



## Environment and Natural Resources Trust Fund (ENRTF) M.L. 2011 Work Plan

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**Date of Status Update:**

**Date of Next Status Update:** 1/1/2012

**Date of Work Plan Approval:** 6/23/2011

**Project Completion Date:** 6/30/2014

**Is this an amendment request?** \_\_\_\_\_

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**Project Title: Prairie Management for Wildlife and Bioenergy - Phase II**

**Project Manager:** Clarence Lehman

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**Location:**

**Counties Impacted:** Statewide

**Ecological Section Impacted:** Lake Agassiz Aspen Parklands (223N), Minnesota and Northeast Iowa Morainal (222M), North Central Glaciated Plains (251B), Northern Minnesota and Ontario Peatlands (212M), Northern Minnesota Drift and lake Plains (212N), Northern Superior Uplands (212L), Paleozoic Plateau (222L), Red River Valley (251A), Southern Superior Uplands (212J), Western Superior Uplands (212K)

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<b>Total ENRTF Project Budget:</b>	<b>ENRTF Appropriation \$:</b>	600,000
	<b>Amount Spent \$:</b>	<u>0</u>
	<b>Balance \$:</b>	600,000

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**Legal Citation:** M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03g

**Appropriation Language:**

\$300,000 the first year and \$300,000 the second year are from the trust fund to the Board of Regents of the University of Minnesota to research and evaluate methods of managing diverse working prairies for wildlife and renewable bioenergy production. This appropriation is available until June 30, 2014, by which time the project must be completed and final products delivered.

**I. PROJECT TITLE:** Prairie management for wildlife and bioenergy: Phase II

**II. PROJECT SUMMARY:** This project is part of a broad effort to sustain Minnesota resources while improving the rural economy and contributing to our energy independence. The project will test best management practices to maintain grassland habitat for wildlife while generating revenue from bioenergy. The work will continue and complete the monitoring of wildlife responses and other ecological responses to harvesting prairies for bioenergy, as started from a 2008 ENRTF project, allowing sufficient time for the significance of results to be understood. A major objective of the project is to identify biomass harvesting patterns that maintain wildlife populations by leaving distinct size and shapes of refuges within the grassland, but doing so while harvesting the greatest sustainable amount of biomass from the sites. Over 1000 acres of restored grasslands across western Minnesota have been divided into 20-acre plots. The plots are organized in three locations spanning the temperature range of Minnesota, in the region of Windom, Morris and Crookston. Wildlife surveys encompass birds, small mammals, and insects, with special attention to pollinators. Bioenergy surveys will monitor changes in plant communities and differences in bioenergy potential from production-scale harvests. Results will be used to develop guides for landowners and to produce standard protocols for bioenergy and wildlife evaluations. Similar reports will be produced for state land-managing entities to improve management efficiency and potentially reduce costs of habitat management.

**III. PROJECT STATUS UPDATES:**

**Project Status as of** (January 1, 2012):

**Project Status as of** (July 1, 2012):

**Project Status as of** (January 1, 2013):

**Project Status as of** (July 1, 2013):

**Project Status as of** (January 1, 2014):

**Project Status as of** (July 1, 2014):

**IV. PROJECT ACTIVITIES AND OUTCOMES:**

**ACTIVITY 1:** Wildlife Sampling

**Description:** Survey crews will sample songbirds, small mammals, and insects. Bird surveys will be conducted in the spring using transect counts. Insects will be sampled at least once during the summer in all plots with sweep nets and potentially pit-fall traps. Small mammal surveys will take place in all plots in the fall of each year using catch-and-release live traps.

**Summary Budget Information for Activity 1:**

**ENRTF Budget:** \$ 202,000  
**Amount Spent:** \$ 0  
**Balance:** \$ 202,000

**Activity Completion Date:**

<b>Outcome</b>	<b>Completion Date</b>	<b>Budget</b>
1. Determine relative abundance of small mammals in various harvesting regimes.	Spring 2014	\$50,500
2. Determine relative abundance of song birds in various harvesting regimes.	Spring 2014	\$50,500
3. Determine biomass of insects of various size classes and functional groups.	Spring 2014	\$101,000

**Activity Status as of** (January 1, 2012):

**Activity Status as of** (July 1, 2012):

**Activity Status as of** (January 1, 2013):

**Activity Status as of** (July 1, 2013):

**Activity Status as of** (January 1, 2014):

**Activity Status as of** (July 1, 2014):

**Final Report Summary:** (August 15, 2014):

**ACTIVITY 2:** Vegetation and soil sampling

**Description:** Survey crews will measure plant species richness and diversity in all plots. Summer vegetation will be sampled to determine standing biomass stocks. Soil cores will be collected in all plots. Bale cores will be collected in all plots for chemical analysis and dry matter calculations to be used for determining harvest yield. Stubble height will be measured in all plots during harvest.

**Summary Budget Information for Activity 2:**

**ENRTF Budget: \$ 40,000**  
**Amount Spent: \$ 0**  
**Balance: \$ 40,000**

**Activity Completion Date:**

<b>Outcome</b>	<b>Completion Date</b>	<b>Budget</b>
Determine biomass productivity and harvest yields.	Spring 2012-2014	\$ 40,000

**Activity Status as of** (January 1, 2012):

**Activity Status as of** (July 1, 2012):

**Activity Status as of** (January 1, 2013):

**Activity Status as of** (July 1, 2013):

**Activity Status as of** (January 1, 2014):

**Activity Status as of** (July 1, 2014):

**Final Report Summary:**

**ACTIVITY 3:** Sample Analysis

**Description:** Biomass collected from the bale cores will be analyzed for nutrient and sugar concentrations. Sub-samples will be combusted to determine ash and energy content. Soil cores will be analyzed for carbon/nitrogen ratios and other nutrient concentrations. Sweep net and pitfall samples of insects will be sorted to functional group and size, in part to estimate biomass value as food for other wildlife. Insect samples will be sorted by year and collection method.

**Summary Budget Information for Activity 3:**

**ENRTF Budget: \$ 190,000**  
**Amount Spent: \$ 0**  
**Balance: \$ 190,000**

**Activity Completion Date:**

<b>Outcome</b>	<b>Completion Date</b>	<b>Budget</b>
1. Determine ethanol, gasification and other energy potential of biomass.	Spring 2012-2014	\$4,000
2. Identify trends in nutrient stocks in soil and biomass to understand ecosystem nutrient sustainability.	Spring 2012-2014	\$3,000
3. Biomass of insects as food source for waterfowl, game-birds, and songbirds.	Spring 2014	\$120,000

**Activity Status as of** (January 1, 2012):

**Activity Status as of** (July 1, 2012):

**Activity Status as of** (January 1, 2013):

**Activity Status as of** (July 1, 2013):

**Activity Status as of** (January 1, 2014):

**Activity Status as of** (July 1, 2014):

**Final Report Summary:****ACTIVITY 4:** Production-scale biomass harvest

**Description:** Each plot will be harvested using farm-grade harvesting equipment. Each plot will have an assigned harvesting regime, which includes a precise size and shape of refuge. Refuges will be left as 50%, 25%, and 0% of the plot and left as either a block or a set of equally distributed strips. Refuges will rotate annually within the plot. Harvesting will take place after the primary nesting season when plants have senesced, yet before spring green-up. This category covers transportation of the biomass.

**Summary Budget Information for Activity 4:**

**ENRTF Budget: \$ 120,000**  
**Amount Spent: \$ 0**  
**Balance: \$ 120,000**

**Activity Completion Date:**

<b>Outcome</b>	<b>Completion Date</b>	<b>Budget</b>
1. <i>Provides treatment effects for experiment</i>	Fall 2014	\$120,000

**Activity Status as of** (January 1, 2012):

**Activity Status as of** (July 1, 2012):

**Activity Status as of** (January 1, 2013):

**Activity Status as of** (July 1, 2013):

**Activity Status as of** (January 1, 2014):

**Activity Status as of** (July 1, 2014):

**Final Report Summary:**

**ACTIVITY 5:** Reports and dissemination

**Description:** Results will be distributed in the form of academic publications, public reports, project web site pages, local newsprint, and other forms of media. Substantial funds are allocated to this activity because multiple publications are needed for a variety of audiences to disseminate the results of this broad study.

**Summary Budget Information for Activity 5:**

**ENRTF Budget:** \$ 48,000  
**Amount Spent:** \$ 0  
**Balance:** \$ 48,000

**Activity Completion Date:**

<b>Outcome</b>	<b>Completion Date</b>	<b>Budget</b>
1. Economic and logistic analysis report of harvest feasibility	Spring 2014	\$19,000
2. Final report for DNR explaining ecological impacts of harvesting for BMP	Spring 2014	\$19,000
3. Multiple peer-reviewed publications on impacts of harvesting prairies for energy	Spring 2014	\$10,000

**Activity Status as of** (January 1, 2012):

**Activity Status as of** (July 1, 2012):

**Activity Status as of** (January 1, 2013):

**Activity Status as of** (July 1, 2013):

**Activity Status as of** (January 1, 2014):

**Activity Status as of** (July 1, 2014):

**Final Report Summary:**

**V. DISSEMINATION:**

**Description:** The results of this project will be distributed to a wide range of audiences, from industry to academia. Results will be distributed in the form of academic publications, public reports, project web site pages, local newsprint, and other forms of media. Substantial funds are allocated to this activity to disseminate the results of this broad study in multiple publications for a variety of audiences.

**Status as of** (January 1, 2012):

**Status as of** (July 1, 2012):

**Status as of** (January 1, 2013):

Status as of (July 1, 2013):

Status as of (January 1, 2014):

Status as of (July 1, 2014):

**Final Report Summary:**

**VI. PROJECT BUDGET SUMMARY:**

Funds will employ 9.3 FTE technicians, managers, students and interns to survey and analyze results of wildlife and bioenergy potential from harvested grasslands.

**A. ENRTF Budget:**

<b>Budget Category</b>	<b>\$ Amount</b>	<b>Explanation</b>
Personnel:	\$ 480,000	Two full-time research coordinators (3 FTE), project manager (0.2 FTE), 60 months of intern work (5.1 FTE), and a graduate student (1 FTE).
Professional/Technical Contracts:	\$100,000	Contract to harvest experimental plots: MN Native Landscapes Inc.(Selected after competitive evaluation before a panel of forage experts. This company has proved reliable and will continue to be contracted, if quality persists, at equal or less cost to maintain consistency in treatments)
Equipment/Tools/Supplies:	\$8,000	Field equipment: Replacement bamboo poles: \$75/fifty, flagging tape, replacement small mammal traps: \$15 each, microscope parts, bale coring supplies (drill battery: \$60, parts for corer: \$25, ATV maintenance), sorting supplies, materials for disposable insect pit-fall traps, blades for clippers: \$132/six, sample bags: \$0.10/bag, cleaning chemicals/tools for small mammal traps, safety equipment for field interns (gloves: \$12/pair, hip-boots: \$30/pair, safety glasses: \$9/pair)
Travel Expenses in MN:	\$10,000	Travel and lodging between St. Paul, Windom, and Morris MN-Based on standard University compensation rates. About 6500 miles/year at \$0.51 / mile standard UM reimbursement rate.
Other:	\$2,000	Chemical Analysis: Biomass-150 samples: Mineral analysis (\$14/sample), Carbon/Nitrogen (\$3/sample) and sugar analysis (\$15/ sample). Soil- 195 samples: Carbon/Nitrogen (\$4/sample), p.H. Organics, N,P,K (\$20/sample)
<b>TOTAL ENRTF BUDGET:</b>	<b>\$600,000</b>	

**Explanation of Use of Classified Staff: NA**

**Explanation of Capital Expenditures Greater Than \$3,500: NA**

**Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: 9.3**

**B. Other Funds:**

<b>Source of Funds</b>	<b>\$ Amount Proposed</b>	<b>\$ Amount Spent</b>	<b>Use of Other Funds</b>
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<b>Non-state</b>			
USDA – Conservation Innovation Grant 7/30/2009 to 9/29/2011: CASH	\$45,000		Dissemination of results through field days, website, and reports.
<b>State</b>			
	\$	\$	
<b>TOTAL OTHER FUNDS:</b>	<b>\$</b>	<b>\$</b>	

**VII. PROJECT STRATEGY:**

**A. Project Partners:** Minnesota DNR, USDA-NRCS, Minnesota citizens.

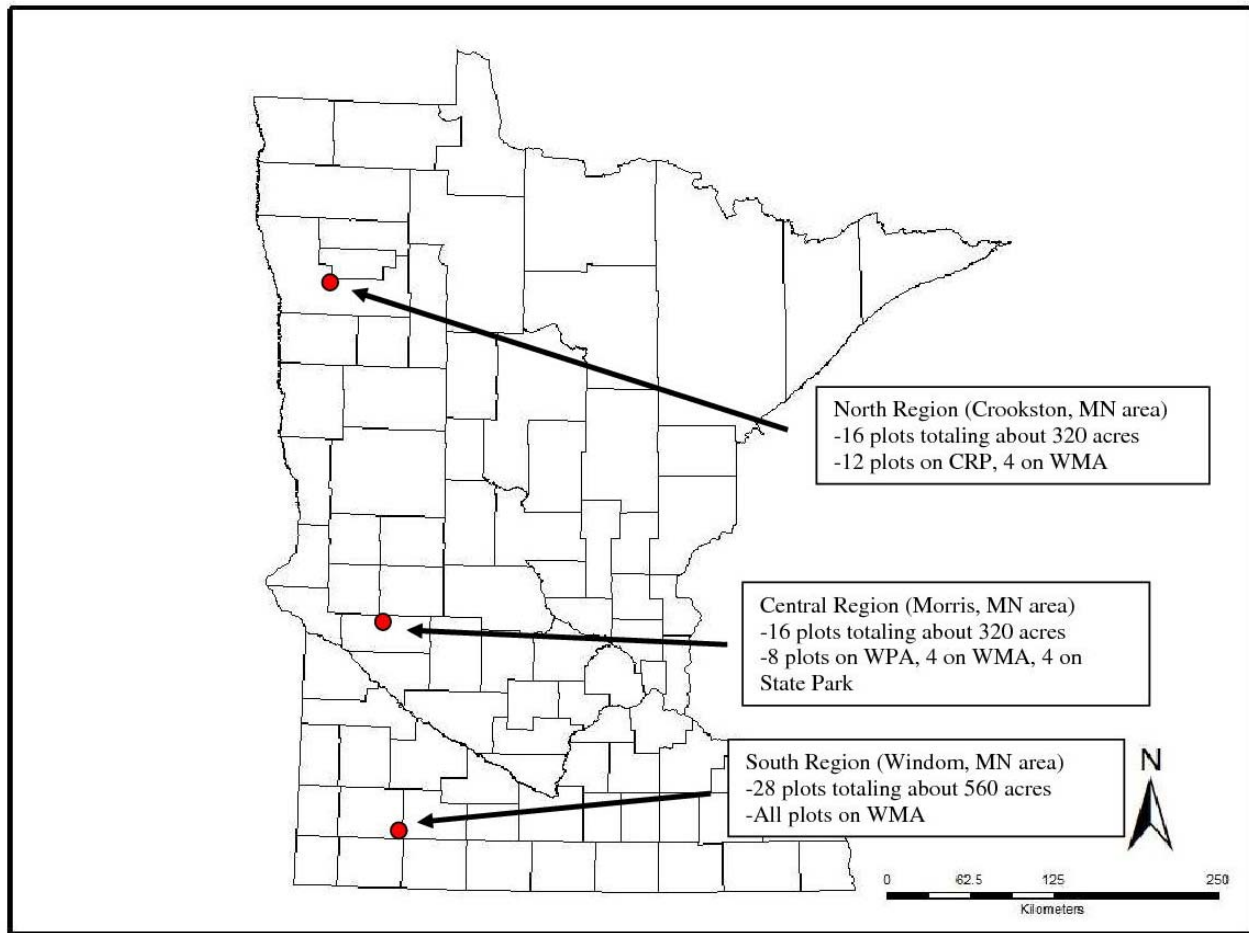
**B. Project Impact and Long-term Strategy:** Bioenergy production in Minnesota and around the globe has the potential to improve conditions for wildlife species, but if not properly done, could make conditions markedly worse. The broad consensus among wildlife experts is that diverse ecosystems, such as prairie grasslands or diverse woodlands, offer habitat that is superior for a wide spectrum of wildlife, in comparison with simplified habitats like cornfields or brome grass (Fargione et al., 2009). The present project focuses on such habitats of high biodiversity that can be useful for bioenergy and beneficial to wildlife. Even though it is well understood that biodiversity is good for wildlife, we must finish our investigation of how management methods can best provide bioenergy production, wildlife protection, and other services to society. Practical question such as how much refuge in a bioenergy system must be maintained as wildlife cover remain to be determined by experimental examination before biomass industries ramp up to a large scale.

**C. Spending History:**

<b>Funding Source</b>	<b>M.L. 2005 or FY 2006-07</b>	<b>M.L. 2007 or FY 2008</b>	<b>M.L. 2008 or FY 2009</b>	<b>M.L. 2009 or FY 2010</b>	<b>M.L. 2010 or FY 2011</b>
ENRTF subd. 3(q)			\$750,000		
National Fish and Wildlife Foundation 2009-2011			\$300,000		
USDA-Conservation Innovation Grant 2009-2011				\$454,527	
UMN-College of Biological Sciences 2010				\$60,000	

**VIII. ACQUISITION/RESTORATION LIST:NA**

**IX. MAP(S):**



**X. RESEARCH ADDENDUM:** See attached

**XI. REPORTING REQUIREMENTS:**

Periodic work plan status update reports will be submitted not later than Jan 1, 2012, July 1, 2012, Jan 1, 2013, July 1, 2013, Jan 1, 2014, July 1, 2014. A final report and associated products will be submitted between June 30 and August 1, 2014 as requested by the LCCMR.



Attachment A: Budget Detail for M.L. 2011 (FY 2012-13) Environment and Natural Resources Trust Fund Projects																	
<b>Project Title:</b> <i>Prairie management for wildlife and bioenergy: Phase II</i>																	
<b>Legal Citation:</b> <i>Fill in your project's legal citation from the appropriation language</i>																	
<b>Project Manager:</b> Clarence Lehman																	
<b>M.L. 2011 (FY 2012-13) ENRTF Appropriation:</b> \$ 600,000																	
<b>Project Length and Completion Date:</b> June 31, 2014																	
<b>Date of Update:</b>																	
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Balance	Activity 2 Budget	Amount Spent	Balance	Activity 3 Budget	Amount Spent	Balance	Activity 4 Budget	Amount Spent	Balance	Activity 5 Budget	Amount Spent	Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	<i>Wildlife Sampling</i>			<i>Fill in your activity title here.</i>			<i>Fill in your activity title here.</i>			<i>Fill in your activity title here.</i>			<i>Fill in your activity title here.</i>				
<b>Personnel (Wages and Benefits)</b>																	
Field Coordinator 1: 2 FTE. Organize and manage field sampling of birds, mammals, and vegetation. Oversee vegetative sampling and harvest operation. Help with data for reports. Field Coordinator 2: 1 FTE. Organize and manage field sampling of insects. Organize and manage lab sorting of insects, voucher collection, and data. Project Manager: 0.2 FTE to manage expenses, work programs, and field coordinators. Interns: 4 seasonal interns for 15 months to collect data. 5.1 FTE Graduate Student: 1 FTE. Manage data sets. Design floral surveys and harvest collection protocols. Author manuscripts of vegetation and harvest data.	190,500	0	190,500	38,900	0	38,900	185,100	0	185,100	17,500	0	17,500	48,000	0	48,000	480,000	480,000
<b>Professional/Technical Contracts</b> Contract to harvest experimental plots: MN Native Landscapes Inc.(Selected after competitive evaluation before a panel of forage experts. This company has proved reliable and will continue to be contracted, if quality persists, at equal or less cost to maintain consistency in treatments)										100,000	0	100,000				100,000	100,000
<b>Equipment/Tools/Supplies</b> Field equipment: Replacement bamboo poles: \$75/fifty, flagging tape, replacement small mammal traps: \$15 each, microscope parts, bale coring supplies (drill battery: \$60, parts for corer: \$25, ATV maintenance), sorting supplies, materials for disposable insect pit-fall traps, blades for clippers: \$132/six, sample bags: \$0.10/bag, cleaning chemicals/tools for small mammal traps, safety equipment for field interns (gloves: \$12/pair, hip-boots: \$30/pair, safety glasses: \$9/pair)	4,000	0	4,000	100	0	100	2,900	0	2,900	1,000	0	1,000				8,000	8,000
<b>Travel expenses in Minnesota</b> Travel and lodging between St. Paul, Windom, and Morris MN-Based on standard University compensation rates. About 6500 miles/year at \$0.51 / mile standard UM reimbursement rate.	7,500	0	7,500	1,000	0	1,000				1,500	0	1,500				10,000	10,000
<b>Other</b> Chemical Analysis: Biomass-150 samples: Mineral analysis (\$14/sample), Carbon/Nitrogen (\$3/sample) and sugar analysis (\$15/ sample). Soil- 195 samples: Carbon/Nitrogen (\$4/sample), p.H. Organics, N,P,K (\$20/sample)							2,000	0	2,000							2,000	2,000
<b>COLUMN TOTAL</b>	<b>\$202,000</b>	<b>\$0</b>	<b>\$202,000</b>	<b>\$40,000</b>	<b>\$0</b>	<b>\$40,000</b>	<b>\$190,000</b>	<b>\$0</b>	<b>\$190,000</b>	<b>\$120,000</b>	<b>\$0</b>	<b>\$120,000</b>	<b>\$48,000</b>	<b>\$0</b>	<b>\$48,000</b>	<b>\$600,000</b>	<b>\$600,000</b>