

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

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**Project Title:**

**ENRTF ID: 112-BH**

Are Metal Concentrations in Kawishiwi Waters Above Standards?

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**Category:** H. Proposals seeking \$200,000 or less in funding

**Sub-Category:** B. Water Resources

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**Total Project Budget: \$** 174,268

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

**Summary:**

Metal concentrations in some waters of the south Kawishiwi watershed are above aquatic life and recreation standards. This project assesses effects of exposed mineralized bedrock on metal concentrations in waters.

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**Name:** Perry Jones

**Sponsoring Organization:** USGS

**Title:** Hydrologist

**Department:** \_\_\_\_\_

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**Location**

**Region:** Northeast

**County Name:** St. Louis

**City / Township:** Near Ely

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**Alternate Text for Visual:**

Map showing the location of exposed mineralized bedrock relative to South Kawishiwi River, Filson Creek, Birch Lake, and White Iron Lake. Surface-water flow directions also are indicated.

<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: Are Metal Concentrations in Kawishiwi Waters Above Standards?**

**I. PROJECT STATEMENT**

**State water managers are concerned that metal concentrations in some waters of the Kawishiwi watershed are above aquatic life and recreation standards.** Dissolved aluminum and copper concentrations in surface-water samples collected between 2008 and 2016 in the Kawishiwi River and its tributary, Filson Creek, were above class 2A (aquatic life and recreation) water-quality standards. However, total aluminum and copper concentrations in other surface-water samples collected in 2007 and 2012 from Birch Lake and White Iron Lake were below these standards.

**The goal of this work is to provide baseline total and dissolved trace metal concentrations in surface waters of the south Kawishiwi watershed upgradient and downgradient of exposed mineralized bedrock.** Mineralized bedrock, a potential source of metals to waters, is exposed at the water surface in the Kawishiwi River, Filson Creek, and Birch Lake, and upgradient of White Iron Lake. Dissolved aluminum and copper concentrations above standard concentrations in the Kawishiwi River and its tributary, Filson Creek, were thought to occur naturally in surface waters of the watershed because 1) mineralized parts of the Duluth complex bedrock are exposed at the water and land surface in the Kawishiwi watershed, and 2) no known land-use changes have occurred in the watershed to result in these above standard concentrations. However, exposed mineralized bedrock also exists at Birch Lake and upgradient of White Iron Lake, where total aluminum and copper concentrations in surface waters were lower than standard concentrations.

**Establishing and understanding baseline trace metal concentrations in surface waters relative to exposed mineralized bedrock in the south Kawishiwi Watershed is needed to effectively assess the impacts of potential land-use changes, such as mining, on water-quality in important recreational lakes and rivers, such as Birch Lake, White Iron Lake, and Kawishiwi River.** Rivers in the Boundary Waters, such as the Kawishiwi River, are on the 2018 America’s 10 Most Endangered Rivers list in the United States, under the threat from proposed sulfide-ore copper mining on adjacent lands.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1: Developing sampling/coordination plans for surface waters in south Kawishiwi Watershed**

USGS hydrologists will work with Lake County SWCD, White Iron Chain of Lakes Association, and Minnesota Pollution Control Agency staff to select 6 sites to collect surface-water samples in the south Kawishiwi Watershed. Site selection will be based on 1) the location of mineralized bedrock relative to the locations of the lakes and river, 2) the presence of existing stream gages that continuously monitor streamflow, and 3) locations where water-quality samples have been collected in the past. The location of 2 replicate surface-water samples will be determined for quality assurance/quality control purposes.

**ENRTF BUDGET: \$9,453**

Outcome	Completion Date
1. Develops water-quality sampling/coordination plan	September 30, 2019

**Activity 2: Collection and analysis of surface-water samples from south Kawishiwi Watershed**

USGS hydrologist and hydrologic technicians will work with Lake County SWCD to collect water-quality samples from the 6 selected sites under 1) high-flow and 2) low-flow conditions. A total of 6 water-quality samples and one replicate sample will be collected during two sample trips, one sample trip done for each of the two flow conditions. All water samples will be analyzed by the USGS National



Water-Quality Laboratory for nutrients, trace metal, and major constituent concentrations and USGS Mercury Research Laboratory for total and dissolved mercury and methyl mercury concentrations.

**ENRTF BUDGET: \$89,542**

Outcome	Completion Date
1. Collect water-quality samples at 6 locations during high-flow conditions	May 30, 2020
2. Collect water-quality samples at 6 locations during low-flow conditions	September 30, 2020
3. Analyze water-quality samples for metal, nutrient, and major constituent concentrations	January 30, 2021

**Activity 3: Interpretation of water-quality results**

USGS hydrologist will review water-quality analytical results from the collected water samples, comparing these results to metal concentrations determined for water-quality samples collected between 2007 to 2015 at the 6 sites. Results also will be compared to class 2A and other Minnesota water-quality standards. All water-quality results will be entered into the USGS National Water Information System (NWIS) database. All water-quality results will be summarized in a USGS report.

**ENRTF BUDGET: \$75,273**

Outcome	Completion Date
1. Review water-quality analytical results	June 30, 2021
2. Compare water-quality analytical results to past water-quality results and water-quality standards	June 30, 2021
3. Enter water-quality results into USGS NWIS database and write USGS report	June 30, 2021

**III. PROJECT PARTNERS:**

**A. Partners receiving ENRTF funding**

Name	Title	Affiliation	Role
Perry M. Jones	Hydrologist	USGS Upper Midwest Water Science Center	Project Principal Investigator/Hydrologist
Two USGS Hydrologic Technicians	Hydrologic Technicians	USGS Upper Midwest Water Science Center	Collect Water-Quality Samples

**B. Partners NOT receiving ENRTF funding**

Name	Title	Affiliation	Role
Derrick Passe	Project Coordinator	Lake County SWCD	Planning /coordinating water-quality sampling
Darren Lilja	Rainey River Headwaters Outreach Coordinator	Lake County SWCD	Assists in Collection of Water-Quality Samples
Teresa Sagen	Board President	The White Iron Chain of Lakes Association (WICOLA)	Planning /coordinating water-quality sampling

**IV. LONG-TERM- IMPLEMENTATION AND FUNDING:**

Establishing an understanding of baseline total and dissolved trace metal concentrations in surface waters of the Kawishiwi Watershed will provide a framework for northeast Minnesota water managers to assess water-quality data in other areas where mineralized bedrock is present at or near the land/water surface. This data will be added to existing water-quality data for the Kawishiwi Watershed.

**V. TIME LINE REQUIREMENTS:**

The project will be start in July 1, 2019, and be completed by June 30, 2021 (2.0 years).

## 2019 Proposal Budget Spreadsheet

**Project Title:**

**IV. TOTAL ENRTF REQUEST BUDGET** *[Insert # of years for project] years*

BUDGET ITEM (See "Guidance on Allowable Expenses")	AMOUNT
<b>Personnel:</b>	
<b>Hydrologist</b> , U.S. Geological Survey, Principal Investigator, Lead in water-quality sampling and data analysis, oversees data entry and review into USGS NWIS database, (0.14 FTE for 2 years, 72% salary, 28% benefits)	\$ 75,432
<b>Hydrologic Technician</b> : U.S. Geological Survey, Leads field team in collections of water-quality samples, enters water-quality data into USGS NWIS database (0.04 FTE for 2 years, 69% salary, 31% benefits)	\$ 13,922
<b>Hydrologic Technician</b> : U.S. Geological Survey, Member of field team collecting water-quality samples, enters water-quality data into USGS NWIS database (0.04 FTE for 2 years, 75% salary, 25% benefits)	\$ 12,108
<b>Water-quality Personnel</b> : U.S. Geological Survey, Reviews water-quality sampling plans, water-quality analyses and interpretations, data entry into USGS NWIS database (0.04 FTE for 2 years, 78% salary, 22% benefits)	\$ 19,094
<b>Administration</b> : Administrative support for contracts and billing (0.02 FTE for 2 years, 68% salary, 32% benefits)	\$ 5,255
<b>Professional/Technical/Service Contracts</b> : USGS National Water-Quality Laboratory - water-quality analyses for nutrient, trace metal, and major constituent concentrations (\$11,122), USGS Mercury Research Laboratory - water-quality analyses for mercury and methyl mercury concentrations (\$8,493)	\$ 19,615
<b>Equipment/Tools/Supplies</b> : Water-quality sampling supplies, such as filters, preservation chemicals.	\$ 4,970
<b>Acquisition (Fee Title or Permanent Easements):</b>	N/A
<b>Travel</b> : Lodging and per diem for 2 water-quality sampling trips, 2 weeks for each trip - 2 USGS hydrologic technicians on each trip, travel from Mounds View/Grand Rapids, MN to Kawishiwi watershed (\$11,432), vehicle and boat rental (\$3,976)	\$ 15,408
Additional Budget Items: Shipping of water-quality samples (\$2,162) USGS report publication (\$6,302)	\$ 8,464
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 174,268</b>

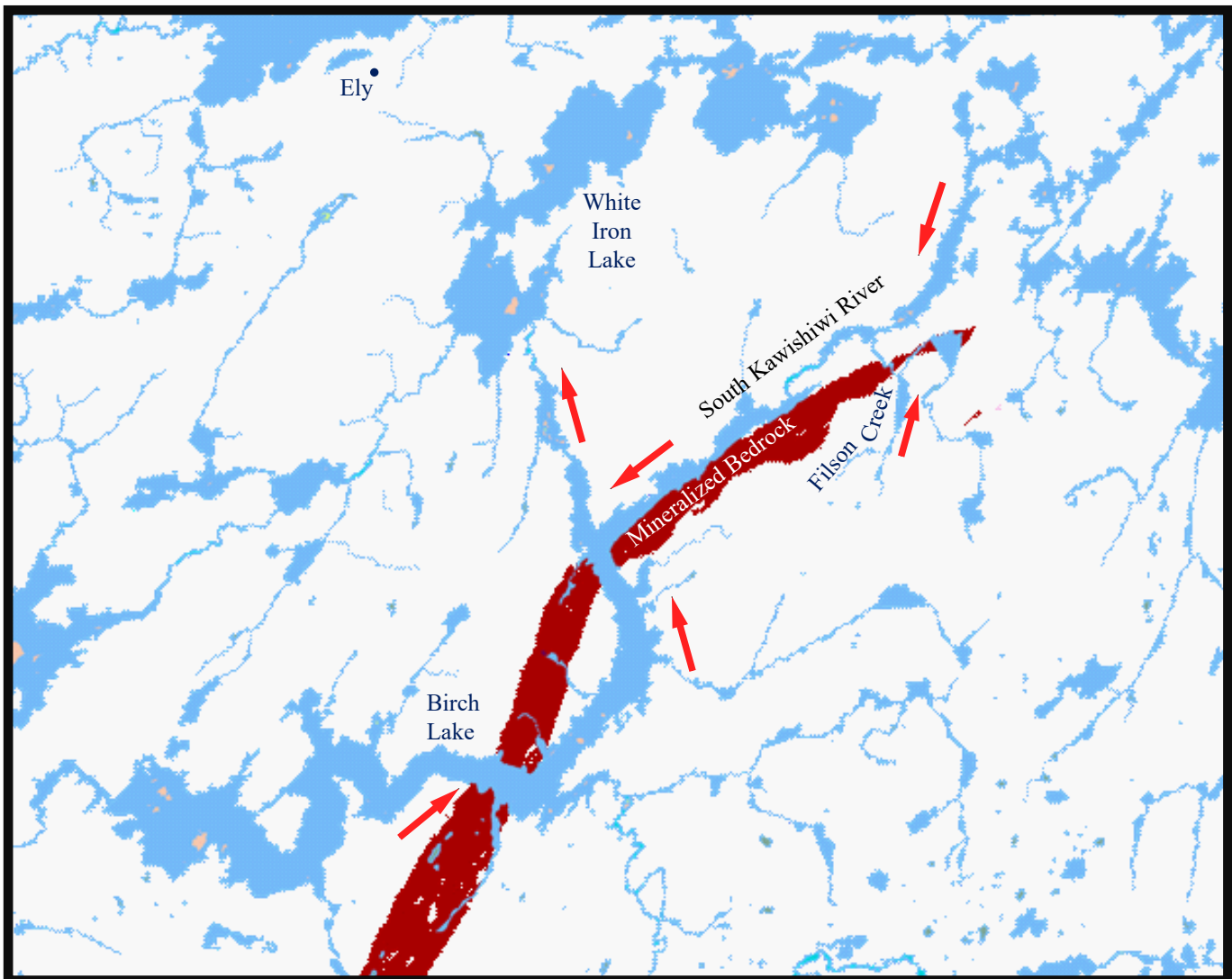
**V. OTHER FUNDS** *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

SOURCE OF FUNDS	AMOUNT	Status
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b>	<b>\$ 49,709</b>	<b>Secured</b>
USGS Cooperative Matching Fund	\$ 39,709	Secured
WICOLA Funds	\$ 10,000	Secured
<b>Other State \$ To Be Applied To Project During Project Period:</b>	<b>N/A</b>	
<b>In-kind Services To Be Applied To Project During Project Period:</b>	<b>\$ 6,620</b>	<b>Secured</b>
Lake County SWCD - Four weeks of personnel time for collection of water-quality sampling over the 2 years of the project	\$ 5,120	Secured
WICOLA - One week of personnel time for develop a water-quality sampling plan and assisting in water-quality sampling logistics	\$ 1,500	Secured
<b>Past and Current ENRTF Appropriation:</b>	<b>N/A</b>	
<b>Other Funding History:</b>	<b>N/A</b>	

Project Title: Are Metal Concentrations in Kawishiwi Waters Above Standards?

Concern: Metal concentrations in some waters of the South Kawishiwi River and Filson Creek are known to be above aquatic life and recreation standards.

Goal: Establish baseline trace metal concentrations in surface waters relative to exposed mineralized bedrock in Birch Lake, White Iron Lake, and south Kawishiwi River



← General surface-water flow direction

## **PROJECT MANAGER QUALIFICATIONS AND ORGANIZATION DESCRIPTION**

Perry M. Jones, Hydrologist (Project Manager) is a research hydrologist in the Investigations Section of the U.S. Geological Survey (USGS), Upper Midwest Water Science Center, Minnesota Office, in Mounds View, MN. Perry received his B.S. in Geology from State University of New York at Cortland and his M.S. in Geology at the University of Minnesota. Perry has worked for the USGS for the past 28 years, currently leading research projects in the areas of baseline water-quality assessments in potential mining areas in northern Minnesota, groundwater and surface-water exchanges near lakes and wetlands, and geophysical assessments of lakes and reservoirs. He also was involved in past interdisciplinary studies involving water-quality/amphibian population assessments, groundwater-flow modeling of abandoned mine pits and source-water protection areas, nitrogen uptake in Decorah Edge wetlands, and borehole geophysical and age-dating assessment of groundwaters in the St. Lawrence Formation. He has authored or co-authored more than 20 reports or journal articles.

The **USGS** is a non-regulatory science agency that works as a partner with federal, state, local, and tribal agencies to collect and analyze hydrologic and other environmental data. The project team has extensive experience collecting, analyzing surface-water-quality samples, and the USGS has individuals with state-of-the-science expertise in water-quality assessments to assist in the project.