

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

LCCMR ID: 027-B

Project Title: New Generation in Water Supply Management-Pilot Studies

Category: B. Water Resources

Total Project Budget: \$ \$986,500

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

Other Non-State Funds: \$ 0

Summary:

This proposal will develop a new approach for sustainable water management planning across governmental jurisdictions and link users and citizens in water management decisions that are unique to their area.

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Sponsoring Organization: DNR

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Location

Region: NW, Central

Ecological Section: Red River Valley (251A), North Central Glaciated Plains (251B)

County Name: Clay, Kandiyohi, Pope, Stearns, Wilkin

City / Township:

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

MAIN PROPOSAL

PROJECT TITLE: NEW GENERATION IN WATER SUPPLY MANAGEMENT – PILOT STUDIES

I. PROJECT STATEMENT

In order to conserve and yet sustainably utilize our water supply resources, a new generation of water supply management strategies is needed. This proposal seeks to develop and implement new guidance for water management across governmental jurisdictions and natural hydrologic units. Traditional water management is based on political boundaries and location-specific uses. Future water management will likely be based on ground and surface watersheds and analysis of cumulative impacts. The natural management unit for groundwater is the aquifer, which may extend across political, ecological and surface watershed boundaries. Two pilot study areas, the Bonanza Valley and the Buffalo Aquifer, have been selected to develop these new strategies.

Objectives and results: The Bonanza Valley and the Buffalo Aquifer pilot studies will:

- a. research, monitor and evaluate ground and surface water interaction, potential vulnerabilities and sustainable use,
- b. research potential pumping induced movement of contaminants through complex confined, leaky aquifers,
- c. investigate the hydrologic properties of confining beds (aquitards) in relationship to confined, leaky and unconfined aquifers,
- d. assemble decision support tools to help with local planning,
- e. establish locally supported water management plans for each study area,
- f. design management guidance that will be easily applied to other places with similar problems.

The Bonanza Valley pilot study area is in Stearns, Pope and Kandiyohi Counties where water supply and quality issues have recently come to light but are not well understood. Community interest is growing but uncertain. This area is often considered to be water rich and, until recently, has supported agricultural irrigation without measured impact to other users or ecologic resources; however, several years of reduced precipitation and increased irrigation resulted in water use conflicts. Previous studies and ongoing work in this area include:

- county geologic atlases in Stearns and Pope Counties,
- United States Geological Survey (USGS) historical streamgage data, historical studies and hydrologic model,
- DNR groundwater level monitoring network in all three counties,
- DNR streamflow and groundwater level readings in 2008 to 2010, gathered to address water use conflicts.

The Buffalo Aquifer pilot study area includes portions of Clay and Wilkin Counties. Many communities and water users are involved and interested. Stakeholders want to balance water use from surface water and groundwater to maintain an adequate water supply for all users and the area's economic integrity during a prolonged drought similar to that of the 1930s. The City of Moorhead and Clay County are active partners in this project. Previous studies and ongoing work in this area include:

- county geologic atlas in progress for Clay County,
- regional hydrogeologic assessment of the southern Red River Valley,
- USGS historical streamgage data, historical studies and hydrologic model,
- Department of Natural Resources (DNR) groundwater level monitoring network in both counties,
- TMDL study in the Buffalo River Watershed.

Additional objectives and results of the Bonanza Valley and the Buffalo Aquifer pilot studies are to:

- g. better use of land and water vulnerability and sustainability information in decision making,
- h. develop more knowledgeable and engaged citizens,
- i. link studies and data to predict future impacts,
- j. provide more tools and products to guide land and water management plans,
- k. improve information sharing between partners and provide public web access to standardized data.

II. DESCRIPTION OF PROJECT RESULTS

Activity 1: Data collection and compilation for each pilot study area **Budget:** \$ 563,000
Compile and prepare for input into the hydrologic model the results of past and ongoing data collection. Perform geochemical and age-dating analyses. Gather additional streamflow and groundwater data.

Outcome**Completion Date**

- | | |
|---|--------------------|
| 1. Additional stations and wells installed, aquifer testing conducted. | April 30, 2012 |
| 2. Existing data compiled and transferred into a usable format for hydrologic model | September 30, 2011 |

Activity 2: Develop hydrologic models for each pilot study area**Budget:** \$ 254,000

The USGS will develop hydrologic models for each study area. These models will assist in identifying potential impacts of groundwater withdrawal on surface waters and ecologic systems. This result will include an uncertainty analysis of the model to identify areas of inadequate data and will define flows needed to sustain ecological needs. These findings will inform decisions about additional monitoring and testing and development of decision making management scenarios and options.

Outcome**Completion Date**

- | | |
|---|-------------------|
| 1. Data compiled in Activity 1 incorporated in models and model scenarios developed | December 31, 2011 |
| 2. Models for the Bonanza Valley and the Buffalo Aquifer pilot studies created | December 31, 2012 |
| 3. Project report on models | June 30, 2013 |

Activity 3: Civic engagement, creation of plans and guidance development**Budget:** \$169,500

The involvement of local governments and stakeholders is essential for the success of this project and will be accomplished through the engagement of community groups, public meetings and web based information. Technical expert review and input will be included in plan and guidance development. Water management plans for each study area will be developed. Transferable guidance for the design and creation of locally supported water supply management will be developed. The guidance will be usable for large and small scale watershed management, consider surface and groundwater, incorporate ecologic and economic considerations and conserve, yet sustainably utilize, our water resources. Recommendations will be made for improved cooperative water management strategies.

Outcome**Completion Date**

- | | |
|---|----------------|
| 1. A minimum of two community meetings held in each study area | June 30, 2013 |
| 2. Technical experts' review incorporated into plans and guidance | March 31, 2013 |
| 3. Web-based community communication established and maintained | June 30, 2013 |
| 4. Water supply management plans for each pilot study area written | June 30, 2013 |
| 5. Guidance on how to design and implement watershed management plans developed | June 30, 2013 |

III. PROJECT STRATEGY**A. Project Team/Partners**

Funded team/partners - DNR, project lead and data gathering; USGS, modeling (contract); Freshwater Society and Water Resources Center University of Minnesota (contract), plan and guidance development and civic engagement;

In-kind team/partners, DNR, USGS, City of Moorhead;

Other partners (not receiving funds) - Clay County Board of Commissioners, Pope County Commissioners, - local government leaders; Department of Health, Department of Agriculture and Pollution Control Agency - water quality assessments; Minnesota Rural Water Assoc., Buffalo-Red River Watershed District, Stearns County Environmental Services, Stearns County Soil and Water Conservation District and Pope County Land & Resources Management – local involvement.

B. Timeline Requirements

This project will be conducted over a period of two years with anticipated report completion by June 30, 2013. Actual implementation of management plans will continue after project completion. The duration and extent of this aspect will be one of the components of the management plans.

C. Long-Term Strategy

In addition to gathering new data and investigating the relation of aquitards with ground and surface water interaction, this project will develop guidance for sustainable water management on a watershed basis. This guidance has potential application to 81 major surface watersheds and uncounted groundwater-sheds and other surface watersheds. Future requests for LCCMR funding in these areas are not anticipated but may be necessary because of the complexity of the issues.

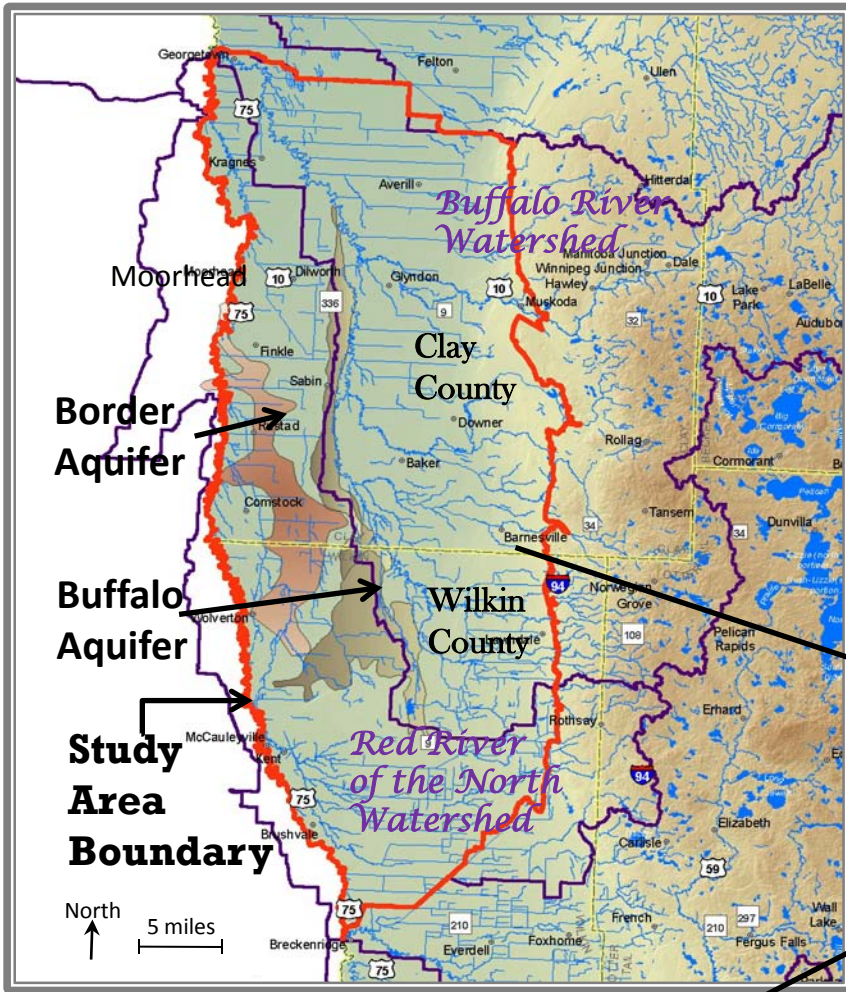
Project Budget

IV. TOTAL PROJECT REQUEST BUDGET (2 years)

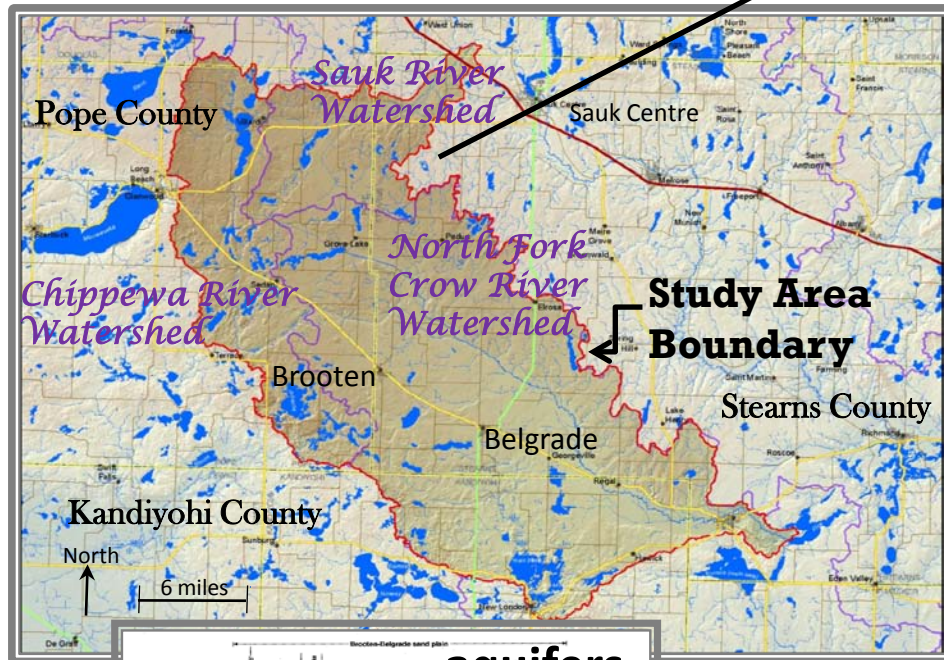
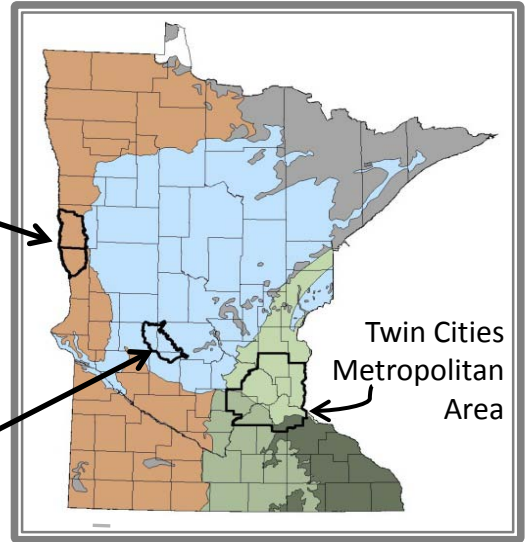
BUDGET ITEM	AMOUNT
Personnel:	
DNR Hydrologist 3, Project Manager (will be either unclassified or, if classified, backfilled with unclassified staff) - 1 FTE/year-July 2011 through June 2013 (salary+fringe)	\$ 184,000
DNR Hydrologist 1, data collection (will be either unclassified or, if classified, backfilled with unclassified hydrologist) - 1 FTE/yr - July 2011 through June 2013 (salary+fringe)	\$ 145,000
Contracts:	
United States Geological Survey: Hydrologist (Perry Jones) groundwater/surface water models for the Bonanza Valley and for the Buffalo Aquifer pilot study areas, calibration runs, scenario runs, uncertainty analyses, report - (salary+fringe and minor travel, field work and supplies. Does not include USGS "overhead" assessments that are indirectly related to the conduct of the project.)	\$ 254,000
Well driller TBD: well installation and documentation - 12 wells est. @ \$5,000/well and 12 @\$3,000/well	\$ 96,000
The Freshwater Society and Water Resource Center University of Minnesota: workshops, community involvement, guidance development	\$ 30,000
Uof M, MDH, MDAgric. (existing interagency state contracts) geochemistry/age-dating - est. 12 wells/pilot area	\$ 25,000
Equipment/Tools/Supplies:	
Stream Gaging–data logger & pressure transducer, solar panel & regulator, protective enclosure, marine battery, raingage, telecommunications remote equipment, misc. hardware - est. 6 sites/pilot area @ \$12,000/site	\$ 144,000
Groundwater level monitoring-data loggers/pressure transducers/sensors 36 @ 750/well	\$ 27,000
Remote, real-time stations-surface gage + 2 wells - 3 sites Bonanza @\$15,000/site	\$ 45,000
Geochemical and age-dating - bottles, shipping, field supplies	\$ 1,000
Field laptop computer for specialized for data downloading	\$ 5,000
GIS computer specialized for map creation and data analysis	\$ 2,500
GPS receivers, protective safety and field gear, steel tapes and chalk	\$ 3,000
Travel: In-state - DNR travel for monitoring point installation, data collection, well installation, meeting attendance - Meals and lodging + mileage	\$ 25,000
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 986,500

V. OTHER FUNDS

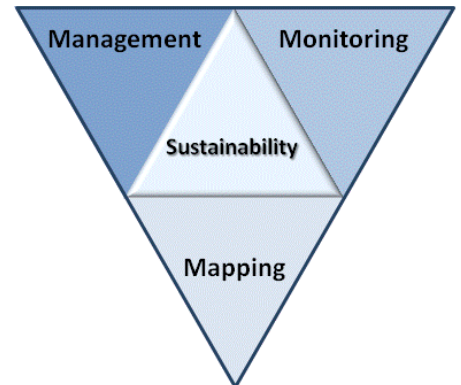
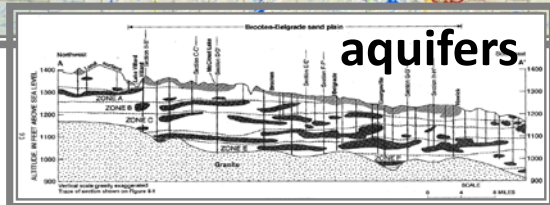
SOURCE OF FUNDS	AMOUNT	Status
In-kind Services During Project Period:		
DNR Area Hydrologists, local contacts - 1/8 FTE/year - July 2011 through June 2013	\$ 22,000	pending
DNR Hydrologist 3, modeler data prep - 1/8 FTE total - July 2011 through June 2013	\$ 15,000	pending
United States Geological Survey - 40% contribution toward models' development - federal contribution used to cover federal overhead costs as well as some direct project costs.	\$ 169,000	pending
City of Moorhead-monitoring levels and sampling, meetings, web development, scenario identification, plan development, public review and adoptions	\$ 65,600	secured
Minnesota DNR's In-kind Contribution: for shared services and governance	\$ 49,700	non-secured



Buffalo Aquifer Study Area



Bonanza Valley Study Area



LCCMR Proposal 2011

Title: New Generation in Water Supply Management – Pilot Studies

Project Manager Qualifications:

Laurel D. Reeves, P.G.

Professional Geologist License #30707

DNR Waters Hydrogeologist

Manager - Water Appropriation Permit program

Surface and ground water allocations

Water management planning

Water availability analyses

Manager - Ground Water Level Monitoring – 1990 to 2006

Plan, coordinate and manage ground water level data statewide

Plan, coordinate and manage an ongoing well and monitoring point maintenance, sealing and drilling program

Initiate studies, analyses and reports on water resource management issues

DNR Waters and MPCA hydrologist – 1981 to 1990

Water appropriation and protected waters permits and inventory

Solid waste and superfund permits and enforcement

Environmental review, public drainage project review, local water planning

Soil Exploration Co./Twin City Testing – geologist – 1970 - 1980

Publications:

Hydrogeologic Characterization of Six Sites in Southeastern Minnesota Using Borehole Flowmeters and Other Geophysical Logs, USGS Water-Resources Investigation Report 00-4142, 2000, co-authors

Minnesota's Water Supply: Natural Conditions and Human Impacts; 2000

Laurel D. Reeves & John Linc Stine, editors

Professional leadership:

President 2005 - Minnesota Ground Water Association.

Presentations:

Freeman Forum, LCCMR, LCMR, Minnesota Environmental Initiative, Citizens League, Minnesota Geological Survey, Univ. of Minn. WRC graduate seminar, American Institute of Hydrologists, American Water Works Assoc., Minn. Water Well Assoc., Minn. Ground Water Assoc., municipal water engineers, watershed districts, Ehler's Public Finance Seminar, Irrigator's Association, Minnesota Assoc. of Townships, Growing Greener Workshops, American Assoc. of Univ. Women, Minnesota Dept. of Health and U.S. Environmental Protection Agency managers, DNR Managers and staff.

Organization Description:

The Minnesota Department of Natural Resources (DNR)'s 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. The department consists of several divisions based on the state's natural resources, such as Fish and Wildlife, Forestry, Lands and Minerals, Parks and Trails, and Ecological Resources and Waters, as well as four regions and four support bureaus.