



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2018 ENRTF Work Plan (Main Document)

Today's Date: March 6, 2018

Date of Next Status Update Report: January 31, 2019

Date of Work Plan Approval: 06/05/2018

Project Completion Date: December 31, 2021

Does this submission include an amendment request? No

PROJECT TITLE: Characterize Unregulated Contaminants in Source Water and Drinking Water

Project Manager: Steve Robertson

Organization: Minnesota Department of Health

College/Department/Division: Environmental Health Division

Mailing Address: 625 Robert Street North

City/State/Zip Code: Saint Paul, MN 55164-0975

Telephone Number: 651-201-4648

Email Address: steve.robertson@state.mn.us

Web Address: www.health.state.mn

Location: Statewide

Total Project Budget: \$1,000,000

Amount Spent: \$0

Balance: \$1,000,000

Legal Citation: M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 04g

Appropriation Language: \$1,000,000 the second year is from the trust fund to the commissioner of health to establish monitoring networks of public water-system wells and surface-water intakes to determine if contaminants persist after standard public water treatment. This appropriation is available until June 30, 2022, by which time the project must be completed and final products delivered.

I. PROJECT STATEMENT:

Unregulated contaminants are one of the 21st century threats to drinking water for which existing resources and regulatory approaches are insufficient. The Minnesota Department of Health (MDH) monitors all public water systems (approximately 7000 statewide) for conformance with federal monitoring requirements and water quality standards. EPA has established about 100 water quality standards for drinking water. Federal regulation requires that these standards be met in finished water – the product that a public water system delivers to its customers. For thousands of chemicals in use in modern society, little or no monitoring of drinking water is done because there is neither a federal regulatory mandate nor resources to test for them in drinking water sources. Some of our agency partners (MPCA, MDA, USGS, EPA) have conducted monitoring of lakes, rivers or ambient groundwater to better understand water quality conditions, but none of these efforts have been focused on drinking water sources.

Drinking water sources vary across the state of Minnesota. While most of the state’s residents drink groundwater (mostly from wells), many of the largest public water systems in the state (serving about 20 percent of the population), rely on rivers, lakes or other surface water. Land use is a factor that determines groundwater and surface water quality where precipitation onto contaminant sources soaks into the ground or runs off into streams or lakes. Prior work established that land uses involving wastewater disposal and agricultural chemical storage/use on the land can cause unregulated contaminants to occur in water supplies. Industrial and municipal wastewater effluent contains pharmaceuticals, personal care products and other endocrine-active substances, while runoff and infiltration from agricultural lands can contain various types of pesticides, as well as nutrients. Additionally, natural events like algal blooms can produce cyanotoxins that are acutely toxic to human health.

In Minnesota, the distribution of drinking water is seldom directly from the source without some degree of handling and treatment. Sometimes this handling and treatment is to satisfy regulatory requirements that protect public health, and sometimes it is to provide some aesthetic value, like softening or removal of iron. Due to the cost and lack of a regulatory mandate, it is very unusual for public water systems to design for the removal of unregulated contaminants. However, research indicates that existing treatment processes sometimes provide incidental removal of some unregulated contaminants. Consequently, in addition to characterizing unregulated contaminants present in selected high risk drinking water sources, this project will evaluate the degree to which contaminants present in raw source water may persist to finished drinking water.

The goals of this project are to 1) characterize the presence of selected unregulated contaminants in drinking water sources and associated samples of treated drinking water in Minnesota, and 2) identify screening approaches to simplify and target future monitoring efforts. Also, the information will be of value in MDH efforts to assist public water systems statewide in the areas of source water protection, water treatment, health based guidance, and risk communication. Currently, the lack of data to drive these efforts undermines the integrity of future drinking water protection efforts. As a result, achieving project goals pertaining to drinking water source characterization will provide data and knowledge that state and local officials can use to prioritize future interventions in a way that minimizes risk and maximizes public health benefits.

II. OVERALL PROJECT STATUS UPDATES:

First Update January 31, 2019

Second Update June 30, 2019

Third Update January 31, 2020

Fourth Update June 30, 2020

Fifth Update January 31, 2021

Final Update June 30, 2021

III. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Develop detailed monitoring plan

Description: Analyze land use adjacent to public water system wells and upstream of intakes. Identify wells and intakes at risk from wastewater disposal and agricultural chemicals. Develop monitoring networks comprised of public water system wells and intakes at which the water quality effects of wastewater and agricultural chemicals can be sampled and evaluated.

Review previous state and national water monitoring information to establish a list of laboratory analytical parameters (i.e., specific compounds) targeted to Minnesota conditions. Parameters will be grouped into classes (e.g., pharmaceuticals, personal care products, pesticides, wastewater indicators, etc.). Further analysis will establish specific indicators for each class for which semi-quantitative pre-screening may provide information to guide rigorous and quantitative laboratory analysis. Develop formal strategy to use combination of screening approach and laboratory analysis to maximize the information received on the presence of unregulated contaminants while minimizing costs.

Create statewide monitoring networks for public water systems at risk from the following land uses: 1) wastewater disposal and 2) agricultural chemical storage and uses. Networks will consist of systems using both groundwater and surface water. Establish sampling schedule.

ENRTF BUDGET: \$ 59,341

| Outcome | Completion Date |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <i>1. Analyze land uses near public water system wells and intakes. Identify separate ranked lists of vulnerable public water system wells ranked relative to the degree of exposure to wastewater disposal and agricultural chemicals. Prospective sites are expected all over the state.</i> | January 2019 |
| <i>2. Develop targeted list of parameters of concern in Minnesota due to wastewater disposal and agricultural chemical use. Develop strategy to employ screening tools to evaluate drinking water sources while reserving the high cost laboratory analysis for those systems at highest risk.</i> | January 2019 |
| <i>3. Create specific monitoring plan that lists wells, parameters and sampling schedule for 2019 and 2020.</i> | March 2019 |

First Update January 31, 2019

Second Update June 30, 2019

Third Update January 31, 2020

Fourth Update June 30, 2020

Fifth Update January 31, 2021

Final Update June 30, 2021

ACTIVITY 2: Execute monitoring plan developed in Activity 1

Description: Collect and analyze water samples from public water system wells/intakes identified as at risk for wastewater disposal and agricultural chemicals. The work for this activity constitutes the primary data collection effort of the project. It will consist of coordinating the sampling needs for this project with other MDH sampling and inspection in support of compliance activities associated with federal Safe Drinking Water Act compliance. Assessments will need to be made each sampling round after evaluation of initial screening information to identify those samples associated with drinking water sources with the highest potential for presence of unregulated contaminants of concern. These assessments will be used to identify samples for laboratory analysis.

ENRTF BUDGET: \$ 993,500

| Outcome | Completion Date |
|---------------------------------------------------------------------------------------------------------------------|------------------------|
| 1. <i>Collect water samples from drinking water sources identified in monitoring plan completed in activity 1.</i> | October 2020 |
| 2. <i>Screen samples with ELISA analyses.</i> | November 2020 |
| 3. <i>Select samples for in-depth quantitative laboratory analyses based on results from ELISA screening</i> | November 2020 |
| 4. <i>Quantitative laboratory analysis of selected source and finished water samples and data quality assurance</i> | March 2021 |

First Update January 31, 2019

Second Update June 30, 2019

Third Update January 31, 2020

Fourth Update June 30, 2020

Fifth Update January 31, 2021

Final Update June 30, 2021

ACTIVITY 3: Data analysis and report writing

Description: Upon receipt of quantitative data from the laboratory, data will be quality assured to ensure a robust dataset is available for data analysis. Once the dataset is finalized, different statistical methods will be explored to identify the appropriate method for determining differences between sample types (source and treated), among facilities, and between different types of risk (e.g. agriculture or wastewater). Results will be summarized in a peer-reviewed publication.

ENRTF BUDGET: \$ 121,954

| Outcome | Completion Date |
|------------------------------------------------------------------------|------------------------|
| 1. <i>Statistical analyses and interpretation of quantitative data</i> | May 2021 |
| 2. <i>Report preparation</i> | June 2021 |

First Update January 31, 2019

Second Update June 30, 2019

Third Update January 31, 2020

Fourth Update June 30, 2020

Fifth Update January 31, 2021

Final Update June 30, 2021

IV. DISSEMINATION:

Description: A report will be prepared at the conclusion of each project activity, as described above. Each report will contain key data and results generated by the work as well as an evaluation of the information relative to water quality and public health criteria. Reports will be submitted to the LCCMR, published on the MDH web site, and submitted to the Minnesota Water Research Digital Library. As appropriate, project data and results will be summarized and evaluated in peer-reviewed professional publications and presented at local and national conferences.

First Update January 31, 2019

Second Update June 30, 2019

Third Update January 31, 2020

Fourth Update June 30, 2020

Fifth Update January 31, 2021

Final Update June 30, 2021

V. PROJECT BUDGET SUMMARY:

A. Preliminary ENRTF Budget Overview: See attached budget spreadsheet

Explanation of Capital Expenditures Greater Than \$5,000: NA

Explanation of Use of Classified Staff: Classified staff will not be paid for with ENRTF.

Total Number of Full-time Equivalent (FTE) Directly Funded with this ENRTF Appropriation:

| | |
|--------------------------------------------|-----------------------------------|
| Enter Total Estimated Personnel Hours: 750 | Divide by 2,080 = TOTAL FTE: 0.36 |
|--------------------------------------------|-----------------------------------|

Total Number of Full-time Equivalent (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:

| | |
|---------------------------------------------|-----------------------------------|
| Enter Total Estimated Personnel Hours: 2400 | Divide by 2,080 = TOTAL FTE: 1.15 |
|---------------------------------------------|-----------------------------------|

B. Other Funds:

| SOURCE OF AND USE OF OTHER FUNDS | Amount Proposed | Amount Spent | Status and Timeframe |
|---------------------------------------------------------------------------|-----------------|--------------|----------------------|
| Other Non-State \$ To Be Applied To Project During Project Period: | | | |
| EPA Section 106 Grant | \$ 14,011 | \$ | Pending |
| USGS match | \$ 69,084 | | Secured |
| EPA DWRLF Set-aside | \$ 91,700 | \$ | Secured |
| Other State \$ To Be Applied To Project During Project Period: NA | | | |
| Past and Current ENRTF Appropriation: NA | | | |
| Other Funding History: NA | | | |

VI. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

| Name | Title | Affiliation | Role |
|------|-------|-------------|------|
| | | | |

B. Partners NOT receiving ENRTF funding

| Name | Title | Affiliation | Role |
|-----------------|--------------------|-------------|-----------------|
| Mark Ferrey | Research Scientist | MPCA | Project Advisor |
| Bill van Rsywyk | Hydrologist 4 | MDA | Project Advisor |

VII. LONG-TERM- IMPLEMENTATION AND FUNDING:

The outcomes of this work will be used to inform work efforts involving source water protection, development of health based guidance, drinking water treatment, as well as other means of managing unregulated contaminants in drinking water sources. Additionally, the results of this work will help to facilitate interagency

coordination and cooperation to prioritize and target drinking water protection efforts. Our intent is to use the project to leverage other funding partners to support ongoing and permanent drinking water source characterization efforts. Lastly, the laboratory analytical techniques required for the work described in this proposal are, at present, cost-prohibitive to carry out routinely. Accordingly, this study will include the development of strategies (e.g., indicator parameter lists, simplified analytical protocols, use of new technology) that could be used in general practice by MDH, public water systems and other stakeholders to evaluate risks relative to unregulated contaminants.

VIII. REPORTING REQUIREMENTS:

- **The project is for 3.5 years, will begin on July 1, 2018 and end on December 31, 2021.**
- **Periodic project status update reports will be submitted January 31 and June 30 of each year.**
- **A final report and associated products will be submitted between January 3 and February 15, 2022.**

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

- A. Budget Spreadsheet (attached)**
- B. Visual Component or Map (attached)**

Attachment A:
 Environment and Natural Resources Trust Fund
 M.L. 2018 Budget Spreadsheet



Project Title: Characterize Unregulated Contaminants in Source Water and Drinking Water

Legal Citation: M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 04g

Project Manager: Steve Robertson

Organization: Minnesota Department of Health

College/Department/Division: Environmental Health

M.L. 2018 ENRTF Appropriation: \$1,000,000

Project Length and Completion Date: 3.5 years; December 31, 2021

Date of Report: 3/4/2018

| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | TOTAL BUDGET | AMOUNT SPENT | TOTAL BALANCE |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------|--------------------|
| BUDGET ITEM | | | |
| Personnel (Wages and Benefits) | | | |
| <i>Temporary samplers 0.25 FTE for years 1 and 2 and 0.375 in year 3, base cost is \$40,000 per FTE plus 31% fringe, distributed over duration of project (\$52,400)</i> | \$52,400 | \$0 | \$52,400 |
| Professional/Technical/Service Contracts | | | |
| <i>Private analytical laboratory (Laboratory analytical services for pharmaceuticals, personal care products, pesticides (exact vendor not yet determined and will depend on monitoring plan developed in Activity 1)</i> | \$679,800 | \$0 | \$679,800 |
| <i>U.S. Geological Survey (Professional and technical services related to monitoring plan design, sample collection, laboratory analytical services, data review and analysis, and report preparation) (\$214,915, not including USGS cost share)</i> | \$214,915 | \$0 | \$214,915 |
| <i>MDH Public Health Laboratory (Routine water quality analysis in support of water chemistry and vulnerability characterizations) (\$21,235, not including EPA Section 106 cost share)</i> | \$21,235 | \$0 | \$21,235 |
| Equipment/Tools/Supplies | | | |
| <i>Sampling equipment, supplies</i> | \$13,500 | \$0 | \$13,500 |
| Travel expenses in Minnesota | | | |
| <i>Travel</i> | \$18,150 | \$0 | \$18,150 |
| COLUMN TOTAL | \$1,000,000 | | \$1,000,000 |

