

**Environment and Natural Resources Trust Fund  
2011-2012 Request for Proposals (RFP)**

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**LCCMR ID: 023-A2**

**Project Title:** Harmonized DNR and Canadian Watersheds Enhance Streamstats

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**Category:** A2. Natural Resource Data and Information: Distribution, Application, and Training

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**Total Project Budget:** \$ \$213,650

**Proposed Project Time Period for the Funding Requested:** 2 yrs, July 2011 - June 2013

**Other Non-State Funds:** \$ 0

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**Summary:**

This project will provide on-line access to very detailed DNR Lake watersheds through the Minnesota USGS StreamStats application.

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**Name:** Christopher Sanocki

**Sponsoring Organization:** United States Geological Survey

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Mounds View MN 55112

**Telephone Number:** 763-783-3100

**Email:** sanocki@usgs.gov

**Web Address:** \_\_\_\_\_

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**Location**

**Region:** Statewide

**Ecological Section:** Statewide

**County Name:** Statewide

**City / Township:**

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

# 2011-2012 MAIN PROPOSAL

## PROJECT TITLE: HARMONIZED DNR AND CANADAIAN WATERSHEDS ENHANCE STREAMSTATS

### I. PROJECT STATEMENT

StreamStats is a Web-based Geographic Information System (GIS) that provides users easy access to an assortment of **watershed** based analytical tools that are useful for **water-resources planning, management (conservation practices to reduce soil erosion), and engineering design (peak-flow estimates for bridge and culvert design)**. The watershed boundary data used in the development of Minnesota's StreamStats contained approximately 3,000 watersheds and had thousands of unresolved gaps and overlaps. DNR's watershed dataset has over 12,000 watersheds and is **highly accurate and detailed with over 12,000 watersheds**. Another concern is the inability of StreamStats to generate binational watershed boundaries along Minnesota's Canadian border waters. **Responding to the absence of seamless transboundary watershed data the USGS and the International Joint Commission (IJC) of Canada convened a binational taskforce to create a shared geospatial foundation of watershed data which local, regional and federal agencies could share without the fault lines of state or international boundaries. Minnesota's taskforce (IJC, USGS, DNR, PCA and MNGEO) focus has been on the Rainy River, Lake of the Woods and Pigeon River binational watersheds. The harmonized watershed data will enable researchers to precisely define characteristics for tributaries to Lake of the Woods which can assist with the 303(d) Threatened and Impaired Waters classification due to high phosphorus.**

### II. DESCRIPTION OF PROJECT ACTIVITIES

**Activity 1:** *Update procedures and methods used to hydro-enhance DEMs using DNR Catchments watershed data, and hybrid synthetic stream data.*  
**Budget:** \$33,992

Testing and quality assurance of procedures used to update the Minnesota StreamStats database - this will include the updating of data processing programs and applications

<b>Outcome</b>	<b>Completion Date</b>
<i>1. update modeling flow chart showing the procedures used to prep data</i>	<i>09/30/11</i>
<i>2. process and assemble 5 hydrologic units for pre StreamStats testing</i>	<i>09/30/11</i>
<i>3. Update computer programs and document updated methods and procedures</i>	<i>09/30/11</i>

**Activity 2:** *Assemble, process, and generate characteristics for 91 level 4 Hydrologic Units*  
**Budget:** \$124,425

*Organize and populate the 86 Level 4 Hydrologic Units with synthetic based streams from NRCS/DNR hydrologic processing, Digital Elevation Models, and final level 4 hydrologic units with DNR Catchment subdivisions*

Outcome	Completion Date
1. Populate 91 level 4 geodatabases with synthetic Streams, DNR Catchments, and DEMs	10/31/11
1. Hydroenhance 91 level 4 Hydrologic Units	03/31/12
2. Global database assembly, generate characteristics, and build exclusion polygons	04/31/12

**Activity 3:** Quality assurance testing, documentation and report addendum  
**Budget:** \$55,224

Testing and quality assurance of procedures used to update the Minnesota StreamStats database - this will include the update of GIS data processing programs and applications

Outcome	Completion Date
1. Watershed characteristics, quality assurance testing and produce addendum to the Scientific Investigations Report 2009-5250	09/30/12
2. Update gis metadata with new procedures and methods	09/30/12

### III. PROJECT STRATEGY

#### A. Project Team/Partners

*This project is an extension of a continuing partnership between the USGS, Minnesota Department of Transportation, DNR Waters and USDA-NRCS to share watershed boundary update information and applications. All funds will be distributed to USGS Water Science Center Staff Only. Team members include*

*Chris Sanocki (USGS project Lead District GIS Specialist), - Project manager – manage contracts, reporting, quality assurance, data processing and team coordination*

*Dave Lorenz (USGS hydrologist Engineer) -- statistical and hydrologic lead--*

*USGS Water Science Center Staff – data collection and processing*

*Sonia Jacobsen (P.E. Hydraulic engineer USDA-NRCS)- will provide approximately \$75,000 in GIS staff services in support of the enhancement to StreamStats*

*Sean Vaughn (GIS Hydrologist DNR Waters) -- will provide technical and coordination assistance for DNR watershed data.*

*Susanne Maeder (Research Analysis Spec Sr MNGeo) -- will provide documentation and coordination assistance.*

*Michael Laitta (International Joint Commission) and Conrad Wyrzykowski (Agriculture and Agi-Food Canada) -- will provide technical and data assistance and coordination from Canada.*

#### B. Timeline Requirements

*This is a two year proposal. Activities in year one include data collection, testing and design updates. The second year will be data processing, final quality assurance and documentation and implementation of the new watershed boundaries within USGS Minnesota StreamStats (<http://water.usgs.gov/osw/streamstats/>).*

#### C. Long-Term Strategy and Future Funding Needs

The addition of DNR catchments and harmonized state and binational watershed boundaries into the web based application StreamStats is the final step needed to provide water resource planners, managers, researchers, and engineers a tool for hydrological analysis.

**IV. TOTAL TRUST FUND REQUEST BUDGET 2 years**

<b>BUDGET ITEM</b>	<b>AMOUNT</b>
<b>Personnel:</b> USGS Geographer Project Manager: .16 FTE per year for 2 years USGS Hydrologist Engineer: .1 FTE per year for 2 years USGS Water Science Center Staff: .51 FTE per year for 2 years	\$ 213,650 -
<b>Contracts:</b>	\$ -
<b>Equipment/Tools/Supplies:</b>	\$ -
<b>Acquisition (Fee Title or Permanent Easements):</b>	\$ -
<b>Travel:</b>	\$ -
<b>Additional Budget Items:</b>	\$ -
<b>TOTAL ENVIRONMENT &amp; NATURAL RESOURCES TRUST FUND \$ REQUEST</b>	<b>\$ 213,650</b>

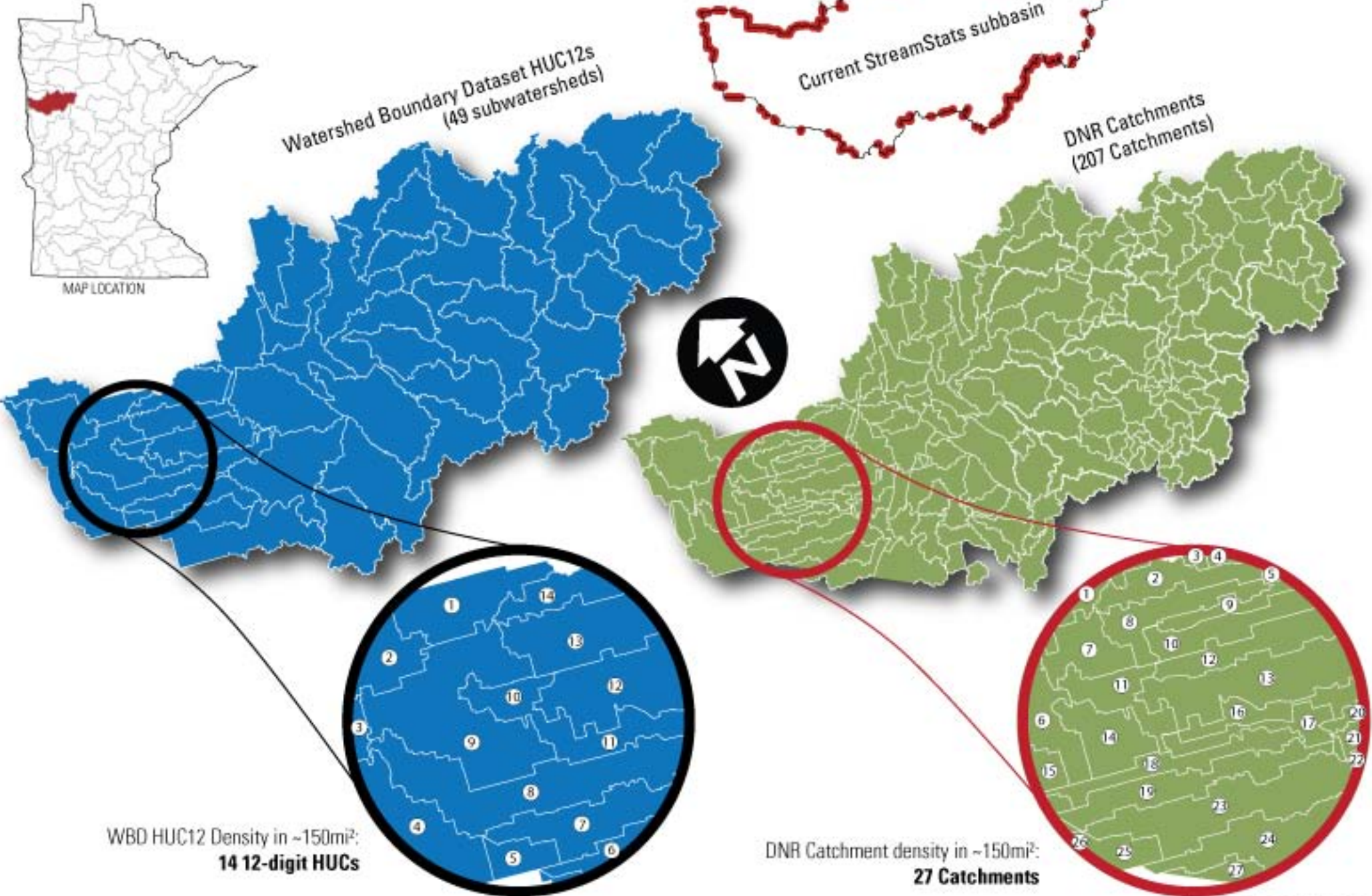
**V. OTHER FUNDS**

	<b>AMOUNT</b>	<b>Status</b>
<b>SOURCE OF FUNDS</b>		
<b>Other Non-State \$ Being Applied to Project During Project Period:</b> USGS funds will be provided as federal match to the project to cover USGS specialist support staff and bureau and facilities costs (40% of the total state plus federal cost for the project of \$356,084).	\$ 142,433	
<b>Other State \$ Being Applied to Project During Project Period:</b>	\$ -	
<b>In-kind Services During Project Period:</b> <i>USDA/NRCS will provide GIS staff services for hybrid streams for 91, 8 digit Hydrologic units</i>	\$75,000 -	
<b>Remaining \$ from Current ENRTF Appropriation (if applicable):</b>	\$ -	

# Updated Minnesota StreamStats Watersheds

09020108 Wild Rice River subbasin

● indicates topological gap or overlap with neighboring subbasins.



WBD HUC12 Density in ~150mi<sup>2</sup>:  
**14 12-digit HUCs**

DNR Catchment density in ~150mi<sup>2</sup>:  
**27 Catchments**

**DNR Catchments are denser, forcing delineations to be based upon boundaries.**

**Christopher A. Sanocki**  
**U.S. Geological Survey, Water Science Center, 2280 Woodale Drive,**  
**Mounds View, Minnesota**

**EDUCATION**

University of Minnesota, Minneapolis, Minnesota, B.A./B.S. Geography 1991

***USGS District GIS Specialist 5/95-Present***

Major duties include - Project Chief, District GIS database manager, District GIS project manager, District GIS programming applications manager, supervise, hire, and train district and contract staff.

***Geographer 6/91-5/95***

Major duties included, District GIS database manager, GIS project management

**Recent Publications:**

- **Sanocki, Christopher A.; Langer, Susan K.; Menard, Jason C. 2009 U.S. Geological Survey Scientific Investigations Report 2009-5226** *Potentiometric Surfaces and Changes in Groundwater Levels in Selected Bedrock Aquifers in the Twin Cities Metropolitan Area, March-August 2008 and 1988-2008*
- **Lorenz, D. L.; Sanocki, C. A.; Kocian, M. J. 2009 U.S. Geological Survey Water Resource Investigation 97-4249** *Techniques for estimating the magnitude and frequency of peak flow on small streams in Minnesota*
- **Johnson, Michaela R.; Clark, Jimmy M.; Dickinson, Ross G.; Sanocki, Chris A.; Tranmer, Andrew W. 2009 U.S. Geological Survey Data Series 2009-483** *Riparian Land Use/Land Cover Data for Three Study Units in Group II of the Nutrient Enrichment Effects Topical Study of the National Water-Quality Assessment Program*
- **Christensen, Victoria G.; Lee, Kathy E.; Sanocki, Christopher A.; Mohring, Eric H.; Kiesling, Richard L. 2009 U.S. Geological Survey Scientific Investigations Report 2009-5215** *Water-Quality and Biological Characteristics and Responses to Agricultural Land Retirement in Three Streams of the Minnesota River Basin, Water Years 2006-08*

**Recent Presentations:**

- Sanocki, Christopher A. 2009. Changes in Groundwater Level and Potentiometric Surfaces in Selected Bedrock Aquifers in the Twin Cities Metropolitan Area, 2008 Minnesota Water Resources Conference October 26-27, 2009 Saint Paul, Minnesota
- Sanocki, Christopher A. 2008 USGS nationwide StreamStats program and its status in Minnesota". Minnesota Governors Council Hydrography Subcommittee February 21, 2008
- Sanocki, Christopher A. 2007 Panel: National Hydrography Dataset (NHD) Stewardship and Hydrography Applications, Minnesota GIS/LIS Consortium Conference, October 10-12, 2007, Mayo Civic Center, Rochester, Minnesota.
- Sanocki, Christopher A. 2006 Displaying Surface-Water Data and Spatial Information for USGS Gaging and Water-Quality Stations in Minnesota, U.S. Geological Survey Sixth Biennial Geographic Information Science Workshop, Denver, Colorado, April 24-28, 2006
- *Christopher A. Sanocki<sup>1</sup>, Matt Kocian<sup>2</sup>, and Bruce C. Vondracek<sup>3</sup>* 2006 Comparing Geographic Information System Stream Slope Methods to Field Measurements in Minnesota, U.S. Geological Survey Sixth Biennial Geographic Information Science Workshop, Denver, Colorado, April 24-28, 2006