

**Environment and Natural Resources Trust Fund
2018 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 010-A

Improving Watershed Management by Modernizing Hydrography Data

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: \$ 1,277,727

Proposed Project Time Period for the Funding Requested: 2 years, July 2018 to June 2020

Summary:

Improve watershed management decisions with modern, field-scale spatial data of rivers, streams, lakes, wetlands, and watersheds. This foundational data product will serve as the authoritative source for hydrography in Minnesota.

Name: Nila Hines

Sponsoring Organization: MN DNR

Address: 500 Lafayette road
Saint Paul MN 55155

Telephone Number: (651) 259-5546

Email nila.hines@state.mn.us

Web Address _____

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

This visual shows why we need to invest in modern hydrography data. It compares the current state of hydrography data with a proposed future state. Currently, multiple copies of hydrography data are compared with field observations using Google Earth. This creates confusion for stakeholders using the data. A picture of the final data product shows how the data will change as a result of this proposal. Data is harmonized, enhancing public trust in water management decisions.

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



PROJECT TITLE: Improving Watershed Management by Modernizing Hydrography Data

I. PROJECT STATEMENT

Modern, highly accurate hydrography data of rivers, streams, and watersheds at a field scale are foundational for managing Minnesota’s natural resources. Hydrography data connects water features, such as rivers and lakes, found on maps with vast amounts of critical information, such as protected water designations, stored in a database format. Landscape hydrography is dynamic not static; stream and river channels change over time and after catastrophic events like flooding. Today, despite the fact that nearly all watershed management decisions rely on accurate hydrography data, most decisions are based on static topographic maps that were hand drawn on paper during the 1960s and 1970s and later built into digital products. This foundational data is now over 40 years old; as a result, individuals have overcome data shortcomings by creating multiple, redundant, and out-of-sync versions of existing data. This means that when engineering firms or others collaborate with land owners and state agencies, they are often not referencing the same data, creating confusion and poor decision making. Action is needed to ensure the accuracy, reliability, and usability of our most essential hydrography data.

This project proposes to develop the next generation of hydrography data that will serve as the authoritative source for watercourses and watershed boundaries for the State of Minnesota. Given the scale and significance of this effort, this project is the first phase of what is designed as a multi-phase project. Overall, the proposed final data product will significantly improve watershed management, with the following specific results:

- **Improved public safety**, by modeling dynamic hydrologic responses during catastrophic weather events;
- **Greater public trust for water resource management decisions** based on accurate, field-scale data (e.g. accurate topographic riparian area boundaries for stream restoration projects);
- **Large efficiency gains** in the production of derived products, such as updated trout stream or water trail maps, derived from one authoritative data source;
- **Fewer field site visits**, more automated processes that will help identify changes on the landscape at a field-scale resolution (e.g. automated identification of unstable stream reaches); and,
- **More powerful watershed modeling**, enhancing the ability to identify sources of non-point pollution.

To maximize previous state investments in GIS data, the new hydrography data will be integrated with modern high-resolution Light Detection and Ranging (LiDAR) data, high resolution aerial imagery, and a recent statewide update of the National Wetland Inventory (NWI). This first phase of the project is designed as a proof-of-concept that will leverage existing projects to better understand how to build, manage, and govern this foundational data. Four distinct watersheds that represent unique physiographic regions across the state have been selected to pilot this effort.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Establish a Long-term Data Management Plan for Hydrography Data

Budget: \$191,659

Establish a data management plan that will formalize decision making for a single authoritative source of hydrography data. We will document how these data will be managed and updated over time to ensure high quality, accessible data; reducing long-term costs associated with maintenance and poor quality data.

Outcome	Completion Date
1. Define data stewardship roles and responsibilities.	September 30, 2018
2. Document and formalize data standards.	December 30, 2018
3. Develop procedures to capture and transfer legacy attribute data.	June 30, 2019
4. Develop data management tools and an approval process for proposed data quality improvements.	June 30, 2020



Environment and Natural Resources Trust Fund (ENRTF)

2018 Main Proposal

Project Title: Improving Watershed Management by Modernizing Hydrography Data

Activity 2: Update Watercourse and Watershed Data; Four Distinct Watersheds

Budget: \$1,060,513

Create updated and accurate watercourse and watershed data for the following watersheds: Lake Superior South, the North Fork of the Crow River, Bois de Sioux, and the Root River.

Outcome	Completion Date
1. Hydro-modification of LiDAR-derived Digital Elevation Models (DEMs)- Level 3, watercourse generation, and quality control review.	June 30, 2020
2. Integrate updates from other sources (e.g. centerlines from wide river polygons).	June 30, 2020
3. Transfer legacy watercourse attributes and recalculate selected attributes.	June 30, 2020
4. Pour point generation and quality control review.	June 30, 2020
5. Watershed and catchment generation along with quality control review.	June 30, 2020
6. Transfer legacy watershed attributes.	June 30, 2020
7. Transfer legacy attributes for basins to NWI (PWI, DOW#, etc.).	June 30, 2020
8. Final data integration and quality control review.	June 30, 2020

Activity 3: Publication, and User Outreach

Budget: \$25,555

Publish data on the Geospatial Commons website for easy public access. Provide outreach on data standards and solicit feedback from stakeholders on final data product.

Outcome	Completion Date
1. Publish data and maps via MN Geospatial Commons and Web Services.	June 30, 2020
2. Develop metadata and technical user guidance.	June 30, 2020
3. Conduct trainings and deliver presentations about new data resource.	Ongoing

III. PROJECT STRATEGY

A. Project Team/Partners

- *Nila Hines, DNR Data Governance Program Administrator:* Project management, reporting, and coordination. Lead consultant on data management activities.
- *Data Management Project Coordinator, new position housed in the DNR Operation Services Division:* Coordinates development of data stewardship model, data management, and data integration work.
- *MN.IT @DNR Geospatial Water Resources Team, Resource Assessment Office, and MnGeo:* Conducts GIS and geodatabase work. Works with stakeholders to publish new data resource.

B. Project Impact and Long-Term Strategy

This project is essential to further advance emergency response planning, disaster recovery, watershed modeling, water recreation, and water conservation planning, benefiting a wide variety of public and private organizations. Landowners, engineering firms, local units of government, counties, SWCDs, and state agencies (DNR, BWSR, MPCA, MDA, MnDOT) increasingly rely on hydrography data to deliver an array of services.

This project seeks to leverage and build on an existing statewide update of the NWI for Minnesota, which serves as the foundational dataset for lakes, ponds, and wetlands. It will begin the process of integrating updated NWI data with watercourse and watershed data; ultimately creating a single authoritative source for hydrography data in the State of Minnesota. This is the first phase of a larger effort; additional proposals that expand this effort beyond four distinct watersheds will be needed to sustain this effort. Database templates and procedures established during Phase 1 will streamline the creation of new data during subsequent phases of the project.

C. Timeline Requirements

Work will be initiated in 2018 and continue for two years. This work will require additional funding to complete a statewide data product.

2018 Detailed Project Budget

Project Title: Improving Watershed Management by Modernizing Hydrography Data

IV. TOTAL ENRTF REQUEST BUDGET 2 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: DNR data management project coordinator, new temporary position (1 unclassified 1.0 FTE for two years) 78% salary, 22% benefits	\$ 197,000
Professional/Technical/Service Contracts: Contract with MN.IT services to conduct GIS and geodatabase work.	\$ 743,088
Professional/Technical/Service Contracts: Contract with DNR Resource Assessment Office for data processing and quality assurance support.	\$ 318,466
Equipment/Tools/Supplies: Handouts for training sessions for 100 participants @\$10 (\$1,000); Large portable hard drives 4 @\$100 (\$400), GPS batteries, and office supplies.	\$ 1,400
Travel: Travel expenses for MN travel only and includes in-state mileage, lodging and travel expenses. Travel is for project coordination and outreach and training activities. Travel expenses are subject to State of MN labor agreements and DNR policy.	\$ 3,000
Direct and Necessary: *Direct and Necessary expenses: HR Support (~\$2,969), Safety Support (~\$682), Financial Support (~\$2,631), Communication Support (~\$1,271), IT Support (~\$6,148), and Planning Support (~\$1,072) necessary to accomplish funded programs/projects.	\$ 14,773
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 1,277,727

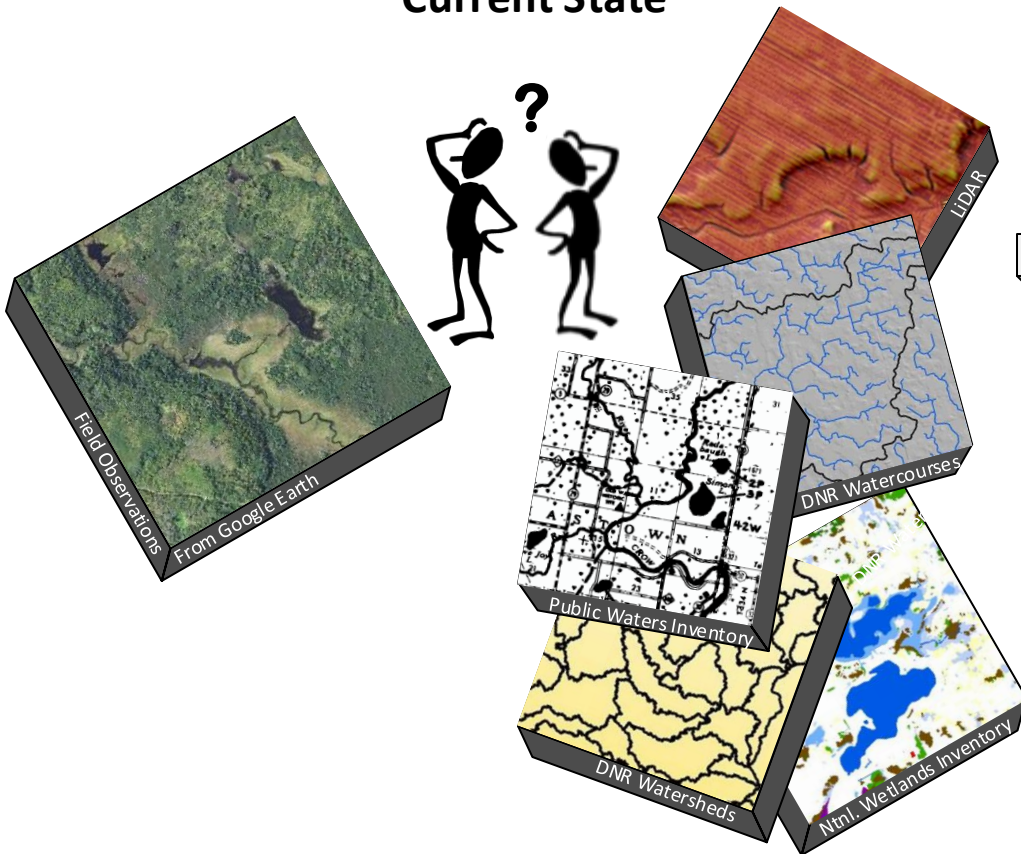
*Direct and Necessary expenses include Department Support Services (Human Resources, IT Support, Safety, Financial Support, Communications Support, and Planning Support). Department Support Services are described in the agency Service Level Agreement and billed internally to divisions based on rate that have been developed for each area of service. These services are directly related to and necessary for the appropriation. Department leadership services (Commissioner's Office and Regional Directors) are not assessed. Those elements of individual projects that put little or no demand on support services such as large single-source contracts, large land acquisitions, and funds that are passed through to other entities are not assessed Direct and Necessary costs for those activities.

V. OTHER FUNDS

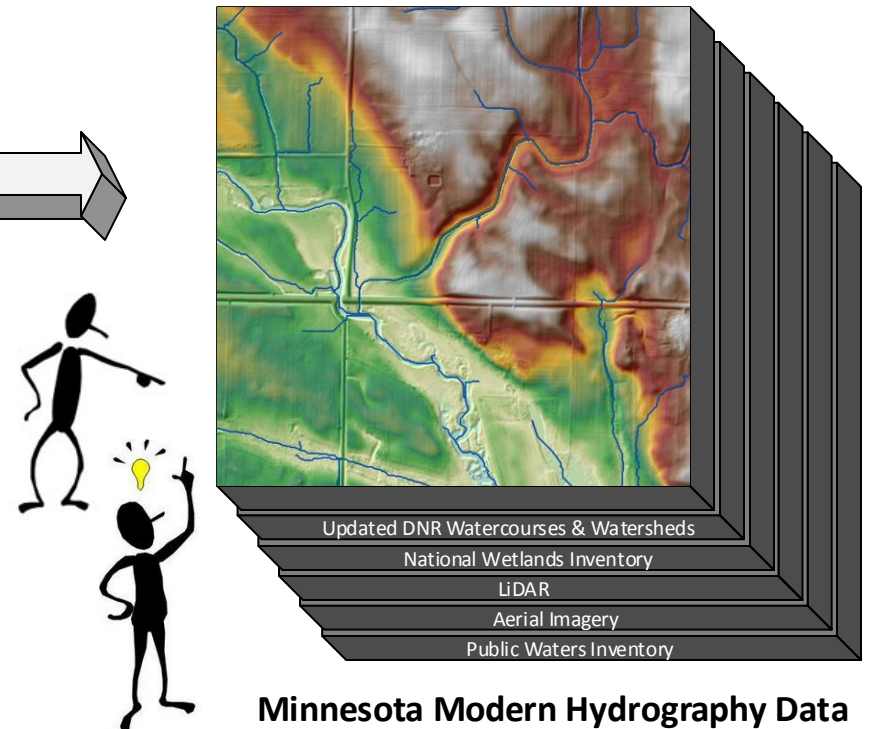
<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period: N/A	N/A	N/A
Other State \$ To Be Applied To Project During Project Period: N/A	N/A	N/A
In-kind Services To Be Applied To Project During Project Period: DNR staff time for project management, reporting, and coordination: (~296 hours per year for 2 years).	\$ 49,728	Secured
Past and Current ENRTF Appropriation: N/A	N/A	N/A
Other Funding History: N/A	N/A	N/A

Why We Need to Invest in Modern Hydrography Data

Current State



Proposed Future State



Current

- Multiple, out-of-sync copies of hydrography data.
- Locations of stream centerlines based on historic maps.
- Inefficient processes for creating derived data products.
- Costly field site verifications.
- Missing data lowers public trust.

Future

- Single, authoritative data source.
- Harmonized data that leverages recent state investments.
- Automated processes identify changes on the landscape.
- High-resolution data that minimizes field site verifications.
- Enhanced public trust in watershed management decisions.

Project Manager Qualifications

Project Manager: **Nila Hines**
Data Governance Program Administrator, Office of Policy and Planning, OSD
Affiliation: Minnesota Department of Natural Resources
Mailing Address: 500 Lafayette Road, St. Paul MN 55155
Telephone: 651-259-5546
E-mail: nila.hines@state.mn.us

Nila provides strategic support and leadership for a new data governance program at the Minnesota Department of Natural Resources (DNR). She is currently developing data policies that are designed to influence and determine decisions that will improve data quality and promote interoperability, exchanges, sharing, and the ability to effectively use data produced by colleagues at the DNR. This work is an essential step to ensure that the DNR has the capacity to truly leverage data as an asset for delivering natural resource conservation results. Recently, Nila provided strategic input on data governance for the DNR’s Buffer Mapping Project, developing a practical approach to managing the accuracy and completeness of metadata for GIS data products.

Professional Experience

2015 - current	Data Governance Program Administrator, DNR Operations Services Division
2014	Research Coordinator, Department of Entomology, University of Minnesota
2006 - 2012	Research Scientist, Pesticide Management, Minnesota Department of Agriculture
2006	Emerald Ash Borer GIS Specialist

Education

University of California, Davis

Degree: M.S. Integrated Pest Management

M.S. Thesis: Tracking Non-Residential Pesticide Use in Urban Areas of California

Agricultural Geographic Information System Laboratory, Department of Hydrology

- Collected, organized, and statistically evaluated California Pesticide Use Report data using GIS software tools. Examined the use of pesticides that may degrade surface water and groundwater quality and soil health.

Penn State University

Degree B.S. Agricultural Science

Organization Description

The DNR’s data governance program is responsible for orchestrating the development of policies, procedures, and standards to ensure that the DNR’s data and information is secure, accessible, and usable. Our program facilitates decision making throughout data, information, and content life cycles, documenting how it is used, when, and by whom. The data governance program is designed to sit between the business functions at the DNR and MN.IT @DNR and is a shared service that benefits all divisions at the DNR.