Trust Fund 2008 Work Program and Trust Fund 2009 Work Program

Date of Report: 06/8/09
Date of Next Status Report: 7/01/09

	M.L. 2008	M.L. 2009
Date of Work program Approval:	June 10, 2008	June xx, 2009
Project Completion Date:	June, 30 2011	June 30, 2012

I. PROJECT TITLES: South-Central Minnesota Groundwater Monitoring and County Geologic Atlases (2008), County Geological Atlas and South-Central Minnesota Groundwater (2009)

Project Manager: Jim Berg
Affiliation: Minnesota Department of Natural Resources
Mailing Address: 500 Lafayette Road
City / State / Zip : St. Paul, MN 55155
Telephone Number: 651-259-5680
E-mail Address: jim.berg@dnr.state.mn.us
FAX Number: 651-296-0445
Web Page address: http://www.dnr.state.mn.us/index.html

Location: Jackson, Martin, Watonwan, Brown, Nicollet, Blue Earth, and Sibley Counties (2008 project). McLeod, Wright, Sherburne, and Isanti (Mt. Simon aquifer monitoring - 2009 project); The Part B atlases that will be funded during the project period (2009 project) will include Todd, Carlton, McLeod, Carver, Benton, and Chisago counties.

	M.L. 2008	M.L. 2009	Total
Total Trust Fund Project Budget:	**$1,600,000**	**$2,695,000**	**$4,295,000**
DNR Total	*$894,000*	*$1,875,000*	*$2,769,000*
MGS Total	*$706,000*	*$820,000*	*$1,526,000*
DNR Trust Fund Appropriation	**$894,000**	**$1,875,000**	**$2,769,000**
Minus Amount Spent:	**$33,033**	**$0**	**$33,033**
DNR Equal Balance:	**$860,967**	**$1,875,000**	**$2,735,967**

Legal Citation:
ML 2008, Chap.367, Sec. 2, Subd. 4 (h).
Appropriation Language (2008):
$1,600,000 is from the trust fund for collection and interpretation of subsurface geological information and acceleration of the county geologic atlas program. $706,000 of this appropriation is to the Board of Regents of the University of Minnesota for the Geological Survey to begin county geologic atlases in three counties. $894,000 of this appropriation is to the commissioner of natural resources to investigate the physical and recharge characteristics of the Mt. Simon aquifer. This appropriation represents a continuing effort to complete the county geologic atlases throughout the state. This appropriation is available until June 30, 2011, at which time the project must be

completed and final products delivered, unless an earlier date is specified in the work program.

Legal Citation: ML 2009, Chap.143, Sec. 2, Subd. 3 (b)
Appropriation Language (2009):

$2,695,000 is from the trust fund for collection and interpretation of subsurface geological information and acceleration of the county geologic atlas program. $820,000 of this appropriation is to the Board of Regents of the University of Minnesota for the geological survey to continue and to initiate the production of county geologic atlases. $1,875,000 of this appropriation is to the commissioner of natural resources to investigate the physical and recharge characteristics of the Mt. Simon aquifer. This appropriation represents a continuing effort to complete the county geologic atlases throughout the state. This appropriation is available until June 30, 2012, at which time the project must be completed and final products delivered, unless an earlier date is specified in the work program.

II. 2008 PROJECT SUMMARY AND RESULTS:

M.L. 2008

The three main objectives for this project included: investigating the physical and recharge characteristics of the Mt. Simon aquifer to begin understanding the sustainable limits of this resource; to gather high quality data on the overlying geologic materials to aid future mapping of the buried sand and gravel aquifers of the region; and to initiate Part A County Geologic Atlases by the Minnesota Geological survey for Sibley, Blue Earth, and Nicollet counties.

This work plan will advance geologic mapping for the purpose of ground water management in the region. The attached pyramid diagram shows the basic dependencies of the typical atlas tasks beginning on the bottom with basic data collection, data verification, and database development. Every layer of the pyramid builds on the previous layer ending at the top with county scale hydrogeologic maps.

Monitoring wells (observation wells) will be drilled and completed at approximately 13 locations with contracted drilling services hired and coordinated by the DNR. The wells will be completed in the lowermost bedrock aquifer (Mt. Simon Formation), and possibly shallower aquifers, on public property in the seven county project area to depths of 150 to 1000 feet. The wells will be sampled for chemical constituents that will help determine the residence time or age of the ground water in this aquifer. The wells will be instrumented with continuous water level recording equipment. These data will help determine aquifer recharge characteristics and sustainable limitations for future use. A groundwater level monitoring guidance document will be developed by the DNR to define the purposes and procedures for maintaining and developing statewide monitoring.

The project will also initiate Part A County Geologic Atlases by the Minnesota Geological Survey for Sibley, Blue Earth, and Nicollet counties. These atlases describe the location, size, and boundaries of aquifers. This result will also establish digital

locations and geologic interpretations for wells and enter the information in the County Well Index for Nicollet, Blue Earth, and Sibley counties. MGS will train county staff to establish the digital locations. Part A atlases establish the basic geologic and database framework for subsequent DNR Part B hydrogeological evaluations.

This project will create both short and long-term benefits for the people and natural resources of the region. The information generated by this project will be immediately useful to water management scientists, planners, drillers, consultants, industrial users, and municipal officials for understanding and assessing local ground water conditions for protection and wise use.

M.L. 2009

The County Geologic atlas series provide information essential to sustainable management of ground water resources. They define aquifer boundaries, the connection of aquifers to the land surface, and the connection of aquifers to surface water resources. They facilitate and enhance the operations of natural resource management and regulation by state and local government units. Part A (geology) is completed by the Minnesota Geological Survey and Part B (groundwater and pollution sensitivity) is completed by the Minnesota Department of Natural Resources.

The deepest bedrock aquifer of south central Minnesota and the metro area – the Mt. Simon aquifer, supplies all or some of the water needs of over one million Minnesotans. The few water level measurements available from this aquifer in the Mankato and Twin Cities metro area indicate declining water levels in some areas. Critical recharge areas for the Mt. Simon aquifer exist in the northwestern and western metro area and portions of south central Minnesota. The recharge and physical characteristics of the Mt. Simon aquifer along this zone are poorly understood. This recharge zone will be investigated and characterized through monitoring well installations, water level monitoring, groundwater chemical analysis, and aquifer capacity testing to help determine recharge pathways and sustainable limits for this aquifer.

This project will be an expansion of the 2008 LCCMR funded project to investigate the Mt. Simon aquifer recharge zone in south central Minnesota and to fund additional Part A County Geologic Atlases. In addition, the 2009 project will fund the initiation and completion of Part B atlases. Part A is completed before work on part B commences. The Part B atlases focus on defining aquifer boundaries; natural water chemistry; ground water flow; and identifying the connection of aquifers to the land surface and surface water resources. Atlas reports facilitate and enhance the operations of natural resource management and regulation by state and local government units.

This project will support completion of County Geologic Atlas Part B reports by expanding production capacity by providing additional staff to existing staff of the ongoing Part B project and providing additional project funds for water sampling and analysis and report printing consistent with the ongoing project.

III. PROGRESS SUMMARY AS OF 1/05/09:

M.L. 2008

Most of the drilling sites visited and evaluated for access and probable geologic characteristics. Initial contact with DNR, MnDOT and county management staff has been completed. On September 3, 2008 the project hydrologist was hired. Seven of the drill sites in Nicollet, Brown, and Watonwan counties have been contracted to two drilling companies (Traut Well Drilling, and Searles Well Drilling). One of the drilling contracts that covers work for three of the well nests will be paid with funds from a 2008 bonding appropriation. This bonding appropriation has the same objectives as the LCCMR project to assess and monitor the Mt. Simon aquifer. The well drilling costs for the sites included in this contract will be paid from the bonding appropriation. All other associated costs for these well nests (DNR staff costs, travel expenses, water level monitoring equipment, contracted sampling services, and laboratory costs) will be paid with funds from this LCCMR appropriation. To date, one of the well nests to be paid with bonding funds has been completed and another is nearly completed at sites in Nicollet County.

Three meetings have been assembled with DNR staff to discuss the content of the Groundwater level monitoring guidance document. Some existing sources of information have been reviewed.

Amendment Request (1/05/09)

The scope of the project will be modified for two reasons: Le Sueur County is not participating and has been replaced by Sibley County for atlases and monitoring well installations. Also the number of well nests will be reduced from approximately 21 to approximately 13 due to higher than anticipated drilling costs. Drillers have cited much higher steel and fuel costs since 2007 as the main reason for the higher than expected drilling costs. Average costs per foot for a completed 4-inch diameter well have ranged from approximately $50/foot to $125/foot. The project will include a mix of high quality/ high cost and lower quality/lower cost methods and contractors to achieve an adequate distribution of well nests in the project area without totally abandoning the advantages of using the high quality/higher cost methods in some areas. Well nests may not be installed in Blue Earth and Jackson counties since data from these counties may only marginally meet the needs of this project. High flow specific capacity tests have been replaced with lower flow tests due to the pumping limitations created by the deep static water levels of the Mt. Simon aquifer.

Minor adjustments have been made to Attachment A to account for archeological assessments on DNR land (State Historical Preservation Office - SHPO assessments) prior to drilling and other minor cost categories. The 2008 Minnesota statutes, Chapter 138.40 requires, “When archaeological or historic sites are known or, based on scientific investigations are predicted to exist on public lands or waters, the agency or department controlling said lands or waters shall use the professional services of archaeologists from the University of Minnesota, Minnesota Historical Society, or other qualified professional archaeologists, to preserve these sites. In the event that archaeological excavation is required to protect or preserve these sites, state and other governmental agencies may use their funds for such activities”. The costs to complete the SHPO assessments are mostly for State Historical society staff time and travel expenses for record review and minor site excavation.

Amendment Request (6/8/09)

Several amendments are requested and shown on Attachment A-2008. From top to bottom the amendment requests include:

- An increased amount for laboratory analysis. Many of the buried sand aquifers and Cretaceous sandstone aquifers that we have completed monitoring wells in are deeper than we originally anticipated and may contain older groundwater than we expected. Therefore, we would like to have all the buried sand aquifer groundwater samples analyzed for 14C residence time which costs $600/sample. This information will help us with Mt. Simon recharge evaluations.
- The field computer cost more than the original estimate due to state and local taxes. This is a special laptop computer that has been manufactured to withstand moisture and shocks that would destroy other laptops. The extra toughness increases the cost compared to a standard laptop but we consider it essential for protecting our priceless data.
- The "Supplies" item includes many miscellaneous items needed for the project such as a camera, hardware for securing the data loggers in the well casings, and software for creating a combined graphic log from each well that includes the geophysical and lithology log.

The higher cost for these items is offset by a lower cost for continuous water level monitoring equipment.

Amendment Approved:

M.L. 2009
N/A

IV. OUTLINE OF PROJECT RESULTS*:*

Result 1: Groundwater level monitoring guidance document

Description: The purpose of this document is to create a strategic plan for developing a statewide network of water level monitoring wells (observation wells). The document, created by DNR Waters, will review the current state of Minnesota's network, monitoring frequency, database protocols, costs, data uses, and limitations. The document will include a review of networks in other states or countries that may have advantageous approaches that the Minnesota DNR could consider. Finally, the document will make recommendations for how to evaluate the adequacy of the existing network and make recommendations for improving the existing network.

Summary Budget Information for Result 1:

	M.L. 2008	M.L. 2009	Total
Trust Fund Budget:	**$33,000**	**$0**	**$33,000**
Amount Spent:	**$1,000**	**$0**	**$1,000**
Balance:	**$32,000**	**$0**	**$32,000**

Deliverable	Completion Date	Budget	Status
1. Existing sources of information from other states and countries.	1/05/09	$1,000	active

2. Information and status of the Minnesota observation well network.	7/1/09	$1,000	
3. Information and methods used by other government entities	12/1/09	$11,000	
4. Final Report: Information and recommendations for Minnesota groundwater monitoring	6/30/10	$20,000	

Completion Date: M.L. 2008: 6/30/10

Result Status as of 1/05/09:
Three meetings have been assembled with DNR staff to discuss the content of the Groundwater level monitoring guidance document. Some existing sources of information have been reviewed.

Result Status as of 7/1/09:

Result Status as of 12/1/09:

Result Status as of 6/30/10:

Final Report Summary:

Result 2: Test drilling, monitoring well installation, sampling, laboratory analysis, water level measurement

Description: Monitoring wells (observation wells) will be drilled and completed at approximately 13 locations in the 2008 project area and approximately 10 locations in the 2009 project area. The monitoring well installations will be completed with contracted drilling services hired and coordinated by the DNR. Each location will consist of a two-well nest with a deep well completed in the lowermost bedrock aquifer (Mt. Simon Formation), and another well completed in a shallower unconsolidated sand and gravel aquifer. The well nests will be located on public property and completed to depths of approximately 100 to 1000 feet. Drill cuttings (ground-up rock and sediment brought to the surface by the drilling process) will be collected at 5-foot intervals by DNR staff and archived for analysis by the Minnesota Geological Survey. DNR or MGS staff will complete downhole geophysical surveys after the full depth of the deep borehole has been drilled. A reverse circulation/dual rotary drilling method will be used as much as possible to generate high quality drill cuttings. These high quality samples will significantly improve stratigraphic interpretations of glacial and bedrock materials. This drilling method advances an 8 - inch diameter steel casing during the drilling process. The wells will be pumped prior to sampling providing some specific capacity information. The specific capacity test will provide some information regarding the aquifers producing capacity.

Most of the test holes will be completed as 4-inch diameter water level monitoring wells (observation wells) in the lowermost bedrock aquifer (Mt. Simon Formation) and shallower aquifers, to help track long-term groundwater level trends. The wells will be

sampled by DNR staff for general chemistry, trace elements, tritium, carbon 14 and stable oxygen and deuterium isotopes to determine the residence time of the ground water in the formations. In addition, DNR staff will instrument the wells with continuous water level recording equipment to track short and long term changes in water levels. The chemistry and water level information will help determine the sustainable limitations for future use of this aquifer.

Summary Budget Information for Result 2:

	M.L. 2008	M.L. 2009	Total
Trust Fund Budget:	**$861,000**	**$985,000**	**$1,846,000**
Amount Spent:	**$32,033**	**$0**	**$0**
Balance:	**$828,967**	**$985,000**	**$1,846,000**

Deliverable	Completion Date	Budget	Status
1. All the drilling sites will have been chosen and several of the wells will have been installed, instrumented and sampled. The drilling logs, geophysical logs, flow logs, locations, well construction diagrams, and water level data from the wells that have been installed by this date will be available.	12/01/08	$250,000	active
2. Same as above with several more sites completed (M.L. 2008)	7/1/09	$250,000	
3. Same as above with several more sites completed (M.L. 2008). Sites have been chosen for M.L. 2009 and contractor bidding, SHPO reviews and access permission requests are underway. Several of the wells will have been installed.	12/1/09	$250,000 (2008) $250,000 (2009)	
4. All the monitoring wells will have been installed, instrumented, and sampled. During the remaining one-year period The data loggers will downloaded and maintained on a regular basis. Remaining data compilation and interpretation will continue and creation of final report will begin (M.L. 2008). Several more well nests for the M.L. 2009 will have been completed and associated data loggers installed.	7/1/10	$37,000 (2008) $300,000 (2009)	
5. Same as above with more data compilation and progress toward completion of final report (M.L. 2008). All of the well nests will have been completed, associated data loggers	12/1/10	$37,000 (2008) $300,000 (2009)	

installed, and water samples collected and submitted for lab analysis (M.L. 2009).			
6. Project completion (M.L. 2008) and final report to include maps summarizing thickness and extent of Mt. Simon aquifer in project area. Interpretation of collected water level data and chemistry and implications for sustainable use of Mt. Simon aquifer. Recommendations for future investigations and/or monitoring. Routine downloading of data loggers, data compilation, interpretation and report preparation (M.L. 2009)	6/30/11	$37,000 (2008) $33,750 (2009)	
7. Routine downloading of data loggers, data compilation, interpretation and report preparation (M.L. 2009)	7/1/11	$33,750 (2009)	
8. Same as above (M.L. 2009)	12/1/11	$33,750 (2009)	
9. Project completion (M.L. 2009) and final report to include maps summarizing thickness and extent of Mt. Simon aquifer in project area integrated with 2008 project results. Report will include interpretation of collected water level data and chemistry and implications for sustainable use of Mt. Simon aquifer. Recommendations for future investigations and/or monitoring.	6/30/12	$33,750 (2009)	

Completion Date **M.L. 2008:** 6/30/11
M.L. 2009: 6/30/12

Result Status as of 1/05/09:
Most of the drilling sites visited and evaluated for access and probable geologic characteristics. Initial contact with DNR, MnDOT and county management staff has been completed. On September 3, 2008 the project hydrologist was hired. Seven of the drill sites in Nicollet, Brown,and Watonwan counties have been contracted to two drilling companies (Traut Well Drilling, and Searles Well Drilling). To date, one of the well nests has been completed and another nearly completed in Nicollet County.

Result Status as of 7/1/09:

Result Status as of 12/1/09:

Result Status as of 7/1/10:

Result Status as of 12/1/10:

Result Status as of 6/30/11:

M.L. 2008 Final Report Summary:

Result Status as of 7/1/11:

Result Status as of 12/1/12:

Result Status as of 6/30/12:

M.L. 2008 Final Report Summary:

Result 3 (to be completed by the MGS who will be providing separate work program updates): Initiate Part A County Geologic Atlases for Blue Earth, Nicollet, and Sibley Counties. Note: all components listed below may not be completed within the time frame and budget of this project, but substantial progress in all three counties is anticipated.

Result 4 (to be completed by the MGS): MGS support for DNR Drilling Program
Description: MGS will process, examine, interpret, and archive samples from the DNR test drilling. MGS will also conduct downhole geophysical logging of selected test holes to observe aquifer properties.

Result 5 (to be completed by the MGS): Production and Printing of the Benton and Chisago County Geologic Atlases

Result 6: Acceleration of County Geologic Atlas Part B reports.
Description: Initiate and complete the Benton and Chisago county geologic atlas Part B projects. Support initiation of three (Carlton, McLeod, Carver) and completion of four (Todd, Carlton, McLeod, Carver) county geologic atlas Part B projects. Progress on Part B atlas development includes ground water sample collection and analysis; geophysics field data collection and analysis; aquifer mapping and technical analysis of ground water systems. Publication of Part B atlas reports include preparation and printing of the County Geologic Atlases, Part B and delivery of printed reports to county; preparation and delivery of Part B materials to MGS for DVD version of each, along with geographic information system (GIS) files, database files, pdfs, and additional digital products. Digital products will be posted on DNR webspace.

Summary Budget Information for Result 6:

	M.L. 2008	M.L. 2009	Total
Trust Fund Budget:	**$0**	**$890,000**	**$890,000**
Amount Spent:	**$0**	**$0**	**$0**
Balance:	**$0**	**$890,000**	**$890,000**

Deliverable	Completion Date	Budget	Status

1. Additional staff hired (2 hydrologists; research analyst; half-time editor) to support additional atlas projects to be developed and completed during the project. Support continuation of ongoing projects: Todd County. Support publication of Todd County Part B.	12/01/09	$205,333	active
2. Support continuation of ongoing work. Start Benton, and Chisago counties. Support start of Carlton, McLeod, and Carver Counties.	7/1/10	$153,333	
3. Continue ongoing projects.	12/1/10	$123,333	
4. Continue ongoing projects. Support publication of Carlton County Part B.	7/1/11	$147,333	
5. Continue ongoing projects. Support publication of Part B for McLeod and Carver counties	12/1/11	$133,334	
6. Publish Part B for Benton and Chisago counties.	6/30/12	$127,334	

Completion Date M.L. 2009: 6/30/12

Result Status as of 12/01/09:

Result Status as of 7/1/10:

Result Status as of 12/1/10:

Result Status as of 7/1/11:

Result Status as of 12/1/11:

Result Status as of 6/30/12:

V. TOTAL TRUST FUND PROJECT BUDGET:

M.L. 2008

DNR Staff or Contract Services:

Hydrologist 3, unclassified, 1.0 FTE x 2years (results 1 and 2)	$132,000
Drilling contractor	$636,625
Laboratory analysis of 26 ground water samples cations, anions, trace elements, tritium, 14 carbon, deuterium and 18 oxygen ~~(Mt. Simon samples only)~~	$24,700
Archeological site assessment (SHPO)	$10,000

DNR Equipment:

Down-hole geophysical logging tool (gamma, magnetic induction)	$11,000

Field computer	$4,267
Submersible sample pump, reel, tubing and cable (or contracted sampling services)	$8,000
Continuous water level monitoring equipment for 26 wells	$45,043
DNR Other:	
Overnight expenses (160 days @ $100/day)	$16,000
Mileage (9000 miles @ $.48/mile)	$4,365
Supplies	$2,000
SUBTOTAL DNR PROJECT BUDGET:	$894,000
SUBTOTOTAL MGS (see MGS WP) **PROJECT BUDGET:**	$706,000
TOTAL TRUST FUND PROJECT BUDGET:	$1,600,000

M.L. 2009

DNR Staff or Contract Services (Result 2):	
Hydrologist 3, unclassified, 1.0 FTE x 2years	$132,000
Drilling contractor	$785,000
Laboratory analysis of 20 ground water samples cations, anions, trace elements, tritium, stable isotopes 14 carbon (Mt. Simon samples only)	$15,000
Archeological site assessment (SHPO)	$10,000
Well pumping services for aquifer tests and sampling	$10,000
DNR Staff or Contract Services (Result 6):	
Hydrologist 2, unclassified. 2.0FTE x 3 years	$446,000
Research Analyst, unclassified 1.0 FTE x 3 years	$197,000
Information Officer 1, unclassified 0.5 FTE x 3 years	$91,000
Printing	$38,000
Laboratory analysis of 80 groundwater samples/county for cations, anions, trace elements, tritium and several 14 C	$108,000
DNR Equipment (Result 2):	
Continuous water level monitoring equipment for 20 wells	$12,000
DNR Other:	
(Result 2)	
Overnight expenses (160 days @ $100/day)	$16,000
Mileage (8,333 miles @ $.48/mile)	$4,000
Supplies	$1,000
(Result 6)	
Overnight expenses (80 days @ $100/day)	$8,000
Mileage (4,167 miles @ $.48/mile)	$2,000
SUBTOTAL DNR PROJECT BUDGET:	$1,875,000
SUBTOTOTAL MGS (see MGS WP) **PROJECT BUDGET:**	$820,000
TOTAL TRUST FUND PROJECT BUDGET (2009):	$2,695,000

Explanation of Capital Expenditures Greater Than $3,500 (2008):

Down-hole geophysical logging tool (gamma, magnetic induction)
This tool is essential for any borehole subsurface investigation. The tool measures the natural gamma radiation and electrical conductivity (or resistivity) of the various downhole formations. A continuous profile of these downhole properties is created from this data that allows the geologist to determine what types of sediment (sand, silt, clay) or layers of bedrock sandstone, shale etc.) exist at that location. Formations have characteristic profiles that aid in their identification and correlation. The physical properties of the aquifers (porosity and permeability) can also be estimated from this data. The use of this tool requires supporting equipment (truck, winch, cable computer, software) that the DNR currently possesses. At the end of this project this equipment will continue to be used as part of the DNR ground water level monitoring program and other related activities.

Field computer
Downloading the data from the data loggers requires regular use of a portable computer that can be used under all types of weather conditions and can survive occasional drops and bumps. This is a special laptop computer that has been manufactured to withstand moisture and shocks that would destroy other laptops. The extra toughness increases the cost compared to a standard laptop but we consider it essential for protecting our priceless data.

Submersible sample pump, reel, tubing and cable
One of the objectives of this project is to characterize the ground water residence time of the Mt. Simon aquifer through laboratory analysis of ground water samples. This data will represent an essential component for understanding the recharge characteristics of this aquifer and limits for sustainable use. Many of the ground water samples will be collected from depths greater than 50 feet below ground surface, which requires the use of a submersible pump. At the end of this project this equipment will continue to be used as part of the DNR county geologic atlas program and other related activities.

Continuous water level monitoring equipment for 24 wells
Another method for understanding the recharge characteristics of this aquifer and limits for sustainable use is to track water levels continuously over an extended time period. Fluctuations in water levels not caused by nearby pumping might be evidence of aquifer recharge. Tracking water levels with dedicated equipment is efficient and creates scientifically valid information versus manually gathering this data on a much less frequent basis. At the end of this project this equipment will probably remain on all the wells for water level data acquisition as part of the DNR ground water level monitoring program.

VI. OTHER FUNDS & PARTNERS/ PROJECT STRATEGY:

A. Project Partners

M.L. 2008

Minnesota Geological Survey, total from appropriation	$706,000
Nicollet County (well location verification)	in-kind contribution
Blue Earth County (well location verification)	in-kind contribution
Sibley County (well location verification)	in-kind contribution

M.L. 2009

Minnesota Geological Survey, total from appropriation	$820,000
Anoka County (well location verification)	in-kind contribution
Wright County (well location verification)	in-kind contribution

B. Other Funds Proposed to be spent during the Project Period (2008 and 2009):

The report from Result 1 (Groundwater level monitoring guidance document) will be reviewed and edited by several senior staff at the DNR and other state and federal agencies. The project will be managed by existing DNR staff with salary paid through the general fund.

Result 6 (Acceleration of county geologic atlas Part B reports) will be supported by existing DNR staff with salary paid through the general fund. The project will be managed by existing DNR staff with salary paid through the general fund.

C. Spending History (2008 and 2009): LCMR provided funds for the Mankato State University, Water Resource Center to create and publish geologic atlases in the project area covered by this work plan.

D. Time:

E. Project Impact and Long-term Strategy (2008 and 2009):

This project will create both short and long-term benefits for the people and natural resources of the region. The information generated by this project will be immediately useful to water management scientists, planners, drillers, consultants, industrial users, and municipal officials for understanding and assessing local ground water conditions for protection and wise use. Atlas acceleration funds are part of a long-term plan to complete country geologic atlases for the entire state.

VII. DISSEMINATION:

The well logs, geophysical logs and well construction information from the borehole drilling will be submitted to the Minnesota Geological Survey (MGS) for inclusion in the county well index. The drill cuttings from the boreholes will be placed in sample bags and submitted to the MGS for archiving and analysis. Laboratory analysis results of water samples will be archived in a program database. The final report will be available on the DNR Waters website.

VIII. REPORTING REQUIREMENTS:

Periodic work program progress reports will be submitted not later than 12/1/08, 7/1/09, 12/1/09, 7/1/10, 12/1/10, 7/1/11, 12/1/11, 6/30/12

IX. RESEARCH PROJECTS:

Attachment A: Budget Detail for 2008 Projects									
Project Manager Name: Jim Berg, DNR Waters									
Trust Fund Appropriation: $ 894,000									
Project Title: South-Central Minnesota Groundwater Monitoring and County Geological Atlases									
Date: 6/4/2009									
2008 Trust Fund Budget	**Result 1 (DNR) Budget:**	**Amount Spent**	**Balance**	**Result 2 (DNR) Budget:**	**Revised Result 2 Budget 6/4/09**	**Amount Spent**	**Balance**	**TOTAL BUDGET**	**TOTAL BALANCE**
	Groundwater level monitoring guidance document			*Test drilling, monitoring well installation, sampling, laboratory analysis, water level measurement*					
BUDGET ITEM									
PERSONNEL: wages and benefits	33,000	1,000	32,000	99,000		24,463	74,537	132,000	106,537
Contracts									
University of Minnesota hydrogeochemistry lab -- lab analysis of ground water samples				~~17,010~~	24,700	0	24,700	24,700	24,700
Drilling contracts				636,625		0	636,625	636,625	636,625
SHPO assessments				10,000	0	0	0	10,000	0
Equipment									
Down-hole geophysical logging tool				11,000		0	11,000	11,000	11,000
Submersible sampling pump and accessories or contracted sampling services				8,000		0	8,000	8,000	8,000
Field computer				~~4,000~~	4,267	4,267	0	4,267	0
Continuous water level monitoring equipment				55,000	45,043	0	45,043	45,043	45,043
Travel expenses				20,365		2,593	17,772	20,365	17,772
Other									
Supplies				~~0~~	2,000	242	1,758	2,000	1,758
COLUMN TOTAL	**$33,000**	**$1,000**	**$32,000**	**$861,000**		**$31,565**	**$829,435**	**$894,000**	**$851,435**

Attachment A: Budget Detail for 2009 Projects
Project Manager Name: Jim Berg, DNR Waters

Trust Fund Appropriation: $ 1,875,000
Project Title: County Geological Atlases South-Central Minnesota Groundwater (2009)
Date: 6/8/2009

2009 Trust Fund Budget	Result 2 (DNR) Budget:	Amount Spent	Balance	Result 6 (DNR) Budget:	Amount Spent	Balance	TOTAL BUDGET	TOTAL BALANCE
	Test drilling, monitoring well installation, sampling, laboratory analysis, water level measurement			*Acceleration of County Geologic Atlas Part B reports*				
BUDGET ITEM								
PERSONNEL: wages and benefits	132,000	0	132,000	734,000	0	734,000	866,000	866,000
Contracts								
Lab analysis of ground water samples	15,000		15,000	108,000	0	108,000	123,000	123,000
Drilling contracts	785,000		785,000	0	0	0	785,000	785,000
SHPO assessments	10,000		10,000	0	0	0	10,000	10,000
Well pumping services for aquifer test and sampling	10,000		10,000				10,000	10,000
Equipment								
Continuous water level monitoring equipment	12,000		12,000	0	0	0	12,000	12,000
Travel expenses	20,000		20,000	10,000	0	10,000	30,000	30,000
Other								
Printing	0		0	38,000		38,000	38,000	38,000
Supplies	1,000		1,000	0		0	1,000	1,000
COLUMN TOTAL	**$985,000**	**$0**	**$985,000**	**$890,000**	**$0**	**$890,000**	**$1,875,000**	**$1,875,000**