Midwest Technology Assistance Center
Groundwater Resource Assessment for Small Communities

Groundwater Availability
At
Cowden, Illinois
(Shelby County)

Project Overview
This project is an outgrowth of the Public Service Program of the Center for Groundwater Science (CGS) at the Illinois State Water Survey. For over 50 years, the CGS has provided groundwater information to any requesting individual, commercial facility or public water facility. Groundwater resource assessments have been an integral part of this public service and have been undertaken for thousands of individuals and facilities throughout its history. Community groundwater supplies that have been identified as potentially "deficient" are the targets for this project. The criterion used for determining community deficiency were; 1) Water Supply and Demand (operating time), 2) Aquifer Limitation, 3) Well Specific Capacity, and 4) Facility History. The Village of Cowden has been identified as a target community for groundwater assessment through this project.

Project Goal
To provide a resource tool of pertinent groundwater information to each target facility. This document describes a summary of historic information, current conditions and the potential for expansion of the water supply within 5 and 10 miles of Cowden.

Fayette Water Company (Fayette County)

The Village of Cowden (Facility Number 1730050) obtains its water from three active community water supply wells. Well Nos. 2, 3 and 4 (Illinois EPA Nos. 45186, 45187 and 01461, respectively) supply an average of 62,000 gallons per day (gpd) to 312 services or a population of 600.

Cowden was determined to be “Adequate” by the project criteria and this report serves as a summary of information should they need to increase their current supply.

Historic Information

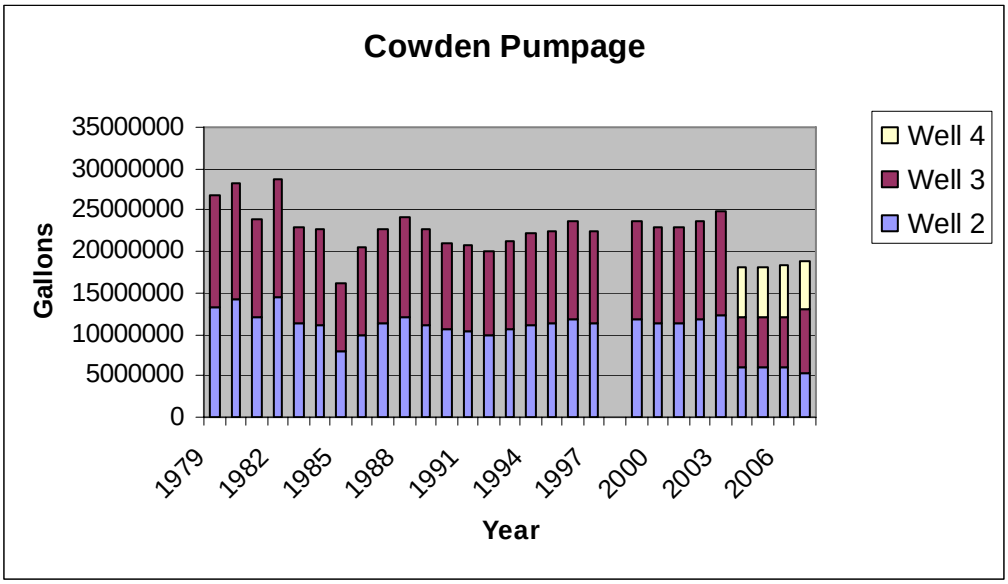
Background Well Information

Well No. 2
Finished in shallow sand and gravel deposits about 1 mile east of the village within the flood plain of the Kaskaskia River, located in Section 10, T.9N., R.3E., Shelby County. The well was drilled to a depth of 56 feet in 1944 and was tested at about 117 gpm upon completion. The well is rated at 117 gpm but is pumped at 105 gpm.

Well No. 3
Finished in shallow sand and gravel deposits about 1 mile east of the village within the flood plain of the Kaskaskia River, located in Section 10, T.9N., R.3E., Shelby County. The well was drilled to a depth of 52 feet in 1954 and was tested at about 100 gpm upon completion. The well is rated at 117 gpm but is pumped at 105 gpm.

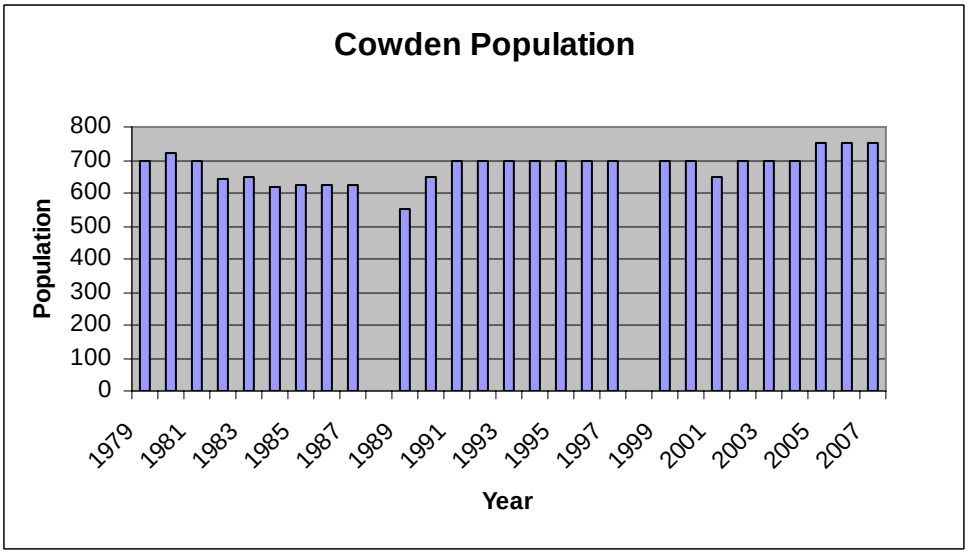
Well No. 4
Finished in shallow sand and gravel deposits about 1 mile east of the village within the flood plain of the Kaskaskia River, located in Section 10, T.9N., R.3E., Shelby County. The well was drilled to a depth of 47 feet in 2003 and was tested at about 125 gpm upon completion. The drawdown from a nonpumping water level of 12.48 feet was 9.09 feet after pumping for 24 hours. The observed specific capacity of the well was calculated as 13.8 gpm/ft. The well is rated at 125 gpm but is pumped at 105 gpm.

Background Pumpage Information



Source: ISWS Illinois Water Inventory Program

Historic Population Information



Source: ISWS Illinois Water Inventory Program

Regional Information

Resources within the Cowden area.

Domestic Groundwater Supplies

The available regional data indicate that groundwater for domestic and farm use in this part of Illinois is obtained from mainly large-diameter (approximately 3 feet) bored and small-diameter drilled wells finished in the unconsolidated materials above bedrock. The bored wells tap stringers or lenses of silt, sand, or gravel only a few inches thick contained in the unconsolidated materials above bedrock. The yield of this type of well is limited to a few hundred gallons per day and may be only barely adequate for normal household uses. The drilled wells tap variable, thin sand and gravel deposits throughout the area.

A few reported wells in the area have been drilled into the underlying Pennsylvanian bedrock formations. These wells are finished in thin sandstone and creviced limestone beds in the shallow bedrock. Upon completion, these wells were pumped at very low rates for short periods of time.

Municipal Groundwater Supplies

There is only one town within the Cowden area that has a major public water supply system similar to Cowden; the village of Herrick in Shelby County. The Fayette Water Company also has a municipal well field located near the Cowden area.

The Village of Herrick currently uses two wells located in Sections 25 and 26, T.9N., R.2E., Shelby county. The wells are finished in sand and gravel associated with Mitchell Creek at depths of 78 and 80 feet below land surface. Current information indicates these wells are pumped at rates around 50 gpm for the village needs.

The Fayette Water Company uses five wells all finished within the floodplain of the Kaskaskia River located in sections 31 and 32, T.8N., R.2.E., Fayette County. These well range in depth from 40 to 51 feet and have been pumped at rates from 175 to 385 gpm.

Figures 1 and 2 picture the ISWS Potential Yield maps for sand and gravel and bedrock aquifer in Illinois, respectively. The pertinent counties for Cowden are highlighted. Figure 1 indicates that sand and gravel deposits are variable throughout most of the Cowden area with the exception of the alluvial sand and gravel deposits to the west and east associated with the Kaskaskia River. The bedrock map (Figure 2) indicates poor availability of groundwater from the bedrock throughout the Cowden area. Figures 3 and 4 present the probability of occurrence of the sand and gravel and the water-yielding character of the

shallow bedrock for the Cowden area as depicted in the Illinois State Geologic Survey Circular 225, *Groundwater Geology in South-Central Illinois* (Selkregg, et al., 195).

Figure 3 indicates “Good to Excellent” conditions along the Kaskaskia River and “Fair to Good” variability in other parts of the county for sand and gravel deposit development. Figure 4 indicates only small supplies are available from the shallow bedrock units. The domestic well construction records verify these map outlooks.

Groundwater Availability Summary

The available information indicates that the sand and gravel deposits that Cowden currently uses in the Kaskaskia River bottoms are capable of supplying the current and future needs of the village. Water studies conducted by the Illinois State Water Survey for the Fayette Water Company suggested a yield of 1.5 mgd could be possible from two well fields within the Kaskaskia River bottoms. Should the need arise for additional wells, the sand and gravel deposits currently being used would be the best source provided proper spacing of any new wells be determined to minimize interference effects.

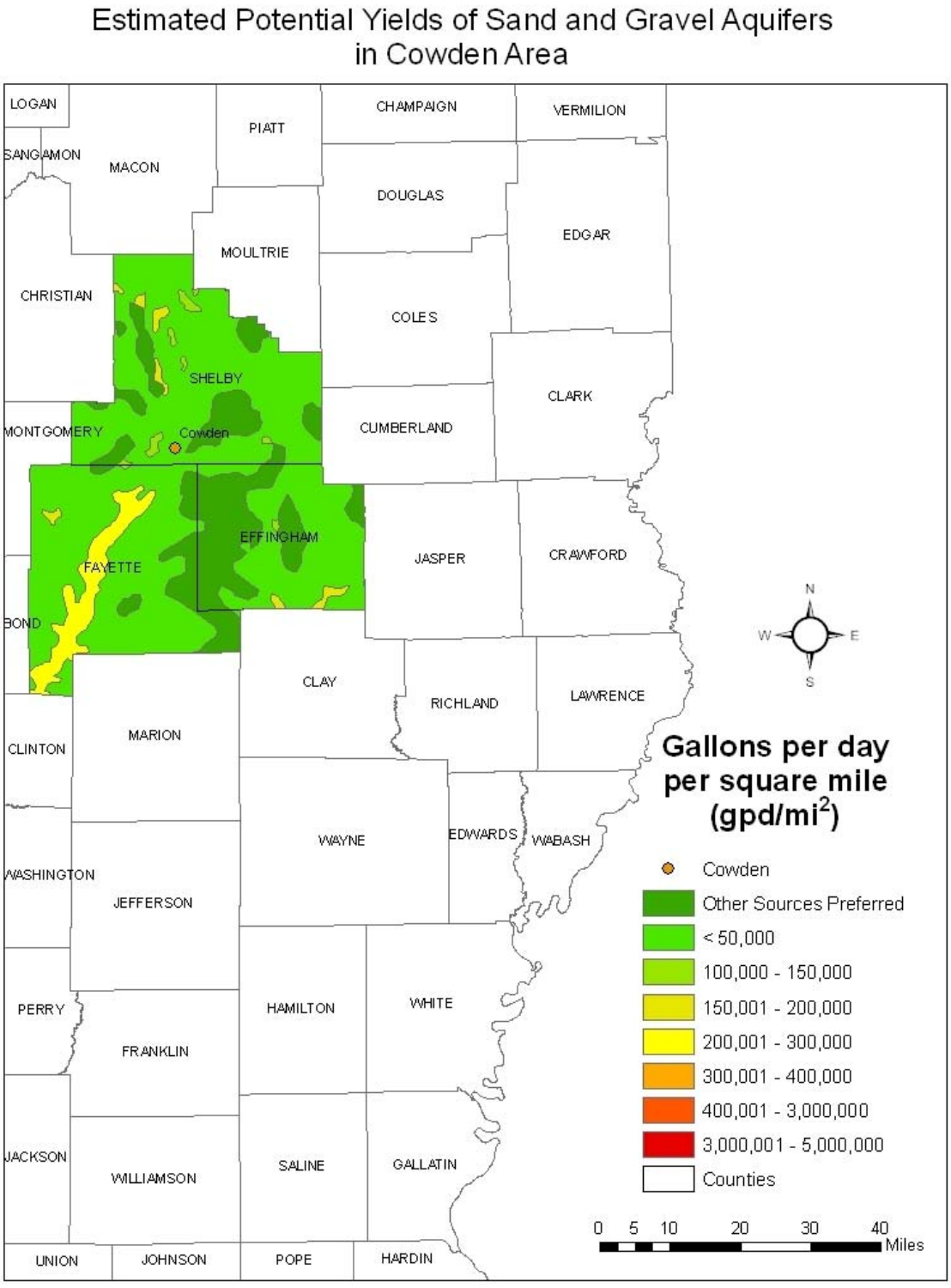

Estimated Potential Yields of Sand and Gravel Aquifers
in Cowden Area
LOGAN
SANGAMON
MACON
PIATT
CHAMPAIGN
VERMILION
DOUGLAS
EDGAR
MOULTRIE
CHRISTIAN
COLES
SHELBY
CLARK
MONTGOMERY
Cowden
CUMBERLAND
EFFINGHAM
FAYETTE
JASPER
CRAWFORD
BOND
CLAY
RICHLAND
LAWRENCE
CLINTON
MARION
WAYNE
EDWARDS
WABASH
WASHINGTON
JEFFERSON
PERRY
FRANKLIN
HAMILTON
WHITE
JACKSON
WILLIAMSON
SALINE
GALLATIN
UNION
JOHNSON
POPE
HARDIN
N
W
E
S
Gallons per day per square mile (gpd/mi2)
Cowden
Other Sources Preferred
< 50,000
100,000 - 150,000
150,001 - 200,000
200,001 - 300,000
300,001 - 400,000
400,001 - 3,000,000
3,000,001 - 5,000,000
Counties
0 5 10 20 30 40
Miles

Figure 1.

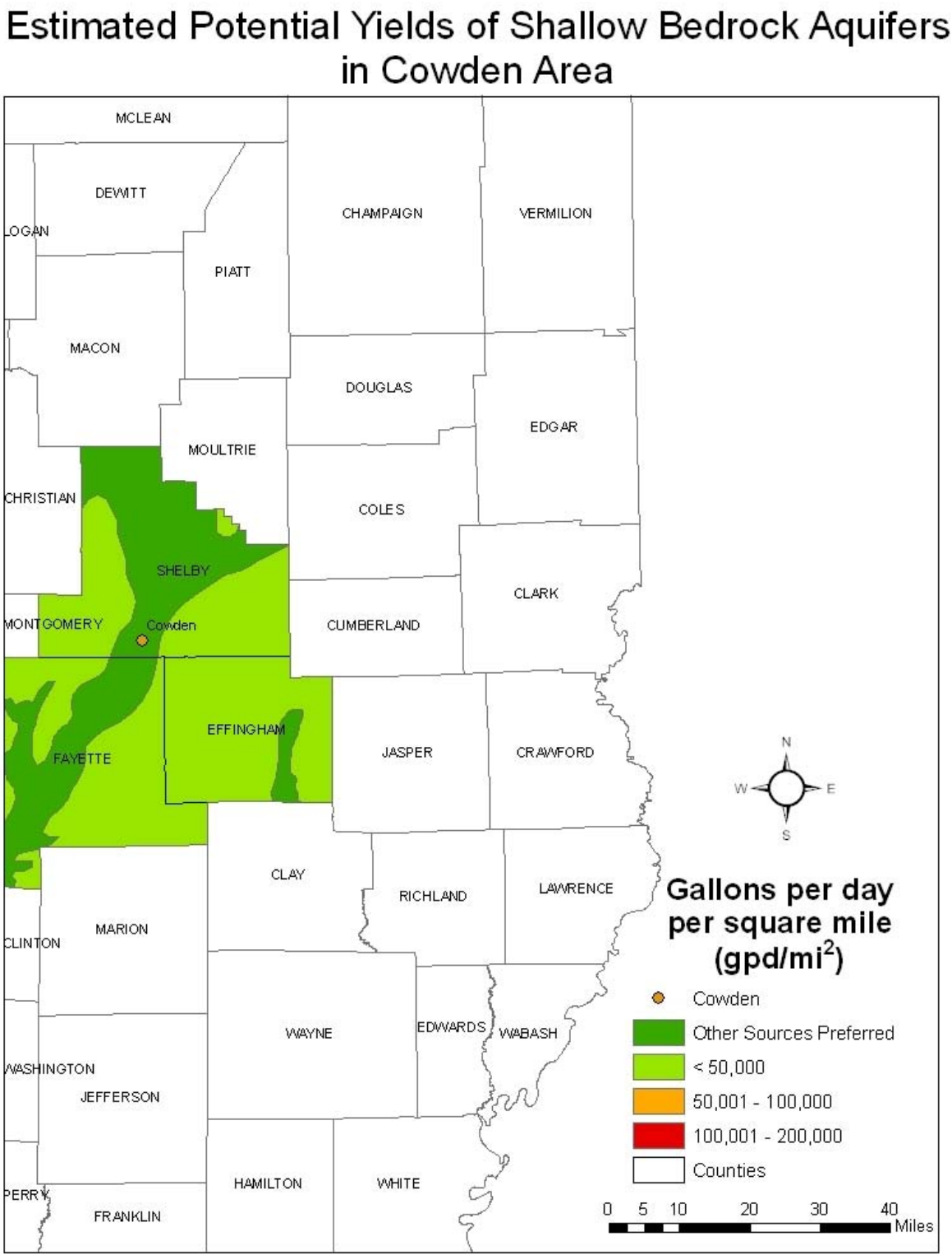

Estimated Potential Yields of Shallow Bedrock Aquifers in Cowden Area
MCLEAN
DEWITT
LOGAN
PIATT
CHAMPAIGN
VERMILION
MACON
DOUGLAS
EDGAR
MOULTRIE
CHRISTIAN
COLES
SHELBY
CLARK
MONTGOMERY
Cowden
CUMBERLAND
EFFINGHAM
FAYETTE
JASPER
CRAWFORD
N
W
E
S
CLAY
RICHLAND
LAWRENCE
MARION
CLINTON
Gallons per day per square mile (gpd/mi2)
Cowden
Other Sources Preferred
< 50,000
50,001 - 100,000
100,001 - 200,000
Counties
WAYNE
EDWARDS
WABASH
WASHINGTON
JEFFERSON
HAMILTON
WHITE
PERRY
FRANKLIN
0 5 10 20 30 40
Miles

Figure 2.

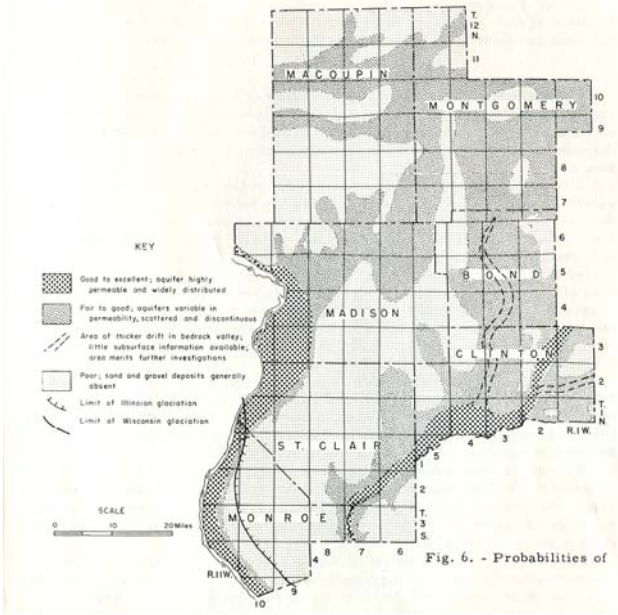


Fig. 6. - Probabilities of occurrence of sand and gravel aquifers.

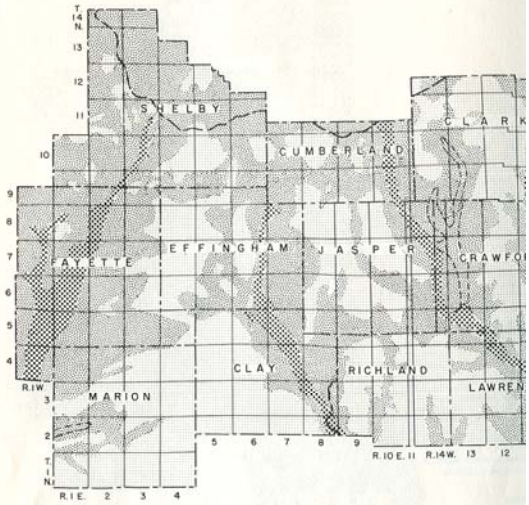


Figure 3.

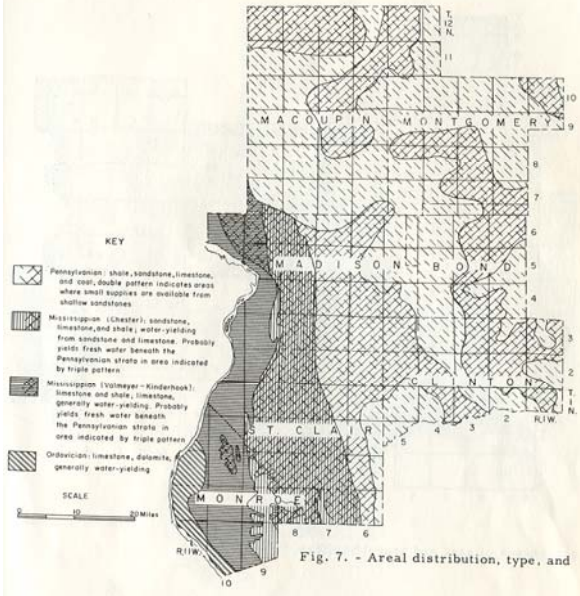


Fig. 7. - Areal distribution, type, and water-yielding character of upper bedrock formations.

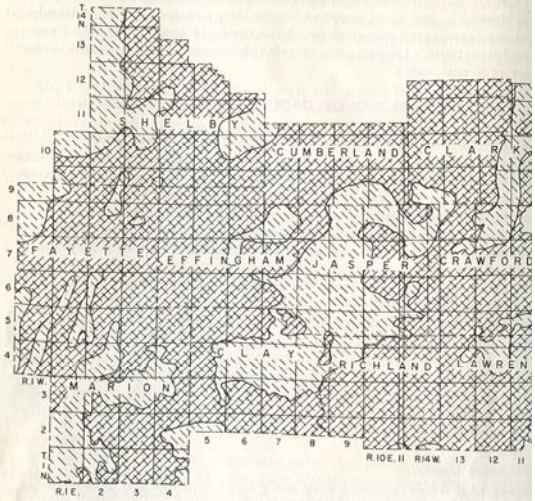


Figure 4.

References

Selkregg, L.F., W. A. Pryor, and J. Kempton. 1957. Groundwater Geology In South-Central Illinois, A preliminary Geologic Report. Illinois State Geological Survey Circular 225.

ISWS publications list for Cowden and surrounding areas.

EFFINGHAM

*1965	RI-53	Potential yield of aquifers in Embarras River Basin, Illinois. Walton-Csallany. Open File Report.
*1966	RI-55	Yields of wells in Pennsylvanian and Mississippian rocks in Illinois. Csallany. 42p.
1972	RI-70	Plans for meeting water requirements in the Kaskaskia River Basin, 1970-2020. Singh-Visocky-Lonnquist. 24p.
*1978	CR-209	Assessment of public groundwater supplies in Illinois. Visocky-Wehrmann- Kim-Ringler. 193p.
*1980	CR-237	Assessment of eighteen public groundwater supplies in Illinois. Wehrmann-Visocky-Burris-Ringler-Brower. 185p.
1992	COOP-14	Pilot Study: Agricultural chemicals in rural, private wells in Illinois. Schock-Mehnert-Caughey-Dreher-Dey-Wilson-Ray-Chou-Valkenburg-Gosar-Karny-Barnhardt-Black-Brown-Garcia. 84p.
1992	COOP-15	Characterization of the study areas for the Pilot Study: Agricultural chemicals in rural, private wells in Illinois. Barnhardt-Mehnert-Ray-Schock. 114p.

FAYETTE

*1965	RI-53	Potential yield of aquifers in Embarras River Basin, Illinois. Walton-Csallany. Open File Report.
1965	RS-48	Relationship between water use and population in the Embarras River Basin, Illinois. Csallany.

*1966 RI-55 Yields of wells in Pennsylvanian and Mississippian rocks in Illinois. Csallany. 42p.

*1969 RI-62 Groundwater resources of the buried Mahomet Bedrock Valley. Visocky-Schicht. 52p.

*1978 CR-196 Water supply alternatives for the city of Danville. Singh. 124p.

*1978 CR-199 Reconnaissance study of final cut impoundments. Gibb-Evans. 101p.

*1978 CR-209 Assessment of public groundwater supplies in Illinois. Visocky-Wehrmann-Kim- Ringler. 193p.

*1980 CR-237 Assessment of eighteen public groundwater supplies in Illinois. Wehrmann- Visocky-Burris-Ringler-Brower. 185p.

1982 COOP-8 Hydrogeologic evaluation of sand and gravel aquifers for municipal groundwater supplies in east-central Illinois. Kempton-Morse-Visocky. 59p.

1985 COOP-10 Geology, hydrology, and water quality of the Cambrian and Ordovician Systems in northern Illinois. Visocky-Sherrill-Cartwright. 136p.

1996 CR-592 Ground-Water Investigation in the Kaskaskia River Valley, Fayette County, Illinois. Sanderson.

SHELBY

*1966 RI-55 Yields of wells in Pennsylvanian and Mississippian rocks in Illinois. Csallany. 42p.

1967 C-92 Groundwater availability in Shelby County, Illinois. Sanderson. 37p.

1997 CR611 Delination of Time-Related Recharge Areas for the City of Shelbyville Well Fields. Anliker-Roadcap. 69p.

1972 RI-70 Plans for meeting water requirements in the Kaskaskia River Basin, 1970-2020. Singh-Visocky-Lonnquist. 24p.

*1978 CR-209 Assessment of public groundwater supplies in Illinois. Visocky-Wehrmann-Kim- Ringler. 193p.

1982	COOP-8	Hydrogeologic evaluation of sand and gravel aquifers for municipal groundwater supplies in east-central Illinois. Kempton-Morse-Visocky. 59p.
*1982	CR-299	A summary of information related to the comprehensive management of groundwater and surface water resources in the Sangamon River Basin, Illinois. O'Hearn-Williams. 145p.
1997	CR-611	Delineation of time-related recharge areas for the city of Shelbyville well fields. Anliker-Roadcap. 69p.