

**Environment and Natural Resources Trust Fund  
2014 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 155-F**

Strategies For Restoring Pine in Minnesota's Forests

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**Category:** F. Methods to Protect, Restore, and Enhance Land, Water, and Habitat

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**Total Project Budget: \$** 356,289

**Proposed Project Time Period for the Funding Requested:** 2 Years, July 2014 - June 2016

**Summary:**

Identifies statewide strategies for effective and efficient management investments to restore mixed pine forest cover types. Using inter-organizational collaborations, tests multi-aged, multi-species silvicultural systems, including safe biopesticides for deer control.

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**Sponsoring Organization:** U of MN

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Grand Rapids MN 55744

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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



**PROJECT TITLE: Strategies for Restoring Pine in Minnesota’s forests**

**I. PROJECT STATEMENT**

Pines have long been important components of Minnesota’s forests. The amount of young pine on the landscape has dropped substantially over the last 30 years. Young pine stands were once much more common because of good natural pine regeneration after forest fires. Today, regeneration of pines in Minnesota is far less than what it was 20 and 30 years ago. Statewide forest inventories suggest that the number of acres of pine stands in the 0 to 5-year age class is less than 32% of the area in this age class in 1990. Pines are expensive to regenerate, with deer browsing a major problem, especially for jack pine and red pine.

Aspen is, by far, Minnesota’s most common and most harvested tree species. However, red pine (Norway pine) grows more than twice as fast and is more than twice as valuable per unit volume. Red pine is Minnesota’s state tree, symbolizing Minnesota’s northwoods. White pine and jack pine are also valuable Minnesota pine species with fast growth rates and wildlife values. With more of the landscape in pines, Minnesota could undoubtedly sustain higher and more valuable timber harvest levels. More pine on the landscape, especially in mixed-species and mixed-age stands, could be especially valuable for wildlife. Multi-aged red pine stands have not been studied in detail in Minnesota. Economically, strategies to emphasize multi-aged stands are potentially especially appealing, as carrying high single-aged timber inventory volumes over long time periods is a major cost to the landowner, especially if similar timber growth rates can be achieved with lower timber inventory volumes. Multi-aged stands can still retain desirable characteristics of old forests, as the oldest trees can be tall with large canopies and large tree diameters. With understories opened, a wider variety of tree and ground species can be regenerated. More emphasis of pine on the landscape does not need to equate to more even-aged single-species plantations. Forest economic and ecological objectives need not be polarizing.

It is important to understand site-level forest management investment options from a broad forest-wide perspective. Investments in site-level management options have broader forest-wide impacts. For example, intensifying management on better sites can reduce harvesting pressures on sensitive lands or increase overall sustainable harvest levels, thereby potentially realizing returns much sooner than achieved directly from the long-term nature of the site-level investment. The long-term nature of forestry makes it important to address forest management from a broad systems approach, considering both economic and ecological objectives. When considered only from a site-level, individual investment perspective, the value of forestry investments are often substantially underestimated.

**II. DESCRIPTION OF PROJECT ACTIVITIES**

**Budget: \$ 127,996**

**Activity 1: Examine statewide strategies for increasing Pine on the landscape**

The Department of Forest resources at University of Minnesota has a long history of research on models for forest planning. Applications have shown it valuable to take a broad statewide and multi-ownership approach to forestry issues. Recently, the Blandin Foundation funded a study to update the baseline statewide analysis that was done for the Minnesota Generic Environmental Impact Statement on timber harvesting in Minnesota. This study will utilize the new modeling system to focus specifically on strategies for better utilizing pine management options and how such options might be best integrated across all forest cover types and ownerships to restore more pine on the landscape while also addressing short-term timber harvest opportunities to improve forest productivity.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Analyze statewide alternatives varying emphasis on pine management</i>	<i>December 2015</i>
<i>2. Complete report summarizing trade-offs of alternatives</i>	<i>June 2016</i>



**Activity 2: Improve biopesticide system for controlling deer damage** **Budget: \$ 129,752**

The University of MN Natural Resources Research Institute has discovered a valuable new wildlife browse deterrent (product name Repellex Systemic). It has a systematic mode of action based on a natural occurring biopesticide requiring only one application annually. This study will help accelerate the understanding and development of this approach for potential cost-effective, wide-scale forest applications. Emphasis will be on improving application methods for sapling-size white pine. Tests will also be extended to white cedar regeneration, as white cedar is a species of great concern because of deer browsing pressures.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Identify new methods for treating saplings to increase deterrent concentrations</i>	<i>June 2015</i>
<i>2. Report on field tests of white pine saplings</i>	<i>June 2016</i>
<i>3. Report initial tests for protecting white cedar</i>	<i>June 2016</i>

**Activity 3: Test site-level strategies for multi-age, mixed- species pine stands** **Budget: \$ 98,541**

Tests will be developed in the research forest at the University of Minnesota North Central Research and Outreach Center (NCROC) to examine multi-aged and multi-species management of red pine. Study will integrate expertise of Itasca Community College forestry faculty and students, MN DNR, USDA Forest Service Regional Silvicultural Research Unit, & forestry faculty and staff of the University of Minnesota’s Department of Forest Resources, Natural Resources Research Institute and NCROC

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Plan and implement field tests and demonstrations</i>	<i>June 2015</i>
<i>2. Report on preliminary results and lessons learned</i>	<i>June 2016</i>

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

Project PI: Dr, Howard Hoganson (forest management and economics), Dept. of Forest Resources & North Central Research and Outreach Center, Univ. of MN. Co-PI’s: Thomas Levar (developer of new biopesticide) & Bernard McMahon (forest biology), Natural Resources Research Institute, Univ. of MN. Partners: Dr. Curtis VanderSchaaf (growth and yield expert and forest planner), MN DNR; & Brad Jones (silviculture), Itasca Community College. Team has substantial research and field experience and strong ties with other experts.

**B. Timeline Requirements**

Activities are complementary, emphasizing interdisciplinary teamwork across multiple organizations. Activity 1 is data intensive utilizing substantial data being developed in an ongoing statewide forest management study funded by the Blandin Foundation. Deer browsing tests are seasonal in nature with emphasis on utilizing two winter seasons. Intent is to accelerate wide-scale practical application of successful pine regeneration.

**C. Long-Term Strategy and Future Funding Needs**

Project will be completed in two years and improve understanding for how to effectively and efficiently increase pine component in Minnesota’s forests. Systems approach will utilize new statewide “GEIS” information to help integrate environmental and economic objectives over broad landscapes and ownerships. Leadership of the Minnesota Forest Resources Council strongly support these efforts. All activities have potential for positioning Minnesota to be better prepared for responding to climate change impacts as more becomes known.

## 2014 Detailed Project Budget

**Project Title:** Strategies for Restoring Pine in Minnesota's Forests

### IV. TOTAL ENRTF REQUEST BUDGET 2.0 years

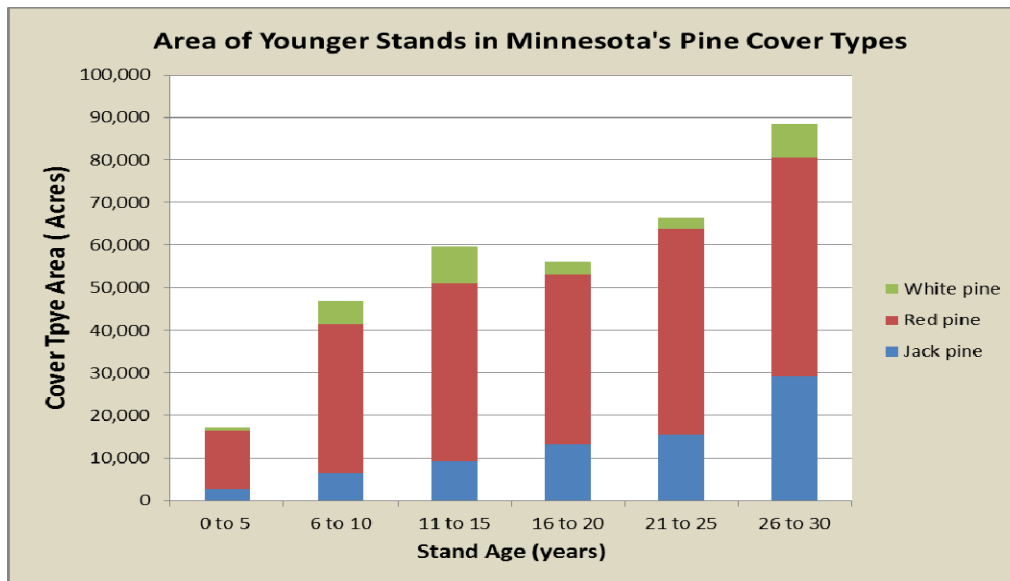
<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel: PI Hoganson</b> -- U of MN faculty, Department of Forest Resources & North Central Research & Outreach Center (NCROC) in Grand Rapids -- one month of summary salary in 2014 and 1/2 month in 2015. Includes 33.6% fringe. Faculty will provide leadership for Activity 1 and coordination for all 3 project activities. Also note in-kind below.	\$ 24,693
<b>Personnel: Co-PI Thomas Levar</b> -- Scientist, U of MN Natural Resources Research Institute, Duluth MN. Levar developed the biopesticide currently marketed as Repellex Systemic. Includes three months of salary in both 2014 and 2015 with 36.8 % fringe. Levar will help provide leadership for Activity 2.	\$ 44,988
<b>Personnel: Co-PI Bernard McMahon</b> -- Research Fellow, U of MN Natural Resources Research Institute, Duluth MN. McMahon provides expertise in intensive silviculture and will help with Activity 2, especially new work with white cedar and integrating Activity 2 with Activity 3 in field trials. Salary includes 3 months/year and 33.6% fringe.	\$ 48,817
<b>Personnel: Graduate Research Assistant</b> -- Department of Forest Resources , University of Minnesota , St Paul. Half-time research assistship for 2 years with work serving as basis of masters thesis. Primary focus will be Acitivity 1 with elements of Activity 2 and Activity 3 also included. Salary includes 23.1% fringe + \$17.32/hr tuition benefit assuming full-time graduate student status during 2 academic years	\$ 91,982
<b>Personnel: Timothy O'Brien</b> -- research plot coordinator, University of Minnesota NCROC. Forest at NCROC is well suited for both Activity 2 and Activity 3 field tests. Salary is 25% time for each year and includes 36.8% fringe.	\$ 44,322
<b>Personnel: Undergrad Research asistants</b> -- full time summer support staff for Activities 2 & 3 to be located at NCROC under guidance of team. Salary is \$12 per hour with 7.4 % fringe.	\$ 12,558
<b>Supplies -- Seedlings</b> -- \$2500 in year 1 and 500 in year 2 @ \$1.05/seedling	\$ 3,191
<b>Supplies -- Biopesticides</b> \$2200 in year 1 and \$2266 in year 2	\$ 4,466
<b>Supplies -- Miscellaneous</b> \$1000 in year 1 and \$1030 in year 2	\$ 2,030
<b>Contract:</b> With Minnesota DNR ( Dr. Curtis VanderSchaaf) to integrate study with DNR Division of Forestry and best available DNR data on growth and yield of pine. Dr. Vanderschchaaf, lead analyst for DNR forest planning analyses, will also coordinate DNR contacts and is located in Grand Rapids. Contract rate is \$90/hr including all fringe.	\$ 38,002
Contract: With Brad Jones, Itasca Community College (ICC) to help coordinate field activities and provide field silviculture research primaily associated with Activity 3. Jones is the lead instructor in silviculture and has numerous years of field experience in northern MN with pine regeneration. He will help project utilize forestry technicain students at ICC. Salary is for \$75/hour which includes all ICC fringe benefits.	\$ 31,668
<b>Travel:</b> Includes 36 nights/year lodging & meal allowance for graduate student in Grand Rapids @ \$50/day plus \$0.565/mile reimbursement for 18 round trips per year between Duluth and Grand Rapids and 6 round trips per year between St Paul and Grand Rapids.	\$ 9,572
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 356,289</b>

### V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ Being Applied to Project During Project Period:</b> Support from the Blandin Foundation to examine statewide wood supply situation in Minnesota	\$ 135,000	Secured with 7/1/2015 targeted completion
<b>Other Non-State \$ Being Applied to Project During Project Period:</b> Support from Rajala Companies, Bigfork, MN to study and demonstrate white pine regeneration	\$ 18,000	Secured and in progress
<b>In-kind Services During Project Period:</b> 1% of PI time (1% of 9 months) in each of the 2 project years (\$2,978) and unrecovered indirect direct costs, calculated at the University's federally negotiated rate of 52% Modified Total Direct Costs (\$160,849)	\$ 163,827	Secured
<b>Funding History:</b>	N/A	N/A



Estimates based on USDA Forest Service Minnesota statewide forest inventories (2008-2012 and 1990) suggest that there were over three times as many acres of age 0 to 5 year pine stands in 1990 than there are today. Eventually, areas of older pine naturally succeed to other species -- so young stands today will be tomorrow's older stands. Graph of age class distribution of pine cover types today (below) shows clear trend in the number of acres in younger age classes for all pine forest cover types. The area in each age class reflects pine regeneration accomplishments in past years. Active management can add more pine and help improve forest conditions substantially.



But pine regeneration is typically expensive, with it important to understand practical options. Deer browsing can be devastating, even with bud capping. Research is needed on effective and efficient ways of getting trees above deer browse heights. New environmentally-safe biopesticide technologies offer enormous promise for many tree species. Natural biopesticides have proven successful in horticultural applications for deer and other animals. Photo at the right shows deer browsing damage on white pine after bud capping in the research forest at the North Central Research and Outreach Center (NCROC), Grand Rapids Minnesota (photo by Tim O'Brien, NCROC Forest Research Plot Coordinator).





## Project Manager Qualifications/Organization

**Howard M. Hoganson**, Professor

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**Background:** He has a B.S. degree in forestry from the University of Minnesota, a M.S. degree in forestry from the University of Washington, a M.S degree in operations research from the University of Minnesota and a Ph.D. in forest management from the University of Minnesota. He joined the faculty at Minnesota in 1987 after service as a Principal Economist with the USDA Forest Service North Central Research Experiment Station in Duluth, Minnesota and a faculty member in the Forestry Department at Virginia Polytechnic Institute and State University in Blacksburg, Virginia. He has authored numerous papers on forest management planning models and served as an Associate Editor for *Forest Science* for five years. Recently he has served as lead analyst in forest harvest scheduling efforts for Interagency Information Center of the University of Minnesota. He has been recognized internationally for developing solution methods for forest management models that take advantage of the specific mathematical structure of forestry problems. These methods have been used in large-scale applications in US, Canada, Sweden, Brazil and Portugal. He is the instructor for forest management & planning courses for the Department of Forest Resources, University of Minnesota. He led technical timber supply analysis for the Environmental Impact Statement for a proposed \$700 million UPM Blandin Mill Expansion in Grand Rapids, MN and served as the lead analyst for the 2004 Forest Plan for the Chippewa and Superior National Forests in Minnesota. His modeling methods served as the basis for scenario modeling for the Minnesota Generic Impact Statement (GEIS) on Timber Harvesting and Forest Management. Since the GEIS, he has often worked closely with the Minnesota Forest Resources Council (MFRC) and Minnesota DNR. He currently serves on the Information Management Committee of the MFRC. Recent research has emphasized spatial facets of forest management with applications to Kirtland's warbler habitat in Michigan on the Hiawatha National Forest.

**Responsibilities for the proposed project:** Supervision of project budget, staff and activities including developing details for activities 1-3 and associated tasks and timelines, including data handling, cooperator communications, and details in the development of deliverables. He will also serve as a co-investigator for all three project activities, specifically by providing expertise in landscape level planning and forest economics. For activities 1-3, corresponding lead investigators will be Hoganson, Levar and Hoganson. Emphasis will be on strong interdisciplinary collaborations, integrating information and insights from three natural resources groups within the University of Minnesota (Department of Forest Resources, Natural Resources Research Institute, and the North Central Research & Outreach Center) with the Minnesota DNR and Itasca Community College. Emphasis will be on teamwork to help improve Minnesota forests.