

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

Project Title:

ENRTF ID: 142-I

Managing Rivers to Ensure Future Demands for Water

Topic Area: I. Water Resources

Total Project Budget: \$ 275,000

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

Other Non-State Funds: \$ 0

Summary:

This project will establish a stream flow estimation methodology for Minnesota. This information is essential to determine water availability, connections between surface water and groundwater and impacts to watershed ecology.

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Sponsoring Organization: MN DNR

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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: Managing Rivers to Ensure Future Demands for Water.

I. PROJECT STATEMENT

Managing rivers is an important activity in the state. Minnesota has tens of thousands of miles of streams about which we know very little. Yet we must manage those resources. It is not practical or feasible to measure stream flow at any given point on every stream across Minnesota. However, it is essential to reliably estimate flow for allocating Minnesota’s limited water resources and for evaluating the influence of appropriation and proposed uses on fish communities, endangered species, and other high priority uses. For example, in Minnesota more than half of native mussel species are listed as endangered, threatened, or of special concern. These species are accustomed to specific stream flow conditions that might be effectively managed with the appropriate tools.

This project will improve water management in the State of Minnesota. The result will be a tool used by the Minnesota Department of Natural Resources (MDNR) to help in water appropriations and permitting. This water-management tool also will be used by the MDNR, the Minnesota Pollution Control Agency (MPCA), the U.S. Geological Survey, and watershed districts in understanding and quantifying the State’s water budget, and by The Nature Conservancy in its Ecological Limits of Hydrologic Alteration (ELOHA) process. The information provided by this project is essential to allocate water appropriately during droughts, to determine potential impacts to river ecology, to provide the information necessary to sustain endangered species, to understand the connections between surface water and ground water and to develop realistic total water availability in our watersheds. The information will also assist pesticide and water quality monitoring efforts throughout the state.

The project will use proven methodologies developed and used by the United States Geological Survey (USGS) in other states for estimating flows in ungaged watersheds. The stream flow estimation will be developed using tools based on regionally similar watershed characteristics that are associated with long-term stream gages throughout Minnesota.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Flow Duration Curve Development

Budget: \$75,000

Flow-duration curves are graphical tools that show the percentage of time a flow in a stream is likely to equal or exceed a certain value. Those characteristics vary considerably from basin to basin and across the State. The flow-duration curve also provides information about how a stream responds to droughts.

Outcome	Completion Date
1. Evaluate the flow records for unregulated stream gages in basins that have at least 10 years of record and develop annual flow duration curves for those locations.	12/31/2013
2. Evaluate the base flow recession rate for of the gages within a basin or region to better model the lower end of the flow duration curves for where flows are unknown.	03/31/2014

Activity 2: Basin Characteristics and Regionalization

Budget: \$110,000

Flow-duration curves vary from basin to basin because of differences among the basins. Those differences are defined by characteristics such as drainage area, land surface slope, precipitation, land cover and geology. The flow-duration curves and basin characteristics can be examined in a regional context and equations to predict flow-duration curves based on basin characteristics developed using multiple linear regressions.

Outcome	Completion Date
1. Develop basin characteristics expected to affect flow-duration curves in Minnesota. They will be calculated using a previously developed methodology for peak flow estimation in Minnesota.	03/31/2014
2. Select the basin characteristics within a region that are most associated with the physical and hydrological response within the regional watersheds and develop regionally based regression equation for flow duration curves.	03/31/2015

Activity 3: Establish the Stream Flow Estimation Methods

Budget: \$90,000

Stream flow estimation will be based on established techniques appropriate for the climate of Minnesota. Basically, the estimation technique uses flow at current stream flow stations to estimate flow based on the relation between the flow-duration curves.

Outcome	Completion Date
1. Identify current and historical stream flow stations that best estimate flow in streams. These will be evaluated using historical records and the extensive history of miscellaneous measurements on streams in Minnesota.	12/31/2015
2. Publish results in a US. Geological Survey Scientific Investigations Report	06/30/2016

III. PROJECT STRATEGY

A. Project Team/Partners

The USGS will provide the majority of the staffing necessary to complete the project. The USGS has the experience in statistical analyses of hydrologic data and the Minnesota USGS Water Science Center is uniquely positioned to support this effort in Minnesota. The MDNR will provide support to the USGS efforts through gathering and processing data from relevant stream flow stations operated by MDNR, MPCA and Minnesota Department of Agriculture (MDA).

B. Timeline Requirements

In general, the results from each of the activities in section II build on each other and are required for successful completion of the project. After identification of the stream gages that will be used in the project, the flow-duration curves and the basin characteristics will be generated. Next, the regionalization and regression equations will be developed. The final step is the development of the transfer of the information from current gages to any stream.

C. Long-Term Strategy and Future Funding Needs

This project is not part of a planned larger project. However, the results of this project can be used in other, ongoing projects, such as the watershed modeling effort by the MPCA and the pesticide monitoring efforts of MDA.

2012-2013 Detailed Project Budget

IV. TOTAL ENRTF REQUEST BUDGET 3years

BUDGET ITEM <i>(See list of Eligible and Non-Eligible Costs, p. 11)</i>	AMOUNT
Personnel:	
USGS - senior level hydrologist 12% all 3 years	86,000
USGS - junior level hydrologist 18% all 3 years	76,000
USGS - GIS specialist 12% all 3 years	73,000
all USGSS 80% salary 20% benefits	
DNR Direct Support Services : Hydrologists 1 16% all 3 years (DNR used a rate of 6.5% to calculate costs for direct support services, which are DNR's direct and necessary business services required to support this proposal)	\$22,125
Contracts: None	\$ -
Equipment/Tools/Supplies: None	\$ -
Acquisition (Fee Title or Permanent Easements): None	\$ -
Travel: Only within Metro travel to coordinate between USGS and MDNR	\$ -
Additional Budget Items: None	\$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 275,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: USGS cooperative match	\$ 155,000	<i>Secured</i>
Other State \$ Being Applied to Project During Project Period:	None	<i>Indicate: Secured or Pending</i>
In-kind Services During Project Period:	\$ -	
Remaining \$ from Current ENRTF Appropriation (if applicable):	None	
Funding History:	None	

Environment Trust Fund 2013 Project Proposal

Title of proposal: Essential Elements of Sustainable Water Management -
Determining Flow on Ungaged Streams.

Project Manager Qualifications

Gregory A. Kruse

Greg Kruse supervises the Water Monitoring and Surveys Unit for the Division of Ecological and Water Resources Division of the Department of Natural Resources. In this position Greg directs and manages state water quantity monitoring activities for lakes, rivers, groundwater, climatology and water related land surveying. As a Hydrologist for the department Greg has over 20 years of experience coordinating, managing, and monitoring the State of Minnesota's water resources. Greg coordinates department data collection activities with local, state and federal agencies and private organizations utilizing a staff of Hydrologists, Hydrogeologists, State Climatologists and Survey Technicians. His experience also includes hydrologic and hydraulic computer modeling, technical report writing and analyses, federal hydropower licensing review and contract management.

Organization Description

The Minnesota Department of Natural Resources' overall 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. Under MS 103G.101, 103G.255, 103G.261, 103G.265 the department must conserve, allocate and develop the water resources of the state for the best interest of the people.

