



# Environment and Natural Resources Trust Fund (ENRTF)

## M.L. 2013 Work Plan

**Date of Amendment Request:** June 5, 2015  
**Date of Next Status Update Report:** July 31, 2015  
**Date of Work Plan Approval:** June 25, 2013  
**Project Completion Date:** June 30, 2016

**Is this an amendment request?** Yes

**PROJECT TITLE:** Updating the National Wetland Inventory for Minnesota - Phase 4

**Project Manager:** Steve Kloiber

**Affiliation:** Minnesota DNR

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**City/State/Zip Code:** St. Paul, MN 55155-4025

**Telephone Number:** (651) 259-5164

**Email Address:** steve.kloiber@state.mn.us

**Web Address:** [http://www.dnr.state.mn.us/eco/wetlands/nwi\\_proj.html](http://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html)

**Location:** Lake, Cook, and St. Louis Counties

<b>Total ENRTF Project Budget:</b>	<b>ENRTF Appropriation:</b>	<b>\$1,000,000</b>
	<b>Amount Spent:</b>	<b>\$ 215,661</b>
	<b>Balance:</b>	<b>\$ 784,339</b>

**Legal Citation:** M.L. 2013, Chp. 52, Sec. 2, Subd. 03d

**Appropriation Language:**

\$1,000,000 the first year is from the trust fund to the commissioner of natural resources to continue the update and enhancement of wetland inventory maps for Minnesota. This appropriation is available until June 30, 2016, by which time the project must be completed and final products delivered.

## **I. PROJECT TITLE:** Updating the National Wetland Inventory for Minnesota - Phase 4

### **II. PROJECT STATEMENT:**

Over the past 100 years, about half of Minnesota's original 22 million acres of wetlands have been drained or filled. Some regions of the State have lost more than 90 percent of their original wetlands. Urban development, agricultural drainage, mining, road construction, and utility projects result in additional losses each year (attached figure). The function and quality of remaining wetlands are often impaired. Updating the NWI is a key component of the State's strategy to monitor and assess wetlands in support of efforts to assure healthy wetlands and clean water for Minnesota.

- NWI is the only comprehensive inventory of wetlands for Minnesota. To protect wetlands, we need to know how many wetland acres we have and where they are. We can't manage what we don't measure. Unfortunately, the current NWI is inaccurate in many places because it is 25-30 years out-of-date and some of the original imagery used was relatively coarse scale.
- NWI is an important screening tool for land use planning and for identifying potential wetland impacts. State, regional and local agencies use the NWI for making land use decisions, including planning for transportation and utility services. Wetland programs such as Minnesota's Wetland Conservation Act and the US Army Corps' Clean Water Act Permit Program rely on the NWI as the initial resource for identifying potential impacts of proposed projects. Having accurate maps upfront prevents problems later on; saving time and money for permit applicants and wetland program managers as well as preventing wetland impacts.
- NWI is useful for strategic wetland restoration planning. Funds for wetland restoration are limited; therefore, it is important to get the most benefit possible for our restoration dollars. Wetland maps provide useful information for strategic wetland restoration planning. The NWI includes information about partly drained and ditched wetlands that may be potential wetland restoration opportunities. In addition, the updated NWI will provide enhanced attributes to support assessment of wetland function. The updated and enhanced NWI will also help target wetland restoration in a way that complements the functions and values of existing wetlands.

This is the fourth phase of a six-phase project to update the National Wetland Inventory (NWI) maps for Minnesota using modern, high-resolution imagery and elevation data. This project phase will: 1) update NWI maps for 569 USGS quarter quadrangles of Lake, Cook, and St. Louis Counties in northeastern Minnesota. The data required for updating the NWI maps in this proposal was already acquired through a previously funded project phase. High-resolution elevation data were also acquired through a separate project. Wetland maps and aerial imagery will be produced by contractors under the supervision of the DNR. All wetland map data and aerial imagery will be available free of charge to the public.

### **III. PROJECT STATUS UPDATES:**

**Project Status as of January 31, 2014:**

The DNR published a request for proposals to conduct the update of the NWI for northeast Minnesota in July. The contractor selected for this work was Ducks Unlimited. Their bid came in under budget, allowing us to expand the scope of the mapping area from 7,185 square-miles to 13,778 square miles. Subsequently, we developed and executed a contract for this work on September 30, 2013. We also developed a service level agreement (SLA) with the DNR Resource Assessment Program (DNR-RAP) to provide project support including data preprocessing, field work, and quality control review.

An initial joint field reconnaissance was conducted by Ducks Unlimited and DNR-RAP in the first week of October. A project kick-off meeting was held with the contractor and the technical advisory committee on October 9th. The Ducks Unlimited Team (DU and subcontractor Equinox Analytics) also had an initial technical workshop meeting on November 13-16, 2013.

All of the input data for the project area have been compiled and transmitted to DU. Automated scripts have been developed by DNR-RAP for the preprocessing of the lidar data and the results of this have been provided to the DU Team for testing on three pilot watersheds; Pike River, Upper Little Fork River, and Sturgeon River.

The development on the watershed-scale segmentation and classification process is complete and the draft automated analysis data and is currently being worked on by the photo-interpretation team.

Another meeting was held in December to discuss the potential for project enhancements based upon a tentative offer of additional financial support from the Coastal Zone Program. We are continuing to refine the potential scope and cost estimates for these potential enhancements.

**Project Status as of July 31, 2014:**

DU has been reconfiguring the imagery data by mosaicking the imagery into watershed-based work areas. This process is done to reduce the overall number of seamlines required between project work areas. The operating assumption is that watershed boundaries do not usually cut across wetlands. There is also some benefit from the fact that some of the lidar derivatives, like the compound topographic index, require computation on a watershed basis as well. This work is about 70% complete. Also river features within each watershed work area are being manually delineated as a precursor to the image segmentation process. This work is about 33% complete. DNR-RAP has generated the input data layer stacks for about 35% of the project area. The image segmentation process has undergone a number of refinements. Segmentation is complete for 15% of the project area and draft NWI maps have been developed for three watersheds (about 4% of the project area).

**Amendment Request (8/14/14) Approved (8/18/14):**

The purpose of this amendment request is to shift \$1,555 from the budget line for equipment tools and supplies to the professional technical contract for wetland mapping services. The intention is to provide funding for a joint workshop for the project team and vendors to discuss strategies for ensuring consistency and accuracy of the hydrogeomorphic classification of wetlands. The workshop will be held in the Twin Cities over a two-day period. The funding shift is needed to cover the costs associated with having two staff members from Ducks Unlimited participate in the workshop (time and travel costs). The additional \$1,555 will be added to the line item for wetland mapping services which has \$1,645 currently unencumbered. The total cost for the contract amendment is \$3,200.

**Project Status as of January 31, 2015:**

Data pre-processing is proceeding with watershed imagery mosaics created for 67 out of 80 watershed tiles in the project area (83%). River segments have been manually digitized for 50 out of 80 watersheds (62%). The DNR Resource Assessment Program has delivered pre-processed data layer stacks for 79 out of 80 watersheds (99%). The image segmentation process has been refined through several iterations and a final segmentation process has been defined. Segmentation has been performed on 32 watersheds (40%). Draft NWI maps have been completed for 14 watersheds (17%) with another 15 watersheds currently in progress (18%). DU and the DNR participated in a two-day project workshop focused on improving hydro-geomorphic wetland classification.

**Project Status as of July 31, 2015:**

**Project Status as of January 31, 2016:**

**IV. PROJECT ACTIVITIES AND OUTCOMES:**

**ACTIVITY 1: Updated Wetland Maps for Northeastern Minnesota**

**Description:**

Produce updated wetland maps for 569 USGS quarter quadrangles of Lake, Cook, and St. Louis Counties in northeastern MN (see attached map for detail). The map production will be conducted by contractors under the supervision of the DNR and will be based on recommendations for wetland mapping methods developed by the UMN through a previous phase of this project. This work will consist of digital photo-interpretation, topographic analysis of LiDAR data, and analysis of ancillary data such as soils maps and forest inventory maps, as well as quality control review. Completed digital map data will be available to the public through several websites, including the DNR and the U.S. Fish and Wildlife Service.

**Summary Budget Information for Activity 1:**

**ENRTF Budget: \$1,000,000**

**Amount Spent: \$ 215,661**

**Balance: \$ 784,339**

**Activity Completion Date:**

<b>Outcome</b>	<b>Completion Date</b>	<b>Budget</b>
<b>1. Updated wetland inventory maps for portions of Lake, Cook, and St. Louis Counties</b>	12/31/15	\$1,000,000

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**Activity Status as of July 31, 2015:**

**Activity Status as of January 31, 2016:**

**Final Report Summary:**

**V. DISSEMINATION:**

**Description:** The plan for disseminating the project results primarily relies on distribution of the wetland maps through web-based data distribution hubs and online viewing of wetland maps through web mapping applications. Primary data access websites for the State of Minnesota include the [DNR Data Deli](#) and the [MN Geographic Data Clearinghouse](#). The primary online mapping application for viewing the data will be [DNR Landview](#). Furthermore, the data are likely to be picked up and served by other sites and applications beyond the ones listed here. Publicity for this effort will include presentations at professional conferences as well as publication in selected newsletters and journals. Conference presentations will include at least two of the following venues; the Minnesota Water Resources Conference, the Minnesota GIS/LIS Conference, the Annual Minnesota Wetlands Conference, and the Conference of the Minnesota Association of Watershed Districts.

**Status as of January 31, 2014:**

A short overview of the NWI project was given as part of a larger presentation on wetland monitoring and mapping at the DNR Round Table on January 10, 2014.

**Status as of July 31, 2014:**

A stakeholder outreach meeting was held in Duluth, MN on February 6<sup>th</sup> to provide background information on the NWI update for northeastern Minnesota as well as to discuss opportunities for stakeholder participation. The DNR and DU made a joint presentation about the project through a webinar of the Wetland Mapping Consortium in April 2014. A recording of the presentation is available online (<http://www.aswm.org/wetland-science/wetlands-one-stop-mapping/3436-past-wetland-mapping-consortium>).

**Status as of January 31, 2015:**

The DNR and DU collaborated on a peer-reviewed journal article describing the NWI project for the journal Wetlands. This paper has been accepted for publication and is currently *in press*.

**Status as of July 31, 2015:**

**Status as of January 31, 2016:**

**Final Report Summary:**

**VI. PROJECT BUDGET SUMMARY:**

**A. ENRTF Budget:**

Budget Category	\$ Amount	Explanation
Personnel	\$157,000	Project manager at 0.65 FTE for 2-years.
Professional/Technical/Service Contracts:	\$756,650	One service level agreement with DNR Resource Assessment Office for data processing, field work, quality assurance, and other support, and one competitive bid contract for wetland mapping services.

DNR Direct & Necessary Support*	\$82,905	DNR's direct and necessary business services required to support this proposal
Equipment/Tools/Supplies:	\$445	Field supplies; GPS batteries, insect repellent, sunscreen, protective equipment, and paint for photo control points. Office supplies and equipment: printing, shipping, and digital storage media.
Travel Expenses in MN:	\$3,000	In-state mileage, lodging and travel expenses for project coordination, field reconnaissance, and outreach meetings.
<b>TOTAL ENRTF BUDGET:</b>	<b>\$1,000,000</b>	

\* Direct and Necessary expenses include both Department Support Services (Human Resources, IT, Financial Management, Communications, Procurement, and Facilities) and Division Support Services. Department Support Services are described in agency Service Level Agreements, and billed internally to divisions based on indices that have been developed for each area of service. Department leadership (Commissioner's Office and Regional Directors) are not assessed. Division Support Services include costs associated with Division and regional leadership, business offices, and clerical support. Those elements of individual projects that put little or no demand on support services such as large single-source contracts, large land acquisitions, and funds that are passed-thru to other entities are not assessed Direct and Necessary costs for those activities.

**Explanation of Use of Classified Staff:** NA The DNR contracts for project management services for this project through MN.IT Services. The MN.IT project manager was originally hired as an unclassified DNR employee. This position was reorganized to MN.IT Services under a statewide consolidation of IT services and is now proposed to be changed to a classified employee. This position has been funded by the ENRTF program for 0.65 FTE. There is currently no other source of funding for managing the NWI project and once the project is complete the agency will secure other funds to continue funding this position.

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

**Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation:** 0.65 FTE for 2-years (1.3 FTE)

**Number of Full-time Equivalent (FTE) estimated to be funded through contracts with this ENRTF appropriation:** 7 FTE for two years (14 FTE)

**B. Other Funds:**

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
<b>Non-state</b>			
	\$0	\$0	
<b>State</b>			
	\$0	\$0	
<b>TOTAL OTHER FUNDS:</b>	<b>\$0</b>	<b>\$0</b>	

**VII. PROJECT STRATEGY:**

**A. Project Partners:** Partners providing in-kind services for this project include the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the Minnesota Board of Water and Soil Resources, the U.S. Fish and Wildlife Service, and the Minnesota Dept. of Administration’s Geographic Information Office.

**B. Project Impact and Long-term Strategy:** This is the fourth phase of a multi-phase project to update the NWI for the entire state of Minnesota. The estimated total budget for the project is \$7.5 million. With this appropriation, the total amount received from ENTRF to date will be \$4,150,000 (55% of the total estimated cost). Upon completion of this phase, our estimated progress will be approximately 75% completion for imagery and field data acquisition and approximately 47% completion for wetland mapping.

**C. Spending History:**

<b>Funding Source</b>	<b>M.L. 2008 or FY09-10</b>	<b>M.L. 2010 or FY11-12</b>	<b>M.L. 2011 or FY12-13</b>
ENTRF	\$550,000 Chap. 367, Sec. 2, Subd. 5a	\$1,100,000 Chap. 362, Sec. 2, Subd. 3b	\$1,500,000 First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03d
USGS/NGA	\$25,000		
St. Louis County	\$24,999		
MPCA Clean Water Legacy	\$111,000		
DNR – Heritage Enhancement Fund	\$ 181,064		
DNR/NOAA – Coastal Zone Program	\$ 24,227		
USGS/NGA	\$75,000		
Metropolitan Council	\$ 65,750		
Metropolitan Mosquito Control District	\$ 7,000		
McLeod County		\$24,000	
Sibley County		\$29,000	
Murray County		\$35,000	
US Fish and Wildlife Service		\$75,000	

**VIII. ACQUISITION/ RESTORATION LIST: N/A**

**IX. MAP(S): SEE MAP ATTACHMENT**

**X. RESEARCH ADDENDUM: N/A**



**IX. REPORTING REQUIREMENTS:**

Periodic work plan status update reports will be submitted not later than January 31, 2014, July 31, 2014, January 31, 2015, July 31, 2015 and January 31, 2016. A final report and associated products will be submitted between June 30 and August 15, 2016 as requested by the LCCMR.

**Attachment A: Budget Detail for M.L. 2013 Environment and Natural Resources Trust Fund Projects**

**Project Title:** *Updating the National Wetland Inventory for Minnesota - Phase 4*

**Legal Citation:** *M.L. 2013, Chp. 52, Sec. 2, Subd. 03d*

**Project Manager:** *Steve Kloiber*

**M.L. 2013 ENRTF Appropriation:** *\$ 1,000,000*

**Project Length and Completion Date:** *June 30, 2016*

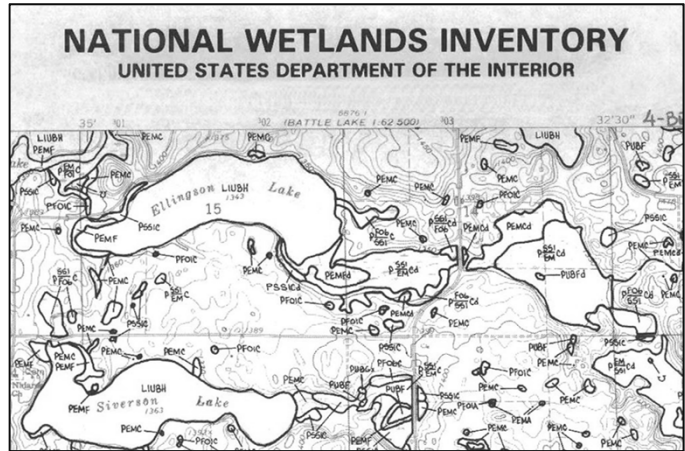
**Date of Update:** *January 30, 2015*

<b>ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET</b>	<b>Activity 1 Budget</b>	<b>Amount Spent</b>	<b>Balance</b>	<b>TOTAL BUDGET</b>	<b>TOTAL BALANCE</b>
<b>BUDGET ITEM</b>	<b><i>Wetland Mapping</i></b>				
<b>Personnel (Wages &amp; Benefits)</b> <i>Project Manager (78% salary, 22% benefits); 0.65FTE for 2 years</i>	157,000	39,892	117,108	157,000	117,108
<b>Professional/Technical/Service Contracts</b> <i>Wetland Mapping Service - Ducks Unlimited</i>	663,200	56,739	606,461	663,200	606,461
<b>Professional/Technical/Service Contracts</b> <i>Service Level Agreement with DNR Resource Assessment Office for data processing and quality assurance support</i>	93,450	35,761	57,689	93,450	57,689
<b>DNR direct and necessary support</b>	82,905	82,905	0	82,905	0
<b>Equipment/Tools/Supplies</b> <i>Field supplies; GPS batteries, insect repellent, sunscreen, protective equipment, and paint for photo control points. Office supplies and equipment; printing, shipping, and digital storage media.</i>	445	0	445	445	445
<b>Travel expenses in Minnesota</b> <i>In-state mileage, lodging and travel expenses for project coordination, field reconnaissance, and outreach meetings.</i>	3,000	364	2,636	3,000	2,636
<b>COLUMN TOTAL</b>	<b>\$1,000,000</b>	<b>\$215,661</b>	<b>\$784,339</b>	<b>1,000,000</b>	<b>784,339</b>

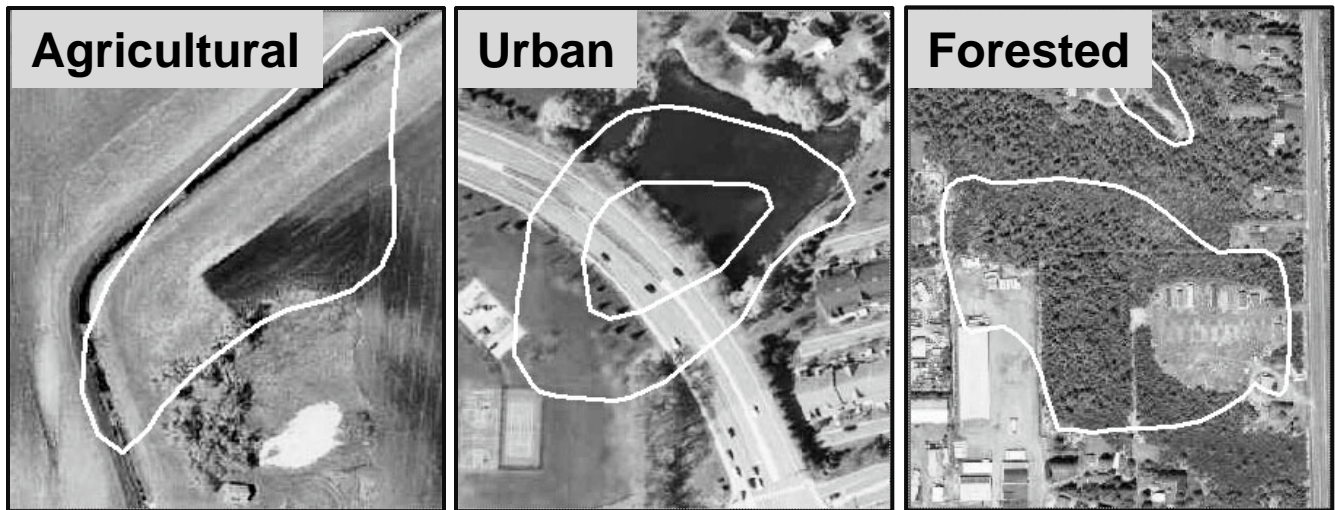
# The National Wetland Inventory Update for Minnesota

The NWI is being updated using modern, high-resolution digital imagery, digital elevation data from LiDAR, and the best-available ancillary GIS data including digital soil surveys and other aerial imagery.

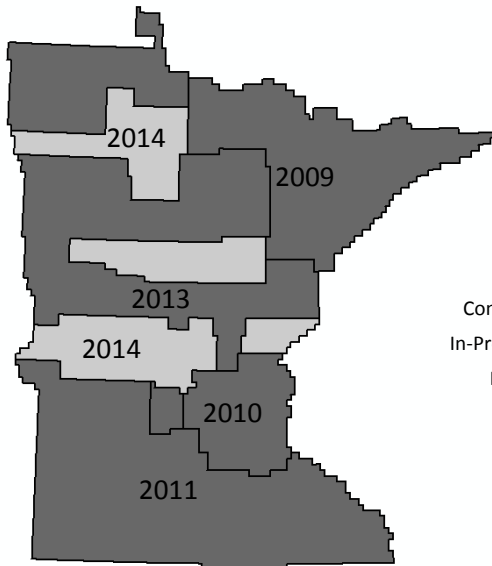
The original NWI maps for Minnesota were developed 25 to 30 years ago as paper maps.



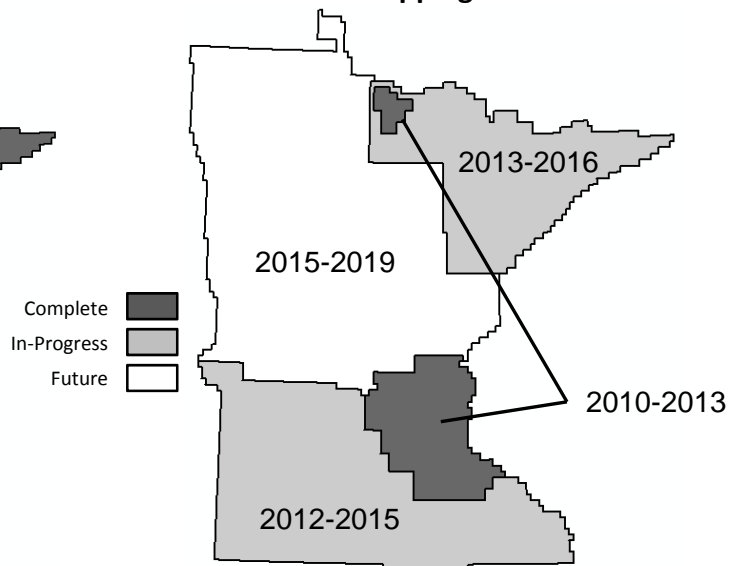
Examples of inaccuracies in the original NWI maps resulting from land use changes. The white outlines indicate wetlands from the original NWI superimposed on modern aerial photos.



**Aerial Photography Status**



**Wetland Mapping Status**



# Schedule for the National Wetland Inventory Update

