

**Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)**

LCCMR ID: 019-A3

Project Title:

Updating the Minnesota Wetlands Inventory: Phase 2

LCCMR 2010 Funding Priority:

A. Water Resources

Total Project Budget: \$ \$2,222,820

Proposed Project Time Period for the Funding Requested: 3 years, 2010 - 2013

Other Non-State Funds: \$ \$0

Summary:

The overall goal of this ongoing project is to update wetland inventory maps for all of Minnesota. This phase will update wetland maps for the Northeast and Metro regions.

Name: Steve Kloiber

Sponsoring Organization: DNR

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St. Paul MN 55155

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Email: steve.kloiber@dnr.state.mn.us

Fax: _____

Web Address: http://www.dnr.state.mn.us/eco/wetlands/index.html

Location:

Region: Statewide

County Name: Anoka, Carver, Chisago, Cook, Dakota, Goodhue, Hennepin, Isanti, Lake, Ramsey, Rice, Scott, Sherburne, St. Louis, Washington, Wright

City / Township:

_____ Knowledge Base	_____ Broad App.	_____ Innovation
_____ Leverage	_____ Outcomes	
_____ Partnerships	_____ Urgency	_____ TOTAL

MAIN PROPOSAL

PROJECT TITLE: Updating the National Wetlands Inventory (NWI) for Minnesota: Phase 2

I. PROJECT STATEMENT

This is a continuation of the NWI Update project originally recommended for funding by the LCCMR beginning in FY08. This project is needed because the original NWI is severely out of date and, in some areas of the state, was not very accurate to begin with. Wetland inventories are an essential tool for effective wetland management, protection, and restoration. Such inventories provide baseline information for assessing the effectiveness of wetland policies and management actions.

The overall goal of this project is to improve wetland protection and management in Minnesota by updating wetland inventory maps for the state. The goal for this specific proposal is to produce updated wetland maps for 13 counties encompassing the metro area and three counties in northeast Minnesota (see figure). Subsequent LCCMR proposals will seek funding to update the NWI in other regions. The University of Minnesota will develop mapping standards and methods aimed at producing the most accurate maps for the least cost. The actual wetland mapping will be conducted by contractors. All wetland map data will be available free of charge to the public.

A side benefit of this project is that we anticipate that it will result in the employment and training of between 15 and 20 full-time equivalent staff. These staff will learn valuable skills in wetland identification and delineation as well as in geographic information systems.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Methods Development

Budget: \$ 113,420

Complete the analysis of wetland mapping methods in order to identify the most accurate and cost effective techniques for use in wetland map production. Our 2008 LCCMR proposal requested funding for a three-year methods analysis and development effort, including pilot mapping projects in at least three distinct ecoregions of the state. We received funding for two years and two pilot areas. For this (2010) proposal, we are requesting funding to continue the methods development in a third pilot area. This component of the project is being conducted by the University of Minnesota's Remote Sensing Laboratory.

Deliverable

Completion Date

- | | |
|---------------------------------------------------|-----------|
| 1. Updated wetland inventory data for pilot areas | July 2011 |
| 2. Final mapping protocols for all areas | July 2011 |

Result 2: Updated Wetland Maps for Greater 13-County Metro Area Budget: \$ 425,060

Produce updated wetland maps for 13 counties encompassing the Twin Cities metro area (see figure). This area is a high priority for updating because land use changes have rendered the original maps inaccurate and because of continuing development pressure. The map production will be conducted by private, academic or government contractors and will consist of digital photo-interpretation and ground truthing for quality control. Completed digital map data will be available to the public through several websites, including the DNR and the U.S. Fish and Wildlife Service.

Deliverable

Completion Date

- | | |
|---------------------------------------------------|----------------|
| 1. Updated digital wetland inventory maps on-line | September 2012 |
|---------------------------------------------------|----------------|

Result 3: Updated Wetland Maps for Northeast Minnesota Budget: \$ 1,169,180

Produce updated wetland maps for Cook, Lake and St. Louis Counties. This area is a high priority for mapping because the original NWI maps were not very accurate and because of mining and

recreational development pressure. Mapping in this area will be more expensive than in the metro region because interpretation of the imagery in forested areas takes more time. The map production will be conducted by private, academic or government contractors and will consist of digital photo-interpretation and ground truthing for quality control. Completed digital map data will be available to the public through several websites, including the DNR and the U.S. Fish and Wildlife Service.

Deliverable

Completion Date

1. Updated digital wetland inventory maps on-line

September 2012

Result 4: Imagery Acquisition for Phase 3

Budget: \$ 515,160

Acquire digital color-infrared imagery under leaf-off conditions for the 3rd phase of this project (see figure). While digital imagery was collected across the entire state in 2008, this imagery was collected primarily during summer leaf-on conditions, thus limiting its use for wetland mapping to non-forested portions of the state. The last time publicly available leaf-off imagery was collected for this part of the state was in 1991. This imagery will be used to update wetland maps for the next mapping phase. This imagery will also be made freely available to the public for other beneficial uses.

Deliverable

Completion Date

1. Digital color-infrared imagery in leaf-off condition

September 2011

III. PROJECT STRATEGY

A. Project Team/Partners

Funded partners (Env. Trust Fund): Minnesota DNR (\$2,039,820) and University of Minnesota (\$183,000).

Other collaborators providing in-kind services: U.S. Fish and Wildlife Service, Board of Water and Soil Resources, Minnesota Pollution Control Agency, and Land Management Information Center.

B. Timeline Requirements

This proposal is a continuation of the previously funded project to update the NWI statewide, which began in July 2008. This phase of the project will begin in July 2010 and conclude in December 2012. Updated wetland mapping for the entire state is scheduled to be completed in 2016, pending additional funding (see attached timeline).

C. Long-Term Strategy

In 2006, a group of state and federal agencies published, "A Comprehensive Wetland Assessment, Monitoring and Mapping Strategy for Minnesota."¹ This strategy identified a clear need to update the NWI. We propose to accomplish this in four phases. The first phase of the project (already funded) is currently laying the groundwork for the actual map production by assessing current mapping methods, identifying user needs, developing mapping standards and acquiring some of the remote imagery needed to produce updated maps. This proposal would begin the mapping updates, focusing on an area encompassing the Twin Cities metro area and on the Arrowhead region. These areas were selected as highest priority because 1) the existing maps are most out of date due to land use changes or were not very accurate to begin with; 2) they have high development pressure and resource management needs. The third phase of the project will address central Minnesota and the final phase will focus on the southern and western portion of the state. The overall cost of updating the NWI statewide is expected to be \$7 million. We anticipate submitting future LCCMR proposals on a biennial basis and will continue to explore other sources of funding. See the attached timeline for the project.

¹ Available at: http://files.dnr.state.mn.us/eco/wetlands/wetland_monitoring.pdf

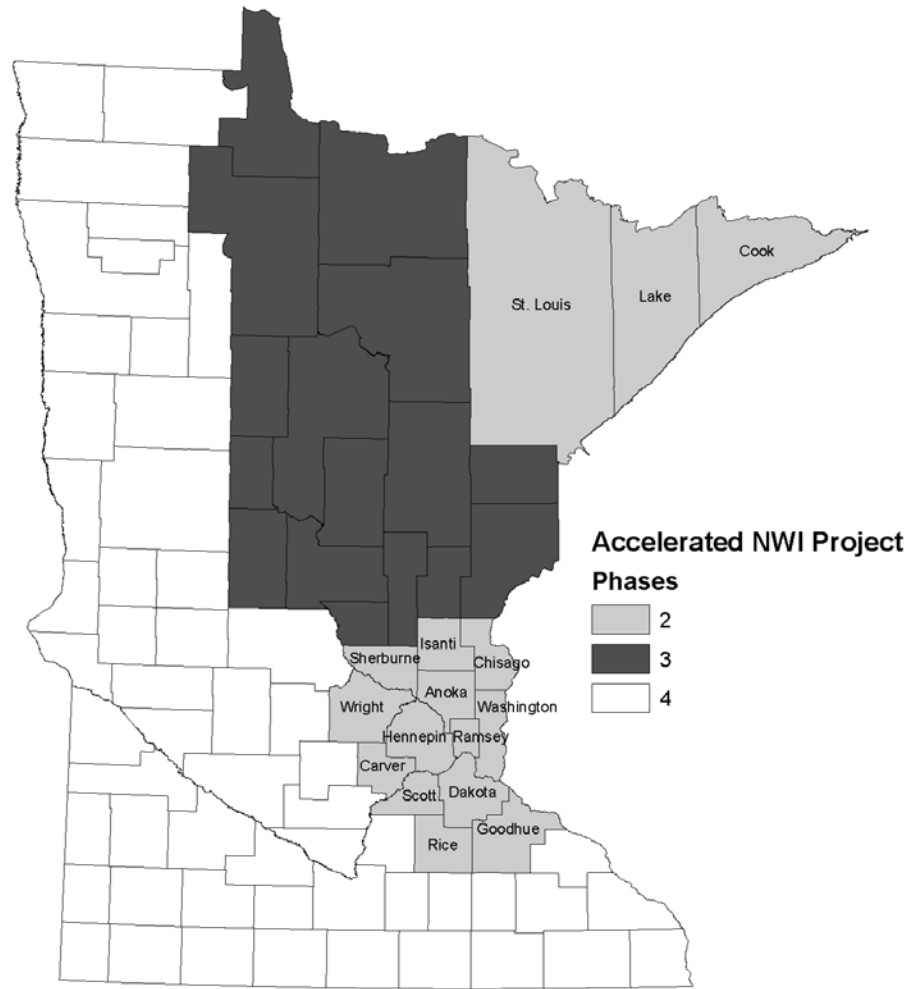
Project Budget

IV. TOTAL PROJECT REQUEST BUDGET (3 years)

BUDGET ITEM (See list of Eligible & Non-Eligible Costs, p. 13)	AMOUNT
Personnel: MnDNR Project Coordinator, 2 yrs, beginning 07/2010 (08-09 already funded under previous Env. Trust Fund grant)	\$ 153,700
Contracts:	
University of Minnesota, Remote Sensing and Geospatial Analysis Laboratory -- for analysis of current remote sensing and wetland mapping technologies and	\$ 106,000
Acquisition of digital aerial imagery for phase 3 mapping area under spring, leaf-off conditions.	\$ 477,000
University of Minnesota, Remote Sensing and Geospatial Analysis Laboratory -- for design and implementation of a field validation sampling program.	\$ 87,980
Technical services contract for imagery acquisition, photointerpretation, QA/QC and digital wetland mapping in selected counties of Minnesota	\$ 1,366,340
Equipment/Tools/Supplies: Three handheld mobile data acquisition devices for acquiring field validation data and stereo-viewing software and hardware for in-office QA review	\$ 21,200
Acquisition (Fee Title or Permanent Easements): N/A	
Travel: <i>In-state mileage and lodging for DNR project coordinator</i>	\$ 6,360
Travel: <i>out-of-state travel to scientific conferences to give presentations on our project and to learn from other engaged in similar efforts.</i>	\$ 4,240
Additional Budget Items: NA	
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 2,222,820

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: During the first phase grant (Env. Trust Fund 2008), we were able to find local and federal matching funds for data acquisition totalling \$49,999. We anticipate that similar matching funds may become available for this 2nd phase grant period.	See note at left	<i>Pending</i>
Other State \$ Being Applied to Project During Project Period: During the first phase grant (Env. Trust Fund 2008), we were able to secure \$146,000 in matching funds for data acquisition. We anticipate that similar matching funds may become available for this 2nd phase grant period.	See note at left	<i>Pending</i>
In-kind Services During Project Period: <i>In-kind labor contribution from DNR Wetland Program Coordinator</i>	\$ 10,000	
Remaining \$ from Current Trust Fund Appropriation (if applicable): The amount spent is \$35,464, the amount legally obligated is \$357,000, and the amount remaining is shown in the box to the right. Funds status of the current grant from Env. Trust Fund 2008 (M.L. 2008 Chap. 367, Sec 2 Subd. 5(a)).	\$ 157,536	<i>Unspent</i>
Funding History: Env. Trust Fund 2008 (M.L. 2008 Chap. 367, Sec. 2 Subd. 5(a))	\$ 550,000	



* Phase 1 includes planning, methods development, and data acquisition. It is not a map production phase.

Task Name	Start	Finish	2009				2010				2011				2012				2013				2014				2015				2016				2017	
			Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
Project Management	Tue 7/1/08	Fri 6/30/17	[Timeline bar spanning from Q2 2009 to Q2 2017]																																	
Phase 1	Tue 7/1/08	Fri 8/27/10	[Timeline bar spanning from Q2 2009 to Q4 2010]																																	
Phase 2	Thu 7/1/10	Thu 1/3/13	[Timeline bar spanning from Q1 2011 to Q4 2012]																																	
Phase 3	Mon 7/2/12	Fri 1/2/15	[Timeline bar spanning from Q1 2013 to Q4 2014]																																	
Phase 4	Tue 7/1/14	Fri 12/30/16	[Timeline bar spanning from Q1 2015 to Q2 2017]																																	

Project Manager Qualifications

Steven Michael Kloiber, Ph.D., P.E.
Minnesota Department of Natural Resources
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(651) 259-5164

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. Steve has authored or co-authored more than a half dozen peer-reviewed journal articles or book chapters. He has managed dozens of projects, ranging in size from ten thousand to over a million dollars.
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
SELECTED PUBLICATIONS	Kloiber, S.M. 2006. Estimating nonpoint source pollution for the Twin Cities metropolitan area using landscape variables. <i>Water, Air, Soil, Poll.</i> 172:313-335. Kloiber, S.M., Brezonik, P.L., Olmanson, L.G. and Bauer, M.E. 2002. A procedure for regional lake water clarity assessment using Landsat multispectral data. <i>Remote Sens. Environ.</i> 82:38-47. Kloiber, S.M., Brezonik, P.L. and Bauer, M.E. 2002. Application of Landsat imagery to regional-scale assessments of lake clarity. <i>Water Research.</i> 36:4330-4340.
