

**Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 010-A

A Better System for Wetland Inventory Data Stewardship

Category: A. Foundational Natural Resource Data and Information

Sub-Category:

Total Project Budget: \$ 291,000

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

The state spent \$7 million to update the wetland inventory for Minnesota. We propose to develop a cost-effective system to streamline ongoing data maintenance and avoid another expensive future overhaul.

Name: Steve Kloiber

Sponsoring Organization: MN DNR

Title: Wetland Monitoring Coordinator

Department: Ecological and Water Resources

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St. Paul MN 55155

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Email steve.kloiber@state.mn.us

Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

This image highlights the importance of ongoing maintenance of the updated National Wetland Inventory. The figure includes two aerial images of the same site from different times. The image taken in 2010 shows eight wetlands on an undeveloped suburban parcel. The image taken in 2015 shows that two of the wetlands have been completely filled and two others have been significantly altered by development on the site.

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency
<input type="checkbox"/>	Capacity	<input type="checkbox"/>	Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>	TOTAL <input type="checkbox"/> %
<input type="checkbox"/>	If under \$200,000, waive presentation?						



PROJECT TITLE: A Better System for Wetland Inventory Data Stewardship

I. PROJECT STATEMENT

We propose to develop a cost-effective system to streamline the ongoing maintenance of the National Wetland Inventory (NWI) for Minnesota. The state has spent \$7 million from the Environmental and Natural Resources Trust Fund to update and enhance the original NWI. The DNR is committed to the stewardship of this foundational dataset for natural resource conservation planning. However, to make the maintenance process cost-efficient, we are proposing to develop a two-part system that incorporates an automated remote sensing procedure to identify potential wetland changes as well as a web-based tool for users of the data to report changes and corrections. The overall objective is to ensure that the NWI for Minnesota remains accurate and up to date, so that we can avoid the significant expense of another overhaul of the data in the future.

The NWI is the only comprehensive inventory of wetlands for Minnesota and it is a key component of the state’s strategy to protect and restore wetland health in support of healthy watersheds and clean water.

- NWI is an important screening tool for land use planning and for evaluating potential wetland impacts. Having accurate wetland inventory data is critical for evaluating the potential impact of proposed projects and carefully siting these projects to preserve the integrity of our remaining wetlands.
- 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. This information helps improve decisions about where to use limited restoration funding.

The NWI update for Minnesota will be completed in 2018, providing statewide digital map data showing the location and extent of wetlands, along with descriptive attributes for each mapped wetland. Developing a system to aid the efficient maintenance of this important dataset is part of an overall data governance effort to protect the state’s investment.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: *Developing a web-based tool for users to request updates and corrections to the NWI* **ENRTF BUDGET: \$61,000**

Ongoing updates to the NWI will be needed to address wetland gains or losses as well as to address occasional errors. Frontline users of the NWI data, such as certified wetland delineators and other wetland professionals from local government units, are often the first to notice areas that require updates. This activity would create a web-based tool for these NWI users to request updates.

Outcome	Completion Date
1. Define user requirements and develop a prototype application for reporting change	January 2020
2. Conduct training and user acceptance testing	July 2020
3. Make revisions based on user testing and final roll-out	January 2021



**Environment and Natural Resources Trust Fund (ENRTF)
2019 Main Proposal**

Activity 2: *Developing a remote sensing procedure for automated detection of wetland change to guide maintenance updates of the NWI*

ENRTF BUDGET: \$230,000

For the automated wetland change detection, we propose to collaborate with the University of Minnesota. Conceptually, this system will compare satellite images on an annual basis to identify where something has changed. The satellite change data will improve the efficiency and reduce the cost of a separate aerial imagery based update that will be conducted by the DNR using other funding sources. The University will provide turnkey training to the data stewards at the DNR.

Outcome	Completion Date
<i>1. Evaluate cost-effectiveness of various automated change detection alternatives</i>	<i>July 2020</i>
<i>2. Develop and implement a full-scale method for the preferred alternative</i>	<i>July 2021</i>
<i>3. Provide turnkey training to DNR data stewards</i>	<i>January 2022</i>

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Name	Title	Affiliation	Role
Joe Knight	Director of the Remote Sensing Laboratory	University of Minnesota	Principal Investigator for Activity 2

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

The DNR is committed to proper data governance for the NWI. This project will enable long-term maintenance of foundational natural resource data needed for effective wetland protection, restoration and management. This grant will fund the infrastructure costs for this maintenance. The long-term operation of the program will be funded from a combination of efficiencies gained and other funding sources.

V. TIME LINE REQUIREMENTS:

The two activities under this grant proposal can run concurrently. We anticipate that the development, testing, and deployment of the web-based change-reporting tool can be completed in 18 months. The evaluation of alternative automated change methods, full-scale methods development, and turnkey training can be completed in 30 months.

VI. SEE ADDITIONAL PROPOSAL COMPONENTS:

- A. Proposal Budget Spreadsheet**
- B. Visual Component or Map**
- C. Project Manager Qualifications and Organization Description**

2019 Proposal Budget Spreadsheet

Project Title: A Better System for Wetland Inventory Data Stewardship

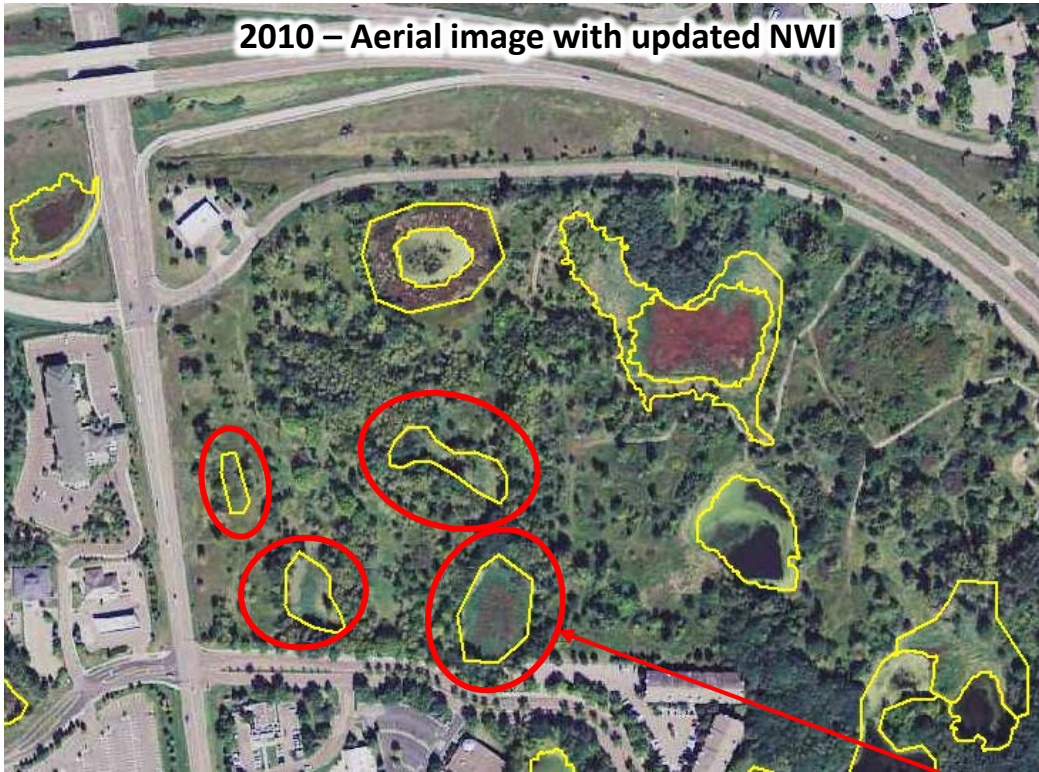
IV. TOTAL ENRTF REQUEST BUDGET 3 years

BUDGET ITEM (See "Guidance on Allowable Expenses")	AMOUNT
Professional/Technical/Service Contracts: University of Minnesota will evaluate alternative automated remote sensing wetland change methods. The preferred cost-effective method will be selected for full-scale implementation. The UMN will provide turnkey training to the DNR and MNIT@DNR to support ongoing maintenance of the National Wetland Inventory.	\$ 200,000
Professional/Technical/Service Contracts: MNIT@DNR will design, build, test, and deploy a web-based application to allow wetland managers to report wetland losses and wetland restorations as well as to report any errors in the wetland inventory. MNIT staff will also provide user support for this application and project management.	\$ 90,000
Travel: In-state travel to support training workshops for local wetland professionals.	\$ 1,000
Additional Budget Items: *Direct and Necessary expenses: DNR has determined that this project is exempt from direct and necessary expenses.	\$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 291,000

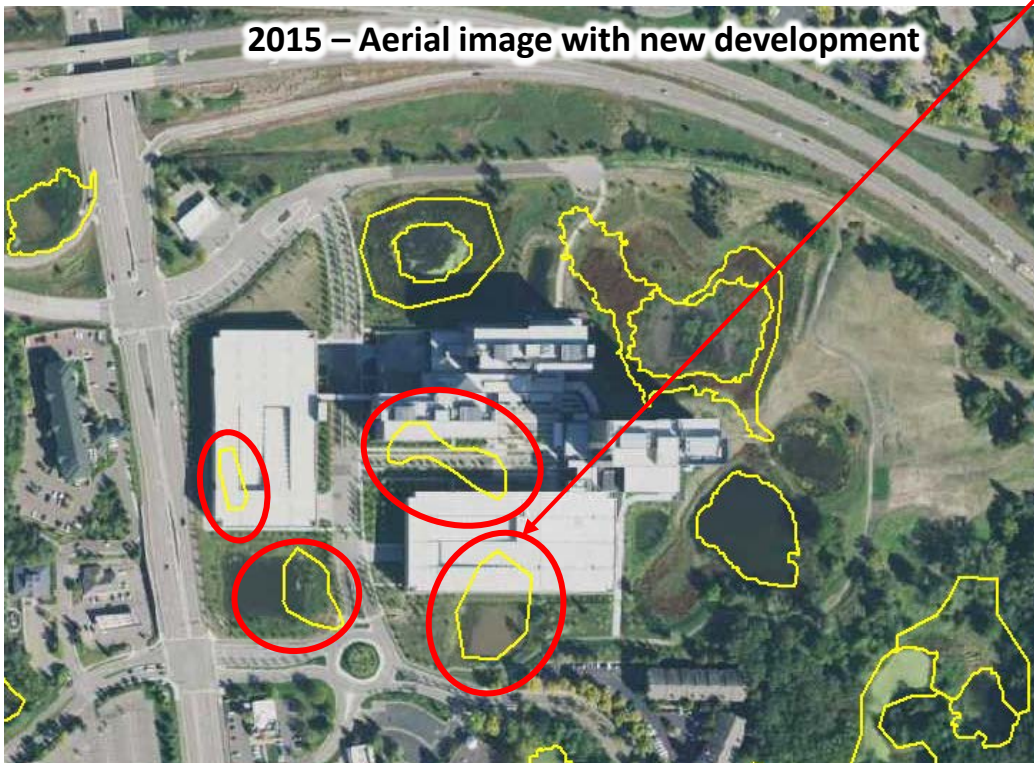
V. OTHER FUNDS (This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period: We have started discussions regarding a potential collaboration effort with the USFWS and an academic researcher from another institution that has some seed funding from the federal government for a potentially similar automated change detection.	see note	
Other State \$ To Be Applied To Project During Project Period:	\$ -	
In-kind Services To Be Applied To Project During Project Period: I-kind labor contribution from the DNR Wetland Program Coordinator	\$ 10,000	
Past and Current ENRTF Appropriation:		
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 closed June 30, 2014	\$ 1,100,000	100% Spent
Env. Trust Fund 2011 (M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03d) - Project closed June 30, 2015	\$ 1,500,000	100% Spent
Env. Trust Fund 2013 (M.L. 2013, Chp. 52, Sec. 2, Subd. 03d) - Project closed June 30, 2016	\$ 1,000,000	100% Spent
Env. Trust Fund 2015 (M.L. 2015, Chp. 52, Sec. 2, Subd. 03d) - Project to close June 30, 2018	\$ 1,500,000	65% Spent
Env. Trust Fund 2016 (M.L. 2016, Chp. 186, Sec. 2, Subd. 03e) - Project to close June 30, 2019	\$ 1,500,000	40% Spent
Other Funding History: During the data acquisition and wetland re-mapping phases of the NWI update, we received \$671,000 in non-state matching funds (local plus federal). We also secured \$292,000 in other state funds.	\$ 963,000	100% Spent

Maintaining Wetland Inventory Accuracy Over Time



In this example, a site was developed since the update of the NWI in 2010. The image below shows how the site looked in 2015.



This proposal will develop a cost-effective system for identifying locations of wetland change. This information will help target needed updates.

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.