Environment and Natural Resources Trust Fund
2015 Request for Proposals (RFP)

Project Title: **ENRTF ID:** **003-A**

Completing the National Wetland Inventory Update for Minnesota [Continuation]

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 2,772,610

Proposed Project Time Period for the Funding Requested: 3 years, July 2015 - June 2018

Summary:

This project will update and field verify wetland inventory maps for all 34 remaining counties in central and northwestern Minnesota (39,800 mi2), thereby completing the wetland inventory update for Minnesota.

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Sponsoring Organization: MN DNR

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Location

Region: Central, NW

County Name: Statewide

City / Township:

Alternate Text for Visual:

This graphic shows an example of errors in the original National Wetland Inventory data and the improved accuracy of the updated data. It also provides a graphical depiction of the current status and timeline for the project. The imagery acquisition should be 100% complete by the end of calendar year 2014. The wetland mapping updates can be completed by June 30, 2018.

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

PROJECT TITLE: Completing the National Wetland Inventory Update for Minnesota

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 have lost more than 90 percent of their original wetlands. The function and quality of remaining wetlands are often impaired. Updating the National Wetland Inventory (NWI) is a key component of a strategy to monitor and assess wetlands to ensure healthy watersheds 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. Unfortunately, the original NWI is 30 years out-of-date and not very accurate in many locations, partly due to its age and partly due to the limitations of the mapping technology at the time it was produced.
- NWI is an important screening tool for land use planning and for evaluating potential wetland impacts. Having accurate wetland inventory data is critical for state, regional, and local agencies when evaluating the potential impact of proposed projects and striving to preserve the integrity of our remaining wetlands. 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 evaluating these impacts. 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 wetland restoration and conservation planning. The NWI includes information about wetlands that helps identify potential restoration opportunities such as partially drained wetlands. In addition, the updated NWI will provide enhanced attributes to support assessment of wetland functions like flood storage capability, water quality protection, and wildlife habitat. Information on which wetlands are providing what benefits helps conservation professionals make better decisions about where to use restoration funding.

We are proposing to complete the statewide update of NWI maps for Minnesota using modern, high resolution imagery and elevation data (lidar). This project phase will:

- Update NWI maps for all 34 remaining counties in Minnesota (39,800 mi^2)
- Complete the field verification of the updated NWI data

Through previous project phases, we have already acquired statewide high-resolution (0.5 meter & 1-foot) aerial imagery. The imagery data are freely available through MnGeo's online imagery service and are being used by numerous federal, state, and local partners for a variety of uses. For example, the Pollution Control Agency has used this imagery to support watershed restoration plans for the Big Fork and Little Fork rivers.

Updated NWI data for east-central Minnesota (7,150 mi^2) have already been completed and are being widely used. For example, researchers at the U of M have used the data to develop improved methods for gathering waterfowl census information. Another 23, 800 mi^2 of updated data for southern Minnesota will be complete by spring 2015 and another 13,800 mi^2 of data for northeastern Minnesota will be complete by spring 2016.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Updated Wetland Maps for Central and Northwestern Minnesota **Budget: $2,629,480**

This activity will produce updated wetland maps for 34 counties in central and northwestern MN (attached map). Map production will be conducted by contractors under the supervision of the DNR and will be based on methods developed by the U of M through a previous phase of this project. This work will consist of digital

image processing, photo-interpretation, topographic analysis of lidar data, and analysis of soils and forest inventory maps to create an initial set of draft data. These data will be reviewed by the DNR as well as local users of the data and any errors will be corrected by the vendor before conducting the final quality control review. Completed digital map data will be available to the public through both state and federal websites.

Outcome	Completion Date
1. Updated draft NWI data for 34 counties in central and northwestern MN (45%)	*09/30/2018*
2. Correct data based on review comments and produce final wetland boundary data (35%)	*01/31/2019*
3. Add enhanced attributes for wetland functions (15%)	*03/31/2019*
4. Conduct final QA/QC checks (4%)	*05/51/2019*
5. Provide final project documentation and metadata (1%)	*06/30/2019*

Activity 2: Collecting Ground-Truth Data and Digital Data Management **Budget: $143,130**

Ground-truth data collection will include a field-based assessment of wetland type for 500 sites in an area of northwestern Minnesota. The data acquisition area covers about 20,000 mi^2. These data will be used to assess the accuracy of the wetland maps. To maintain the independence of the data, these data will not be shared with the mapping contractor. This activity also includes cost for protecting the state's investment by providing secure data management and back-up for the massive amount of digital data generated by this project through the end of the project life cycle.

Outcome	Completion Date
1. Field validation data acquisition for 17 counties in northwestern MN (80%)	*12/01/2016*
2. Data storage and back-up systems for imagery and wetland GIS data (20%)	*09/30/2015*

III. PROJECT STRATEGY

A. Project Team/Partners

TheUMN Remote Sensing Laboratory will receive $100,000 for Activity 2 (field data acquisition). Other 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. Project Impact and Long-Term Strategy

The NWI provides critical baseline data that inform many wetland management actions and policies. Throughout the project, we have realized some cost-savings. These cost-savings make it more feasible to complete the project in five phases instead of the original plan for six phases. So far, we have received $4.15 million from ENTRF. We have also received about $1 million from other partners for project enhancements above and beyond the original scope. We have completed 100% of the methods evaluation and imagery acquisition, as well as 82% of field validation data acquisition. Wetland map updates have been completed or are in process for about 55% of the state. **This phase will complete the overall project**.

C. Timeline Requirements

This project is a phase of a larger project. The project was designed so that the data required for updating wetland maps for any given phase are collected in the previous phase and that field validation data are acquired during the growing season as contemporaneously as possible with the imagery acquisition (attached project timeline). All imagery data have been previously acquired.

2015 Detailed Project Budget

Project Title: Updating the National Wetland Inventory for Minnesota - Phase 5

IV. TOTAL ENRTF REQUEST BUDGET - Three Years

BUDGET ITEM	AMOUNT
Personnel: DNR project manager - 0.65 FTE for three years (78% salary, 22% benefits)	$ 255,000
Contracts: Create initial draft NWI data for 34 counties (39,800 mi^2), incorporate review comments from DNR and other data users, add additional wetland function attributes, create final data, run QA/QC checks, and provide final project report - TBD through competitive bid contract	$ 2,040,000
Contracts: University of Minnesota - Collect "ground-truth" data for 17 counties (20,000 mi^2)	$ 100,000
Equipment/Tools/Supplies: Provide secure digital data storage and back-up for 32 terabytes of input data as well as final GIS data to protect investment	$ 23,000
Equipment/Tools/Supplies: Maintence and updates for specialized software for stereo imagery review, printing	$ 2,000
Travel: Travel for field checking of draft wetland data, meetings with local users of the data, progress report presentations	$ 5,000
Other: Services provided by DNR Resource Assessment Office in Grand Rapids for compiling and preparing inpout data as well as quality assurance review of draft data	$ 200,000
Additional Budget Items: Direct support services. DNR's direct and necessary costs pay for activities that are directly related to and necessary for accomplishing appropriated programs/projects. In addition to itemized costs captured in our proposal budget, direct and necessary costs cover HR Support ($2,586), Safety Support ($640), Financial Support ($30,225), Communication Support ($1,141), IT Support ($4,432), Planning Support ($704), Procurement Support ($235), and division and regional program management ($107,648) that are necessary to accomplishing funded programs/projects	$ 147,610
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 2,772,610

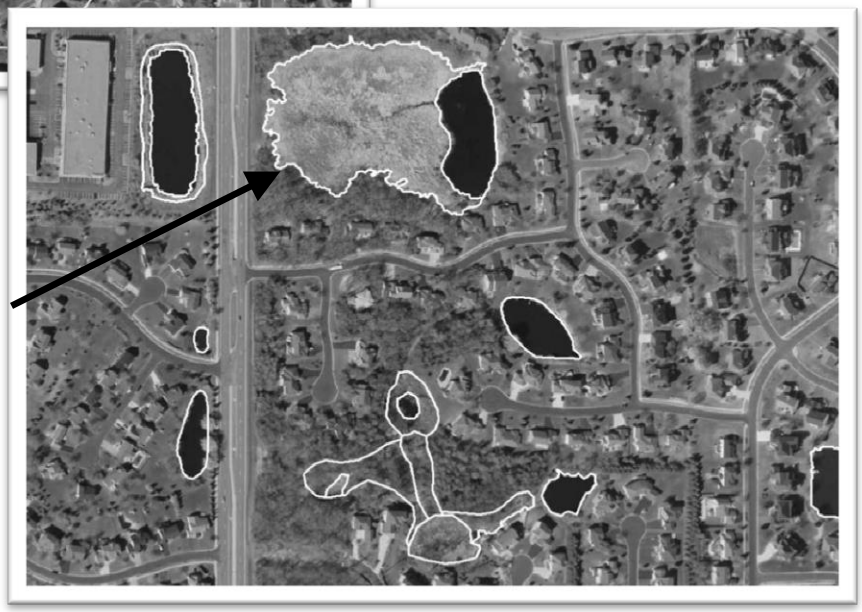
V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period: During the first four phases of the project we were able to secure $571,173 in local and federal matching funds for imagery acquisition. We also received or expect to receive approximately $100,000 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	Pending
Other State $ To Be Applied To Project During Project Period: During the first four phases of the project we were able to secure $292,438 in other state funds for imagery acquisition.	See note at left	Pending
In-kind Services To Be Applied To Project During Project Period: In-kind labor contribution from DNR Wetland Program Coordinator.	$ 10,000	Pending
Funding History:		
Env. Trust Fund 2008 (M.L. 2008 Chap. 367, Sec. 2 Subd. 5(a)) - Project closed June 30, 2011	$ 550,000	100% Spent
Env. Trust Fund 2010 (M.L. 2010, Chap. 362, Sec. 2, Subd. 3b) - Project extended to close June 30, 2014	$ 1,100,000	100% legally obligated / 99% spent
Env. Trust Fund 2011 (M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03d) - Project to close June 30, 2015	$ 1,500,000	99% legally obligated / 30% spent
Remaining $ From Current ENRTF Appropriation:		
Env. Trust Fund 2013 (M.L. 2013, Chp. 52, Sec. 2, Subd. 03d) - Project to close June 2016	$ 1,000,000	99% legally obligated / 5% spent

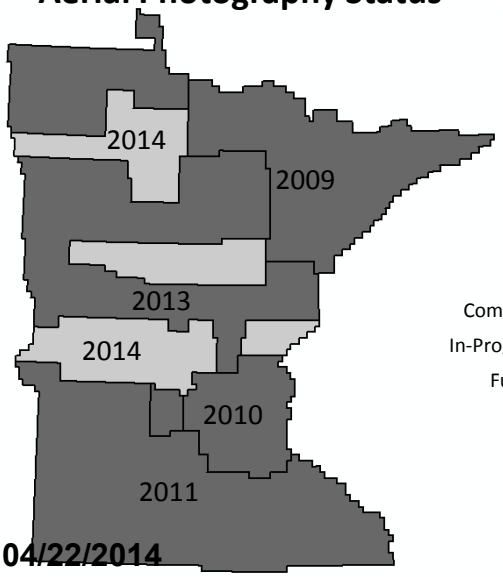
The National Wetland Inventory Update for Minnesota

Old inaccurate wetland boundaries on 2010 image

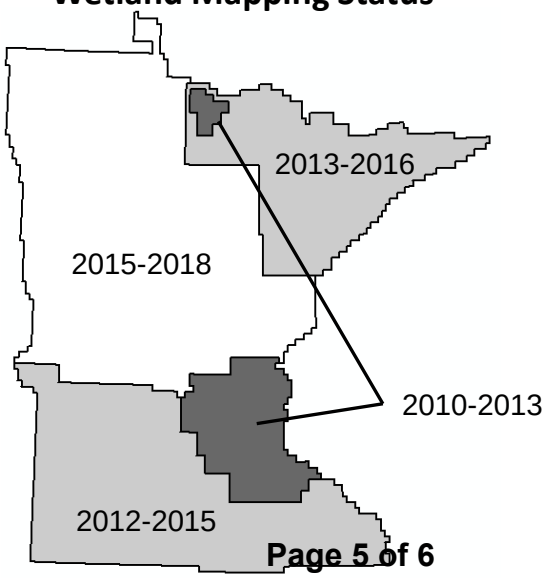
New accurate wetland boundaries on 2010 image



Aerial Photography Status



Wetland Mapping Status



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.