

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 085-E1

Updating the National Wetland Inventory for Minnesota - Phase 4

Topic Area: E1. NR Info Collection /Analysis - Statewide

Total Project Budget: \$ 1,751,000

Proposed Project Time Period for the Funding Requested: 3 yrs, July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

This is the fourth phase of a multi-phase project to update and enhance the National Wetland Inventory for Minnesota. This phase will update wetland maps for northeastern Minnesota.

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Sponsoring Organization: MN DNR

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Web Address: www.dnr.state.mn.us

Location

Region: NW, NE

County Name: Beltrami, Cook, Itasca, Kittson, Koochiching, Lake, Lake of the Woods, Mahnommen, Marshall, Norman, Pennington, Polk, Red Lake, Roseau, St. Louis

City / Township:

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



Environment and Natural Resources Trust Fund (ENRTF) 2012-2013 Main Proposal

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

I. 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 Unfortunately, the current NWI is inaccurate in many places because it is 25-30 years out-of-date and some of the original imagery used was relatively coarse scale.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 three counties in northeastern Minnesota and 2) complete the last acquisition phase of aerial imagery data required for updating the NWI. 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. The University of Minnesota (UMN) will assist in this effort by collecting independent field validation data for wetlands.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Updated Wetland Maps for Northeastern and Southern Minnesota Budget: \$1,131,400

Produce updated wetland maps for three counties in northeastern MN (attached map). The map production will be conducted by contractors under the supervision of the DNR and will be based on recommendations for wetland mapping 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.

Outcome	Completion Date
1. Updated wetland maps for three counties in northeastern MN	9/30/2015

Activity 2: Data Acquisition for Northwestern Minnesota

Budget: \$619,600

This component will include acquisition of imagery along with field verification data for the last anticipated mapping phase in northwestern Minnesota. We will acquire high-resolution, spring leaf-off, multi-spectral aerial photography for 12 counties. The imagery will be used as a base for updating the NWI maps for northwestern Minnesota. Data acquisition will also include a field-based assessment of wetland type for 400 to 500 sites chosen using a stratified random selection process. The field data will be used to assess the accuracy of the wetland maps developed from remote sensing data. To maintain the independence of the field data, the field data acquisition will be managed by UMN Remote Sensing and Geospatial Analysis Laboratory and not shared with the mapping contractor.

Outcome	Completion Date
1. High-resolution, spring, multi-spectral digital aerial imagery for 12 counties in northwestern MN	12/31/2014
2. Field validation data acquisition for 12 counties in northwestern MN (UMN)	10/31/2014

III. PROJECT STRATEGY

A. Project Team/Partners

The UMN Remote Sensing and Geospatial Analysis Laboratory will receive \$88,000 for Activity 2 (field data acquisition). Other primary partners providing in-kind services for this project include 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. Timeline Requirements

This project is a phase of a larger effort (see section III-C below). This project is designed so that the data required for updating wetland maps in any given phase is acquired in the preceding phase and field validation data are collected during the growing season as contemporaneously as possible with the imagery acquisition (attached project timeline).

C. Long-Term Strategy and Future Funding Needs

This is the fourth phase of a six-phase project to update the NWI for the entire state of Minnesota. The NWI provides critical baseline data that inform many wetland management actions and policies. We anticipate initiating a new phase every other year for two additional phases (attached project timeline). The estimated total budget for the project is \$7.5 million. So far, we have received or have been recommended to receive a total of \$3.15 million (about 42%) from ENTRF. Through previous phases, we have completed all of the methods evaluation, 80% of imagery and field validation data acquisition for the state, and 30% of the updated wetland maps for the state. The proposed phase will bring our progress up to 100% completion for imagery and 45% completion for wetland mapping.

2012-2013 Detailed Project Budget

IV. TOTAL ENRTF REQUEST BUDGET - Three Years

BUDGET ITEM	AMOUNT
Personnel: DNR Project manager - 0.65 FTE for two years	\$ 157,000
Contracts: Wetland Mapping	\$ 967,000
Contracts: Aerial Photography	\$ 422,000
Funding to University of Minnesota: Field Data Acquisition	\$ 88,000
Equipment/Tools/Supplies: GPS batteries, replacement parts, software maintenance for stereo QA review (\$600/yr), paint for aerial photo control targets, additional data storage, printing	\$ 5,000
Travel: Coordination meeting with local partners for NE wetland mapping, coordination meeting with local partners for NW imagery acquisition, audit for field data acquisition, field checking of draft wetland data, annual status report for stakeholder groups	\$ 5,000
Additional Budget Items: DNR used a rate of 6.5% to calculate costs for direct support services, which are DNR's direct and necessary business services required to support this proposal.	\$ 107,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 1,751,000

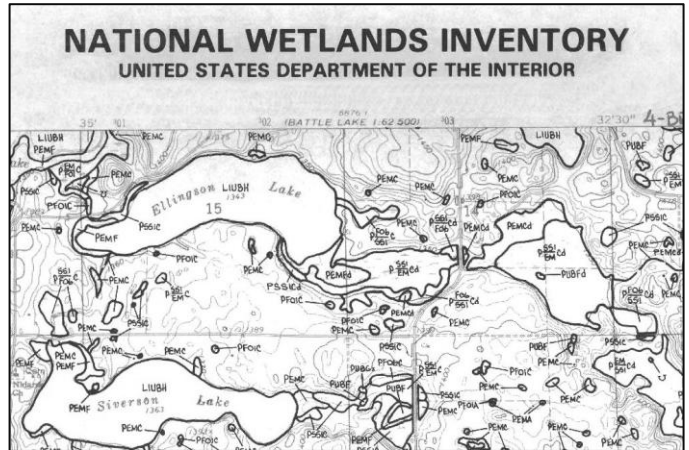
V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: During the first phase of the project we were able to secure approximately \$125,000 in local and federal matching funds for imagery acquisition. In the second phase we received approximately \$90,000 in local matching funds for imagery and \$75,000 in federal matching funds for wetland mapping. We anticipate that we will be able to find an additional \$50,000 to \$75,000 in non-state matching funds during this grant phase.	See note at left	<i>Pending</i>
Other State \$ Being Applied to Project During Project Period: During the first phase of the project we were able to secure approximately \$146,000 in other state funds for imagery acquisition.	See note at left	<i>Pending</i>
In-kind Services During Project Period: In-kind labor contribution from DNR Wetland Program Coordinator.	\$ 10,000	
Remaining \$ from Current ENRTF Appropriation (if applicable): Env. Trust Fund 2011 (M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03d) - Funding becomes available July 1, 2012	\$ 1,500,000	<i>Unspent and not legally obligated</i>
Remaining \$ from Current ENRTF Appropriation (if applicable): Env. Trust Fund 2010 (M.L. 2010, Chap. 362, Sec. 2, Subd. 3b) - estimated as of Feb 1, 2012	\$ 52,000	<i>Unspent and not legally obligated</i>
Funding History: Env. Trust Fund 2008 (M.L. 2008 Chap. 367, Sec. 2 Subd. 5(a)) - Project closed out August 31, 2011	\$ 550,000	Spent

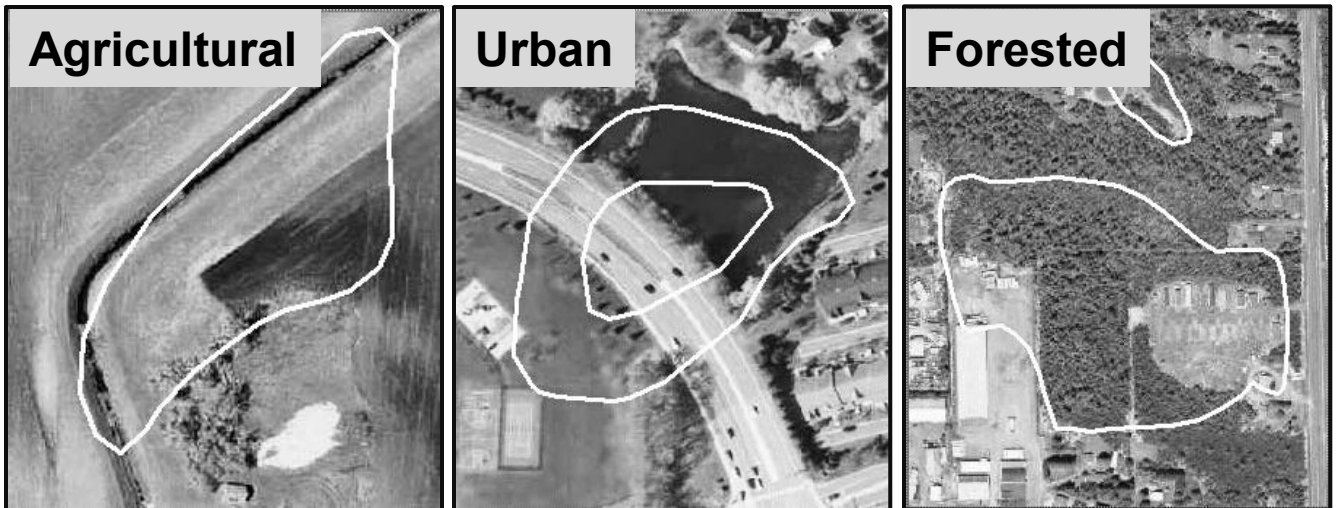
The National Wetland Inventory Update for Minnesota

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.

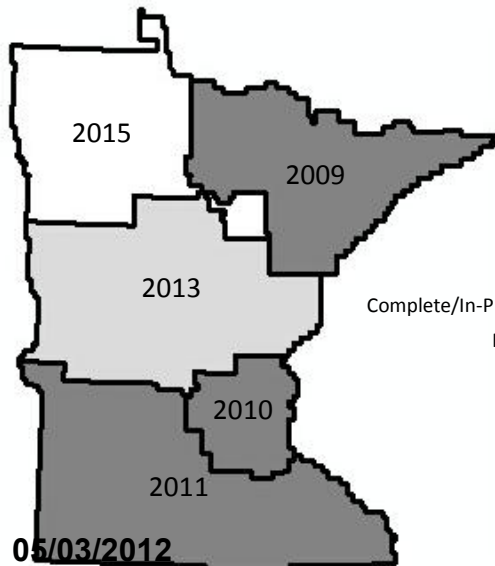
The original NWI maps for Minnesota were developed 25 to 30 years ago as paper maps.



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.

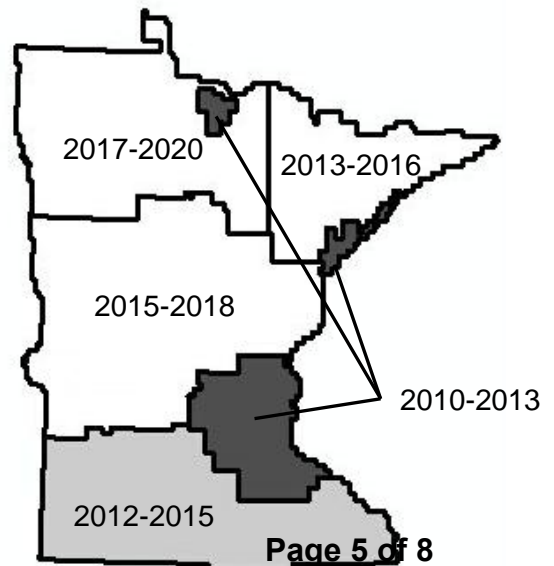


Aerial Photography Status



05/03/2012

Wetland Mapping Status



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Schedule for the National Wetland Inventory Update

Mapping Region

East-Central

South

Northeast

Central Lakes

Northwest

FY09-11
\$550,000
Approp.
ML2008
367/2/5a

Acquire Input Data

- Imagery
- Field Data

Acquire Input Data

Map Production

- Preprocessing
- Delineation
- Classification

FY11-13
\$1,100,000
Approp.
ML2010
362/2/3b

Quality Review

- Inspection
- Automated Checks
- Error Analysis

Acquire Input Data

Data Delivery

- Web Servers
- Web Maps
- Outreach

FY13-15
\$1,500,000
Approp.
ML2011
1SS/2/3/2/
03d

Map Production

Quality Review

Data Delivery

Acquire Input Data

FY14-16
\$1,751,000
Future

Map Production

Quality Review

Data Delivery

Acquire Input Data

FY16-18
\$1,992,000
Future

Map Production

Quality Review

Data Delivery

FY18-20
\$1,280,000
Future

Map Production

Quality Review

Data Delivery

05/03/2012

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Project Manager Qualifications: Steve Kloiber, Ph.D., P.E.

SUMMARY	Steve Kloiber is the wetland monitoring coordinator for the Minnesota Department of Natural Resources. He has twenty years of experience in the water resources field with a special focus on geospatial analysis and environmental informatics. He has managed dozens of projects, ranging in size from tens of thousands to over a million dollars. Steve has authored or co-authored several peer-reviewed journal articles or book chapters on water resources, remote sensing, and GIS. He also serves on the Board of Managers for the Nine Mile Creek Watershed District.
EDUCATION	Ph.D. Civil (Environmental) Engineering/Water Resource Minor University of Minnesota, Minneapolis, Minnesota, 2002 M.S.C.E. Civil (Environmental) Engineering University of Minnesota, Minneapolis, Minnesota, 1992 B.A. Chemistry/Computer Science Concentration St. Olaf College, Northfield, Minnesota, 1988
PROFESSIONAL REGISTRATION	Professional Engineer in Minnesota (Registration #23804) First Issued February 1995
AWARDS/HONORS	Academic Excellence Award 2002 Central States Water Environment Association
EMPLOYMENT HISTORY	Minnesota Department of Natural Resources, St. Paul, MN Wetland Monitoring Coordinator, October 2008 to Present Metropolitan Council, St. Paul, Minnesota Lead Environmental Analyst, September 2002 to October 2008 Senior Water Resource Planner, September 2001 to September 2002 Water Resource Planner, January 1998 to September 2001 Montgomery Watson, Wayzata, Minnesota Professional Environmental Engineer, November 1995 to December 1997 Associate Environmental Engineer, June 1992 to November 1995 University of Minnesota, Minneapolis, Minnesota Research Assistant, September 1989 to March 1992

Organizational Description: Minnesota DNR

The Minnesota Department of Natural Resources (DNR)'s mission is to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life. The department consists of several divisions based on the state's natural resources, such as Fish and Wildlife, Forestry, Lands and Minerals, Parks and Trails, and Ecological Resources and Waters, as well as four regions and four support bureaus.

