

2011 Project Abstract

For the Period Ending June 30, 2015

PROJECT TITLE: County Geologic Atlases for Sustainable Water Management

PROJECT MANAGER: Jan Falteisek

AFFILIATION: MN DNR

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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. 03b2

APPROPRIATION AMOUNT: \$600,000

Overall Project Outcomes and Results

Geologic atlases provide information essential to sustainable management of groundwater resources. Atlases 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.

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. County geologic atlases facilitate management activities to identify sustainable water use and to protect water quality

This project continued the acceleration of County Geologic Atlases, Part B by DNR initiated under M.L. 2009 that provided ENRTF funding through June 30, 2012. This work plan provided support for ongoing Part B atlases in Carlton, Benton, McLeod, Carver, and Chisago counties and to initiate seven new Part B atlases over the project period including Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright counties. The Carlton, Benton, McLeod, Carver, and Chisago county geologic atlases, Part B were completed, printed, and distributed; local training workshops were held for all completed atlases. Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright county Part B geologic atlases were all initiated. Project staff also assisted the initiation of the Part B Sherburne county geologic atlas.

All initiated projects completed initial analysis and groundwater sample collection with only carbon-14 sample collection and analysis remaining for the Renville atlas project. Well owners received reports of the chemical analysis of samples from their well. The format for new atlas reports was redesigned to a USGS-style science report format that will allow an expansion of the information presented in the report. All future atlas reports beginning with Blue Earth will use the new report format. The Blue Earth report is in final draft in the new format with reports for the Nicollet and Sibley atlases in development. Technical analysis and map development for other projects is underway.

The County Geologic Atlas series of reports is a long-term joint effort by the Minnesota Geological Survey and DNR to complete County Geologic Atlases for all counties in the state. Initiated Part B atlas projects mentioned above will be completed with additional existing ENRTF funding. Future Part B atlases are planned for Part A atlases that have been completed by the MGS, including Morrison, Houston, the Winona revision, and Meeker. Ten additional Part A county geologic atlases are currently underway by the MGS.

Project Results Use and Dissemination

The Carlton, Benton, McLeod, Carver, and Chisago county geologic atlases, Part B were completed and printed in paper format and distributed to county, libraries, state agencies, and other organizations. Printed reports are available for sale at the MGS. PDF versions of all printed reports were posted to the DNR web site at http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html Through DNR gov.delivery subscription, (sign up on DNR home page <http://www.dnr.state.mn.us/index.html>) interested persons may self-subscribe to be notified of completed projects and other DNR county geologic atlas news. Project data of completed reports, including water chemistry data and GIS data were also posted to the DNR web site. Following publication of each Part B report, a local workshop was held to introduce the report content and train users in its application. At the completion of each report, the report author prepares an article of atlas highlights for the Minnesota Ground Water Association newsletter. The membership of the MGWA includes many professional hydrogeology colleagues who use the atlas reports.



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

Date of Status Update: January 20, 2016
Date of Next Status Update: Final Report
Date of Work Plan Approval: 06/23/2011
Project Completion Date: 06/30/2015 **Is this an amendment request?** NO

Project Title: County Geologic Atlases for Sustainable Water Management

Project Manager: Jan Falteisek

Affiliation: MN DNR

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Location:

Counties Impacted: Anoka, Benton, Blue Earth, Carlton, Carver, Chisago, Clay, McLeod, Nicollet, Renville, Sibley, Wright

Ecological Section Impacted: Minnesota and Northeast Iowa Morainal (222M), North Central Glaciated Plains (251B), Northern Minnesota Drift and Lake Plains (212N), Northern Superior Uplands (212L), Red River Valley (251A), Southern Superior Uplands (212J), Western Superior Uplands (212K)

Total ENRTF Project Budget:	ENRTF Appropriation \$:	600,000
	Amount Spent \$:	597,773
	Balance \$:	<u>2,227</u>

Legal Citation: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03b2

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 (DNR)

II. FINAL PROJECT SUMMARY:

Geologic atlases provide information essential to sustainable management of groundwater resources. Atlases 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.

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. County geologic atlases facilitate management activities to identify sustainable water use and to protect water quality

This project continues the acceleration of County Geologic Atlases, Part B by DNR initiated under M.L. 2009 that provides funding through June 30, 2012. This work plan provides support for ongoing Part B atlases in Carlton, McLeod, Carver, Benton, and Chisago counties and initiates seven new Part B atlases over the project period FY12-13. The seven new Part B atlases to be initiated include Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright counties. The County Geologic Atlases, Part A, for these seven counties are currently in progress by the Minnesota Geological Survey. Publication of the Part B reports initiated during this project is planned for 2014 or 2015. This is a long-term joint effort by the Minnesota Geological Survey and DNR; the MGS will prepare a separate, coordinated proposal.

III. PROJECT STATUS UPDATES:

Project Status as of January 15, 2012:

The Carlton County Geologic Atlas, Part B was published and delivered. Work continues to develop the Benton, McLeod, Carver, and Chisago Part B reports. Preliminary work began on the Blue Earth Part B project.

Project Status as of July 15, 2012:

The Benton County Geologic Atlas, Part B was printed. The Carver, McLeod, and Chisago Part B reports are in preparation for printing.

Substantial work was completed on the Blue Earth County Geologic Atlas, Part B project with the collection of planned groundwater samples. Collection of groundwater samples is well underway on the Nicollet and Sibley projects.

Project Status as of January 15, 2013:

All work on the Benton County Geologic Atlas, Part B, was completed. Report The Carver, McLeod, and Chisago Part B reports are in preparation for printing.

All water samples for the Blue Earth County Geologic Atlas, Part B, project collected and all data received. Data analysis continuing; preliminary work on the report has begun. Collection of groundwater samples for the Nicollet and Sibley County Geologic Atlas, Part B, projects is nearly complete. Collection of the remaining water samples are planned for early spring.

Program and project staff changes have resulted in two atlas program vacancies; both vacancies will be filled as soon as possible.

Project Status as of September 11, 2013:

McLeod CGA, Part B, report was printed and distributed. The workshop for this project will be held in conjunction with the Carver CGA, Part B project this fall. Report preparation work on the Carver and Chisago reports is continuing and a first draft completed of the Blue Earth CGA, Part B. All data for the Nicollet and Sibley projects have been collected and received. Data analysis for the reports is ongoing; preliminary development of the reports is underway. The next project to start will be Anoka, which will be underway the next review period.

Program and project staff changes during the reporting period include hiring the program GIS specialist (ITS2 - embedded MNIT staff), continuing a temporary project hydrologist staff reassignment to the project hydrologist vacancy, the project editor vacancy, and the GIS specialist vacancy.

Project Status as of March 7, 2014 [budget update as of December 31, 2013] :

The workshop for the McLeod CGA Part B was held in conjunction with the Carver CGA, Part B project on October 10, 2013. The Carver CGA Part B report is in final draft. Report preparation work on the Chisago report is continuing and is in complete draft stage. Technical work continued on the Nicollet and Sibley CGA Part B reports. Further development of the Blue Earth CGA, Part B report temporarily delayed. The Anoka CGA, Part B began with collection of about 85 percent of the planned groundwater samples.

Program and project staff changes during the report period included filling the project hydrologist 2 and GIS specialist vacancies. Unfortunately the project hydrologist 2 took another position in DNR in January 2014. The vacant editor position was finally filled in January 2014.

Project Status as of July 15, 2014 (reported December 26, 2014) [work plan/project and budget update as of June 30, 2014]:

The Carver CGA Part B report was published in June 2014. Printed copies were delivered to Carver County. The Chisago CGA Part B report in final draft. Other projects underway include Blue Earth CGA Part B with a redesign to a USGS-style science report format, which allows an expansion of the information presented in the report. Other reports underway and future reports will be in this new format, including Nicollet, Sibley, Anoka, and Sherburne. Project funds supported collection of groundwater samples for the Sherburne CGA Part B and background work for the Houston CGA Part B.

Program project staff changes during the report period that required project manager attention included filling the vacant editor position in January 2014, the new Science Reports Lead position was hired in January 2014; a senior project hydrologist vacancy was filled by an existing project staff, creating a project hydrologist 2 vacancy; the vacancy in the project hydrologist 2 for the Nicollet and Sibley projects continued; using other atlas project funding the vacant field hydrologist 1 position was filled; and a temporary field hydrologist was hired.

Project Status as of January 15, 2015 [budget update as of December 31, 2014]:

Two new Part B projects were initiated during this report period: Wright and Renville counties and included collection of planned groundwater samples for each project.

Report development continues for several projects, including Chisago (in final pre-printing review), Blue Earth (in final preparation for technical review), Nicollet, Sibley, and Anoka counties. Clay County may be initiated during the final six months of this project.

Atlas program project staff changes during the reporting period included filling one of the vacant project hydrologist 2 positions; the vacancy in the other project hydrologist 2 continues after two attempts. Using other atlas project funding a “trainee” project hydrologist 1 position was created and filled; this project hydrologist 1 has been assigned to atlas project tasks under the direction of more experienced staff. Both field hydrologist 1 positions (permanent and temporary) (funded with other atlas program funding) were vacant at the end of the reporting period. It is expected that at least the permanent field hydrologist 1 position (using other atlas project funds) will be filled during the next reporting period.

Overall Project Outcome and Results

Geologic atlases provide information essential to sustainable management of groundwater resources. Atlases 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.

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This project continued the acceleration of County Geologic Atlases, Part B by DNR initiated under M.L. 2009 that provided ENRTF funding through June 30, 2012. This work plan provided support for ongoing Part B atlases in Carlton, Benton, McLeod, Carver, and Chisago counties and to initiate seven new Part B atlases over the project period including Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright counties. The Carlton, Benton, McLeod, Carver, and Chisago county geologic atlases, Part B were completed, printed, and distributed; local training workshops were held for all completed atlases. Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright county Part B geologic atlases were all initiated. Project staff also assisted the initiation of the Part B Sherburne county geologic atlas.

All initiated projects completed initial analysis and groundwater sample collection with only carbon-14 sample collection and analysis remaining for the Renville atlas project. Well owners received reports of the chemical analysis of samples from their well. The format for new atlas reports was redesigned to a USGS-style science report format that will allow an expansion of the information presented in the report. All future atlas reports beginning with Blue Earth will use the new report format. The Blue Earth report is in final draft in the new format with reports for the Nicollet and Sibley atlases in development. Technical analysis and map development for other projects is underway.

The County Geologic Atlas series of reports is a long-term joint effort by the Minnesota Geological Survey and DNR to complete County Geologic Atlases for all counties in the state. Initiated Part B atlas projects mentioned above will be completed with additional existing ENRTF funding. Future Part B atlases are planned for Part A atlases that have been completed by the MGS, including Morrison, Houston, the Winona revision, and Meeker. Ten additional Part A county geologic atlases are currently underway by the MGS.

Project Results Use and Dissemination

The Carlton, Benton, McLeod, Carver, and Chisago county geologic atlases, Part B were completed and printed in paper format and distributed to county, libraries, state agencies, and other organizations. Printed reports are available for sale at the MGS. PDF versions of all printed reports were posted to the DNR web site at http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html Through DNR gov.delivery subscription, (sign up on DNR home page <http://www.dnr.state.mn.us/index.html>)

interested persons may self-subscribe to be notified of completed projects and other DNR county geologic atlas news. Project data of completed reports, including water chemistry data and GIS data were also posted to the DNR web site. Following publication of each Part B report, a local workshop was held to introduce the report content and train users in its application. At the completion of each report, the report author prepares an article of atlas highlights for the Minnesota Ground Water Association newsletter. The membership of the MGWA includes many professional hydrogeology colleagues who use the atlas reports.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: County Geologic Atlases, Part B.

Description: This project will complete five ongoing and initiate seven new County Geologic Atlases, Part B. A County Geologic Atlas is a single report that includes two parts, Part A, geology, completed by the Minnesota Geologic Survey and Part B, groundwater and pollution sensitivity, completed by DNR. Part A is completed first, followed by Part B, which uses and builds upon the geologic data assembled, analyzed and interpreted in Part A. The groundwater portion of the atlas includes maps of aquifers, groundwater flow, and pollution sensitivity.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 600,000
Amount Spent: \$ 597,773
Balance: \$ 2,227

Activity Completion Date:

Outcome	Completion Date	Budget
1. Support completion of ongoing County Geologic Atlas, Part B reports for Carlton, McLeod, Carver, Benton, and Chisago counties. Includes final assembly of data layers; analysis of chemistry data; development of maps of aquifers; geophysics field data collection and analysis; technical analysis of aquifers and groundwater systems; construction of hydrogeologic cross sections; maps of pollution sensitivity, preparation of final atlas report and publication, training of local atlas users, and dissemination of data. Publication is planned for FY12 or FY13. Part B Atlas program hydrogeologists supported by General Fund will be assigned to several of these projects so funds from both General Fund and ENTRF will be used to complete these atlases.	30 June 2013	\$100,000
2. Initiate County Geologic Atlas, Part B atlases for Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright counties. Includes assembly of data layers and development of conceptual hydrogeologic models; development of preliminary maps of the water table; groundwater sample collection and analysis; geophysics field data collection and analysis; preliminary technical analysis and maps of groundwater systems; construction of preliminary hydrogeologic cross sections; and preliminary maps of pollution sensitivity. Publication is planned for FY14 or FY15. Part B Atlas program hydrogeologists supported by General Fund will be assigned to several of these projects so therefore funds from both General Fund and ENTRF will be used to complete these atlases.	Initiate by 30 June 2014.	\$500,000

Activity Status as of January 15, 2012:

The Carlton County Geologic Atlas, Part B was printed and delivered to Carlton County and the Fond du Lac Band of Lake Superior Chippewa, followed by a training workshop in October. Development of the Benton County Geologic Atlas, Part B continued during this period with a peer review draft nearly complete. Work continued on the McLeod and Carver Part B reports, report production will begin in early 2012. Work progress on the Chisago Part B report improved greatly with the hire of the project hydrogeologist in September.

Initial work began on the Blue Earth Part B, using preliminary data layers from the Minnesota Geological Survey for the Part A report. Because of the state shutdown in July and delay in executing laboratory contracts, groundwater sampling work could not begin before winter weather set in for the season. Groundwater sampling for the project will begin as soon as weather conditions permit in spring 2012. Preliminary work on the Nicollet and Sibley Part B projects is expected to be underway during the next reporting period.

Activity Status as of July 15, 2012:

The Benton County Geologic Atlas, Part B was printed; the project electronic data will be posted to the DNR web site, the printed reports will be distributed, and a local training workshop will be held during the next reporting period. The Carver and McLeod Part B reports are in preparation for printing and will be printed the next reporting period. The Chisago Part B report is making good progress and entering the print production phase; the report will be printed about December-January.

Substantial work was completed on the Blue Earth project with the collection of 100 planned groundwater samples for natural chemistry, trace elements, tritium, and stable isotopes. When the chemistry and isotope data are available, up to 10 groundwater samples for carbon-14 age dating will be collected and analyzed. Good progress was also made on the Nicollet and Sibley projects. Those two projects have each completed about 50% of the planned groundwater sample collection of 100 samples per project. This work will be completed early in the next reporting period. Initial plans will be made to collect the carbon-14 samples in the two project areas and sampling conducted if possible.

Activity Status as of January 15, 2013:

Benton CGA, Part B, workshop and public informational meeting held in December; reports and electronic data distributed. This project is now complete. Report preparation work on the McLeod, Carver, and Chisago reports continuing. By the end of the reporting period, the McLeod project was in final editing prior to publication in early 2013. The Carver and Chisago report progress continuing with publication planned the end of the next review period.

All groundwater samples for the Blue Earth have been collected and data received. Data analysis for the report is ongoing; preliminary development of the report underway. All water samples for the Nicollet and Sibley report have been collected with the exception of up to 10 carbon-14 samples for each atlas that are planned for early spring.

Program and project personnel changes toward the end of the reporting period have affected progress somewhat. The LCCMR project hydrologist for the Nicollet and Sibley projects took another job at DNR in December. The work has been temporarily reassigned to other atlas program staff and will be paid with LCCMR project funds. The position will be backfilled as soon as possible. In addition, the program GIS specialist (ITS2 - embedded MNIT staff) was reassigned in November to other work at DNR. Backfilling the position thru MNIT is underway. The LCCMR atlas project GIS specialist (Research Analyst) is working to continue progress as much as possible during the ITS2 position hiring process.

Amendment Request January 15, 2013

A minor budget amendment is requested to cover the current cost of planned report production software licenses and upgrades. This request is to move \$50 from the Travel Expense budget item to the Other expense budget item. Progress on field work has been better than expected and as a result planned travel expense funds are available.

Amendment request approved February 25, 2013

Activity Status as of September 11, 2013:

McLeod CGA, Part B, report was printed and distributed. Printed reports were delivered to the county, informational presentation to county staff, and electronic data distributed. The workshop for this project will be held in conjunction with the Carver CGA, Part B project this fall. Report preparation work on the Carver and Chisago reports is continuing. The Carver and Chisago report publication planned to be completed by the end of the next review period. Drafting of the Blue Earth CGA, Part B, began and a first draft completed.

All groundwater samples for the Nicollet and Sibley projects have been collected and data received. Data analysis for the report is ongoing; preliminary development of the report underway. The next project to start will be Anoka, which will be underway the next review period.

Program and project personnel changes during the reporting period have affected progress this report period. The LCCMR project hydrologist for the Nicollet and Sibley projects took another job at DNR in December 2012. The project work has been temporarily reassigned to other atlas program hydrologist staff and will be paid with LCCMR project funds. The vacant project hydrologist position will be backfilled as soon as possible. In March, the LCCMR report editor resigned and the editor position remained vacant for the remaining report period. The editor vacancy will be filled as soon as possible. In addition, the program GIS specialist (ITS2 - embedded MNIT staff) was reassigned in November 2012 to other work at DNR. The hiring for that position was completed in April by promoting the LCCMR atlas project GIS specialist (Research Analyst). The vacant LCCMR atlas project GIS specialist position will be backfilled as soon as possible.

Amendment Request September 11, 2013

This amendment request is being submitted concurrently and in coordination with a related amendment request for the M.L. 2013 Chp. 52, Sec. 2, Subd. 03c County Geologic Atlas Part B project.

During this final year of this project, planned groundwater sampling will take place April through June 2014. The samples collected will include tritium isotope samples. The laboratory requires up to three months to complete analysis of these samples and report the results. Therefore, the analyses and reporting is not expected to be completed under this project. To resolve this, this amendment requests that laboratory expense in this project be reduced \$83,000 and personnel salary be increased \$83,000. Concurrently, an amendment of the M.L. 2013 budget is requested to increase the laboratory budget \$83,000 and decrease the personnel salary \$83,000. In these amendment requests, the timing of the expected laboratory expense for the samples is addressed, the overall budget of each project is not changed, and the laboratory budget and personnel budget of the combined 2011 and 2013 projects is not changed.

Also, during this final year of the project, expected travel expenses are estimated to be less than planned because several of the atlas projects are closer to the DNR offices and therefore require less mileage and travel expense to complete the planned sampling. In addition, the personnel cost expense

for the project was estimated several years ago. Since then, personnel cost increases have been legislatively approved. This amendment requests reducing the travel budget \$2,950 and increasing the personnel cost budget by \$2,950.

Amendment Request Approved September 17, 2013

Activity Status as of March 7, 2014 [budget update as of December 31, 2013] :

The workshop for the McLeod CGA Part B was held in conjunction with the Carver CGA, Part B project on October 10, 2013. The Carver CGA Part B report is in final draft. Report preparation work on the Chisago report is continuing and is in complete draft stage. Lack of an editor this review period has limited the ability to take the Carver report to printing. The Carver and Chisago report publication are planned to be completed by the end of the next review period. Further development of the Blue Earth CGA, Part B, report has been temporarily delayed. Technical work on the Nicollet and Sibley CGA Part B projects continued, and included preliminary drafts of main report elements such as water table elevation and near-surface sensitivity to pollution. The Anoka CGA Part B started this review period and included collection and submission for analysis of approximately 85 percent of the planned groundwater samples. The remaining samples, including the planned 10 carbon-14 samples for the project will be completed the next review period. By the end of the review period and early in 2014 the Minnesota Geological Survey released Part A data for Renville, Wright, and Sherburne counties. These projects will be next to start; the preliminary plan is to start collection of groundwater samples in those counties beginning spring 2014.

Program and project personnel changes during the reporting period have affected progress this report period. The vacant project hydrologist 2 position was filled in September by existing program staff working on the Nicollet and Sibley Part B projects. Unfortunately, that person took another job at DNR in January 2014; the vacant project hydrologist 2 position was immediately posted for application. The projects will be reassigned to other atlas program staff. The vacant atlas project GIS specialist position was filled in October 2013. The editor position was vacant for most of the report period, but the position was finally filled in January 2014.

Activity Status as of July 15, 2014 (reported December 26, 2014) [work plan/project and budget update as of June 30, 2014]:

The Carver CGA Part B report was published in June 2014. Printed copies were delivered to Carver County. The Chisago CGA Part B report is in final draft awaiting final internal review and printing. Other projects underway include Blue Earth CGA Part B with a redesign to a USGS-style science report format that will allow an expansion of the information presented in the report. The report will include several fold-in maps. The entire report will posted as a PDF on-line. The GIS data for all geospatial data will be provided on-line. Other reports underway and future reports will be in this new format, including Nicollet, Sibley, Anoka, and Sherburne. Project funds supported collection of groundwater samples for the Sherburne CGA Part B and background work for the Houston CGA Part B. Groundwater sample collection for the Sherburne CGA Part B was completed during the reporting period.

Program project staff changes during the report period that required project manager attention included filling the vacant editor position in January 2014, the new Science Reports Lead position was hired in January 2014; a senior project hydrologist vacancy was filled by an existing project staff, creating a project hydrologist 2 vacancy; the vacancy in the project hydrologist 2 for the Nicollet and Sibley projects continued; using other atlas project funding the vacant field hydrologist 1 position was filled; and a temporary field hydrologist was hired.

Activity Status as of January 15, 2015 [budget update as of December 31, 2014]:

Two new Part B projects were initiated during this report period: Wright and Renville counties. Project funds were used to support collection of the planned groundwater samples (100 each) for each project and submit them for chemistry and isotope analysis. Laboratory data from samples submitted for the Anoka atlas project has been received and will be sent to well owners.

Report development continues for several projects, including Chisago (in final pre-printing review), Blue Earth (in final preparation for technical review), Nicollet, Sibley, and Anoka counties. Clay County may be initiated during the final six months of this project.

Atlas program project staff changes during the reporting period included filling one of the vacant project hydrologist 2 positions; the vacancy in the other project hydrologist 2 continues after two attempts. Using other atlas project funding a "trainee" project hydrologist 1 position was created and filled; this project hydrologist 1 has been assigned to atlas project tasks under the direction of more experienced staff. Both field hydrologist 1 positions (permanent and temporary) were vacant at the end of the reporting period. It is expected that at least the permanent field hydrologist 1 position will be filled during the next reporting period. A decision whether to hire an atlas program temporary field hydrologist for the calendar 2015 field season will be considered early in the next reporting period based on expected field work.

A final amendment request will be submitted in February or March 2015 requesting approval for budget adjustments and redirection at the end of the project.

Amendment Request April 10, 2015

This amendment request is being submitted for approval of some adjustments to the project budget during the final quarter of the project as final or near-final expenses are becoming available. Changes to several budget items are requested as described below.

Professional/Technical Contracts - Laboratory expense: Reduce the laboratory expense budget by \$4,000 and increase the Personnel budget by \$4,000. This represents unused laboratory expense mainly due to a new state contract that had reduced sample charges.

Equipment/Tools – Water sampling tools: Reduce the water sampling equipment budget by \$4,000 and increase the Personnel budget by \$4,000. This is unused estimated budget for water sampling tools, meters, and related equipment.

Printing: Reduce the printing budget by \$3,000 and increase the Personnel budget by \$3,000. Printing costs of atlases were less than estimated partly because fewer copies are now printed.

Travel expense: Reduce the travel expense budget by \$3,000 and increase the Personnel budget by \$3,000. This is unused travel expense budget which was somewhat overestimated originally.

Other – report production software: Reduce the report production software budget by \$11 and increase the Personnel budget by \$11. This represents the unused portion of the final expense for this budget item.

Other – shipping: Reduce the budget for shipping by \$2,000 and increase the Personnel budget by \$2,000. This represents unused shipping budget intended for costs of shipping laboratory samples to the laboratory. The charges for shipping for this project were much less than estimated and not charged to the project.

The result of these changes reduces non-Personnel budget items by \$16,011 and increases the Personnel budget by \$16,011, which was originally underestimated somewhat. The personnel budget increase will be used by a project hydrologist 2 at 50% of position salary to continue the hydrologic analysis of the Renville County Geologic Atlas Part B from the time of amendment approval to June 30, 2015. The personnel budget increase will also be used by the program supervisor at 50% of position

salary for atlas program supervision and project management from the time of amendment approval to June 30, 2015.

Amendment Request Approved by the LCCMR April 16, 2015

Final Report Summary:

The Carlton, Benton, McLeod, Carver, and Chisago county geologic atlases, Part B were completed, printed, and distributed; local training workshops were held for all completed atlases. Blue Earth, Nicollet, Sibley, Anoka, Clay, Renville, and Wright Part B county geologic atlases were all initiated. Project staff also assisted the initiation of the Part B Sherburne county geologic atlas. All initiated projects completed initial analysis and groundwater sample collection with only carbon-14 sample collection and analysis remaining for the Renville atlas. Well owners received reports of the chemical analysis of samples from their well. The format of new atlas reports was redesigned to a USGS-style science report format that will allow an expansion of the information presented in the report. The report will include several fold-in maps. All future atlas reports beginning with Blue Earth report will use the new report format. The Blue Earth report is in final draft in the new format with reports for the Nicollet and Sibley atlases in development. Technical analysis and map development for other projects is underway.

V. DISSEMINATION:

Description: Each county geologic atlas, Part B completed is printed in paper format distributed to county, libraries, state agencies, and other organizations. They are available for sale at the MGS. PDF versions of the report are posted to the DNR web site and are available through http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html . Project data, including water chemistry data and GIS data are also posted to the DNR web site. Following publication of each Part B report, a local workshop is held to introduce the report content and train users in its application.

Status as of January 15, 2012:

The Carlton County Geologic Atlas, Part B was published, delivered to local sponsors, and distributed to library collections around the state. Additional copies were delivered to the Minnesota Geological Survey and made available to the public through their Map Sales Office. Project data, including chemistry data and groundwater GIS data layers, have been posted to the web via the DNR web site.

Status as of July 15, 2012:

The Benton County Geologic Atlas, Part B was published at the end of the reporting period. Complete distribution as described above for the Carlton report will be completed the next reporting period.

Status as of January 15, 2013:

The Benton County Geologic Atlas, Part B, reports were distributed as described above for the Carlton Part B report; a training workshop and public information meeting were held in December; and project electronic data posted to the web. The Benton project results were presented at the Fall 2012 Midwest Ground Water Conference.

Status as of July 15, 2013:

The McLeod County Geologic Atlas, Part B, reports were distributed as described above for the Carlton Part B report. A training workshop and public information meeting is in preparation to be held in

conjunction with completion of the adjacent Carver County Geologic Atlas. The workshop is planned for fall 2013. The McLeod CGA Part B project electronic data has been posted to the web.

Status as of March 7, 2014 [budget update as of December 31, 2013] :

The training workshop and public information meeting for both McLeod and Carver CGAs Part B was held October 10, 2013. A follow up workshop or other presentation of the Carver project following publication has been requested.

Status as of July 15, 2014 (reported December 26, 2014) [work plan/project and budget update as of June 30, 2014] :

Development of project material using the GovDelivery service at DNR underway, along with draft development of a newsletter article for the Minnesota Ground Water Association. Delivery of printed Carver reports is planned, along with a follow up presentation to county staff and local users.

Status as of January 15, 2015 [budget update as of December 31, 2014]:

In July we experimented with using the DNR gov.delivery subscription service as an additional tool for notifying interested subscribers of completed county atlases and related news. The DNR gov.delivery subscription service is also a more efficient way to develop and manage mailing lists. Anyone can sign up by going to <http://www.dnr.state.mn.us/emailupdates/index.html> and providing an email address. An article describing the highlights of the Carver County Geologic Atlas, Part B was prepared and published in the December 2014 Minnesota Ground Water Association Newsletter. MGWA members can go to the newsletter issue at <http://www.mgwa.org/> and read the article on-line. At the request of Mower County staff, DNR atlas staff will prepare and provide a review of their Part B atlas in early January 2015. Mower County has had nearly complete turnover of staff since the Part B atlas was published in 2002.

Final Report Summary:

The Carlton, Benton, McLeod, Carver, and Chisago county geologic atlases, Part B were completed and printed in paper format and distributed to county, libraries, state agencies, and other organizations. Printed reports are available for sale at the MGS. PDF versions of all printed reports were posted to the DNR web site at http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html Through DNR gov.delivery subscription, (sign up on DNR home page <http://www.dnr.state.mn.us/index.html>) interested persons may self-subscribe to be notified of completed projects and other DNR county geologic atlas news. Project data of completed reports, including water chemistry data and GIS data were also posted to the DNR web site. Following publication of each Part B report, a local workshop was held to introduce the report content and train users in its application. At the completion of each report, the report author prepares an article of atlas highlights for the Minnesota Ground Water Association newsletter. The membership of the MGWA includes many professional hydrogeology colleagues who use the atlas reports.

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget: See also M.L. 2011 Attachment A: Budget Detail

Budget Category	\$ Amount	Explanation
Personnel:	\$451,961	Hydrologist Supervisor (classified), Project Manager/Technical Supervisor: \$100,000 (79%

		salary, 21% benefits); 50% FTE; FY12-13. Hydrologist 2 (unclassified), \$65,000 (68% salary, 32% benefits); 95% FTE; FY13. Hydrologist 2 (unclassified): \$63,000 (75% salary, 25% benefits); 100% FTE; FY13. Information Officer 2 (technical editor) (unclassified): \$66,000 (68% salary, 32% benefits); 90% FTE; FY13. Research Analyst–GIS (unclassified): \$56,000 (63% salary, 37% benefits); 100% FTE; FY13.
Professional/Technical Contracts:	\$98,000	Laboratory analysis and interpretation of water samples for natural and isotope chemistry.
Equipment/Tools/Supplies:	\$18,000	Water sampling tools and field analytical meters and equipment. Supplies, including expendable water sampling supplies.
Printing:	\$9,000	
Travel Expenses in MN:	\$20,000	Mileage, lodging, meals.
Other:	\$3,039	Report production software licenses and software upgrades. Report production software licenses and software upgrades (Adobe Illustrator, Photoshop, InDesign; Avenza Map Publisher). Report production software licenses and upgrades are the responsibility of the work unit. Shipping costs for water samples to laboratory.
TOTAL ENRTF BUDGET: \$ 600,000		

Explanation of Use of Classified Staff: Any classified position paid for with LCCMR funds will either be 1) backfilled with a new position or 2) the work previously done by this position will be delayed, eliminated, or completed by the start of the project.

There is one classified position working on this project to be paid partially by this grant. The hydrologist supervisor provides overall atlas program direction, on-going program management, and is the technical supervisor for staff assigned to specific atlas projects or who support the atlas program as GIS or report production specialists. A portion of the hydrologist supervisor's time (0.5 FTE) will be paid by this grant and the remaining portion will be paid by General Fund, subject to an approved DNR budget.

Explanation of Capital Expenditures Greater Than \$3,500: No capital expenditures greater than \$3,500 are planned.

Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: 0.5 in FY12; 4.35 in FY13.

Number of Full-time Equivalent (FTE) estimated to be funded through contracts with this ENRTF appropriation: N/A

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
State			

Other State \$ Being Applied to Project During Project Period: General Fund, atlas staff and support, estimated \$660,000 for 2-year project period to initiate three and complete two Part B atlases in base program. Clean Water Fund, M.L. 2009 Ch 172 Art 2 Sec 5(f) for July 1, 2009 thru December 31, 2014; estimated \$500,000 of CWF appropriation will be used during project period.	\$ 1,160,000	\$	Personnel, laboratory analysis and interpretation, printing, travel expenses, water sampling equipment and supplies, and related expenses. Clean Water Funds primarily intended to expand and improve subsurface data acquisition in support of atlases.
Remaining \$ from Current ENRTF Appropriation: M.L. 2009 Ch 143 Sec 2 Subd 3 ENRTF to DNR \$890,000 (county geologic atlas portion). An additional \$52,300 of the unspent balance is encumbered for FY11, primarily for laboratory services.	\$ 580,000 (as of May 2011)		Personnel, laboratory analysis and interpretation, printing, travel expenses, water sampling equipment and supplies, and related expenses.
Minnesota DNR's In-kind Contribution: \$64,000 for shared services and governance. General fund and other funds as appropriate.	\$ 64,000		Shared Services (operations support governance) are services that DNR relies on in order to conduct business and support the work of the department. These services are more efficient when shared.
In-kind Services During Project Period: County assistance to arrange sampling access and sponsor local training workshop	\$ 5000		County assists staff in local access to well owners and sponsors the training workshop at the conclusion of the project.
TOTAL OTHER FUNDS:	\$ 1,809,000	\$	

VII. PROJECT STRATEGY:

See also MGS Atlas FY12-13 Work Plan to be submitted separately to LCCMR.

A. Project Partners: The Minnesota Geological Survey completes Part A of county geologic atlases (see MGS Work Plan for county atlas continuation). At the completion of the Part A work, DNR Waters Division completes Part B, the groundwater portion, of the atlases. To initiate a project, the MGS will require that the counties participate either with funding, or with in-kind services. Local participation is a primary factor in determining which counties are chosen for this project. Groundwater sensitivity, resource demand, and the size of the population served are also considerations. The DNR does not require additional local funding or in-kind services to do the Part B portion of an atlas. However, DNR does request local government sponsorship of the training workshop for local staff and the public that is held at the completion of a Part B atlas. The local government makes the arrangements and DNR atlas

project staff present the training program. The workshop program transfers knowledge and data acquired during the atlas project to local users and managers for improved decision-making and long-term resource protection.

B. Project Impact and Long-term Strategy: MGS is the geologic mapping agency of the state and intends 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. The MGS receives funding from DNR, and also leverages federal dollars from the National Cooperative Geologic Mapping Program of the USGS. The 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 continue cost sharing several of the map products associated with their work plan. MGS Part A atlas development is also supported by ENRTF and Clean Water Fund direct appropriations to MGS.

DNR has been a cooperator and funding partner with the MGS since the early 1990's. For each Part A atlas completed by the MGS, DNR completes a Part B atlas. The Part B atlases are currently supported by a combination of state general fund, ENRTF, and Clean Water Fund appropriations to DNR.

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
ENRTF (FY10-12) to DNR				\$890,000 Subd. 3(b)	

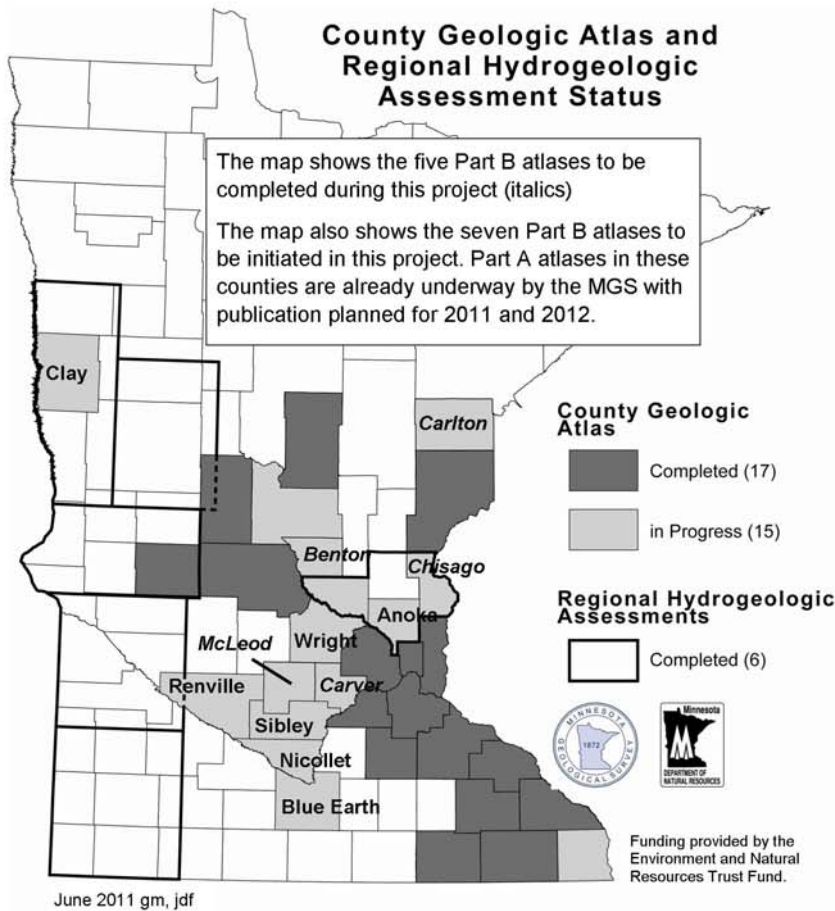
VIII. ACQUISITION/RESTORATION LIST: N/A

IX. MAP: See attached map of Part B atlases to be completed and initiated.

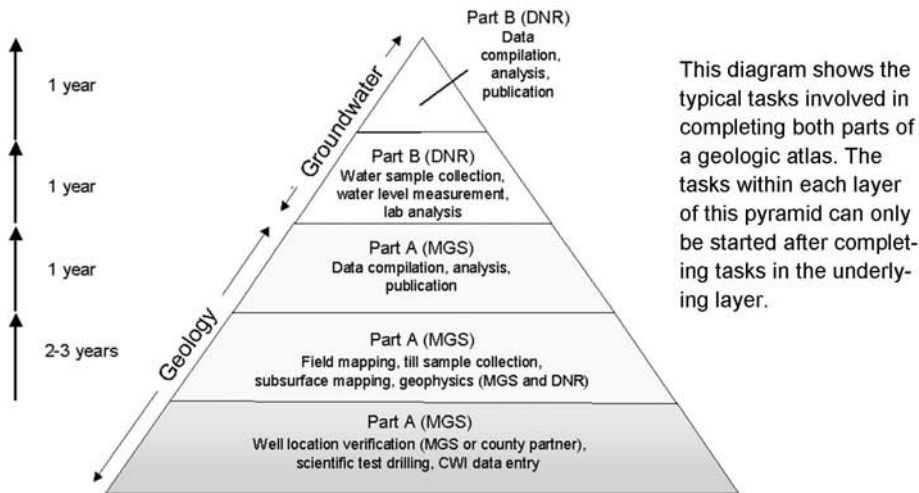
X. RESEARCH ADDENDUM: N/A

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted not later than January 15, 2012, July 15, 2012, and July 15, 2013. A final report and associated products will be submitted between June 30 and August 1, 2013 as requested by the LCCMR.



County atlas tasks and dependencies



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 (DNR)					
Legal Citation: M.L. 2011, First Special Session, Chp. 2, Art. 3, Sec. 2, Subd. 03b2					
Project Manager: Jan Falteisek					
M.L. 2011 (FY 2012-13) ENRTF Appropriation: \$ 600,000					
Project Length and Completion Date: Two years, June 30, 2013, appropriation available until June 30, 2015					
Date of Update: Final January 20, 2016					
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Revised Activity 1 Budget 04/13/2015	Amount Spent thru 6/30/2015	Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Complete five (5) and initiate seven (7) County Geologic Atlases, Part B				
Personnel (Wages and Benefits)	\$451,961	\$451,961	\$0	\$451,961	\$0
Hydrologist Supervisor (classified), Project Manager/Technical Supervisor: \$100,000 (79% salary, 21% benefits); 50% FTE; FY12-13					
Hydrologist 2 (unclassified), \$65,000 (68% salary, 32% benefits); 95% FTE; FY13					
Hydrologist 2 (unclassified): \$63,000 (75% salary, 25% benefits); 100% FTE; FY13					
Information Officer 2 (technical editor) (unclassified): \$66,000 (68% salary, 32% benefits); 90% FTE; FY13					
Research Analyst - GIS (unclassified): \$55,000 (63% salary, 37% benefits); 100% FTE; FY13					
Professional/Technical Contracts					
Laboratory analysis and interpretation of water samples for natural and isotope chemistry	\$98,000	\$97,516	\$484	\$98,000	\$484
Equipment/Tools/Supplies					
Water sampling tools and field analytical meters and equipment	\$6,000	\$5,897	\$103	\$6,000	\$103
Supplies, including expendable water sampling supplies	\$12,000	\$11,239	\$761	\$12,000	\$761
Printing	\$9,000	\$8,872	\$128	\$9,000	\$128
Travel expenses in Minnesota					
Mileage, lodging, meals	\$20,000	\$19,249	\$751	\$20,000	\$751
Other					
Report production software licenses and software upgrades (Adobe Illustrator, Photoshop, InDesign; Avenza Map Publisher). Report production software licenses and upgrades are the responsibility of the work unit.	\$3,039	\$3,039	\$0	\$3,039	\$0
Shipping costs for water samples to laboratory	\$0	\$0	\$0	\$0	\$0
COLUMN TOTAL	\$600,000	\$597,773	\$2,227	\$600,000	\$2,227