

2011 Project Abstract

For the Period Ending June 30, 2015

PROJECT TITLE: County Geologic Atlases for Sustainable Water Management

PROJECT MANAGER: Dale R. Setterholm

AFFILIATION: Minnesota Geological Survey

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03b1

APPROPRIATION AMOUNT: \$1,200,000

Overall Project Outcome and Results

The Minnesota Geological Survey maps sediment and rock because these materials control where water can enter the subsurface (recharge), where and how much water can reside in the ground (aquifers), where the water re-emerges (discharge), and at what rates this movement occurs. This information is essential to managing the quality of our water and the quantity that can be sustainably pumped. This project substantially completed geologic atlases for Meeker, Redwood, and Brown counties, and contributed to atlas work in Anoka and Wright counties. Information about the geology is gleaned from the records of domestic wells, and from drilling conducted for this project. In Meeker County we used 3,600 wells and 6 cores, in Redwood we used 1,900 wells and 10 cores, and in Brown County we used 1,700 wells and 8 cores, and soil borings and geophysical surveys. From the data we created maps of the geology immediately beneath the soil; the aquifers within the glacial sediment; and the shape, elevation, and rock types of the bedrock surface. These maps and data support monitoring, wellhead protection, water appropriation, clean-ups, and supply management.

In large portions of Brown and Redwood counties the glacial materials are relatively thin, and most of the bedrock types present do not provide much water. This makes the mapping of glacial sand bodies, which are potential aquifers, very important. Our maps will guide wise use and protection of these water supplies. In Meeker County, the glacial deposits can be very thick, and the bedrock includes some formations that can serve as aquifers. This is a more diverse and complicated ground water distribution. In all three counties the database of well construction records we have compiled is an excellent indicator of which aquifers the population is currently relying on.

Project Results Use and Dissemination

County geologic atlases are distributed in print and digital formats. The digital format allows us to include all the data that support the maps and the ability to change the maps or create new ones. The products are available from the MGS web site (<http://www.mngs.umn.edu/index.html>). We also conduct post-project workshops in the map area to familiarize users with the products and their applications. The products are also distributed to libraries.



Environment and Natural Resources Trust Fund (ENRTF) M.L. 2011 Work Plan Final Report

Date of Status Update: 2/4/2015
Final Report: 2/14/2015
Date of Work Plan Approval: 6/23/2011
Project Completion Date: 2/4/2015 **Is this an amendment request?** yes

Project Title: County Geologic Atlases for Sustainable Water Management

Project Manager: Dale Setterholm

Affiliation: U of MN - MN Geological Survey

Address: 2609 Territorial Road

City: St. Paul **State:** MN **Zip code:** 55114

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Web Address: <http://www.geo.umn.edu/mgs>

Location:

Counties Impacted: Redwood, Meeker, Brown

Ecological Section Impacted: Minnesota and Northeast Iowa Morainal (222M), North Central Glaciated Plains (251B)

Total ENRTF Project Budget:	ENRTF Appropriation \$:	1,200,000
	Amount Spent \$:	1,200,000
	Balance \$:	0

Legal Citation: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03b1

Appropriation Language:

\$900,000 the first year and \$900,000 the second year are from the trust fund to accelerate the production of county geologic atlases to provide information essential to sustainable management of ground water resources by defining aquifer boundaries and the connection of aquifers to the land surface and surface water resources. Of this appropriation, \$600,000 each year is to the Board of Regents of the University of Minnesota for the Geologic Survey and \$300,000 each year is to the commissioner of natural resources. This appropriation is available until June 30, 2015, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: County Geologic Atlases for Sustainable Water Management

II. FINAL PROJECT STATEMENT: The Minnesota Geological Survey maps sediment and rock because these materials control where water can enter the subsurface (recharge), where and how much water can reside in the ground (aquifers), where the water re-emerges (discharge), and at what rates this movement occurs. This information is essential to managing the quality of our water and the quantity that can be sustainably pumped. This project substantially completed geologic atlases for Meeker, Redwood, and Brown counties, and contributed to atlas work in Anoka and Wright counties. Information about the geology is gleaned from the records of domestic wells, and from drilling conducted for this project. In Meeker County we used 3,600 wells and 6 cores, in Redwood we used 1,900 wells and 10 cores, and in Brown County we used 1,700 wells and 8 cores. These are augmented with soil borings and geophysical surveys. From the data we created maps of the geology immediately beneath the soil; the aquifers within the glacial sediment; and the shape, elevation, and rock types of the bedrock surface. These maps and data support monitoring, wellhead protection, water appropriation, clean-ups, and water supply management. In large portions of Brown and Redwood counties the glacial materials are relatively thin, and most of the bedrock types present do not provide much water. This makes the mapping of glacial sand bodies, which are potential aquifers, very important. Our maps will guide wise use and protection of these water supplies. In Meeker County, the glacial deposits can be very thick, and the bedrock includes some formations that can serve as aquifers. This is a more diverse and complicated ground water distribution. In all three counties the database of well construction records we have compiled is an excellent indicator of which aquifers the population is currently relying on.

PROJECT SUMMARY: Geologic atlases provide maps and databases necessary for sustainable management of water resources. County Geologic Atlases are specifically identified as essential data in the Statewide Conservation Plan, and in the efforts of the Environmental Quality Board, DNR Waters, and the Water Resources Center at the University of Minnesota to design a sustainable water management process. They define aquifer boundaries and the connection of aquifers to the land surface and surface water resources to enable a comprehensive water management effort. A complete geologic atlas consists of Part A constructed by the Minnesota Geological Survey (MGS) and focused on geology and the County Well Index, and Part B constructed by the DNR Division of Waters and focused on hydrology. Local participation is a primary factor in determining which counties are chosen for this work, while ground water sensitivity, water demand, and the size of the population served are also considerations. The counties must provide funds or in-kind service to participate. Atlases facilitate and enhance the operations of natural resource management and regulation by state and local government units. They support management activities designed to evaluate sustainable water use and to protect water quality such as: permitting, land use planning, wellhead protection, remediation, monitoring, modeling, and well construction.

III. PROJECT STATUS UPDATES:

Project Status as of December 31, 2011: MGS has reached agreements with Redwood, Meeker, and Brown counties to create geologic atlases. The counties will establish accurate locations for wells with construction records as their contribution to the project. MGS will create maps and databases based, in part, on that well information. The well-locating efforts are underway.

Project Status as of June 30, 2012: The counties have completed establishing accurate locations for wells with construction records. The database for Meeker County has more than 3,600 wells with 2,900 of them added for this project. The database for Redwood County has nearly 1,900 wells with 1,250 added for this project. The database for Brown County has almost 1,700 wells with just a couple of hundred added for this project. MGS staff are completing the work necessary to enter this data in the County Well Index database including geologic interpretations of the material descriptions provided by

the drillers. MGS geologists are conducting field work this spring and summer, specifically focusing on the geology of the land surface. They are describing and sampling exposures of the glacial materials, and drilling shallow boreholes. Samples are returned to MGS for analysis in our sediment laboratory. The surficial geologic maps of Meeker (\$39,684) and Redwood (\$27,993) counties have been accepted for cost-sharing by the USGS STATEMAP program. Work on the bedrock maps of these areas has been initiated with passive seismic surveys, examination of archived bedrock core, and collection of exploration drilling data.

Project Status as of December 31, 2012: Well locating and data entry is complete except for some bedrock interpretations that will be made as the bedrock geologic map is compiled. The surficial maps of all three counties are in draft stage. The surficial maps of Redwood and Meeker will be completed this period with matching funds from the USGS STATEMAP program. These are supported by Giddings probe samples and outcrop samples which have been analyzed for texture and grain lithology. Work on bedrock geologic maps is underway. Some cores have been examined and outcrops have been mapped in Redwood County. Draft versions of bedrock topography are available for all three counties. These are based on well records and passive seismic surveys. Approximately 8 rotasonic drillholes will be completed in Meeker County in this period. That represents three holes from this budget, and additional holes paid for with Clean Water Funds provided by DNR to augment our coverage. Remaining products for the Anoka and Wright CGAs are being finalized and the budgets reported here include salaries and fringes in the amount of \$22,123 and \$26,862 respectively spent on those projects.

Project Status as of June 30, 2013: County Well Index data is complete for all 3 counties, although some additional data generated during the project will be added as necessary. Surficial geologic maps are in review for all 3 counties with the Meeker and Redwood maps submitted to USGS as STATEMAP cost-shared products. The bedrock map of Meeker County has been accepted as a STATEMAP product and will receive \$18,598 in Federal cost-share. Bedrock mapping in Brown and Redwood counties is underway with field work scheduled this season. The characterization of subsurface glacial materials is based on rotasonic coring, examination of exposures (river banks, roadcuts, other), examination of drill cuttings, and Giddings soil probe drilling (<25' deep). Coring was completed this winter in Meeker County, and will take place this coming winter in Redwood and Brown. River cuts provide deep exposure in Redwood and Brown counties and work on foot and by canoe is underway there. Giddings drilling is nearly complete in Meeker, and underway in Redwood and Brown. The shape and elevation of bedrock surfaces (topographies) are in draft form for all counties.

Amendment Request (09/06/2013): The rotasonic drilling in Brown and Redwood counties is planned to begin in late October of this year. We are preparing the bid documents that will be used to choose a drilling contractor. The drilling programs for County Geologic Atlases are expanded with funds provided by the DNR to facilitate more, and deeper, test holes. The amount available at this time to augment the drilling is less than was anticipated when the project budget was written. For that reason we would like to slightly increase the portion of the project budget dedicated to drilling, and we will decrease the amount dedicated to salaries. These changes are not expected to negatively affect the quality of our products, or the schedule of the project. Changes of this magnitude are well within the variability expected in our estimating and project design. If this request is not approved we will adjust the drilling program to fit the original budget, and the project will go forward with less drilling.

Amendment Approved 9/6/13

Project Status as of December 31, 2013: The CWI database is complete for all three counties. Surficial geologic maps are complete for all three counties. Bedrock topographic maps are drafted for all counties but may be revised slightly. Bedrock geologic maps are underway. Rotasonic drilling and auger drilling are complete for all counties and the cores are described for Meeker County. Descriptive work on the cores and cuttings is underway in Brown and Redwood where drilling was just completed a few weeks ago (not yet billed). The cross-sections and sand body mapping are underway and are furthest along in Meeker County. This level of progress fits the work plan.

Project Status as of June 30, 2014: For all three counties, the CWI database, the surficial geology, the drilling, and the bedrock topography map are complete. For each county, the subsurface Quaternary mapping, technical review/revision, editing, and printing remain. Meeker County is slightly ahead of the other two. The remaining funds in this grant are not sufficient to finish the products and will be expended before the project end date. The size of the grant was sufficient for three county atlases, but we started this series of grants in 2007 with a partial award that was insufficient for the work undertaken. In each successive grant we have utilized funds to complete unfinished work from the previous grant and this is part of each workplan. The work in Redwood, Brown, and Meeker counties that remains when this grant is spent will be funded by our 2013 grant to finish the products, and we expect completion in 12 months or less.

Amendment Request (7/16/14): Our spending has exceeded the budget in some categories, and we would like to shift funds from categories where they are not needed to cover these costs. We would like to move \$8,437 from the printing services category and \$7,538 from the travel expense category into the scientific drilling budget. This will eliminate a deficit from that category. We will spend the remainder of the budget in the next 6 months. If this amendment is approved there will be funds in the personnel category, the equipment/supplies category, and in the travel category. These balances may also require adjustment as the funds are expended. These adjustments could be approved now, or we could request an amendment after those exact balances are known.

Amendment Approved 7/17/14

Final Project Status (2/4/15): The maps for Meeker County have been proofed, and will go to the printer as soon as next week. The digital files of these works will be compiled as a DVD on about the same schedule. This county will be complete with the exception of a product introduction meeting in the county yet to be scheduled.

In Redwood County the database, bedrock topography, and surficial geology products are complete. The bedrock geology is about one month from completion. The sand model and Quaternary stratigraphy products always come last, and these should be done in about 2 months. The production and printing processes will follow, and should be complete by the end of June.

The work on Brown County is less complete. The database, bedrock topography, and draft surficial geology maps are nearly complete. The bedrock geology is in review, and therefore nearly complete. The subsurface cross-sections that lead to the sand model will take another 3 months, and GIS and production work will follow. I expect the final products will not quite be completed at the end of June, but will be soon after.

Including the support for unfinished projects from prior grants this project has succeeded in supporting the creation of three new county geologic atlases as designed.

Amendment Request (2/4/15): Our final accounting shows a spending distribution quite close to the original design of the project. The deviations include spending about \$47,000 less on salaries and wages, about \$8,500 less on printing, about \$30,000 less on travel and vehicles, about \$80,000 more on drilling, and about \$7,000 more on equipment, tools, and supplies. These variations are expected when the budget is designed before the actual counties in which we will work are known. The last amendment request was made just after our accountant suddenly left the organization. Our new accountant has helped me make some corrections and this changed the picture slightly. The increase in drilling funding I had requested in July was larger than needed. A charge against this project was reversed. Our drilling contracts typically cover several projects, sometimes funded by different accounts. Attachment A shows our final spending distribution and I request an amendment as shown. Our new accountant has brought us up to date with current University procedures and this will make future reporting less difficult, and less reliant on a single person.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Create geologic atlases for 3 or more counties (Redwood, Meeker, Brown)

Description: Atlases begin with compilation of a database of subsurface information. The most abundant data source is the construction records of water wells. With the cooperation of the local project partner, accurate digital locations are established for these wells to support their use in mapping. Concurrently, geologists visit the project area to describe and sample landforms, and exposures of rock or sediment. An initial assessment of the geologic data is then completed to focus additional data gathering including shallow and deep drilling programs. Analysis of the complete data set is then completed and maps and associated databases are formalized and prepared for use in geographic information systems and distribution via DVD and web. Most of the products are also printed for use in the field, and by users who prefer this format. As soon as the funds for this project are secured counties will be contacted to find willing and able local partners. This effort will begin with counties prioritized on the basis of need that may be driven by growth, resource demand, resource vulnerability, or opportunities for cooperation with other water management activities. When counties join this project progress and budgeting will be reported as Activity 1A, 1B, and 1C.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 1,200,000
Amount Spent: \$ 1,200,000
Balance: \$ 0

Activity Completion Date:

Outcome	Completion Date	Budget
1. Create database of well construction records to support the mapping, to document water use in specific aquifers, and to help resolve well problems	June 30, 2013	\$120,000
2. Complete any unfinished ENRTF supported County Geologic Atlas projects (ex: from 2010 appropriation).	June 30, 2014	\$100,000
3. Make progress on maps of bedrock geology, surficial geology, subsurface Quaternary geology, bedrock topography, and thickness of glacial deposits.	June 30, 2015	\$980,000

Activity Status as of December 31, 2011: Having reached agreement with the counties, MGS staff visited each county to provide training and materials for establishing accurate well locations. MGS staff are monitoring this activity and will also check this work in the field. An internal MGS work plan with staffing and effort levels has been established for each county. We have also proposed the surficial geologic maps of each county for federal cost-sharing under the STATEMAP program.

Activity Status as of June 30, 2012: The counties have completed establishing accurate locations for wells with construction records. The database for Meeker County has more than 3,600 wells with 2,900 of them added for this project. The database for Redwood County has nearly 1,900 wells with 1,250 added for this project. The database for Brown County has almost 1,700 wells with just a couple of hundred added for this project. MGS staff are completing the work necessary to enter this data in the County Well Index database including geologic interpretations of the material descriptions provided by the drillers. MGS geologists are conducting field work this spring and summer, specifically focusing on the geology of the land surface. They are describing and sampling exposures of the glacial materials, and drilling shallow boreholes. Samples are returned to MGS for analysis in our sediment laboratory. The surficial geologic maps of Meeker (\$39,684) and Redwood (\$27,993) counties have been accepted for cost-sharing by the USGS STATEMAP program. Work on the bedrock maps of these areas has been initiated with passive seismic surveys, examination of archived bedrock core, and collection of exploration drilling data.

Activity Status as of December 31, 2012: Well locating and data entry is complete except for some bedrock interpretations that will be made as the bedrock geologic map is compiled. The surficial maps of all three counties are in draft stage. The surficial maps of Redwood and Meeker will be completed this period with matching funds from the USGS STATEMAP program. These are supported by Giddings probe samples and outcrop samples which have been analyzed for texture and grain lithology. Work on bedrock geologic maps is underway. Some cores have been examined and outcrops have been mapped in Redwood County. Draft versions of bedrock topography are available for all three counties. These are based on well records and passive seismic surveys. Approximately 8 rotasonic drillholes will be completed in Meeker County in this period. That represents three holes from this budget, and additional holes paid for with Clean Water Funds provided by DNR to augment our coverage.

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Activity Status as of December 31, 2013: The CWI database is complete for all three counties. Surficial geologic maps are complete for all three counties. Bedrock topographic maps are drafted for all counties but may be revised slightly. Bedrock geologic maps are underway. Rotasonic drilling and auger drilling are complete for all counties and the cores are described for Meeker County. Descriptive work on the cores and cuttings is underway in Brown and Redwood where drilling was just completed a few weeks ago (not yet billed). The cross-sections and sand body mapping are underway and are furthest along in Meeker County. This level of progress fits the work plan.

Activity Status as of June 30, 2014: For all three counties, the CWI database, the surficial geology, the drilling, and the bedrock topography map are complete. For each county, the subsurface Quaternary mapping, technical review/revision, editing, and printing remain. Meeker County is slightly ahead of the other two. We expect all of the products to be complete in 12 months, which corresponds to the grant end date. The bedrock geology map of Meeker County received federal cost-sharing of \$18,598.

Final Activity Status as of February 5, 2015:

The Meeker CGA products are complete, and will be printed in the coming weeks. All but one of the Redwood products are substantially complete and this atlas should be finished by the project end date. The products of the Brown CGA are mostly complete with the exception of the subsurface glacial products. These are underway and should be complete by the project end date, although printing will likely take place a month or so later.

Final Report Summary: Different geologic settings require different techniques or shifts in the resources devoted to each method. These three counties have relatively lower population density, and therefore fewer well records to describe subsurface conditions. This requires that we do more drilling, both shallow auger drilling and deeper Rotasonic drilling, and more geophysical investigations to improve map accuracy. The increase in drilling requires more time to collect, describe, and analyze samples, but improves the accuracy of the maps. Redwood and Brown counties also include parts of the Minnesota River valley where exposed bedrock provides an opportunity to examine it in the field

and map the outcrops and bedrock topography in detail. Mapping in those parts of the counties will show a much higher resolution than the portions of the counties where the bedrock is buried. Completion of these Part A products will be followed by effort from our DNR counterparts to produce the Part B products focused on water composition, water levels, aquifer characteristics, and sensitivity.

V. DISSEMINATION:

Description: County Geologic Atlases are created in digital and print forms. Printed copies are useful in the field, and for users without computers. The printed copies are shared with the county and also distributed by the MGS. The atlas content is also provided as portable document files (pdfs) that can be accessed by free software, as geographic information system (GIS) files that can be accessed and manipulated to create new or customized maps by those with GIS software, and as GIS files that can be accessed by free GIS software. The digital files are available on a DVD, from the county, or from a digital conservancy through the MGS web site.

MGS provides project status reports to each county, and at the completion of our work we hold a workshop in the county to introduce the products and demonstrate their uses. A field trip is usually conducted to relate the map units to landforms and geologic materials at locations around the county.

Status as of December 31, 2011: Met with Meeker County Planning Commission and Meeker County Board, Redwood County Planning Commission, and the Brown County Board.

Status as of June 30, 2012: Working with county staff on well locations.

Status as of December 31, 2012: Some interaction with Meeker County on sites for drilling. Working with all counties and well drillers to establish locations on a few more wells.

Status as of June 30, 2013: Surficial geologic maps of Redwood and Meeker counties have been submitted to the USGS, and posted to the MGS web site, and the National Geologic Map Database.

Status as of December 31, 2013: Counties assisted with siting the drill holes.

Status as of June 30, 2014: Bedrock geologic map of Meeker County has been submitted to the USGS, and will be posted to the MGS web site and the National Geologic Map Database.

Status as of February 5, 2015: We will deliver the printed products to the counties as they are completed, and also a DVD with all the digital files and data. Then a meeting in each county will be held to introduce the products to users.

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget:

Budget Category	\$ Amount	Explanation
Personnel:	\$877,636	approx. 10.6 FTE civil service and student workers
Professional/Technical Contracts:	\$188,364	rotasonic drilling- awarded by bid process; costs generally range from \$30 to \$60 per foot (more expensive at depth) plus \$8 per foot for abandonment. This amount would likely drill about 9 holes- 3 per county averaging 200 feet deep. This is typically the minimal coverage and may be augmented if conditions require.
Equipment/Tools/Supplies:	\$38,000	expendables for field and laboratory work

Printing:	\$36,000	bid process; typically 6 plates per county (size about 3' by 3'), four color, and 1,500 copies of each for 3 counties equals 27,000 maps
Travel Expenses in MN:	\$60,000	food, lodging, vehicle rental from University Fleet as necessary for field work (typically weekly)
TOTAL ENRTF BUDGET:	\$1,200,000	

Explanation of Capital Expenditures Greater Than \$3,500: none

Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: approx. 10.6, cannot calculate until counties are chosen and staff are assigned based on skills required for those counties.

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
Non-state			
STATEMAP, Great Lakes Geologic Mapping Coalition (both are federal cost-sharing)	\$127,354	\$32,386	Awarded \$86,275 from STATEMAP for surficial maps of Meeker and Redwood, and bedrock map of Meeker. No GLGMC award for these projects
State			
Clean Water Legacy Funds	\$305,000	\$	Dedicated to Houston and Winona CGA projects, not this proposal
TOTAL OTHER FUNDS:	\$430,000	\$	

VII. PROJECT STRATEGY:

A. Project Partners: Under a separate workplan and budget DNR Waters and Environmental Services will receive \$600,000 to work on Part B of County Geologic Atlases

B. Project Impact and Long-term Strategy: MGS is the geologic mapping agency of the state and is striving to provide comprehensive geologic mapping and associated databases at appropriate scales statewide as quickly as possible. The County Geologic Atlas program is the primary vehicle for completing this goal. Atlases are complete or under construction for 32 of the 87 counties in Minnesota. The MGS receives \$150,000 to \$200,000 per year from DNR Waters, and also leverages federal cost share dollars from the National Cooperative Geologic Mapping Program of the United States Geological Survey and the Great Lakes Geologic Mapping Coalition. MGS competes for these cost share dollars annually and they cover half of the costs of each map product incurred in that one-year window. MGS intends to propose project map elements for cost share and if successful may garner an additional \$125,000. MGS atlas development is also supported by Clean Water Funds (one grant of \$305,000 beginning July 2010).

C. Spending History:

Funding Source	M.L. 2005 or FY 2006-07	M.L. 2007 or FY 2008	M.L. 2008 or FY 2009	M.L. 2009 or FY 2010	M.L. 2010 or FY 2011
Benton and Chisago CGAs		\$400,000			
Blue Earth, Nicollet, Sibley CGAs			\$706,000		
Anoka and Wright CGAs				\$820,000	
Sherburne and Morrison					\$800,000

CGAs; St. Lawrence Confinement Study, Rochester Geochem Study					and \$330,000
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VIII. MAP(S): map of CGA program progress and funding sources

IX. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted not later than December 31, 2011, June 30, 2012, December 31, 2012, June 30, 2013, December 31, 2013, June 30, 2014, December 31, 2014. A final report and associated products will be submitted between June 30 and August 1, 2015 as requested by the LCCMR.

Final Attachment A: Budget Detail for M.L. 2011 (FY 2012-13) Environment and Natural Resources Trust Fund Projects
Project Title: County Geologic Atlases for Sustainable Water Management

Legal Citation: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03b1

Project Manager: Dale Setterholm

M.L. 2011 (FY 2012-13) ENRTF Appropriation: \$1,200,000

Project Length and Completion Date: 4 years; June 30, 2015

Date of Update: 2/5/15

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget 7/16/14	Activity 1 Revised Budget 2/5/15	Amount Spent	Balance	TOTAL BALANCE
BUDGET ITEM					
Personnel (Wages and Benefits)					
Approximately 10.6 FTE in a team of database managers, surficial geologists, bedrock geologists, geophysicists, student lab technicians, editor, and GIS scientists. Salary 58.7%, fringes 41.3%, except for students (100% salary). Assignments will be made when project locations (counties) are chosen.	\$ 877,636	\$ 910,796	910,796	0	-33,160
Professional/Technical Contracts					
Scientific drilling services TBD by bidding process; about 9 holes averaging 200' deep including abandonment; may be augmented as necessary	\$ 204,339	\$ 187,856	187,856	0	16,483
Printing services TBD by bidding process (typically 6 plates, 1,500 copies, 3 counties; yields 27,000 3' by 3' maps in color	\$ 27,563	\$ 27,563	27,563	0	0
Equipment/Tools/Supplies					
(2) hand-held GPS units and map files	\$ 700	\$ 500	500	0	200
photocopying, maps, publications, sample envelopes and bags, core boxes, pallet banding, sieves, batteries	\$ 37,300	\$ 23,338	23,338	0	13,962
Printing (see professional contract above)					
Travel expenses in Minnesota					
vehicle rental and mileage (approx. \$40 to \$47 per day, \$0.17 to \$0.37 per mile), mileage on MGS geophysics van (\$0.51 per mile); meals (up to \$46 per day); lodging (up to \$77 per day). Amounts cannot be calculated until project locations (counties) are known. Rentals from U Fleet Services as needed, typically on weekly basis.	\$ 52,462	\$ 49,947	49,947	0	2,515
COLUMN TOTAL	\$ 1,200,000	\$ 1,200,000	\$1,200,000	0	\$0