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

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?** _____

Project Title: Strengthening Natural Resource Management with LiDAR Training

Project Manager: Leslie Everett
Affiliation: U of MN
Address: Water Resources Center, 173 McNeal Hall, 1985 Buford Ave
City: St Paul **State:** MN **Zipcode:** 55108

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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)

Total ENRTF Project Budget:

ENRTF Appropriation $:	180,000
Amount Spent $:	0
Balance $:	180,000

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

Appropriation Language:
$90,000 the first year and $90,000 the second year are from the trust fund to the Board of Regents of the University of Minnesota to provide workshops and Web-based training and information on the use of LiDAR elevation data in planning for and managing natural resources.

I. PROJECT TITLE: Strengthening Natural Resource Management with LiDAR Training

II. PROJECT SUMMARY: The State of Minnesota is completing acquisition of high resolution digital elevation data using LiDAR (Light Detection and Ranging). The data have many applications in natural resource management and protection. For Minnesota examples see: http://www.mngeo.state.mn.us/chouse/elevation/uses/lidar_uses_waterquality.html . Most natural resource managers have not had experience using high resolution digital elevation data. This training project will enable them to effectively employ the data in appropriate applications. Specific training modules will be developed to address: 1. basic LiDAR data management, 2. terrain analysis and soil conservation, 3. natural resource engineering, 4. hydrologic applications, 5. wetland mapping, and 6. forestry and ecological applications. The modules will be delivered in hands-on computer workshops across the state and on the web. The outcome will be natural resource managers who can effectively employ these new data sets in precision conservation and other applications in natural resource evaluation, management, and protection.

Background/Justification: High resolution digital elevation data via LiDAR will be available for most of the state by February 2012 and likely for all of the state by February 2013. Precision, efficacy and cost efficiency of natural resource management will be greatly increased by use of these data. Examples include wetland and restorable wetland mapping, siting and installation of soil and water conservation structures, mapping and prediction of soil erosion, hydrologic modeling for water quality and quantity, plant community mapping by terrain characteristics, forest and biomass volume estimates, geologic mapping, and many other applications. Integration of LiDAR data with Minnesota's rich set of other data layers (soil survey, geological atlas, wetlands inventories, biological surveys, etc.) will add precision to their interpretation and use. For example, the current soil survey provides slope classes. LiDAR data allow calculation of precise slope, slope length, and aspect anywhere in the field, enabling prediction of soil erosion and areas of concentrated flow, as well as rapid pre-design of management practices and structures. Other examples include rapid identification of depressional areas in landscapes suitable for wetland restoration or hydrologic storage, and identification of specific micro-terrain where rare species may be located and mapped. However, in order to fully utilize this new tool, natural resource managers require training and information on how to import, process, and employ the very large LiDAR data sets, using the computer software applications currently and potentially available to them. We have surveyed a subset of resource managers to determine their training and information requirements, and designed this project to meet those needs.

III. PROJECT STATUS UPDATES:

Project Status as of January 2012:

Project Status as of July 2012**:**

Project Status as of January 2013**:**

Project Status as of July 2013**:**

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Prepare Training Modules and Website

Description: Six training modules will be developed for natural resource managers using GIS and CAD (Computer Aided Design) applications: 1. basic LiDAR data management, 2. terrain analysis and soil conservation, 3. engineering, 4. hydrologic applications, 5. wetland mapping, and 6. forestry and ecological applications. Modules will be tested with target audiences and refined for wider delivery. Components of the training modules as well as reference information will be prepared for and maintained on the Web for open use. The host sites will initially be at the University of

Minnesota, with links from MnGeo, MnDNR, BWSR, and NRCS. Interagency coordination will be provided through the State Digital Elevation Committee.

Summary Budget Information for Activity 1:

ENRTF Budget: $ 84,814
Amount Spent: $ 0
Balance: $ 84,814

Activity Completion Date:

Outcome	Completion Date	Budget
1. Six training modules ready for delivery in workshops	January 2012	$ 81,814
2. Training and reference information for application of LiDAR data in natural resource management available on the Web to all users	March 2012, initial versions	$ 3,000

Activity Status as of January 2012:

Activity Status as of July 2012:

Activity Status as of January 2013**:**

Activity Status as of July 2013**:**

Final Report Summary:

ACTIVITY 2: Deliver hands-on training workshops

Description: Each of the six training modules will be delivered through day-long hands-on workshops at computer laboratories selected to best serve the target audience around the state. We will deliver approximately seven basic data management module workshops and an average of five workshops for each of the five application modules, depending on specific audience demand, with an average of 15 participants per workshop. Pre and post-workshop surveys of participants will assist in adjustment of training format and content.

Summary Budget Information for Activity 2:

ENRTF Budget: $ 95,186
Amount Spent: $ 0
Balance: $ 95,186

Activity Completion Date:

Outcome	Completion Date	Budget
Natural resource managers who have received hands-on training in use of LiDAR for resource management activities: 480 participant-training-days.	June 2013	$95,186

Activity Status as of January 2012:

Activity Status as of July 2012:

Activity Status as of January 2013**:**

Activity Status as of July 2013**:**

Final Report Summary:

V. DISSEMINATION:

Description: Two deliverables address dissemination as listed in the activity descriptions above:
1. Training workshops
2. Web posting of training modules (URL to be assigned when modules are posted.)

Status as of January 2012:

Status as of July 2012**:**

Status as of January 2013**:**

Status as of July 2013**:**

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget:

Budget Category	$ Amount	Explanation
Personnel:	$154,676	1 Faculty, wetland module development 3% time, 1 year, personnel fringe benefits 25% 1 Professional staff, forestry module dev. & delivery, 25% time, 1 year, personnel fringe benefits 25% 1 Instructor, engineer module dev & delivery, 139 hr, personnel fringe benefits 25% 1 Civil Svc staff, 3 modules dev. & delivery, 25% time, 22 months, personnel fringe benefits 28.6% 1 Professional staff, principal organizer, coordinate and assist with all modules, web, publications, and workshops, 66% time, 22 months, personnel fringe benefits 25% 1 Graduate student, wetland module, 25% time, 1 yr, personnel fringe benefits including tuition 43.5%
Services:	$6,800	Design of training documents and web pages ($3,000) Video editing software, Camtasia ($200) Outstate training room rental, 12 workshops @$300 each
Supplies:	$5,400	Workshop handouts for 480 participants @$10 Portable hard drives (>300GB) to store and take 6 large GIS training modules to computer training laboratories, 6 @$100
Travel Expenses in MN:	$13,124	Mileage: 26 outstate workshops x 300 mi/wkshp x $0.5/mi or current UM mileage rate Mileage: 6 planning meetings x 2 people x 300 mi/person x $0.5/mi or current UM mileage rate Lodging/meals: 2 trainers x 26 outstate workshops x $116/trainer or current UM reimbursement rate Lodging/meals: 2 people x 6 planning meetings x $116/person or current UM reimbursement rate
TOTAL ENRTF BUDGET:	**$180,000**	

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than $3,500: N/A

Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: 2.3

B. Other Funds: No other cash funds available. A nominal pre-registration fee will be charged participants to pay for in-training food/beverages, avoiding training time lost to travel to restaurants, and assuring attendance by class registrants.

VII. PROJECT STRATEGY:

A. Project Partners:

Partners, UM:

Paul Bolstad, UM Dept. Forest Resources; $9,152 for 25% grad student assistant, 1 year

Joseph Knight, UM Dept. Forest Resources; $3,000 salary & fringe, 3% time, 1 year

Andrew Jenks, UM Dept. Forest Resources; $17,849 salary & fringe, 25% time, 1 year
Joel Nelson, UM Dept. Soil, Water & Climate; $37,330 salary & fringe, 25% time, 22 months
Ann Lewandowski, UM Water Resources Center; $78,114 salary & fringe, 66% time, 22 months
Ann Johnson, UM Dept Civil Engineering; $9,231 salary & fringe, 139 hours
Les Everett, UM Water Resources Center; project manager, time donated by WRC

Except for travel expenses for planning meetings and workshop delivery, non-UM partners (state and federal agency staff) will not receive funds from this project. They are:
Lea Holter and Sonia Jacobsen, NRCS
Karen Bonde, BWSR
Sean Vaughn, DNR

B. Project Impact and Long-term Strategy:

The State of Minnesota is procuring statewide coverage of high resolution digital elevation data via LiDAR. Precision, efficacy and cost efficiency of natural resource management will be greatly increased by use of these data. Examples include wetland and restorable wetland mapping, siting and installation of soil and water conservation structures, mapping and prediction of soil erosion, hydrologic modeling for water quality and quantity, plant community mapping by terrain characteristics, forest and biomass volume estimates, geologic mapping, and many other applications. However, to fully utilize this new tool, natural resource managers require training and information on how to import, process, and employ the very large LiDAR data sets, using the computer software applications currently and potentially available to them. Without this training, use of the LiDAR data at the local level will be limited and the potential benefits not fully exploited. Once the training project is completed, the training modules will be openly available on the LiDAR website of the Minnesota Geospatial Information Office and managed by the State Digital Elevation Committee, Subcommittee on Research and Education.

C. Spending History:

Funding Source	**M.L. 2005 or FY 2006-07**	**M.L. 2007 or FY 2008**	**M.L. 2008 or FY 2009**	**M.L. 2009 or FY 2010**	**M.L. 2010 or FY 2011**
No prior funding for training					
State funding for LiDAR data acquisition	300,000 NW	~650,000 SE		2,800,000 SW	2,800,000 Metro/Arrowhead

VIII. ACQUISITION/RESTORATION LIST: N/A

IX. MAP(S): N/A

X. RESEARCH ADDENDUM: N/A

XI. REPORTING REQUIREMENTS:
Periodic work plan status update reports will be submitted not later than January 31, 2012; July 31, 2012; and January 31, 2013. A final report and associated products will be submitted between June 30 and August 1, 2013 as requested by the LCCMR.

Attachment A: Budget Detail for M.L. 2011 (FY 2012-13) Environment and Natural Resources Trust Fund Projects

Project Title: Strengthening Natural Resource Management with LiDAR Training
Legal Citation: *Fill in your project's legal citation from the appropriation language*
Project Manager: Leslie Everett
M.L. 2011 (FY 2012-13) ENRTF Appropriation: $ 180,000
Project Length and Completion Date: Two years, June 30, 2013
Date of Update: May 17, 2011

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Balance	Activity 2 Budget	Amount Spent	Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	**Prepare Training Modules and Website**			**Deliver hands-on training workshops**				
	07/11 - 03/12			03/12 - 06/13				
Personnel (Wages and Fringe Benefits) Total	**73,022**		73,022	**81,654**		81,654	**154,676**	**154,676**
1 Faculty, wetland module development 3% time, 1 year, personnel fringe benefits @ 25%, ($3000)								
1 Professional staff, forestry module dev. & delivery, 25% time, 1 year, personnel fringe benefits @ 25%, ($17,849)								
1 Instructor, engineer module dev & delivery, 139 hr, personnel fringe benefits @ 25%, ($9,231)								
1 Civil Svc staff, 3 modules dev. & delivery, 25% time, 22 months, personnel fringe benefits @ 28.6%, ($37,330)								
1 Professional staff, principal organizer, coordinate and assist with all modules, web, publications, and workshops, 66% time, 22 months, personnel fringe benefits @25%, ($78,114)								
1 Graduate student, wetland module, 25% time, 1 yr, personnel fringe benefits including tuition @43.5%, ($9,152)								
Services Total	**3,200**		3,200	**3,600**		3,600	**6,800**	**6,800**
Design of training documents and web pages ($3,000)								
Video editing software Camtasia, ($200)								
Outstate GIS computer laboratory training room rental, 12 workshops @$300 ($3600)								
Supplies	**5,400**		5,400				**5,400**	**5,400**
Workshop handouts for 480 participants @$10 ($4,800)								
300 GB or larger portable hard drives to store and take 6 large GIS training modules to computer training laboratories, 6 @$100 ($600)								
Travel expenses in Minnesota	**3,192**		3,192	**9,932**		9,932	**13,124**	**13,124**
Mileage: 26 outstate workshops x 300 mi/wkshp x $0.5/mi or current UM rate ($3,900)								
Mileage: 6 planning meetings x 2 people x 300 mi/person x $0.5/mi or current UM rate ($1,800)								
Lodging/meals: 2 trainers x 26 outstate workshops x $116/trainer or current UM location specific reimbursement rate ($6,032)								
Lodging/meals: 2 people x 6 planning meetings x $116/person or current UM location specific reimbursement rate ($1,392)								
COLUMN TOTAL	**$84,814**		**$84,814**	**$95,186**		**$95,186**	**$180,000**	**$180,000**