

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

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**Project Title:**

**ENRTF ID: 066-B**

Improving Wetland and Groundwater Management Through Hydrologic Monitoring

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**Category:** B. Water Resources

**Sub-Category:**

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**Total Project Budget: \$** 573,661

**Proposed Project Time Period for the Funding Requested:** June 30, 2021 (2 yrs)

**Summary:**

This project will acquire and install the equipment needed for a long-term wetland hydrology monitoring network to improve understanding of wetland hydrology and groundwater interaction, leading to improved management.

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**Name:** Doug Norris

**Sponsoring Organization:** MN DNR

**Title:** Wetlands Program Coordinator

**Department:** Ecological & Water Resources Division

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**Web Address**

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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**Alternate Text for Visual:**

Figure 1 illustrates how groundwater appropriation wells can affect water levels in nearby wetlands. A table illustrates how 60 hydrology monitoring installations will be distributed geographically and among wetland types.

<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"/>		TOTAL	<input type="checkbox"/>	%
<input type="checkbox"/> If under \$200,000, waive presentation?								



**PROJECT TITLE:** Improving wetland and groundwater management through hydrologic monitoring

## **I. PROJECT STATEMENT**

Groundwater and wetlands are frequently connected in ways that are not well understood. **This proposal seeks the initial capital funding to acquire and install the equipment needed for a long-term wetland hydrology monitoring network to address the lack of foundational data on wetland hydrology.** Subsequent, long-term data collection and maintenance of the monitoring network will be done by the DNR using other funding sources. The resulting data will improve our understanding of how alterations to groundwater affect wetlands and their associated benefits and will allow more informed and objective management of both wetlands and groundwater. The information will be made publicly available to local, state, and federal land and water managers.

Minnesota supports a range of different wetland types including marshes, wet meadows, swamps, bogs, fens, and floodplain forests. The type of wetland, its plant and animal species, and its ecological functions are all heavily dependent upon the frequency, depth, duration and timing of inundation or saturation by water – its hydrologic regime. In turn, wetland hydrologic regime is influenced by various water inputs such as groundwater discharge, precipitation, and runoff as well as outputs such as groundwater recharge, surface discharge, and evapotranspiration. Changes to water inputs and outputs, whether natural or human-caused, may result in change in wetland type or ecological function. Understanding the hydrologic requirements of wetlands is critical for effective wetland management and protection, and despite the fact that we have similar programs to monitor hydrology for lakes, streams, and groundwater, there has never been a comprehensive program to monitor wetland hydrology.

We established a 10-site pilot wetland hydrology monitoring network in 2017. Under this proposal, we will install water level monitoring devices (wells/gauges) and automatic data loggers at 50 additional reference wetland sites across the state, representing a range of wetland types. The attached table depicts the initial monitoring scheme, which may be refined as the project progresses. The installations are designed to allow expansion to include additional monitoring variables such as precipitation, conductivity, or adjacent groundwater levels as needed.

Following installation of the monitoring equipment under this proposal, the DNR will continue to collect and analyze fundamental, long-term hydrologic data for wetlands. The data will be used to identify the ecological water requirements for different wetland types and to better understand the wetland-groundwater connection, which will inform state and local wetland and groundwater management efforts. These data will complement wetland data collected by other programs including the DNR groundwater program, the DNR wetland program, and the Minnesota Biological Survey and other similar programs.

## **II. PROJECT ACTIVITIES AND OUTCOMES**

### **Activity 1: Install Wetland Hydrology Monitoring Equipment at 50 Sites** **ENRTF BUDGET: \$526,496**

Under this activity, the project team will purchase equipment and install 50 hydrology monitoring stations in reference (minimally-disturbed) wetlands around the state over two field seasons. Elevation surveys will be conducted for each site to calibrate the monitoring equipment and establish ground surface elevations. This activity also includes follow-up site visits to ensure all sites are operating properly. The equipment specification for a wetland monitoring site calls for the installation of a shallow water table monitoring well (a pipe with slotted or perforated walls along its length) and a continuously recording data logger with sensors to record water level.



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

<b>Outcome</b>	<b>Completion Date</b>
1. First season installation of wetland monitoring stations	September 2019
2. Second season installation of wetland monitoring stations	September 2020
3. Initial data analysis and project completion report	July 2021

**Activity 2: Conduct Wetland Vegetation Surveys at 50 Hydrology Monitoring Sites**      **ENRTF Budget: \$47,165**  
Wetland vegetation surveys will be conducted at each of the reference wetlands where hydrology monitoring equipment is installed. Vegetation and hydrology data will be analyzed to understand how long term wetland hydrology patterns influence wetland plant communities, which in turn relates to various wetland benefits, especially fish and wildlife habitat.

<b>Outcome</b>	<b>Completion Date</b>
1. Wetland vegetation survey reports	July 2021

**III. PROJECT PARTNERS:**

The project team includes:

- Doug Norris (DNR – EWR) – Project manager
- Steve Kloiber (MNIT@DNR) – Monitoring design as well as data analysis and reporting
- Keylor Andrews (DNR – EWR) – Installation and operation of monitoring equipment

We will coordinate this project with other related efforts, including the following ENRTF projects or proposals:

- “Statewide Monitoring Network for Minnesota’s Changing Habitat” conducted by the Minnesota Biological Survey.
- “Peatland forest management,” which involves hydrology monitoring in peatlands.
- ENRTF proposal submitted by the Minnesota Board of Water and Soil Resources to assess the hydrology of restored wetlands.

All funds will be spent within DNR or MNIT@DNR. In-kind contributions of time will be provided by Doug Norris, Steve Kloiber, and Keylor Andrews.

**A. Partners receiving ENRTF funding: N/A**

**B. Partners NOT receiving ENRTF funding: N/A**

**IV. LONG-TERM- IMPLEMENTATION AND FUNDING:** This grant will fund the start-up costs for this effort. The long-term operation of the program will be funded from a combination of other funding sources. The DNR is committed to the long-term operation of this monitoring network.

**V. TIME LINE REQUIREMENTS:** Because the grant funding starts on July 1, 2019, the first field season is only a partial season. Equipment purchase and installation at all sites will be completed by the end of the second field season. All of the installation and troubleshooting and vegetation surveys will be complete by June 30, 2021.

**VI. SEE ADDITIONAL PROPOSAL COMPONENTS:**

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

## 2019 Detailed Project Budget

**Project Title: Understanding effects of groundwater hydrology alteration on wetlands**

### IV. TOTAL ENRTF REQUEST BUDGET 2 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel:</b> DNR field hydrology crews will install and troubleshoot equipment for 50 wetland hydrology monitoring stations. Work will occur in teams of two. The total estimated level of effort required for field crew time is 2600 hours (approximately 0.65 FTE x 2 yrs.). Salaries include ~15-25% fringe benefits as per state union contracts. Either new (temporary) personnel will be hired using ENRTF funding, or current DNR staff will be used, with their existing duties backfilled.	\$ 130,000
<b>Personnel:</b> DNR staff will conduct wetland vegetation surveys for 50 wetland monitoring stations. The total estimated level of effort required for field crew time is 1000 hours (approximately 0.25 FTE x 2 yrs.). Salaries include ~15-25% fringe benefits as per state union contracts. Either new (temporary) personnel will be hired using ENRTF funding, or current DNR staff will be used, with their existing duties backfilled.	\$ 40,000
<b>Equipment/Tools/Supplies:</b> Monitoring equipment including well screens, bubbler systems, dataloggers, power supply, and cables (\$7,500/station x 50 stations) .	\$ 375,000
<b>Travel:</b> In state travel for installation and troubleshooting of wetland water level monitoring network and vegetation surveys. Costs include mileage and per diem for DNR monitoring staff.	\$ 10,000
<b>Additional Budget Items:</b> *Direct and Necessary expenses: HR Support (~\$2,659), Safety Support (~\$551), Financial Support (~\$7,117), Communication Support (~\$1,251), IT Support (~\$6,023), and Planning Support (~\$1,059) necessary to accomplish funded programs/projects.	\$ 18,661
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST</b>	<b>=\$ 573,661</b>

\*Direct and Necessary expenses include Department Support Services (Human Resources, IT Support, Safety, Financial Support, Communications Support, and Planning Support). Department Support Services are described in the agency Service Level Agreement and billed internally to divisions based on rate that have been developed for each area of service. These services are directly related to and necessary for the appropriation. Department leadership services (Commissioner's Office and Regional Directors) are not assessed. Those elements of individual projects that put little or no demand on support services such as large single-source contracts, large land acquisitions, and funds that are passed through to other entities are not assessed Direct and Necessary costs for those activities.

### V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b>	\$ -	NA
<b>Other State \$ To Be Applied To Project During Project Period:</b>	\$ -	NA
<b>In-kind Services To Be Applied To Project During Project Period:</b> Overall project management will be provided at an estimated value of \$5,000/year. Project coordination, data analysis, and reporting will be provided in-kind at an estimated value of \$12,000/yr. Field operations and coordination will be provided in-kind at an estimated value of \$16,000.yr.	\$ 99,000	Secured
<b>Past and Current ENRTF Appropriation:</b>	\$ -	NA
<b>Other Funding History:</b> <i>The DNR is currently developing a statewide wetland hydrologic monitoring plan and installing a 10-site pilot of this monitoring system.</i>	\$ 45,000	Secured

## Understanding effects of groundwater hydrology alteration on wetlands

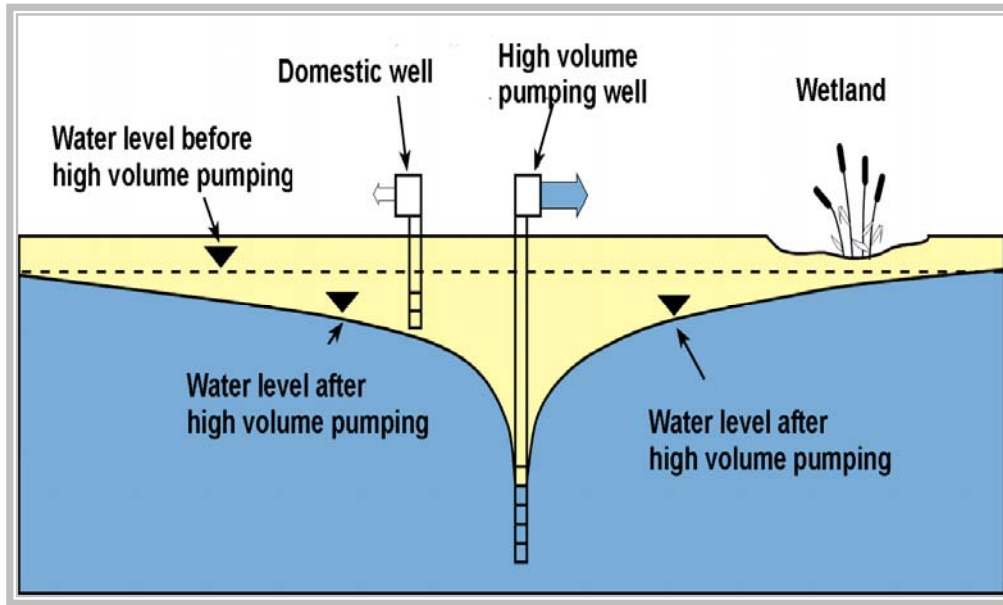


Illustration of how alterations to groundwater hydrology can affect wetlands and other surface waters. Better data can improve planning and avoid potential conflicts.

Hydro-Geomorphic Class	Water Regime Class	Plant Community	Ecological Province		
			Prairie Parkland	Eastern Broadleaf	Laurentian Mixed Forest
Depression/Flat	Temporarily Flooded to Saturated	Wet Meadow, Wet Prairie	3	3	3
Depression/Flat	Temporarily to Seasonally Flooded	Wooded and Shrub Swamps	3	3	3
Depression	Seasonally Flooded	Shallow Marsh	3	3	3
Depression	Semi-Permanently Flooded to Intermittently Exposed	Deep Marsh	3	3	3
Riverine Floodplain	Temporarily to Seasonally Flooded	Forested and Shrub Floodplain	3	3	3
Sloped	Saturated	Fen	3	3	3
Organic Peatland	Saturated	Open and Coniferous Bog	--	3	3
Lacustrine	Semi-Permanently to Permanently Flooded	Aquatic	Monitored by Shallow Lakes Program		

Proposed wetland water level monitoring design. The grid indicates the proposed number of monitoring sites for each wetland type and ecological province. We propose to install 50 of these sites under this project. Another 10 sites are being established as a pilot project in the summer 2017.

## **Project Manager Qualifications and Organization**

**Project Manager:** Doug Norris, Wetlands Program Coordinator  
Minnesota Department of Natural Resources  
Ecological and Water Resources Division

### **Qualifications:**

DNR Wetlands Program Coordinator since 1992. Primary responsibilities include:

- Representing the DNR in developing state wetland regulatory policies and programs. Participated in developing the original rules for the Minnesota Wetland Conservation Act and has collaborated on numerous subsequent legislative and rule revisions.
- Providing guidance and technical assistance to DNR staff in reviewing wetland permits and in complying with wetland regulations for DNR projects.
- Managing the DNR's program for identifying and regulating impacts to calcareous fens.
- Providing technical expertise in developing wetland assessment methods such as the Minnesota Routine Assessment Method.
- Providing management oversight for programs to develop and acquire data to improve wetland policy and regulatory decisions, such as updating the National Wetlands Inventory in Minnesota and the Minnesota Wetlands Status and Trends Monitoring Program.

Has managed numerous projects, including development of the Minnesota Wetland Conservation Plan, the Minnesota Comprehensive Wetland Assessment, Mapping and Monitoring Strategy, an analysis of the effects of aquaculture on wetlands/shallow lakes and, most recently, a legislatively directed study of the feasibility of state assumption of the federal Clean Water Act Section 404 permitting program. Several of the projects were funded through U.S. Environmental Protection Agency state wetland program development grants, requiring budget tracking and reporting.

### **Education:**

B.S., Wildlife Science, Purdue University, 1978  
M.S. Fisheries and Wildlife, University of Missouri, 1982

### **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