

**Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)**

LCCMR ID: 117-D

Project Title:

Rapid Inventory of Invasive Plants in Transportation Corridors

LCCMR 2010 Funding Priority:

D. Invasive Species

Total Project Budget: \$ \$494,787

Proposed Project Time Period for the Funding Requested: 3 years, 2010 - 2013

Other Non-State Funds: \$ \$0

Summary:

Initiate a statewide inventory of invasive plant species on Minnesotas transportation corridors. An accurate inventory of invasive plant infestations is critical for developing effective management systems.

Name: Donald Wyse

Sponsoring Organization: U of MN

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St. Paul MN 55108

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Email: wysex001@umn.edu

Fax: (612) 625-1268

Web Address: _____

Location:

Region: Statewide

County Name: , Polk, Red Lake, Redwood, Renville, Roseau, Sherburne, Stearns, Todd, Wadena, Wright, Yellow Medicine

City / Township:

_____ Knowledge Base	_____ Broad App.	_____ Innovation
_____ Leverage	_____ Outcomes	
_____ Partnerships	_____ Urgency	_____ TOTAL

PROJECT TITLE: Rapid Inventory of Invasive Plants in Transportation Corridors

I. PROJECT STATEMENT

An important step in the early identification and control of invasive weeds is to inventory and map infestations along rights-of-way (ROWs). For five years, beginning in the year 2000, District 4 of the Minnesota Department of Transportation (Mn/DOT) sampled its ROWs using seven, 3-mile long roadway segments as sample units. New sampling plans have since been developed and tested to improve sampling precision and reduce cost. Progress thus far indicates it is feasible to obtain precise maps of densities of individual weed species within the state, and to apply presence-absence sampling to determine population boundaries. Because transportation corridors have increasingly become pathways for the spread of invasive species, there is need for surveying systems which would provide accurate data on current levels of invasive species infestations, and for early detection of new invaders in the rights-of-way previously known to be not infested.

The overall objective of this project is to develop tools to accurately and economically survey ROWs along transportation corridors to assess changing distributions of invasive weed populations. This project fits the 2010 LCCMR Priority D. Invasive Species 2 and 3. In the proposed three year project, different sampling plans will be applied in surveys of ROWs in one Mn/DOT district per year. Recorded data will be analyzed to test the sampling efficiency and cost effectiveness of alternative plans. Because there is great variability in ecological zones, and in various land characteristics which influence invasive species infestation, our ultimate goal is to apply these sampling plans in surveys of all the eight (8) Mn/DOT districts in the state. Wide application of sampling plans will provide requisite data for corroboration of earlier sampling in Mn/DOT District 4, and refine the strategy for development of sampling plans suitable for the remaining districts in Minnesota. Due to the probable economic implications of continued expansion, development of an efficient survey system would be extremely important to focus effort to check new invaders and expanding weed infestations along transportation corridors, first on MNDOT managed roadways then on county and township roads

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Plan and conduct statistically valid surveys of roadway rights-of-ways ROWs in one Mn/DOT Management District. Budget - \$163,280

We will assemble a list of roadway milepost markers, cross classified by ecozone and management subdistrict. Staff will be trained to identify noxious weeds, to navigate among a random sample of roadway ROW segments, to measure weed patches in chosen segments, and to record results into GPS units for subsequent uploading into computers for mapping and statistical analysis. Sampling will be done using different roadway segment lengths, and records of surveyor time will be kept to determine which segment length is most efficient and yields the most precise map for each weed species.

Deliverables	Completion date
1. Maps of roadway infestations of each of 13 invasive weeds in one Mn/DOT management district (District 3), and staff trained to produce and interpret the maps.	December, 2010
2. Draft procedures manual containing recommendations for optimal effort allocation to map weed population boundaries and estimate densities where a chosen species in known to be present.	May, 2011

Result 2: Implement the developed sampling plans in two more Mn/DOT Districts over two consecutive years Budget - \$331,507

Results from the first district and year will be used adaptively to develop the sampling plan for a second district in 2011 (District 8). Staff in the second district will plan and implement surveys using recommendations in the draft manual from the first district. New data from 2011 will be processed and displayed on GIS maps, and results will be analyzed statistically to validate optimality. The manual from 2011 will be revised accordingly and be used to plan and complete surveys in a third district in 2012 (District 2).

Deliverables	Completion date(s)
1. Maps of noxious weed infestations along ROWs in second Mn/DOT districts.	December 2011,
2. Maps of noxious weed infestations along ROWs in third Mn/DOT districts.	December 2012
3. Revised procedures manual containing recommendations for optimal effort allocation to map weed population boundaries and estimate densities where a chosen species is known to be present.	May 2012
4. Revise procedural manual for distribution to remaining Mn/DOT districts and Departments of Transportation in states adjacent to Minnesota	May 2013

III. PROJECT STRATEGY

A. Project Team/Partners: The team will consist of U of M faculty and staff, Dr. D. Wyse, in the Department of Agronomy and Plant Genetics, Drs. J. L. Nieber and Caleb Arika in the Department of Bioproducts and Biosystems Engineering, and Dr. R. D. Moon in the Department of Entomology, who will conduct analyses of data; graduate student assistants will assist with field surveys, data recording and data processing and analyses. Mr. Paul **Walvatne**, Mn/DOT Roadside Vegetation Management Unit Supervisor, St. Paul, MN will coordinate the project activities in each of the three selected Mn/DOT Districts.

B. Timeline Requirements: The project will take three years to complete surveys and collection of data on prohibited invasive species infestation in three Mn/DOT management districts. This will be vital in the evaluation of the sampling plans and their adaptation to surveys in highways across diverse ecological regions throughout Minnesota and adjoining states.

C. Long-Term Strategy: The ultimate goal is to formulate systems that can be applied in surveys over the entire state of Minnesota, subsequently to be tested for national application. The funding we are seeking from LCCMR will facilitate application of different survey methods in the initial three Mn/DOT Districts, to test our conclusions from earlier sampling in Mn/DOT District 4. Following the findings from these tests, further funding will be necessary to extend surveys with the sampling plans in all eight Mn/DOT Districts in the state. Further, because vehicles and transportation corridors are known to be primary vectors and routes for spread of existing species and introduction of new species, it will be important to maintain regular monitoring inspections of these spaces in the long-term for early detection of new infestations. Application of the survey and data recording systems developed in the three Mn/DOT Districts in the remaining five districts will provide essential data for conclusions on statewide and national application of the survey plants of transportation corridors' ROWs. These would be valuable tools, especially to departments of transportation or natural resources in combating current infestations and in early detection of new invaders.

Project Budget

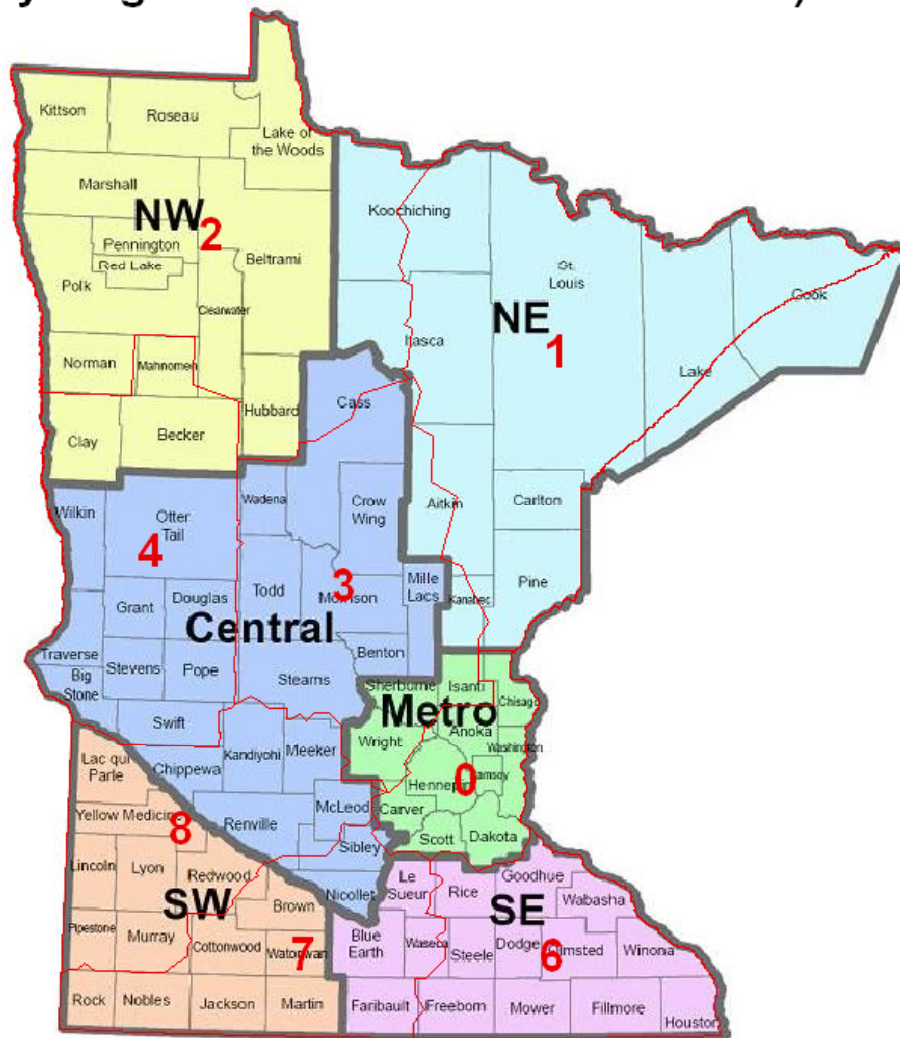
IV. TOTAL PROJECT REQUEST BUDGET (3 years)

BUDGET ITEM	AMOUNT
Personnel:	\$466,992
1 Research Assoc. 100% time; \$44,000 salary; \$14,212 [32.3%] fringe x 3 years [Project planning, supervisoin, weed scouting, data processing and analysis, reports writing] \$174,636 Total	
3 Research/Technical Assistants 33% time; \$13,200 salary; \$4,884 [37%] fringe x 3 years; Field supervision, weed scouting, data processing/analysis, report writing \$162,756 Total	
9 undergraduate students, 40 hrs. week x 12 weeks/yr. @ \$10.00/hr.; weed scouting, data processing/analysis \$129,600 Total	
Contracts: /	N/A
Equipment/Tools/Supplies:	\$ 15,195
3 GPS units (Trimble proXT \$4,000; Software for GPS units: Terra Sync \$265, Pathfinder \$800 = \$15,195 To be used for weed scouting data.	
Acquisition (Fee Title or Permanent Easements):	N/A
Travel:	\$ 12,600
Outstate travel in Minnesota for project data collection. 3 cars leased for 3 months/yr. @\$500/month x three years = \$4,500	
Fuel for 3 midsize cars, 3 month/yr. x 3 years traveling 100 miles/day [approximately 20 miles/gal, \$2.00/gal] = \$0.1/mile x 100 miles day x 90 days/yr. x 3 years x 3 cars = \$8,100	
Additional Budget Items: /	N/A
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 494,787

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:	N/A	
Other State \$ Being Applied to Project During Project Period:	N/A	
In-kind Services During Project Period:	\$ 5,058	
1% Effort - Donald Wyse [salary \$1,274 and fringe @32.3% \$412] x 3 years		
Remaining \$ from Current Trust Fund Appropriation (if applicable):	N/A	
Funding History:	N/A	

Minnesota (By Region and MnDOT Districts 0-8)



Legend

ALL-MNDOT_DISTRICTS_MN

- BEMIDJI, 2
- BRAINERD, 3
- DETROIT LAKES, 4
- DULUTH, 1
- MANKATO, 7
- METRO, 0
- ROCHESTER, 6
- WILLMAR, 8

BIOGRAPHICAL SKETCH

DONALD L. WYSE

Department of Agronomy and Plant Genetics
University of Minnesota, St. Paul, MN 55108
Phone: 612-625-7064, E-mail: wysex001@umn.edu

EDUCATIONAL HISTORY

The Ohio State University, 1970, B.S., Agronomy
Michigan State University, 1972, M.S., Crop Science (Weed Science)
Michigan State University, 1974, Ph.D., Crop Science (Weed Science)

PROFESSIONAL POSITIONS

Founding Director, Minnesota Institute for Sustainable Agriculture, Univ. of Minnesota, 1992-2000
Co-director, Center for Integrated Natural Resources and Agricultural Management, 1995-present
Professor, Dept. of Agronomy and Plant Genetics, University of Minnesota, 1986-present
Associate Professor, Dept. of Agronomy/Plant Genetics, University of Minnesota, 1980-1986
Assistant Professor, Dept. of Agronomy and Plant Genetics, University of Minnesota, 1974-1980

PROFESSIONAL ORGANIZATIONS AND HONOR SOCIETIES

North Central Weed Science Society
Weed Science Society of America
Sigma XI

Plant Physiology

HONORS AND AWARDS

Co-author of the Outstanding Paper published in Weed Science, 1987
Weed Science Society of America Outstanding Young Weed Scientist, 1987
Outstanding Teacher Award in the College of Agriculture, 1988
Weed Science Society of America Outstanding Teacher Award, 1991
Outstanding Faculty Performance Northrup King Award, 1991
CIBA-GEIGY Award for Outstanding Achievement in Agriculture, 1991

TEACHING EXPERIENCE

My responsibilities include teaching and supervising graduate student research in weed science and cropping systems.

AGRO 4503 (3 credits), Biology, Ecology and Management of Invasive Plants

RESEARCH AND MANAGEMENT EXPERIENCE

Donald Wyse is a Professor in the Department of Agronomy and Plant Genetics at the University of Minnesota, St. Paul, where he teaches and conducts research in weed management, cropping system development, and plant breeding and selection. His research concentrates on biological weed management, development of multifunctional agricultural systems, perennial crop breeding, and legume and grass seed production systems. He has focused his research efforts on the development of perennial cropping systems, cover crop systems, biomass prairie polycultures, and has studied their impact on soil and water quality. He has lead several multi-disciplinary research teams composed of university faculty and scientists from both state and federal agencies. He has experience in managing large multi year grants. Dr. Wyse was the founding Director of the Minnesota Institute for Sustainable Agriculture and currently serves as Co-director of the Center for Integrated Natural Resources and Agricultural Management at the University of Minnesota. Recent activities of the Center have led to the development of the Mississippi River—Green Land, Blue Water Initiative that includes universities, state and federal agencies, and NGO's that have organized to deal with the landscape issues that impact water quality in the Mississippi River and Great Lakes Basin. He was one of the founding organizers of the Midwest Cover Crops Council and is an active member of the Executive Committee.