

**Environment and Natural Resources Trust Fund  
2011-2012 Request for Proposals (RFP)**

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**LCCMR ID: 021-A2**

**Project Title:** Wetland Assessment Web-Tool Using Historic Aerial Imagery

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**Category:** A2. Natural Resource Data and Information: Distribution, Application, and Training

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**Total Project Budget: \$** \$285,000

**Proposed Project Time Period for the Funding Requested:** 3 yrs, July 2011 - June 2014

**Other Non-State Funds: \$** 0

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**Summary:**

Improve wetland inventories, restorations, and protection by providing statewide coverage and instant access to a time series of remotely sensed digital photography and contextual climate data essential for wetland delineation.

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**Sponsoring Organization:** Board of Water and Soil Resources

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**Location**

**Region:** Statewide

**Ecological Section:** Statewide

**County Name:** Statewide

**City / Township:**

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<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 Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>	Employment	<input type="checkbox"/>	TOTAL <input type="checkbox"/> %

# 2011-2012 MAIN PROPOSAL

## PROJECT TITLE: Wetland Assessment Web-Tool Using Historic Aerial Imagery

### I. PROJECT STATEMENT

The overall goal of this project is to improve wetland inventory, protection, and restoration efforts by increasing the efficiency, accuracy, and effectiveness of natural resource management agencies' activities. The project will result in statewide access to remotely sensed digital aerial imagery for most years from 1979 through 2010, with the contextual climatological data necessary for wetland identification and delineation provided for each photo. The benefits of this project will include reduced costs to local governments, improved consistency between resource management agencies, better service to landowners, increased accuracy of wetland delineations and inventories, and improved compliance with wetland protection programs. The project will also provide baseline data that can be used to assess long-term changes to wetlands due to climate, drainage activities, and other influences.

Access to historic aerial imagery is essential for wetland identification, delineation, inventory, and restoration activities, and is a necessary part of implementing the Minnesota Wetland Conservation Act (WCA). Aerial slides collected by the United States Department of Agriculture (USDA) are a vital source of information for these efforts. The availability of USDA imagery is currently inconsistent across the state and most are not readily available for use by state and local governments or the public. Obtaining access, viewing, and correlating the slides to the necessary contextual climatological data is often difficult and time consuming, resulting in inadequate or improper use of imagery, increased costs, and reduced effectiveness of wetland protection programs. Limited access to slides creates difficulties for local governments to adequately review projects and provide assistance for high volumes of landowner requests.

The USDA Natural Resources Conservation Service (NRCS) and the Board of Water and Soil Resources (BWSR) recently signed a Memorandum of Understanding for implementation of WCA and the "Swampbuster" provisions of the federal farm bill in Minnesota. Through this partnership, NRCS will make available all existing aerial imagery, including both slides and imagery that were previously digitized. This project will complete the digitizing of all remaining slides, catalog all available imagery statewide from 1979 through 2010 in one central location accessible through the internet, and create a web-tool that will link each slide with the State Climatology Office database to instantly provide contextual climatic information.

The Department of Natural Resources (DNR) is currently coordinating the process of updating the National Wetlands Inventory (NWI) for Minnesota. While the NWI update will rely on other statewide data layers, a historic timeline of aerial photos will serve as an additional data source that will complement other data to provide greater detail and improved mapping accuracy for many agricultural wetlands and areas where other data sources are inconclusive.

### II. DESCRIPTION OF PROJECT ACTIVITIES

**Activity 1: Scanning and Acquisition of USDA Aerial Slides** Budget: \$200,000  
Existing 35mm slides will be scanned according to the standards and procedures developed by NRCS, and all existing digital photos will be acquired. Scanned photos will be checked for completeness and quality.

Outcome	Completion Date
1. Conversion of approximately 400,000 existing 35mm slides to useable digital format for web-posting, sharing, geo-referencing, and other uses.	July 2013
2. Obtain approximately 1.1 million existing digital photos currently existing in various USDA offices to complete full coverage throughout Minnesota.	July 2013

**Activity 2: Creation of Wetland Assessment Web-Tool**

Budget: \$70,000

The BWSR website will be updated to provide necessary web server storage and capacity. Digital photos will be cataloged by year, county, township, and section. Each photo will be linked to the DNR Waters Climatology Office database and, when selected by the user, will automatically be correlated with the contextual climatologic data necessary to utilize the photo for wetland identification purposes. The tool will be tested by agency staff prior to full release.

Outcome	Completion Date
1. Creation of web-tool and posting of photos.	November 2013
2. Utilization of the digital imagery for improved NWI update results.	Per NWI schedule

**Activity 3: Training for Aerial Imagery Interpretation**

Budget: \$15,000

BWSR will partner with the University of Minnesota Wetland Delineator Certification Program (WDCP) to provide training on interpreting aerial imagery. Approximately 5 training sessions will be provided across the state. The target audience will include staff from local governments, BWSR, NRCS, DNR, and other wetland professionals. The training will cover updated methods and procedures, recognizing and interpreting hydrologic and vegetative signatures, and the applicability to wetland identification, inventory, and protection programs. The number of participants and course evaluation responses will be used to evaluate the sessions.

Outcome	Completion Date
1. Development of training module.	December 2013
2. Completion of approximately five training sessions across MN.	June 2014
3. Increased use of aerial photo analysis in wetland delineation and project review, improved accuracy and efficiency, and increased consistency between wetland protection programs.	Ongoing

**III. PROJECT STRATEGY****A. Project Team/Partners**

Les Lemm, BWSR Wetland Conservation Act Coordinator (project manager); Paul Flynn, NRCS Assistant State Conservationist (USDA coordination and access to slides); Steve Kloiber, DNR Wetland Monitoring Coordinator (NWI Update, quality control); the University of Minnesota WDCP (funding provided for training coordination); DNR Waters State Climatology Office (Climatological data and web linking); Aaron Spence, BWSR GIS Specialist (funding provided for web posting and management), and the Fon du Lac Community College in Cloquet (funding provided for scanning of slides, provisions of work-space per contribution agreement).

**B. Timeline Requirements**

The project will be completed in three years (July 1, 2011 through June 30, 2014). Slide scanning will occur during the first two years, followed by creation of the web-based tool, cataloging of slides, and training in year three.

**C. Long-Term Strategy and Future Funding Needs**

Use of the wetland assessment web-tool will be incorporated into current wetland delineation, assessment, and mapping procedures and ongoing training. The web-tool will be maintained through the regular operation of the agency's website. Additional photography obtained in future years can be periodically added to the database. Future efforts could include linking the web-tool to the products of the NWI update, Light Detection and Ranging (LiDAR) topography mapping, and the geo-referencing of select photos for use in Geographic Information Systems.

**2011-2012 Detailed Project Budget**  
**Wetland Assessment Web-Tool Using Historic Aerial Imagery**

**IV. TOTAL TRUST FUND REQUEST BUDGET (3 years)**

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel:</b> Web posting and management of approximately 1.5 million digital slides. Development of training module. Salary for one classified staff paid exclusively with special project funds (BWSR GIS Specialist, 1/6 annual FTE, 74% salary and 26% benefits). August 1, 2013 to November 31, 2013.	\$ 12,500
<b>Contract 1:</b> BWSR will contract with NRCS for scanning of approximately 400,000 aerial slides and acquisition of approximately 1.1 million digital images. Scanning of aerial slides will be accomplished through an existing contribution agreement between NRCS and the Fon du Lac Tribal and Community College.	\$ 200,000
<b>Contract 2:</b> BWSR will contract with a programming consultant for the creation of the web-based wetland assessment tool.	\$ 35,000
<b>Contract 3:</b> BWSR will contract with the U of M WDCP for training coordination.	\$ 5,000
<b>Contract 4:</b> BWSR will obtain an expert in recognizing and interpreting hydrologic and vegetative signatures on aerial imagery for training sessions.	\$ 5,000
<b>Equipment/Tools/Supplies:</b> New web server storage and capacity upgrades needed specifically for the substantial amount of digital data created by this project.	\$ 25,000
<b>Travel:</b> In-state mileage, meals, and lodging for training instructors.	\$ 2,500
<b>TOTAL ENVIRONMENT &amp; NATURAL RESOURCES TRUST FUND \$ REQUEST</b>	<b>\$ 285,000</b>

**V. OTHER FUNDS**

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>In-kind Services During Project Period:</b> In-kind Services During Project Period: Technical support and staff time from BWSR (\$15,000), DNR Waters Climatology Office (\$5,000), NRCS (\$127,000 for 2 FTE and computers/scanning equipment), and Fon du Lac Tribal and Community College (\$18,000 contribution agreement for work-space).	\$ 165,000	Committed
<b>Funding History:</b> NRCS has previously funded the scanning of approximately 1.1 million slides that will be utilized in this project.	\$ 700,000	Completed

## Wetland Assessment Web-Tool Using Historic Aerial Imagery

Below is an abbreviated time series of aerial photos for a single parcel showing yearly variations in several wetland areas (shown within circles). A wetland delineation based on one particular year can be very different than another year, depending on preceding climatic conditions. A time series of photos within the context of climatic conditions is essential to determine the existence and boundaries of wetlands, particularly when areas have been disturbed. The photos can also show the installation of drainage and its effect on wetlands over time.

1986 – Normal Conditions



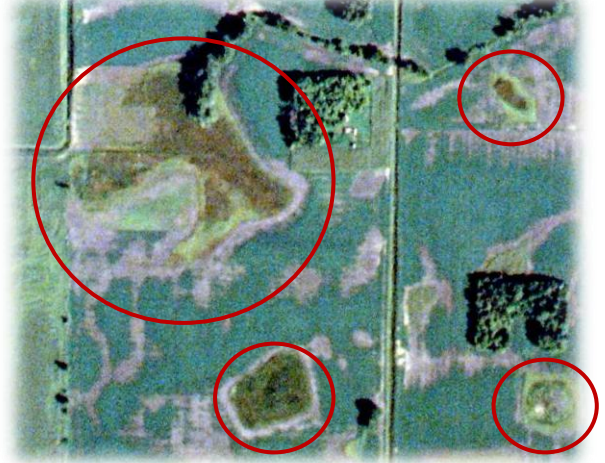
1988 – Dry Conditions



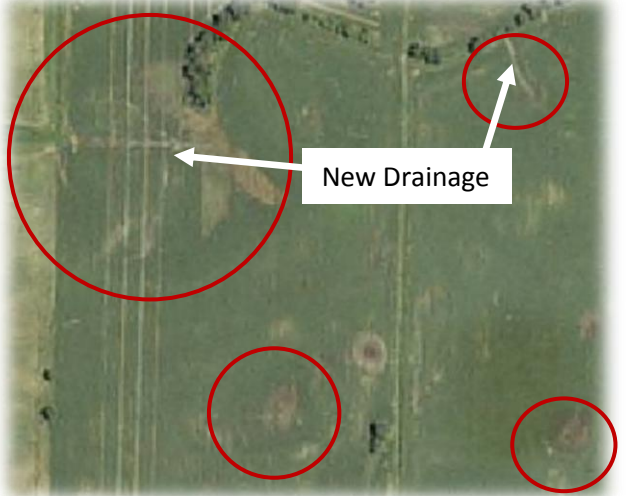
1989 – Normal Conditions



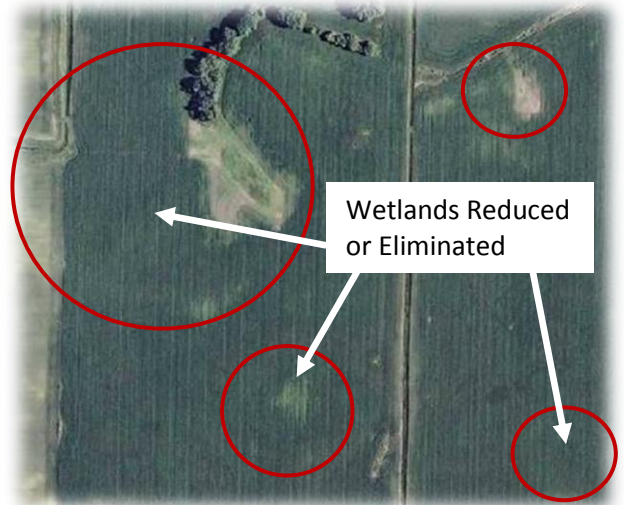
1993 – Wet Conditions



2004 – Normal Conditions



2008 – Normal Conditions



# WETLAND ASSESSMENT WEB-TOOL USING HISTORIC AERIAL IMAGERY

## Project Manager Qualifications and Organization Description

### Project Manager

Les Lemm, Wetland Conservation Act Coordinator for the Minnesota Board of Water and Soil Resources

#### Education:

M.S., Natural Resources Management, North Dakota State University, 2003

B.S., Environmental and Natural Resources Management, University of Minnesota, 1995

#### Background:

Les has served as the WCA Coordinator for the past 2 years. Prior to that, Les served 4 years as a Board Conservationist for BWSR in the metropolitan area where he worked with WCA, local water planning, implementing soil and water conservation practices, and other resource management programs. Previous experience includes working as a Natural Resource Scientist with the consulting firm of Widseth-Smith-Nolting in Brainerd and serving as the District Manager of the Lake of the Woods Soil and Water Conservation District. Les has experience and expertise both in natural resource policy and technical procedures, including wetland delineation methods.

### Organization Description

The Minnesota Board of Water and Soil Resources (BWSR) is the state soil and water conservation agency. It administers programs that prevent sediment and nutrients from entering our lakes, rivers, and streams; enhance fish and wildlife habitat; and protect wetlands. BWSR is the state's administrative agency for 91 soil and water conservation districts, 46 watershed districts, 23 metropolitan watershed management organizations, and 80 county water managers.

The BWSR mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Core functions include implementing the state's soil and water conservation policy, comprehensive local water management, and the Wetland Conservation Act as it relates to the 41.7 million acres of private land in Minnesota.