Environment and Natural Resources Trust Fund
2011-2012 Request for Proposals (RFP)

LCCMR ID: 098-C3+4

Project Title: Tree Retention Following Harvest: Benefit or Unnecessary Cost?

Category: C3+4. Technical Assistance and Community-Based Planning

Total Project Budget: $ $229,825

Proposed Project Time Period for the Funding Requested: 3 yrs, July 2011 - June 2014

Other Non-State Funds: $ 0

Summary:

Determine effectiveness of tree retention on wildlife populations in Minnesota. Assess tree blowdown and economic efficiency of retention guideline. Results used to validate or modify Minnesota's Forest Management Guidelines.

Name: Gerald Niemi

Sponsoring Organization: U of MN - NRRI

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Duluth MN 55811

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Location

Region: NW, NE

Ecological Section: Western Superior Uplands (212K), Northern Superior Uplands (212L), No. Minnesota and Ontario Peatlands (212M), No. Minnesota Drift and Lake Plains (212N), Minnesota and NE Iowa Morainal (222M), Lake Agassiz, Aspen Parklands (223N)

County Name: Aitkin, Beltrami, Cass, Cook, Crow Wing, Itasca, Kittson, Koochiching, Lake, Lake of the Woods, Mille Lacs, Morrison, St. Louis

City / Township:

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base	
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency	
_____ Capacity Readiness	_____ Leverage	_____ Employment	_____ TOTAL	_____%

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Tree retention following harvest: benefit or unnecessary cost?

I. PROJECT STATEMENT

Minnesotans continually demonstrate a strong commitment and interest in maintaining the state's natural resources including wildlife. Recommendations in Minnesota's Forest Management Guidelines to retain trees during harvesting are considered key to sustaining wildlife species of greatest conservation concern including many mammals, birds, and herptiles (amphibians, snakes, and lizards). Tree retention guidelines are grounded in best available scientific judgment, but there is little actual scientific data available on their adequacy or effectiveness. The guidelines recommend that 6-12 trees per acre or 5 percent of the harvest area be left uncut. Uncut trees are a direct cost to landowners in foregone stumpage (collectively costing landowners over $400,000 annually). Economic cost and unknown effectiveness to wildlife contribute to low levels of leave tree implementation (<60% of harvests), which may lead to negative impacts on wildlife populations. In addition, there is a common perception that most leave trees are ineffective because they blow down following harvest, negating many benefits to wildlife. Quantities of blowdown and the factors contributing to it are currently unknown, hindering development of recommendations to reduce blowdown risk. A huge opportunity exists to efficiently address the uncertainties related to these guidelines because the MNDNR has monitored tree retention at over 700 harvest sites from 2000-2009.

The goals of this proposed project are to:

1) determine if trees retained following harvesting provide important habitat for wildlife; primarily birds, small mammals, and amphibians,
2) identify tree characteristics within harvest areas most important to wildlife and blowdown occurrence, and
3) improve ecological and economic benefits of Minnesota's Forest Management Guidelines.

Results will be used to either validate and promote use of the existing guidelines, or be used by the MN Forest Resources Council to revise and modify the current tree retention guidelines. The effectiveness of these guidelines needs to be measured to ensure they are reasonable and not an unnecessary economic burden to landowners. Landowners may be more willing to incur personal cost for a proven public benefit, and guidelines require sound supporting science. The overall desired outcome of this project is to ensure that recommended tree retention guidelines are effective and efficient at mitigating harvest-related impacts on wildlife in the state.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Select research sites and obtain access to private lands. **Budget:** $ 5,000

We will compile all implementation monitoring data for over 700 harvest sites collected by Minnesota DNR Forestry over the period 2000-2009. The DNR randomly selected these sites from all forest harvests, providing a representative sample of conditions within the state. Sites will be evaluated and separated into two implementation categories: 1) implemented leave tree guideline as recommended, or 2) did not implement leave tree guideline. A random sample of 100 sites will be selected with 50 from each group and stratified among years to determine if leave tree effectiveness varied since time of harvest. The approach will allow for robust comparisons between groups across a wide range of site conditions, while greatly reducing costs associated with site selection. Landowners will be identified from previously collected information or county tax records, and then contacted to obtain permission to enter the site.

Outcome for Activity 1	Completion Date
1. 100 sample sites selected from all monitored sites	October, 2011
2. Landowner permission to access sites completed	January, 2012

Activity 2: Quantify leave tree effect on birds, mammals, and herptiles **Budget:** $124,602

We will measure bird activity at each site by spring/summer counts, determine small mammal presence by trapping, and conduct systematic searches for salamanders, frogs, and snakes in 2012 and 2013. We will also use remote cameras and sound records to document mammal and bird presence over longer time time intervals. Identical protocols at sites with and without leave trees will enable a powerful test of leave trees on wildlife species following harvesting.

Outcome for Activity 2	Completion Date
1. Bird and mammal data collection completed	October 2013
2. Provide guidance on bird and mammal use of leave trees	June, 2014
3. Present recommendations to the Minnesota Forest Resources Council	June, 2014

Activity 3: Quantify leave tree blowdown and characteristics **Budget:** $100,223

Harvest sites with leave trees will be surveyed to identify all blowdown and standing leave trees. Surveys will be conducted during leaf-off and snow-free conditions. Species, diameter, and total height of each tree will be recorded (live and dead), as well as slope aspect and position. Soil series will be determined for each site, and a measure of rooting depth will be conducted at each tree. Results will be used to develop practical field recommendations to reduce the occurrence of blowdown for use by landowners, land managers, and loggers.

Outcome for Activity 3	Completion Date
1. Data collection for blowdown and related characteristics completed	October, 2013
2. Data analysis of blowdown and final report completed	June, 2014
3. Publish recommendations for landowners to minimize tree blowdown	June, 2014

III. PROJECT STRATEGY

A. Project Team/Partners

The project team includes Drs. Gerald Niemi and Ron Moen from the Natural Resources Research Institute, and Dr. Rob Slesak from the MN Forest Resources Council. All members of the project team will use LCCMR funds for this project.

B. Timeline Requirements

The project duration is three years. It will require two field seasons to sample the proposed sites, and an additional eight months for data analysis and reporting.

C. Long-Term Strategy and Future Funding Needs

This proposal is a part of a larger strategy to assess the effectiveness of Minnesota's Forest Management Guidelines. The strategy is broadly focused on wildlife, soil, and water resources, and emphasizes assessment at large scales and across the range of site variability in the state.

2011-2012 Detailed Project Budget

IV. TOTAL TRUST FUND REQUEST BUDGET 3 years

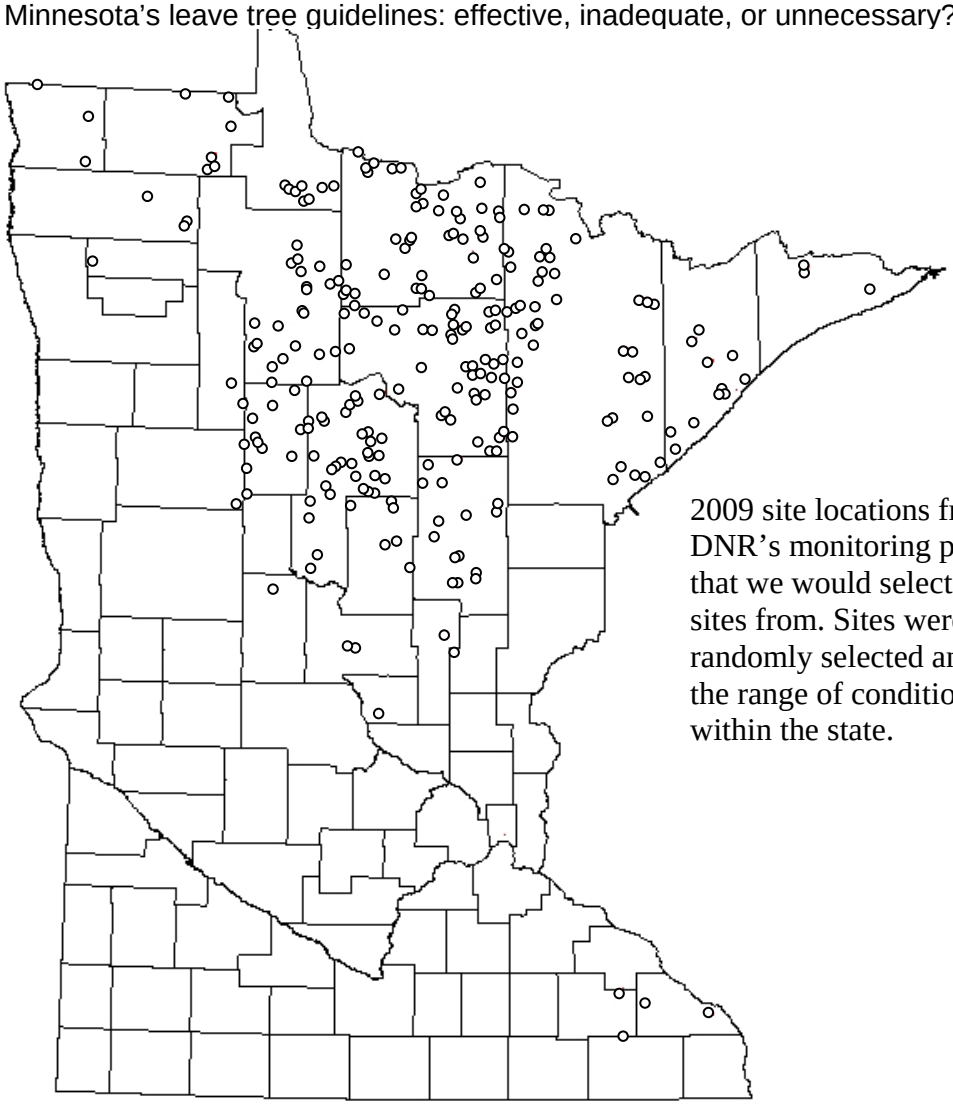
BUDGET ITEM	AMOUNT
Personnel:	
R. Moen, Res Assoc: analyze data, report. 36 mo, 15% sal, FB 33%	$ 42,861
Grd Std-sample, doc. wildlife. 36 mo, 50% AY, FB 17%+tuition; FB summer 24%)	$ 110,266
Undgrd Std-sample, input data. 36 mo, 25% AY-FB 0, 100% summer-FB 7.3%	$ 33,878
Contracts:	
Blowdown field guide development and printing	$ 10,000
Other:	
GIS services @ $4.10/hr for approx. 730 hrs.	$ 3,000
Equipment/Tools/Supplies:	
Binoculars, traps	$ 6,000
Diameter tape, compass, soil auger, soil color charts	$ 500
Travel:	
sites, $0.50/mile, 25k mi;lodg 130 da@$50/ea; meals $18/ea x2pplx130da	$ 23,320
Additional Budget Items: N/A	
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND $ REQUEST	$ 229,825

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ Being Applied to Project During Project Period:		
G. Niemi, Sr Res Assoc - design,supervise,analyze data. 3yr, 10% sal, FB 33%	$41,309	Secured
Other State $ Being Applied to Project During Project Period:		
R. Slesak, Adj Prof - supervise student. 3 yr, 10% sal, FB 33%	$25,800	Secured
In-kind Services During Project Period:		NA

Remaining $ from Current ENRTF Appropriation (if applicable):		NA
Funding History:	$ -	NA
No previous funds.		
	$ -	

Minnesota's leave tree guidelines: effective, inadequate, or unnecessary?



2009 site locations from the DNR's monitoring program that we would select project sites from. Sites were randomly selected and cover the range of conditions found within the state.

Site with tree retention following forest harvest near Grand Rapids. Trees provide important habitat for key wildlife species, but wind blowdown of the newly exposed trees may negate wildlife benefits.

5. Project Manager Qualifications; Gerald J. Niemi, a professor in the Department of Biology and senior research associate at the Natural Resources Research Institute, will lead the efforts for birds and herps. He has over 35 years of experience designing and implementing field projects on birds throughout Minnesota. He also served as one of the lead scientists for the original GEIS on forest harvesting and management and served on the roundtable that originally developed the forest management guidelines.

Education: Florida State University, Biology, PhD, 1983; University of Helsinki, Fulbright Scholar, Pre-doctoral, 1981; UMD, Biology, Zoology, BS, 1974; MS 1977

Appointments: Professor: Biology, UMD, 1993 to present. *Senior Research Associate:* NRRI, UMD, 2008-present. *Director:* Center for Water and the Environment (CWE), NRRI, UMD, 1989-2008. *Department Chairman:* Biology, UMD, 1997-1998. *Graduate Faculty Appointments:* Integrated Biological Sciences UMD, 2007-present; Biology 1987 to 2009 (program terminated); Chemical Toxicology, UM-TC, 1992 to present; Conservation Biology Program, UM-TC, 1996 to present.

Publications > 100 peer reviewed

Etterson MA, Niemi GJ, Danz NP. 2009. Estimating the effects of detection heterogeneity and overdispersion on trends estimated from avian point counts. Ecological Applications 19(8):2049-2066.

Mattsson BJ, Niemi GJ. 2008. Causes and consequences of distribution patterns in a migratory songbird across its geographic range. Canadian Journal of Zoology 86:314-328.

Danz NP, Bracie A, Niemi GJ. 2008. Breeding bird monitoring in western Great Lakes national forests 1991-2007. NRRI/TR-2008/1.1

Miller C, Niemi GJ, Hanowski JM, Regal RR. 2007. Breeding bird communities across an upland disturbance gradient in the western Lake Superior region. Journal of Great Lakes Research 33(3):305-318.

Hanowski JM, Danz NP, Howe RW, Niemi GJ, Regal RR. 2007. Consideration of geography and wetland geomorphic type in the development of Great Lakes coastal wetland bird indicators. Ecohealth 4:194-205.

Research Projects - 46 managed, >$18 million

2007-2008 Co-PI and Team Lead for Wildlife portion, Co-Lead for Land and Aquatic Habitat Conservation, Minnesota Statewide Conservation and Preservation Plan. LCCMR. $450,000 to U of Minnesota-Institute on the Environment; *2001-2006* Lead PI with 27 Co-PIs. Development of environmental indicators of condition, integrity, and sustainability in the Great Lakes basin. U.S. EPA-NASA STAR Grant Program, $6,979,667. *1991-2003* Lead PI. Effects of changes in the forest ecosystem on the biodiversity of Minnesota's northern forest birds. Minnesota LCMR. $2,112,473 in cooperation with MN Department of Natural Resources.

Organization Description: The Natural Resources Research Institute is a part of the University of Minnesota Duluth. Its mission is to promote private sector employment based on natural resources, in an environmentally sensitive manner. NRRI scientists have extensive experience in managing large, interdisciplinary projects whose objectives include the development of tools for environmental assessment and resource management.