**PROJECT TITLE: County Groundwater Atlas**

**I. PROJECT STATEMENT**

This projects supports continuing development of the County Groundwater Atlases by the Department of Natural Resources (DNR). The goal is to provide this valuable water and resource management “information infrastructure” to every county in Minnesota. Approximately half the counties have a completed atlas, and with this funding, four to five new atlases will be completed each year for the next two years. This LCCMR project will complete, continue, or initiate Groundwater Atlases for the following counties:

* Becker
* Cass
* Dodge
* Hennepin
* Hubbard
* Isanti
* Kanabec
* Olmsted
* Wadena

A Groundwater Atlas provides information that is essential to sustainable management and wise use of Minnesota’s groundwater resources. The atlas is the primary tool providing comprehensive geologic and groundwater mapping and associated information for planners, managers, scientists and citizens statewide for a wide variety of projects such as:

* Water supply planning
* Land use decisions
* Resources development
* Resource protection
* Transportation planning
* Agricultural Water Supply
* Groundwater Research
* Environmental Impact Statement

A few of the many representative comments provided by typical atlas users are provided below. The comments demonstrate some of the many uses and the value Minnesota places on having a completed atlas for their county:

**Heather Cunningham is the Zoning and Environmental Services Administrator for Carlton County**, “I *use the atlas on a monthly basis*. In the last 6 months, I have used it for the review of an EAW, pollution sensitivity for a proposed mixed use development, groundwater contamination at our closed landfill, and in working with a lake association.”

**Stephanie Souter, Supervisor of Planning and Performance Management Team, Washington County** “The updated data on shallow and subsurface groundwater sensitivity in the *DNR’s Part B atlas was an integral part* of the county’s development of a septic system risk assessment tool.”

**Rob Vix is a Drilling Manager with Traut Well Drilling Companies**, “For agriculture projects the atlas helps when looking for *places to drill high capacity wells*. The county atlas maps also provide ideas of the feasibility of my geothermal projects.”

The Groundwater Atlas defines aquifer availability and boundaries and helps identify the interconnection of aquifers, their sensitivity to pollution, recharge areas and their connection to the land surface and surface water resources. Delineation and mapping of aquifers, recharge areas, and karst systems is an essential step to inform management decisions that will protect water supplies, public health, ecological systems and the groundwater resource. A completed atlas represents a resource management benefit to the county and others.

The complete county atlas is prepared in two parts (**Two Parts: One Atlas**):

* Geologic Atlas (Part A) – The geology is mapped by the Minnesota Geological Survey (MGS).
* Groundwater Atlas (Part B) – The groundwater resources are mapped by the DNR.

Each Groundwater Atlas project includes some or all of the following work components: assembly of data layers and development of groundwater models; development of flow direction maps of the water table and deeper aquifers; groundwater sample collection and laboratory analysis; analysis and interpretation of water chemistry data including age of groundwater; construction of hydrogeologic cross sections; construction of maps of pollution sensitivity; preparation and publication of the final atlas report, training of local atlas users, dissemination of information and follow up support.

**II. PROJECT ACTIVITIES AND OUTCOMES**

|  |  |
| --- | --- |
| **Activity 1 Title: Groundwater Atlas Production – Work on Nine Counties****Description:** The DNR will collect groundwater samples in at least eight counties, compile field chemistry, analyze groundwater samples for natural chemistry and age-dating isotopes, and assemble aquifer characteristics. The project includes preparing groundwater maps, groundwater cross sections, and interpretations of pollution sensitivity of aquifers for up to eight counties, with publication as Groundwater Atlas reports. This project will provide GIS data layers for use in decision-support systems, such as county land use planning, and county environmental programs. The assembled GIS layers and electronic tools also make the information accessible for local, regional, and state decision makers, scientists, industry and citizens. Project design and data collection for counties in southeast Minnesota (Dodge and Olmsted) may include specialty mapping of the karst groundwater conditions, including dye tracing. This LCCMR project will complete, continue, or initiate Groundwater Atlases for the nine counties list in the Project Statement, Section 1. The goal is to complete Activity 1 work in approximately two years.**ENRTF BUDGET: $2,250,000** |  |
| **Outcome** | **Completion Date** |
| 1. Publish completed Groundwater Atlas reports (four counties per year). | June 30, 2022 |
| 2. Continue ongoing work on Groundwater Atlas projects (up to eight counties). | June 30, 2022 |
| 3. Continue to add data GIS data layers.  | June 30, 2022 |
| 4. Start new Groundwater Atlas projects in counties (up to four per year).  | June 30, 2022 |

**III. PROJECT PARTNERS AND COLLABORATORS:**

The Minnesota Geological Survey completes the county geologic atlases. To determine the priority for which counties to begin work, the MGS asks that the counties participate with in-kind services and the MGS also considers groundwater sensitivity, resource demand, and the size of the population served. The Minnesota Department of Agriculture and the University of Minnesota provide laboratory analytical services as partners in support of the atlas work. When the county Groundwater Atlas is published, the DNR requests that local governments (county environmental and public works staff, county soil and water conservation districts) sponsor and support training workshops within the county for local staff and the public. The half-day workshops include presentations by the MGS (Geologic) and the DNR (Groundwater), and also include table-top exercises that demonstrate the real-life application of the information provided in the atlas (e.g., landfill siting, water supply planning, and spill release response). Minnesota Department of Health participates in the Groundwater Atlas by providing a substantial amount of groundwater chemistry data collected by them for their purposes. The DNR atlas staff also offer to make presentations to county commissioners and staff and may lead field trips upon request.

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:**

To accomplish this important work, the Groundwater Atlases are currently supported by a combination of the state general fund, ENRTF, and Clean Water Fund appropriations to the DNR. Karst system mapping and research to investigate and understand groundwater flow in complex geologic systems and has been ongoing in southeast Minnesota; some of this work has been supported by ENRTF and the University of Minnesota. The MGS receives funding for the Geologic Atlas from the DNR and also leverages federal dollars from the National Cooperative Geologic Mapping Program of the USGS. The MGS competes annually for these federal cost-share dollars. MGS Geologic Atlas development is also supported by ENRTF and Clean Water Fund though direct appropriation.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

**A. Proposal Budget Spreadsheet - ATTACHED**

**B. Visual Component or Map - ATTACHED**

**C. Parcel List Spreadsheet – N/A**

**D. Acquisition, Easements, and Restoration Requirements – N/A**

**E. Research Addendum (Not required at proposal submission stage. Required later in process, if proposal is recommended. Staff will provide further information at that time). N/A**

**F. Project Manager Qualifications and Organization Description – ATTACHED**

**G. Letter or Resolution – N/A**

**H. Financial Capacity – N/A**