Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)

Project Title: **ENRTF ID: 197-EH**

Visualizing projected climate information for Minnesota

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

Sub-Category: E. Air Quality, Climate Change, and Renewable Energy

Total Project Budget: $ 125,000

Proposed Project Time Period for the Funding Requested: June 30, 2022 (2 yrs)

Summary:

Provide access to climate projections for the 21st century through a simple web tool, so that Minnesotans can use the best available science to plan for future conditions.

Name: Kenneth Blumenfeld

Sponsoring Organization: MN DNR

Job Title:

Department:

Address: 439 Borlaug Hall, 1991 Upper Buford Circle

St. Paul MN 55108

Telephone Number: (651) 296-4214

Email kenneth.blumenfeld@state.mn.us

Web Address:

Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Layout and design of current web tool, on which proposed tool will be based.

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

PROJECT TITLE: Visualizing Projected Climate Information for Minnesota

I. PROJECT STATEMENT

The Minnesota Department of Natural Resources will provide access to future climate scenarios through a simple, user-friendly web portal. Minnesotans currently lack access to future climate information, which is essential for planning purposes.

The DNR will add climate projections for the middle and end of the 21st century to its existing climate analysis web tool (https://arcgis.dnr.state.mn.us/ewr/climatetrends/#), so that citizens, communities, and resource managers can use the best available scientific information to plan for *future* climatic conditions.

This project will take advantage of newly available, high-quality, dynamically-downscaled climate projections for Minnesota, valid for the middle and end of the 21st century. These projections have been created for other projects and for other purposes by University of Minnesota scientists, who will be making their data available to this project team for incorporation into the web tool.

Users of the tool will be able to choose an area, and then select, retrieve, graph, and analyze the projected future states of monthly and seasonal climatic variables, including: maximum, minimum, and average air temperature; relative humidity; solar radiation (sunlight); wind speed; precipitation; snowfall; snow depth; evapotranspiration (moisture loss from surfaces)

Funding for this project is required to enable the DNR's IT (MNIT @ DNR) staff to undertake the following tasks, which are above and beyond normal, day-to-day responsibilities:

- Receive, format, and place the climate projections into a database
- Consult with DNR climatologist to understand the requirements of the web tool, and to guide the tool's development.
- Write, test, and implement computer programs that will help users access, analyze, visualize, and display information from the climate projections, while maintaining consistency with the existing climate tool.
- Test, refine and publish the new, improved tool on the DNR's website

Note: This project will utilize and add value to climate projections already created by other projects for other purposes, including but not limited to LCCMR project 201703b. This project will not be developing or running new climate models.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1 Title: *Build the climate projection database and provide public access to it by enhancing the existing climate visualization tool on the DNR's website*

Description: The first step in this project will be to create a database of the climate projections. This step will require data acquisition (from University of Minnesota scientists), data formatting, database design, database management, data migration, and data stewardship tasks.

The project team will explore, discuss, and agree upon the types of visualizations it will use to for the different types of climate data available, with an emphasis on simplicity and user-friendliness.

Next, the team will agree upon the basic layout and design of the interface that allows users to access the data and visualizations. This interface will be placed on a test site and will be modified over the course of the testing period.

The greatest proportion of project time will be spent developing, testing, and refining the visualizations and the interface on the DNR's test site. This will require application programming, end-user input, documentation, application security measures, and user acceptance testing.

Finally, the DNR will publish the new, improved tool on the DNR's website. Getting to this point will require DNR management review, coordination with the DNR Web Team for final publishing, and tasks related to moving the application from the test site to the DNR's production server.

ENRTF BUDGET: $125,000

Outcome	Completion Date
1. All climate projections are in database, are properly formatted, and are ready for analysis	August 2020
2. Project team agrees upon visualizations and output options for each climate variable	September 2020
3. User interface built on DNR's "development" site for testing and refinement	October 2020

III. PROJECT PARTNERS AND COLLABORATORS:

DNR Staff:
Kenny Blumenfeld, DNR Climatologist (in-kind)
Two (2) DNR MNIT Application Developers
One (1) DNR MNIT Business Analyst
One (1) MNIT Project Manager

University of Minnesota Scientists
Dr. Tracy Twine, Associate Professor, Dept. of Soil, Water, and Climate (in-kind)
Dr. Peter Snyder, Associate Professor Dept. of Soil, Water, and Climate (in-kind)
Dr. Stefan Liess, Research Scientist, Dept. of Soil, Water, and Climate (in-kind)

IV. LONG-TERM IMPLEMENTATION AND FUNDING:

The availability of this tool will be announced internally and to partners over email; it will be highlighted on the DNR's public website, and will be shared through social media channels. The Project Manager will feature data from the tool in his many public speaking engagements, and will be willing to provide user training as part of his regular duties as needs arise.

The climate projections web tool will require occasional small corrections and adjustments after the completion of this project, requiring additional labor from the team's MNIT Application Developers. These relatively small costs will be covered by an ongoing application maintenance agreement between DNR MNIT and the DNR Division of Ecological and Water Resources (the Project Manager's division within the DNR).

V. SEE ADDITIONAL PROPOSAL COMPONENTS:

A. Proposal Budget Spreadsheet
B. Visual Component or Map
C. Parcel List Spreadsheet
D. Acquisition, Easements, and Restoration Requirements
E. Research Addendum (Not required at proposal submission stage. Required later in process, if proposal is recommended. Staff will provide further information at that time)
F. Project Manager Qualifications and Organization Description
G. Letter or Resolution
H. Financial Capacity

Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Kenny Blumenfeld
Project Title: Visualizing projected climate information for Minnesota
Organization: Minnesota Department of Natural Resources
Project Budget: $125,000
Project Length and Completion Date: 1 Year, June 30, 2021
Today's Date: April 12, 2019

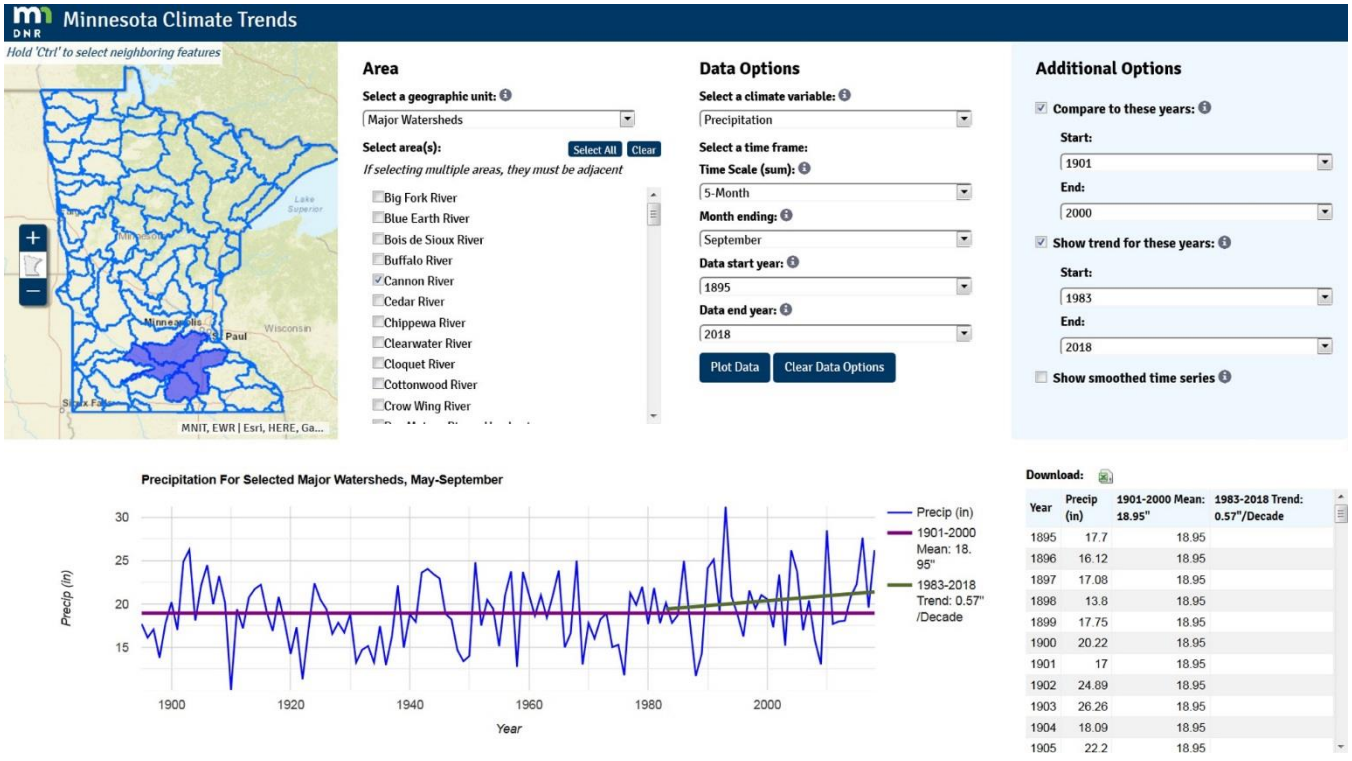
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)		$ -	$ -
Professional/Technical/Service Contracts			
Service level agreement with MNIT Professional Services for business analysis, project management, application development (programming), database administration, testing, security provisions, publication on web	$ 125,000	$ -	$ 125,000
(Entire budget is for contract with DNR MNIT, to perform tasks above and beyond normal duties.)			
Equipment/Tools/Supplies			
	$ -	$ -	$ -
Capital Expenditures Over $5,000			
	$ -	$ -	$ -
Fee Title Acquisition			
	$ -	$ -	$ -
Easement Acquisition			
	$ -	$ -	$ -
Professional Services for Acquisition			
	$ -	$ -	$ -
Printing			
	$ -	$ -	$ -
Travel expenses in Minnesota			
	$ -	$ -	$ -
Other			
	$ -	$ -	$ -
COLUMN TOTAL	$ 125,000	$ -	$ 125,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:		$ -	$ -	$ -
State:		$ -	$ -	$ -
In kind:		$ -	$ -	$ -
Climate projection data for this project have been produced and stored at the Minnesota Supercomputing Institute (MSI) at a cost of $75,000 ($25k for three years)	Secured			
Drs. Tracy Twine, Peter Snyder, and Stefan Liess at the University of Minnesota Department of Soil, Water, and Climate have pledged a total of 100 hours, to transfer the climate data and for consultation regarding its use. This contribution is equivalent to $10,800 in salary and benefits.	Secured			
Project manager and DNR climatologist will work on this project as part of normal responsibilities, at 2 hours per week or 5% FTE.	Secured			

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		$ -	$ -	$ -

PROJECT TITLE: *Visualizing projected climate information for Minnesota*

B. Visual Component or Map (image of current web tool for understanding <u>past</u> and <u>current</u> climate trends)



PROJECT TITLE: *Visualizing projected climate information for Minnesota*

F. Project Manager Qualifications and Organization Description

Kenneth Blumenfeld ("Kenny") is Sr. Climatologist for the Minnesota State Climatology Office (DNR), and is responsible for keeping the state's citizens, organizations, and communities up-to-date on the science of Minnesota's changing climate. Kenny received a Ph.D. in 2008, from the University of Minnesota, Department of Geography, where he studied patterns of extreme and hazardous weather in Minnesota.

Within the DNR, the State Climatology Office's mission is to collect, maintain, analyze, and distribute information about Minnesota's climate for the benefit of its citizens, organizations, and communities.