



Environment and Natural Resources Trust Fund (ENRTF) M.L. 2015 Work Plan

Date of Report: October 15, 2014
Date of Next Status Update Report: December 31, 2015
Date of Work Plan Approval:
Project Completion Date: June 30, 2018
Does this submission include an amendment request? no

PROJECT TITLE: County Geologic Atlases - Part A

Project Manager: Dale R. Setterholm

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Location: statewide -work will occur in multiple counties including Lake and St. Louis, and others not yet determined.

Total ENRTF Project Budget: \$2,040,000	ENRTF Appropriation: \$2,040,000
	Amount Spent: \$0
	Balance: \$2,040,000

Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 03a

Appropriation Language:

\$2,040,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota for the Minnesota Geological Survey to continue the acceleration of the production of county geologic atlases for the purpose of sustainable management of surface water and groundwater resources. This appropriation is to complete Part A of county geologic atlases which focuses on the properties and distribution of earth materials in order to define aquifer boundaries and the connection of aquifers to the land surface and surface water resources. This appropriation is available until June 30, 2018, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: County Geologic Atlases – Part A

II. PROJECT STATEMENT: Geologic atlases provide maps and databases essential for improved management of ground and surface water resources. This is foundational data that supports water management activities to the benefit of drinking water and aquatic habitat. 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. Geologic Atlases define aquifer boundaries and the connection of aquifers to the land surface and to surface water resources to enable a comprehensive water management effort. The program goal of atlas coverage statewide has benefited from long-term support of LCCMR to accelerate the work.

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 (funded separately) 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 are required to provide funds or in-kind service, typically by establishing accurate locations for water wells. The construction records of water wells are a fundamental data source that describes subsurface conditions, and also tells us where the population is obtaining water.

Atlases enhance natural resource management and regulation, and facilitate wise use of water resources. They support water management activities for sustainable water use and protection and improvement of water quality such as: permitting, land use planning, wellhead protection, remediation, nutrient management, monitoring, modeling, and well construction. Atlas information is used by citizens, local government, counties, and state agencies (SWCDs, MDH, DNR, MPCA, Ag). The atlases document existing conditions so that changes in the water system can be recognized and evaluated. A User’s Guide to geologic atlases supports and educates users of all backgrounds.

This project continues an effort to provide county geologic atlases statewide. The first atlas was initiated in 1979. Funding from ENRTF in the early 1990s and from 2007 to the present has greatly accelerated production (see attached map). At this time 37% of the state has a completed Part A atlas, or a project underway. Annual funding of \$1,750,000 (aggregate from all sources) would achieve statewide coverage in about 14 years.

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of 12/31/15:

Project Status as of 6/30/16:

Project Status as of 12/31/16:

Project Status as of 6/30/17:

Project Status as of 12/31/17:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Initiate new geologic atlases, and complete any unfinished atlases from previous grants.

Description: Atlas projects from the 2013 grant (Wadena, Hubbard, and Becker counties) are those most likely to need funding from this grant to reach completion. Agreements with St. Louis and Lake counties are in effect and these new projects will be funded from this grant. Work in those counties will proceed as a series of

subproject areas, with the results being released as digital products immediately following technical review. The final compilation of all the subproject products as county-wide maps will be produced in digital form, and printed, although that will not be completed in the term of this grant.

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 geophysical surveys, pit excavations, and 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 additional 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.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 2,040,000
Amount Spent: \$ 0
Balance: \$ 2,040,000

Outcome	Completion Date
1. Completion of atlases initiated on prior grants. The atlases of Meeker, Redwood, and Brown counties are nearing completion but may need funds to finish. Atlases of Wadena, Becker, and Hubbard counties would be next in line for assistance if needed.	12/31/17
2. Digital release of geologic mapping and databases for at least one subproject area. The atlases of St. Louis and Lake counties will be completed in a series of subprojects that cover parts of these counties. This will allow us to put more people on the job without fewer delays. For example, as soon as the database is completed for a subproject the geologists can start their work. If they waited for the databases to be completed for the entire county the delay would be significant. This will also allow us to complete and digitally publish subproject maps much sooner than maps of the entire county.	12/31/17
3. Progress on new atlas projects (mapping and associated databases). Discussions are underway with several counties likely to pursue atlas projects. We especially pursue those where water sensitivity, population, growth, water growth, or other management issues are present.	6/30/18

Activity Status as of 12/31/15:

Activity Status as of 6/30/16:

Activity Status as of 12/31/16:

Activity Status as of 6/30/17:

Activity Status as of 12/31/17:

Final Report Summary:

V. DISSEMINATION:

Description: Every atlas is produced in portable document format, as geographic information systems files, and in printed form. The digital files are produced as a DVD, and are also available from the University of Minnesota Digital Conservancy, and via link from the MGS web page. Each project culminates with a meeting held in the project area to present the results to the county staff, and any other interested parties. At these meetings the products are described, access to the products is explained, and examples of applications of the products to common resource management situations are demonstrated. The products of subprojects in St. Louis and Lake counties will be released in digital form immediately following technical review. When all the subproject areas are complete county-wide compilations will be created and distributed digitally and in print. The printed copies are shared with the county, who in turn can distribute them to libraries, schools, townships, and other agencies. They are also distributed by the MGS map sales office.

Status as of 12/31/15:

Status as of 6/30/16:

Status as of 12/31/16:

Status as of 6/30/17:

Status as of 12/31/17:

Status as of 6/30/18:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	\$ Amount	Overview Explanation
Personnel:	\$ 1,484,100	Equivalent to about 19 FTE civil service employees; most work on sponsored projects about 72% time and on base funds the remainder. Students cost less and are not included in this calculation. Includes geologists, geophysicist, editor, GIS technicians.
Professional/Technical/Service Contracts:	\$ 357,000	Approx. \$300,000 in rotasonic drilling services (competitive bid); the cost of drilling is estimated based on the number of atlases this grant would cover, and past drilling costs. Approx. \$50,000 for excavation of test pits (as many as 375 pits) in areas where auger drilling is not effective.
Equipment/Tools/Supplies/Services:	\$ 30,600	expendables for field and laboratory work (sample bags, batteries, lab chemicals, distilled water, notebooks, augers, stakes, flagging, notebooks, microscopy supplies, rock saw blades) ; lab analyses; equipment repairs for auger drill, other equipment; boat and ATV rental
Printing:	\$ 45,900	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:	\$ 122,400	food, lodging, vehicle rental from University Fleet as necessary for field work (typically weekly)
Other:	\$	
TOTAL ENRTF BUDGET:		\$2,040,000

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Number of Full-time Equivalent (FTE) Directly Funded with this ENRTF Appropriation: About 19 FTE.

Number of Full-time Equivalent (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: Insufficient knowledge to estimate labor component of drilling or printing or excavation contracts.

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
Non-state			
USGS STATEMAP Program	\$150,000	\$	Will apply for funds as projects are developed- none are locked in at this time. Augments costs of some map elements.
State			
Clean Water Legacy Funds	\$	\$	DNR <u>may</u> provide funds to augment the rotasonic drilling program (more or deeper holes)
In-kind Services During Project Period: participating counties are expected to provide accurate locations of water wells.			The value of this work is difficult to estimate as methods and other factors vary from county to county.
TOTAL OTHER FUNDS:	\$150,000	\$	pending

VII. PROJECT STRATEGY:

A. Project Partners: Under a separate workplan and budget DNR Waters and Ecological Services will receive funds to work on Part B of County Geologic Atlases, and county partners will supply in-kind services.

B. Project Impact and Long-term Strategy:

C. Funding History:

Funding Source and Use of Funds	M.L. 2007 or FY08-10	M.L. 2008 or FY09-12	M.L. 2009 or FY10-13	M.L. 2010 or FY11-14	M.L. 2011 or FY12-14	M.L. 2013 or FY14-16
ENRTF Benton and Chisago CGAs	\$400,000					
ENRTF Blue Earth, Nicollet, Sibley CGAs		\$706,000				
ENRTF Anoka and Wright CGAs			\$820,000			
ENRTF Sherburne and Morrison				\$1,130,000		

CGAs and related research						
ENRTF Redwood, Meeker, Brown					\$1,200,000	
ENRTF Wadena, Hubbard, Becker						\$1,200,000
Clean Water Funds (Houston, Winona)				\$305,000		
Clean Water Funds (Cass, Isanti, Hennepin update, Dodge, other)						\$1,230,000

VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS:

A. Parcel List: N/A

B. Acquisition/Restoration Information: N/A

IX. VISUAL COMPONENT or MAP(S): see attached map of County Geologic Atlas Part A status

X. RESEARCH ADDENDUM: N/A

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than January 2016, July 2016, January 2017, July 2017, January 2018, and July 2018. A final report and associated products will be submitted between June 30 and August 15, 2018.

**Environment and Natural Resources Trust Fund
M.L. 2015 Project Budget**



Project Title: County Geologic Atlases – Part A

Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 03a

Project Manager: Dale Setterholm

Organization: Minnesota Geological Survey, University of Minnesota

M.L. 2015 ENRTF Appropriation: \$ 2,040,000

Project Length and Completion Date: June 30, 2018

Date of Report: 10/15/14

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Initiate new geologic atlases and complete any atlases from previous grants.				
Personnel (Wages and Benefits)					
Personnel: Between 15 and 20 MGS staff (mostly geologists but also GIS, hydrogeologist, editor, database specialists, field assistants) will be assigned to work on geologic atlases on a part time basis; chosen based on the skill sets necessary for the geology of the selected counties. The total effort averages about 3 FTE per atlas or about 19 FTE for this proposal. The cost includes the University benefits (26.3%).	\$1,484,100	\$0	\$1,484,100	\$1,484,100	\$1,484,100
Professional/Technical/Service Contracts					
Contracts: rotasonic test hole drilling (awarded by a competitive bidding process). Generally 3-6 holes per county, based on 3 counties. Rotasonic method yields 4" undisturbed core of unconsolidated deposits. Rates increase from \$45/ft near surface to \$75/ft at depths exceeding 400'. There will also be geochemical and geochronologic analyses.	\$307,000	\$0	\$307,000	\$307,000	\$307,000
Contracts: test pit excavation (up to 375 pits) in areas where auger drilling is not possible.	\$50,000	\$0	\$50,000	\$50,000	\$50,000
Equipment/Tools/Supplies					
Field and lab expendables (batteries, sample bags, augers, Giddings Probe repair parts, maps, core boxes, etc.); watercraft and ATV rental	\$30,600	\$0	\$30,600	\$30,600	\$30,600
Printing					
offset printing awarded by competitive bid; typically 1,000 copies of each of 6 plates per county, 3 counties, 18,000 maps, 3' by 3' four color; print run has been lowered as there are more online users	\$45,900	\$0	\$45,900	\$45,900	\$45,900
Travel expenses in Minnesota					
vehicle rental and mileage (approx. \$40 to \$47 per day, \$0.17 to \$0.37 per mile); meals (up to \$46 per day); lodging (up to \$125 per day). Amounts cannot be calculated until project locations (counties) are known. Rentals from U Fleet Services as needed, typically on weekly basis.	\$122,400	\$0	\$122,400	\$122,400	\$122,400
COLUMN TOTAL	\$2,040,000	\$0	\$2,040,000	\$2,040,000	\$2,040,000

County Geologic Atlas Status: Oct. 2014





