

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 143-I

Evaluating Groundwater Threats from Contaminants of Emerging Concern

Topic Area: I. Water Resources

Total Project Budget: \$ 388,273

Proposed Project Time Period for the Funding Requested: 3 yrs. July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

Municipal and industrial wastewaters, known to contain contaminants of emerging concern, are routinely applied to land throughout the state. This project evaluates whether these contaminants are threatening groundwater resources.

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Sponsoring Organization: MN Pollution Control Agency

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Location

Region: Statewide

County Name: Statewide

City / Township:

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



Environment and Natural Resources Trust Fund (ENRTF) 2012-2013 Main Proposal

PROJECT TITLE: Evaluating Groundwater Threats from Contaminants of Emerging Concern

I. PROJECT STATEMENT

Contaminants of emerging concern (CEC) are substances that have been released to, found in, or have the potential to enter Minnesota waters (groundwater or surface water) and: (1) do not have Minnesota human health-based standards; (2) pose a real or perceived health threat; and (3) have new or changing health or exposure information.

The Minnesota Pollution Control Agency (MPCA) is charged with developing program practices that are protective of groundwater resources. CEC have been found in MN groundwater and surface water. Current program emphasis, rules, and funding are focused on traditional contaminants such as nitrate and phosphorus. The MPCA is interested in evaluating whether CEC released into the environment via rapid infiltration basins, large drainfields, or as land-applied septage are contaminating groundwater resources in regions of highly vulnerable aquifers. It is currently unknown whether CEC contained in municipal wastewater effluent, commercial and industrial wastewaters, and domestic septage are impacting groundwater resources, and whether standards should be developed for some CEC.

In Minnesota, approximately 125 MPCA-permitted facilities discharge treated wastewater effluent to large drainfields. In addition, about 20 municipalities discharge treated effluent to rapid infiltration basins (RIBs). These facilities discharge significantly larger volumes of wastewater to the soils and groundwater than the typical household septic system. According to the Minnesota Department of Health (MDH) Source Water Protection program, a number of these systems discharge water within drinking water supply management areas, which indicates discharges are in proximity to public water supply wells. Roughly half of these sites have a basic groundwater monitoring systems in place, used primarily to monitor for nitrates. Monitoring for CEC at these sites will provide valuable information to determine their relative impacts to groundwater resources.

Of additional concern is the land application of industrial and commercial wastewaters and their byproducts from thousands of small commercial businesses throughout the state. These commercial businesses include car washes, automotive repair garages, veterinarian clinics, funeral homes, beauty shop salons, spas, and butcher shops that are located outside the service area of wastewater treatment plants. These businesses use subsurface treatment systems (SSTS) to dispose of wastewater and hire septic tank pumpers to land apply their septic tank and/or holding tank wastes. These land application sites receive a mix of waste streams, many of which contain CEC, which are then surface-applied or incorporated into the soil. The fate and transport of land-applied CEC to groundwater in these settings is largely unknown.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Evaluate rapid infiltration basins and large drainfields **Budget:** \$232,963

This activity will involve selecting two appropriate rapid infiltration basins or large drainfield sites that already have groundwater monitoring systems in-place, collecting samples for analysis of a suite of CEC, including pharmaceuticals, endocrine active compounds, and personal care products.

Outcome	Completion Date
1. Select sites and conduct 2 rounds of effluent and groundwater sampling	December 2013
2. Analyze samples at USGS laboratories	April 2014
3. Evaluate preliminary results	June 2014
4. Install additional monitoring wells	September 2014
5. Conduct 2 rounds of groundwater sampling	April 2015
6. Analyze samples at USGS laboratories	July 2015
7. Write report of results	July 2016

Activity 2: Evaluate a commercial/industrial septage land application site **Budget:** \$155,309

This activity will involve selecting several appropriate commercial and industrial wastewater septage application sites, installing groundwater monitoring systems, collecting samples for analysis of a suite of CEC, including pharmaceuticals, endocrine active compounds, and personal care products, in addition to a standard suite of contaminants.

Outcome	Completion Date
1. Select sites and conduct sediment and groundwater sampling	April 2015
2. Analyze samples at USGS laboratories	September 2015
3. Write report of results	July 2016

III. PROJECT STRATEGY

A. Project Team/Partners

The MPCA and United States Geological Survey (USGS) are the primary team members. There will be a joint effort to identify sampling sites, with input from the MDH Drinking Water Protection Section. USGS will have the lead role in collecting samples, conducting laboratory analysis, review of laboratory results, and writing the report. MDH supports this effort, and MDH staff from Environmental Health programs will provide technical input to the project and site selection.

B. Timeline Requirements

This will be a three year project.

C. Long-Term Strategy and Future Funding Needs

If this study finds CEC contamination from the study sources, long term strategies would include additional monitoring for CEC at wastewater land application sites and in public water supply wells, as indicated by the types and concentrations of CEC detected in this study. If needed, future funding needs would include funding for monitoring of CEC at wastewater land application sites and in public water supply wells and funding for the evaluation of alternative practices for management of land applied wastewaters in vulnerable groundwater settings to reduce risks from CEC contaminants.

Other long term strategic benefits of this project would be to: 1) identify CEC in Minnesota groundwater that will assist the MDH in their evaluation and prioritization of CEC contaminants, 2) compliment ongoing efforts to identify the potential sources of CEC in Minnesota's surface waters by the MPCA and USGS, and 3) compliment the MPCA's ambient groundwater monitoring network efforts to characterize CEC under different land use settings across the state.

2012-2013 Detailed Project Budget

IV. TOTAL ENRTF REQUEST BUDGET: 3 year project.

Title: Evaluating Groundwater Threats from Contaminants of Emerging Concern

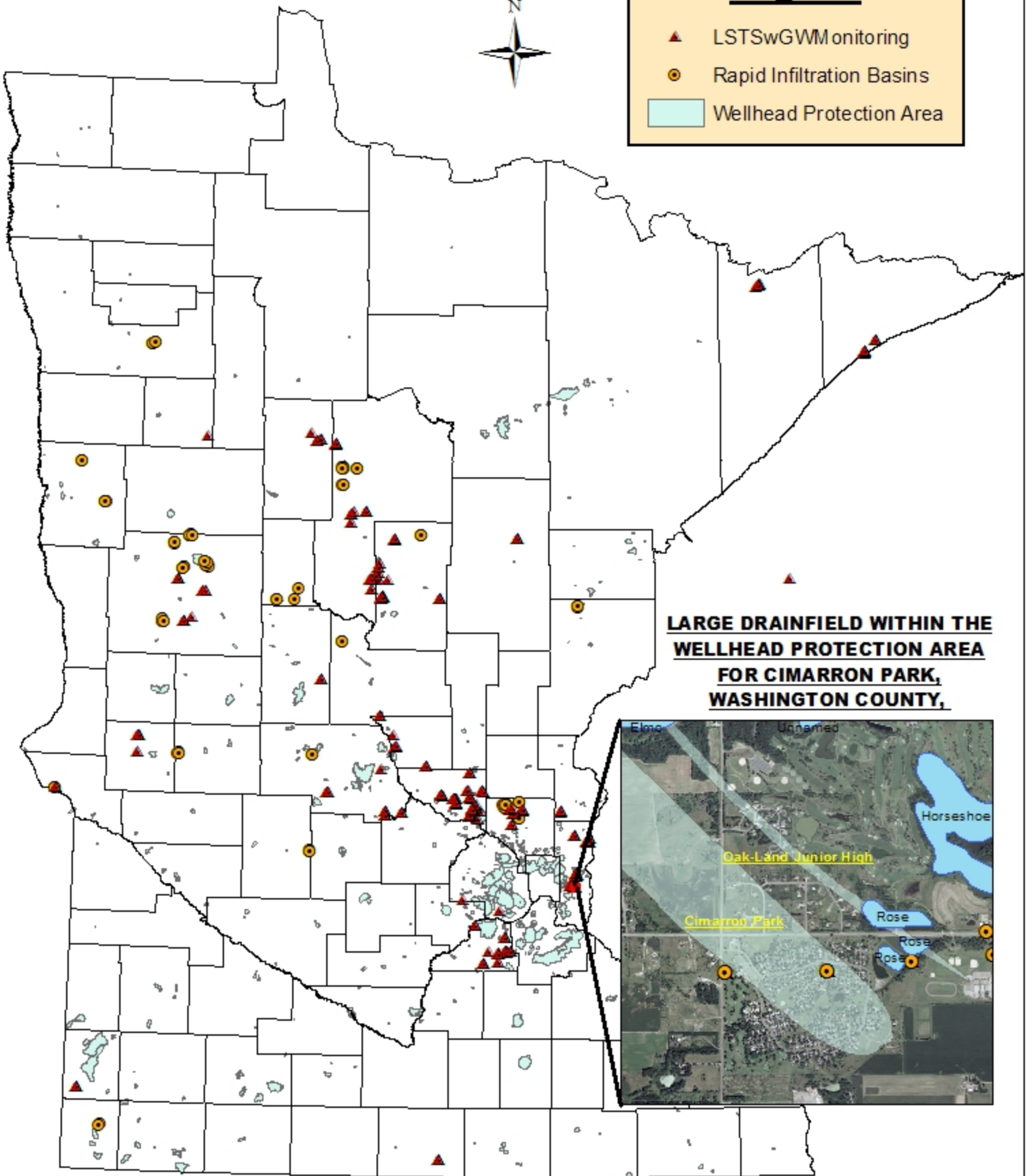
<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: personnel costs are covered under the USGS/MPCA contract described below under contracts.	N.A.
Contracts: United States Geological Survey Joint Funding Agreement Contract with the MPCA to provide personnel costs, USGS Laboratory analytical services, sample collection, data analysis and report writing.	\$ 311,431
Contract to install monitoring wells through the MPCA's Master Contract for soil sampling and well drilling.	\$ 45,000
Contract for laboratory and analytical services through the MPCA's Contract for laboratory analysis of environmental samples.	\$ 23,200
Equipment/Tools/Supplies: for collection of groundwater samples, to include rental of field sampling equipment as needed for measurement of water levels and other water quality parameters.	\$ 5,000
Travel: In-state travel to at least three site locations to collect groundwater samples, sediment samples and install monitoring wells.	\$ 3,642
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 388,273

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period: cash contribution from USGS under the Joint contract agreement, figured as 30% of non-laboratory costs.	\$ 57,414	<i>Pending</i>
In-kind Services During Project Period: in-kind personnel hours/salary costs for MPCA staff throughout project life.	\$ 104,225	

Legend

- ▲ LSTSwGWMonitoring
- Rapid Infiltration Basins
- Wellhead Protection Area



LARGE DRAINFIELD WITHIN THE WELLHEAD PROTECTION AREA FOR CIMARRON PARK, WASHINGTON COUNTY,



Locations of Large Subsurface Treatment Systems (LSTs), Rapid Infiltration Basins and Wellhead Protection Areas throughout the state.

Project Title: Evaluating Groundwater Threats from Contaminants of Emerging Concern

Project Manager: Byron Adams

Organizational Description: the MPCA is a mid-level State Agency with the responsibility to investigate non-agricultural groundwater specific problems, and to design management approaches to protect or improve groundwater resources (MS 103H).

EXPERIENCE AND QUALIFICATIONS

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Relevant Work Experience

As a Research Scientist at the MPCA my primary task is to evaluate MPCA program practices for protection of groundwater resources. Data gaps in program practices have identified the need to evaluate the potential impacts of contaminants of emerging concern in groundwater from land applied wastewaters and subsurface treatment systems located throughout the state. I am also the liaison to the Minnesota Department of Health for issues related to source water protection of public water supply wells, as delineated by wellhead protection areas.

For the last 26 years at the MPCA, I have conducted investigations and reviews of groundwater contaminant and monitoring sites throughout the state. More recently, I was the lead groundwater hydrologist for the MPCA Water Quality Permits Program overseeing groundwater monitoring at industrial wastewater land application sites. Prior to this I was a MPCA regional hydrologist with responsibilities for overseeing municipal effluent spray irrigation sites, rapid infiltration basins, and industrial byproduct land application sites. I have also conducted the technical oversight of hydrogeologic investigations and monitoring at Superfund sites, Hazardous Waste facilities, refineries and Brownfield sites.

Education

M.S. 1984	University of Minnesota, St. Paul (Soil Science)
B.S. 1980	University of Minnesota, St. Paul (Soil Science)
A.A. 1977	University of Minnesota, Minneapolis (Science)

Positions

2008-Present	Research Scientist 3, Minnesota Pollution Control Agency
1989-2008	Senior Hydrologist, Minnesota Pollution Control Agency
1986-1989	Hydrologist I & II, Minnesota Pollution Control Agency
1981-1985	Project Hydrologist, Self Employed
1981-1983	Research Assistant, University of Minnesota