

DATA-BASE MAP

By
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INTRODUCTION

The public health and economic development of Wadena County are directly dependent on the wise use and management of its land and water resources. Geologic and hydrologic information are essential before decisions are made that affect natural resources. Although the amount of geologic information required for making specific decisions can vary, the information will not be used if it is unavailable when needed, or if it is available only in a highly technical form, or scattered in many different maps and reports. The data bases described here address this need.

County atlases, prepared jointly by the Minnesota Geological Survey and the Minnesota Department of Natural Resources, Division of Ecological and Water Resources, present detailed geologic and hydrologic information in an interpretive as well as descriptive form. Maps and texts summarize basic geologic and hydrologic conditions at a county scale, and interpret these conditions in terms of the impacts of possible land- and water-use decisions. Site-specific information is available in some areas at a greater level of technical detail than shown on the maps of this atlas. The data are too voluminous to present at the scale of this atlas, but have been incorporated into readily accessible files housed at the Minnesota Geological Survey.

Several sources commonly provide information about an area or an individual property, but they may use different classification schemes to describe the same geologic materials. As a result, discrepancies in interpreting the data may arise or the different sources may appear to contradict each other. For example, water-well drillers may describe glacial till as "clay," but engineering records will describe it as "clayey sand." Both descriptions are acceptable for their original purpose of describing the physical attributes of the material. "Clay" is the term used by well drillers, defines the general inability of the till to yield groundwater to a well. "Clayey sand," the term from the engineering record, defines the physical composition of the till relative to particle size and engineering properties. The geologist must take the analysis one step further and define the material in terms of how it formed rather than how it is to be used. In this example, till consists of an unsorted mixture of rock fragments ranging in size from clay to cobbles and boulders, and it is interpreted by the geologist as having been deposited directly by glacial ice. Understanding the process by which the material formed allows geologists to make predictions about what lies between and beyond data points.

All of the types of data described on this plate were interpreted by geologists or hydrogeologists to make them meaningful for mapping purposes. The 1:100,000 scale of the maps in this atlas was chosen because it shows the geologic and topographic details of the county while keeping the physical size of each plate to a manageable level. As a result, some detailed information that was gained by data interpretation and mapping cannot be shown on these maps or discussed in the texts. Some of this information is available in digital files that accompany the atlas.

Whether to use the atlas alone, or in combination with the data bases, depends on the amount of detail needed. Generally, data-base information must be used to evaluate site-specific conditions.

DATA-BASE MANAGEMENT

All of the data shown on the maps were plotted on 7.5-minute topographic quadrangle maps or highway alignment maps and assigned inventory numbers. Automated data bases and a few manual files were developed to provide easy access and rapid retrieval of these site-specific data. The data may be obtained from the Minnesota Geological Survey.

Computer storage and retrieval systems are better than manual files for manipulating large amounts of data because automated geologic data bases can be designed to interact with other computer files, such as land-use data. Such interaction permits more efficient assessment of cause-and-effect relationships concerning natural resources than is possible with manual files.

WADENA COUNTY DATA BASES

Computerized files were developed for point-source data such as wells and borings in Wadena County. They use Public Land Survey descriptions, Universal Transverse Mercator (UTM), and latitude-longitude coordinates as location criteria; thus, they are compatible with the natural-resources data bases housed at the Minnesota Land Management Information Center (LMIC). The computerized data base developed for Wadena County by the Minnesota Geological Survey is the County Well Index.

County Well Index (CWI)—Information from water-well records and exploration holes is entered into this statewide data base. Each well log is assigned a six-digit unique number and each exploration drill hole is assigned either a five- or six-digit unique number. These reference numbers are also used by state agencies and the Water Resources Division of the U.S. Geological Survey. Elevations, expressed in feet above sea level, were determined from topographic maps (see the index to 7.5-minute quadrangles) and are generally accurate to plus or minus 5 feet (1.5 meters). The street address of each well is also included wherever possible to provide data users with a well-location system that is compatible with local regulatory programs. Software at the Minnesota Geological Survey is used to display and tabulate many of the data elements contained on the original well log.

The County Well Index is currently stored in a data base that consists of ten related tables. These tables contain information such as well depths, well construction, addresses, aquifers, dates drilled, static water levels, and pumping test data. They also contain alternate well identifiers such as permit numbers or emergency-service numbers, the well stratigraphy (the geologic materials encountered during drilling), and the azimuth and inclination of angled exploration holes.

CWI application software developed by the Minnesota Department of Health provides two types of reports.

WELL LOG contains all the information about the well as it was reported by the contractor (Fig. 1). There may also be additional location information, land-surface elevation, aquifer designation, and remarks about the drill holes.

WELL STRATIGRAPHY contains the geologic log with a geologist's stratigraphic interpretations, which are based on her or his knowledge and understanding of the geology of Wadena County and augmented in some cases by additional data sources, such as cuttings, borehole geophysical logs, or core (Fig. 2). Only those drill holes with verified locations have stratigraphy assigned to them.

File data of the Minnesota Geological Survey—Details about other types of data shown on this plate are available from digital (including the Quaternary Data Index, an internal working data base) and paper files at the Minnesota Geological Survey. These include descriptions of cutting samples, soil borings, Giddings probe holes, field sites, soil auger holes, textural analyses, gravity and aeromagnetic data, passive seismic sites, and aggregate resources.

FUTURE DATA COLLECTION

Additional geologic information is generated continuously as new water wells are drilled, construction activities expose more bedrock, or additional wells are tested for water quality. To address this, the library of information prepared for Wadena County is flexible so that old data can be reevaluated in light of new information, and new forms of data can be added if required. The need to manage groundwater and other natural resources wisely will never become outdated. Future demands on these resources will require current data to assess the impacts.

ACKNOWLEDGEMENTS

The Wadena Soil and Water Conservation District staff contributed greatly to the development of the County Well Index data base. We thank local water-well contractors and landowners for their valuable assistance.

MAP SYMBOLS

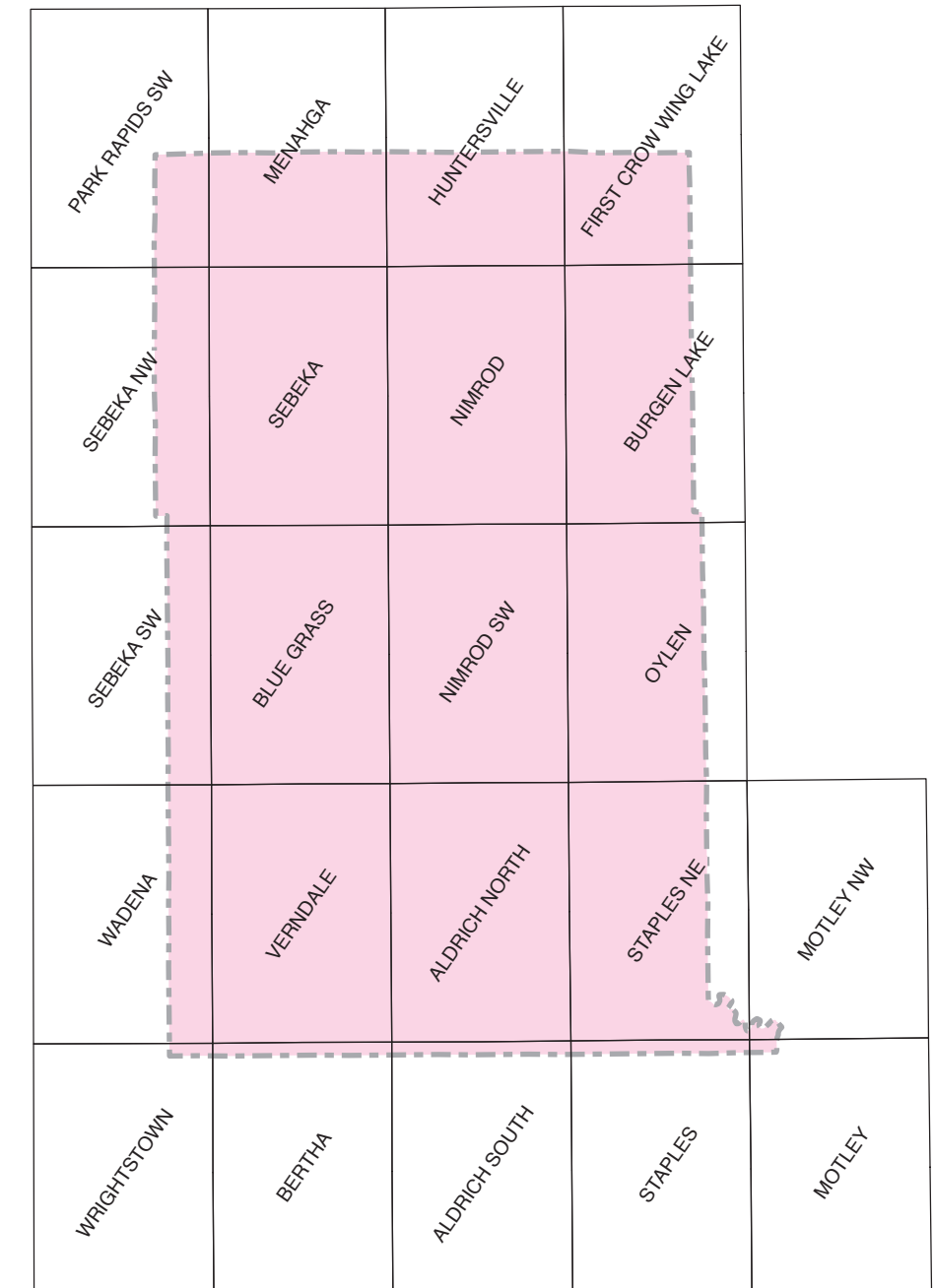
- Record of water-well construction (well driller's log)
- ◆ Scientific investigation hole
- ◇ Diamond drill core sample
- Rotary-sonic core sample
- Cutting sample
- Borehole geophysical log
- Soil boring
- ◇ Giddings probe hole
- ◇ Field site
- ◆ Textural analysis
- Gravity data
- Passive seismic sounding
- Seismic sounding

Unique Well Number	County	Wadena	SEBEKA	Quadrangle	235A	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD MINNESOTA STATUTES CHAPTER 1031	Entry Date	1989/04/17		
226188	Wadena	Sebeka	235A	Well Name	SEBEKA OLD 1	Update Date	2014/02/14			
Township Range		Dir Section		Subsection		Depth Drilled	Depth Completed	Date Completed		
137 35 W 34		C440DC		168 R		365 ft	168 ft	1989/04/17		
Field Located		Program		Location Method		Input Source	Minnesota Geological Survey	Universal Transverse Mercator (UTM) - NAD83 - Zone 15 - Meters		
USGS		USGS		Minnesota Geological Survey		Input Date	1990/01/01	UTM Easting (X)		
Agency		Agency		Agency		Agency	MOSS	UTM Northing (Y)		
Agency		Agency		Agency		Agency	MOSS	Geographic Study 1:24k to 1:100k		
Geological Material		Color	Hardness	From To	Thick To	Stratigraphy	Primary	Secondary	Minor	
DIRT AND CLAY		YELLOW	0	10	10	1385 1375	clay-yellow	soil	Clay	
GRAVEL			10	38	28	1375 1347	gravel (larger)	Gravel		
CLAY			38	58	20	1347 1327	clay-yellow	Clay		
CLAY		BLUE	58	141	83	1327 1244	clay-gray	Clay		
SAND			141	145	4	1244 1240	sand	sand		
CLAY		BLUE	145	179	34	1240 1200	clay-gray	Clay		
SAND			179	188	9	1200 1197	sand	sand		
CLAY		BLUE	188	348	160	1197 1037	clay-gray	Clay		
SAND ROCK		WHITE	348	359	11	1037 1029	weathering residuum uncg	regolith		
SAND ROCK		RED	359	363	4	1029 1022	weathering residuum uncg	regolith		
CLAY		GREEN	363	395	32	1022 990	weathering residuum uncg	regolith		
Static Water Level		20.00 ft		Land surface		Date measured		1940/00/00		
Pumping Level (below land surface)		ft		hrs pumping		p.p.m.				
Wellhead Completion		Pitless adapter manufacturer		Model		13.00 above grade				
Casing Protection		Agency (Environmental Wells and Borings ONLY)		Basement offset						
Grouting Information		Was grouted?		YES		NO		NOT SPECIFIED		
Nearest Known Source of Contamination		Well		Direction		Type				
Well disinfected upon completion?		YES		NO						
Pump		Has installed		Date installed						
Manufacturer's name		Model number		HP		Wells		p.p.m.		
Length of drop pipe		Material		Capacity		p.p.m.				
Abandoned Wells		Does property have any old or not sealed wells?		YES		NO				
Variance		Was a variance granted from the MBI for this well?		YES		NO				
Well Contractor Certification		United States Geological Survey		USGS		License of Reg No.				
First Bedrock UREG		Aquifer		Qual. Buried Artes. Aquifer		Depth to Bedrock		348.00 ft		
Last BWM UREG		Depth to Bedrock		348.00 ft		License of Reg No.				
REPORT		Printed on		4/8/2016		Date		HE.01255.07 (Rev. 2/05)		

Figure 1. Example of a WELL LOG record, showing all the information about the well as reported by the well driller.

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Figure 2. Example of a WELL STRATIGRAPHY record, which contains a geologist's interpretation of the geologic materials listed by the driller in the WELL LOG record (Fig. 1). Additional downhole information for this well (as noted in the Interpretation Method on the record above) controls the geologist's interpretation, which may not match the driller's description of the geologic material penetrated.



INDEX TO 7.5-MINUTE QUADRANGLES

