thistle also eradicate desirable species that Mn/DOT has planted. Reductions in mowing and herbicide use will result in less environmental impact, enhanced native plant establishment and reduced cost of prairie wetland restoration.

Current Research Projects continued from page 5.

“Improved Methodologies for the Inoculation of Prairie Legumes in Roadside/Revegetation Settings”

Principal Investigator: Peter Graham

Technical Liaison: Bob Jacobson

Funding Source: Mn/DOT

This project will be concerned with the evaluation of three different methods of inoculation aimed at increasing rhizobial numbers supplied for prairie legumes and in monitoring legume establishment and function after inoculation. Our goal will be to identify methods of inoculant and rhizobial strains that allow full prairie establishment and function.

“Facilitating Native Plant Community Establishment in Wetlands Following Invasive Plant Removal”

Principal Investigator: Susan Galatowitsch

Technical Liaison: Bob Jacobson

Funding Source: Cooperative Program for Transportation Research and Studies

The proposed study will determine the conditions under which cover crops are most likely to succeed; specifically, whether they can be used in mixture or are better used between massed plantings, whether different levels of saturation or flooding changes effectiveness and whether some wetland natives can tolerate cover crop shade better than others. These questions will be pursued primarily as a field experiment, using four wetland cells that have independent hydrologic control. Greenhouse investigations will be used for investigating differences in shade tolerance. If this research identifies techniques that minimize *Phalaris* reinvasion and accelerate native community establishment, restoration management costs will substantially decline and restoration success rates improve.

“Canada Thistle Seed Movement”

Principal Investigator: Roger Becker

Technical Liaison: Bob Jacobson

Funding Source: Mn/DOT

The objective of this proposal is to improve understanding of the role seed movement plays in the spread and perpetuation of Canada thistle infestations. The hypothesis is that current perceptions over emphasize the importance of wind blown seed dispersal to the spread and persistence of Canada thistle. The knowledge gained from this research will be used to improve Best Management Practice recommendations for Canada thistle control.

“Wildlife Value of Reed Canary Grass Infested Wetlands in Minnesota”

Principal Investigator: Brock McMillan

Technical Liaison: Bob Jacobson

Funding Source: Mn/DOT

The purpose of this project is to compare the wildlife value of wet meadows that have been invaded by reed canary grass to wet meadows that are comprised of native wetland vegetation.

Current Research Projects continued from page 6.

“Wetland Mitigation in Abandoned Gravel Pits”

Principal Investigator: Kurt Johnson
Technical Liaison: Bob Jacobson
Funding Source: Mn/DOT

It is becoming increasingly difficult to provide on-site mitigation for wetland impacts due to road construction in northeastern Minnesota counties, which retain greater than 80 percent of their pre-settlement wetlands. Abandoned gravel pits are one of the few remaining areas that can serve as wetland mitigation sites within the impacted watersheds. The main goal of the project is to determine if viable mitigation wetlands can be created on abandoned gravel pit sites to compensate for wetland impacts due to road construction in northeastern Minnesota.

“Biological Control of Canada Thistle in Wetland Prairie Restoration”

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This project will investigate the effectiveness of a recently discovered native biological control agent *Pseudomonas syringae pv. tagetis* (PST) for the selective control of Canada thistle in prairie restoration systems. Current control methods consist of the use of herbicides and mowing, which can be effective but are expensive and can damage native species. Herbicides that are used to control Canada thistle also eradicate desirable species that Mn/DOT has planted. Reductions in mowing and herbicide use will result in less environmental impact, enhanced native plant establishment and reduced cost of prairie wetland restoration.

“Management Practices for Weed Control in Roadway Ditches”

Principal Investigator: Donald Wyse
Technical Liaison: Tina Markeson
Panel Members: Paul Walvatne
Funding Source: Mn/DOT

The objectives of this project include:

- 1) Development of an annotated bibliography of current and previous research on technologies (GPS and GIS, videography) and methods used in the management of noxious weeds in right of way, while preserving native species. The bibliography will include a review of methods for predicting population dynamics.
- 2) Evaluation of the procedures currently developed by Mn/DOT's District 4 (Detroit Lakes) staff for surveying and mapping the population of noxious weeds along highways. The noxious weeds to be considered are limited to Canada thistle, leafy spurge and poison ivy. This evaluation will assess the statistical validity of weed population estimates made with these current procedures and any potential improvements will be suggested.
- 3) Development/Adaptation of an algorithm/model for predicting the population dynamics of noxious weeds. This algorithm/model will be calibrated and tested using weed population records assembled prior to and during this project.
- 4) Development of a users guide for the use of GPS/GIS databases in the management of weed populations located within roadway right-of-way.

Restoring and Managing Continued from page 1.

This manual is a culmination of years of research and experience in the field of planting and managing wetland/upland restoration projects. It provides guidance on how to restore all but a few of the rarest wetland and upland types in the state and how to take care of them while they are establishing. The third (2006) update includes guidance on evaluating establishment performance during the first five years of a project. The “tip of the iceberg” has just begun being investigated.

Five research projects funded through Mn/DOT’s Research Services Section were referenced in this manual:

- “Best Management Practices for the Invasive *Phalaris arundinacea* L. (Reed canary grass) in Wetland Restorations” Report No. 2004-36
- “Factors Affecting Biological Recovery of Wetland Restorations” Report No. 1999-25
- “Establishment of Native Sedge Vegetation in Created Wetlands” Report No. 1999-38
- “Roadside Prairie and Wetland Restoration: Mycorrhizal/Plant Factors” Report No. 1998-15
- “Effects of Seeding Date on Establishment of Prairie Grasses in Minnesota” Report No. 1999-16

Some issues that are still being faced in “ecology and transportation” are:

- Improved methods for the restoration of wooded wetlands and bogs and their associated uplands
- Developing project sites that are “friendly” to rare and endangered species so that new populations can be established or existing ones can expand. The end result being that they can be “delisted”.
- Dealing with invasive species on new projects (wetlands and new road construction).
- Making roads/transportation corridors more permeable to wildlife.

Bob is currently working at Board of Soil & Water Resources 70% time on an interagency personnel agreement, which runs through the fall of 2007. The other 30% of his time is spent at Mn/DOT’s Office of Environmental Services.

For more information contact Bob Jacobson:

Mn/DOT 651/ 284-3767 or robert.jacobson@dot.state.mn.us

BWSR 651/ 297-4958 or bob.jacobson@bwsr.state.mn.us

Manual: <http://www.bwsr.state.mn.us/wetlands/publications/nativewetveg.pdf>

Personnel Changes in Research Services



Barb Loida

Barb Loida, our Research Program Development Engineer since April 2000, has taken a new position within Mn/DOT. Barb is now a Water Resource Engineer with the Metro Division at Water's Edge. Until her position is filled, Cory Johnson will be taking her calls, emails, etc. Barb was instrumental in improving processes within our program as well as connecting with many people throughout the state. She seemed to know so many people within Mn/DOT and those from cities, counties and other state agencies. It is fitting that this issue of the RSS Newsletter is focused on the environment since Barb has always enjoyed environmental projects and can now work closely in this area in her new position. RSS wishes to thank Barb for all her hard work and dedication and wish her the best. Barb will be missed by all!

Retiree, **Bill Bunde** is back with the Research Services Section on a part-time basis for the next six months and we are excited to be working with him again. Bill will be working closely with Clark Moe on implementation, evaluation and closing out of completed research projects. Bill will be working Tuesdays through Thursdays and his phone number is 651/284-3026. Welcome back Bill!

Jane Thoen has been working on a mobility with our office since November 2005. Her last day with RSS will be May 2nd. She has been instrumental in the close out of several federal projects, archiving completed financial contracts and developing a new process for future contract management. Jane will be returning to purchasing in the Business Services Section. RSS wants to thank Jane for all her help these past six months.

On May 3rd, **Carole Wiese** will be joining RSS as a Transportation Program Specialist. She will be working with our Finance Unit in managing contracts. Carole comes to us from Mn/DOT's Business Services Section. Welcome Carole!

We also expect to hire a SEEDS worker in the next month to assist with administrative support tasks.

We're on the Web!

<http://www.research.dot.state.mn.us/>