

Midwest Technology Assistance Center  
Groundwater Resource Assessment for Small Communities

**Groundwater Availability  
At  
Morrisonville, Illinois  
(Christian County)**

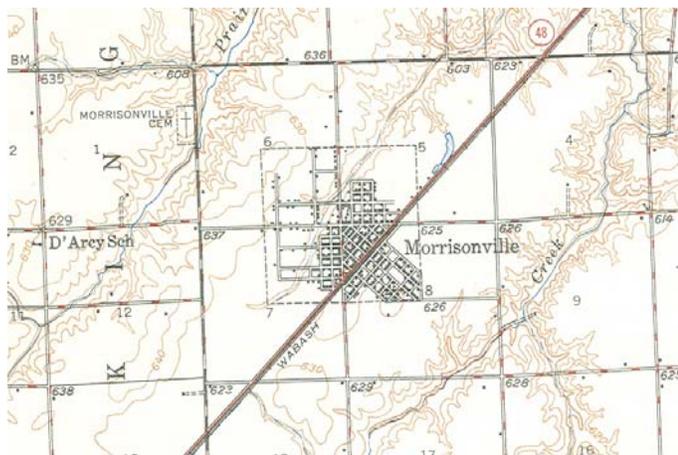
**Project Overview**

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.

**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 Morrisonville.

**Morrisonville  
(Christian County)**



The Village of Morrisonville (Facility No. 0210300) obtains its water from three active community water supply wells. Well Nos. 4, 5, and 6 (Illinois EPA Nos. 50236, 50237, and 50238, respectively) supply an average of 108,652 gallons per day (gpd) to 512 services or a population of 1,068.

Morrisonville was determined to be “Adequate” mainly because of the well field capacity for the required supply. This report summarized groundwater resources within this area should the village look to increase usage.

**Historic Information**

Background Well Information

Well No.4

Finished in sand and gravel deposits located in Section 8, T.11N., R.3W., Christian County. The well was drilled to a depth of 39 feet in 1944 and was pumped at 187 gallons per minute (gpm) for 7 hours, upon completion. The well experienced 11 feet of drawdown from a static water level of 5.5 feet.

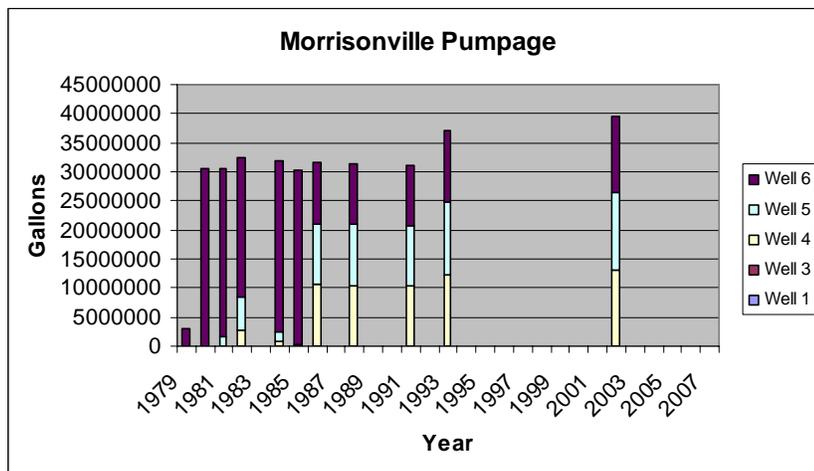
Well No.5

Finished in sand and gravel deposits located in Section 8, T.11N., R.3W., Christian County. The well was drilled to a depth of 41 feet in 1952 and was pumped at 200 gpm for 6 hours, upon completion. The well experienced 8.1 feet of drawdown from a static water level of 5.4 feet.

Well No.6

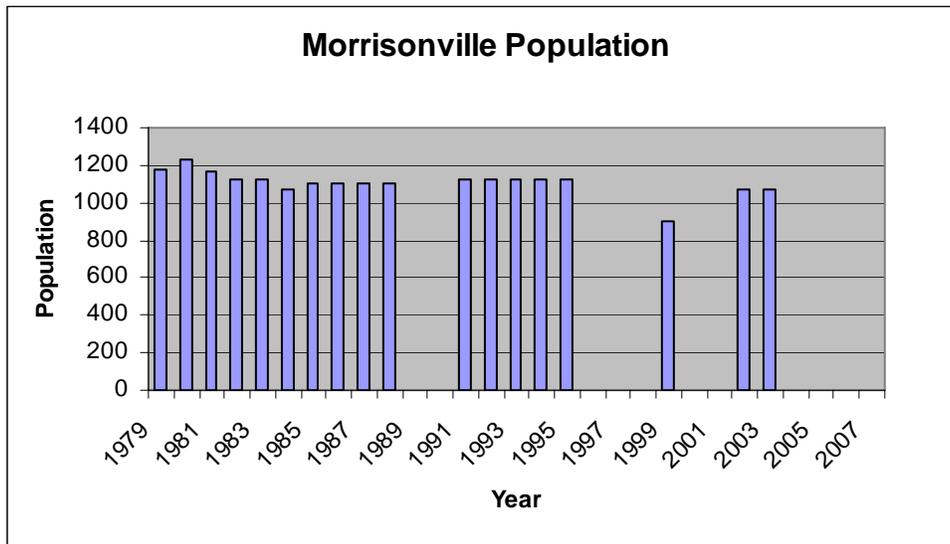
Finished in sand and gravel deposits located in Section 9, T.11N., R.3W., Christian County. The well was drilled to a depth of 45 feet in 1977 and was pumped at 201 gpm for 3 hours, upon completion. The well experienced 7.6 feet of drawdown from a static water level of 6.3 feet.

Background Pumpage Information



Source: ISWS Illinois Water Inventory Program

Historic Population Information



Source: ISWS Illinois Water Inventory Program

**Regional Information**

Resources within 5 miles of Harvel.

*Domestic Groundwater Supplies*

The available regional data indicate that groundwater for domestic and farm use in this part of Illinois is obtained mainly from small-diameter drilled and large-diameter (approximately 3 feet) bored wells finished in the unconsolidated materials above bedrock. The drilled wells are finished in narrow discontinuous sand and gravel deposits found throughout the area. 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.

A few reported wells in the area have been drilled into the underlying Pennsylvanian bedrock formations. These wells are finished in thin sandstone found within 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 five miles of Morrisonville; the Village of Palmer to the northeast in Christian County. The Village of Palmer uses two wells located in Section 35, T.12N., R.3W., Christian County. Their wells are finished in sand

and gravel deposits at depths of 76 and 85 feet below land surface. These wells reportedly are run at rates of around 70 gpm for their supply.

#### Resources with 10 miles of Morrisonville.

##### *Municipal Groundwater Supplies*

Because the Village of Morrisonville's wells are finished in what is termed the "Central Illinois Strip Aquifer," only the villages of Palmer, Harvel, and Raymond wells are detailed for this report. These towns all have wells finished in this aquifer and would be the only other wells of interest for future development for Morrisonville. All the other towns located within 10 miles of Morrisonville use sand and gravel wells that are very local and very limited to their surrounding areas.

The Village of Harvel uses two wells finished in the sand and gravel deposits of the "Central Illinois Strip Aquifer." These wells are both located in Section 34, T.11N., R.4W., Montgomery County and were drilled to depths of 38 and 35 feet. The wells are rated at 200 and 175 gpm but are pumped at a rate of about 150 gpm for their supply. The village alternates the usage of the wells.

The Village of Raymond located to the southwest of Morrisonville and Harvel, mainly uses one well (No. 5) for its supply and has Well No. 4 as an emergency well. These two wells are finished in sand and gravel at depths of 54 and 52 feet, and are located in Sections 17 and 8, T.10N., R.4W, Montgomery County, respectively. Well Nos. 4 and 5 are rated at about 140 gpm each. The village also has Well Nos. 2 and 3, both finished in sand and gravel at 39 and 36 feet, as backup for their supply.

Figures 1 and 2 picture the ISWS Potential Yield maps for sand and gravel and bedrock aquifer in Illinois, respectively. The pertinent counties for Morrisonville are highlighted. Figure 1 indicates that sand and gravel deposits are variable throughout most of the Morrisonville area with the exception of the "Central Illinois Strip Aquifer" that runs from the northeast to the southwest across this area. This aquifer is a good source of groundwater for domestic and municipal wells in this area and is detailed in Cooperative Groundwater Report 6, *Assessment of a Regional Aquifer in Central Illinois* (Burris, et. al. 1981).

The bedrock map (Figure 2) indicates poor availability of groundwater from the bedrock throughout the Morrisonville 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 Harvel area as depicted in the Illinois State Geologic Survey Circular 248, *Groundwater Geology in East-Central Illinois* (Selkregg, et al., 1958). Figure 3 indicates "Fair to Good," variable and discontinuous sand and gravel deposits and 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 the Village of Morrisonville currently uses are capable of providing groundwater to meet the village needs now and into the future. Morrisonville, along with Harvel, Palmer, and Raymond, all collect groundwater from a reliable strip aquifer located in this area. The aquifer runs from the northeast near the village of Macon, to the southwest near Morrisonville. Although this system is not very deep, it is highly productive and produces good quality groundwater. Figure 5 depicts this aquifer in this area along with municipalities that currently use it. Should they need to expand, the areas where their current wells reside would be the most logical site for further study. The distance between wells would be the critical factor so interference drawdown would be held to a minimum. Replacing wells next to any that fail would be recommended if no additional water is required. Cooperative Report 6 (Burriss, et.al. 1981) describes this aquifer in detail and should be used as a guide in any further development in this area.

## Estimated Potential Yields of Sand and Gravel Aquifers in Morrisonville Area

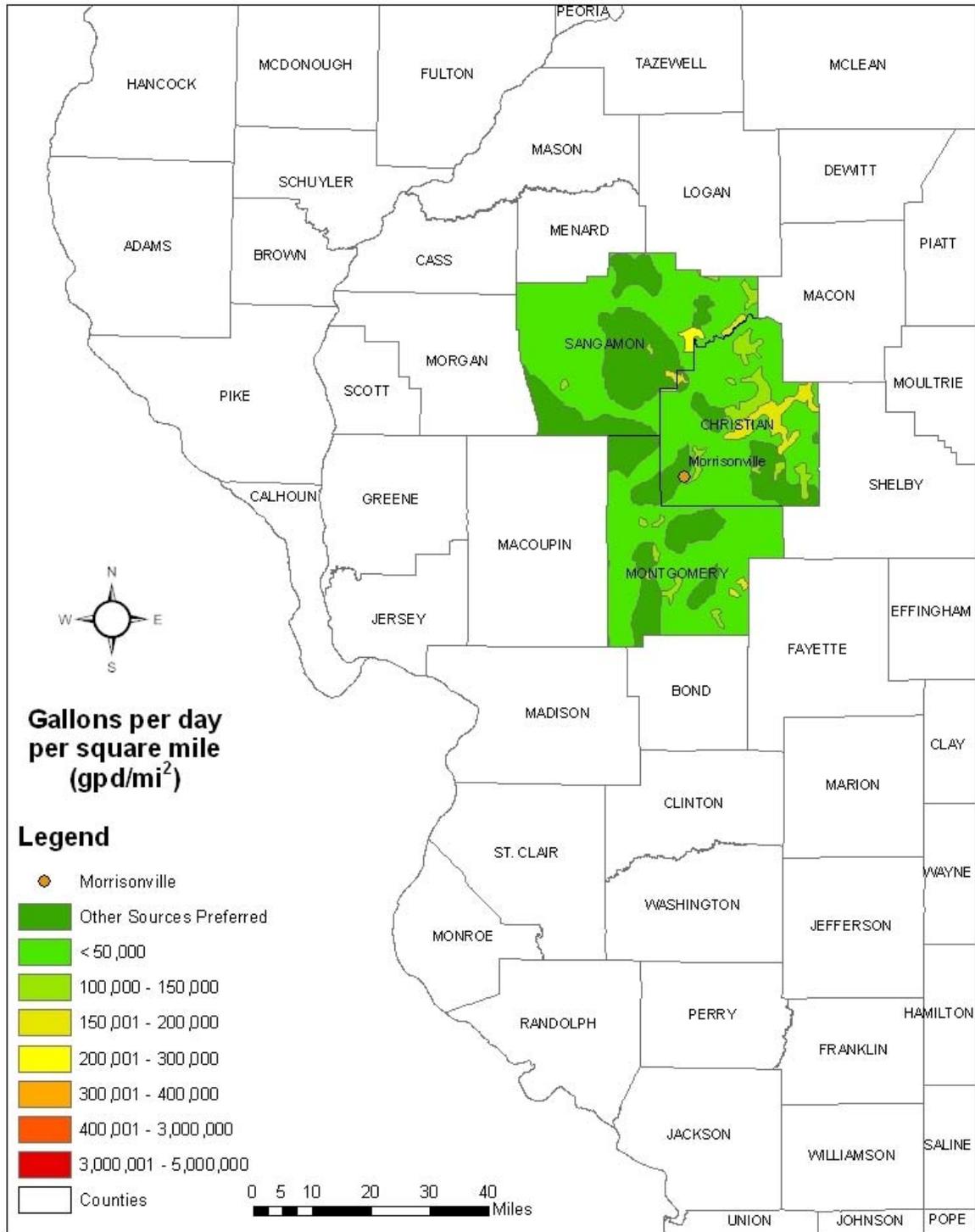


Figure 1.

## Estimated Potential Yields of Shallow Bedrock Aquifers in Morrisonville Area

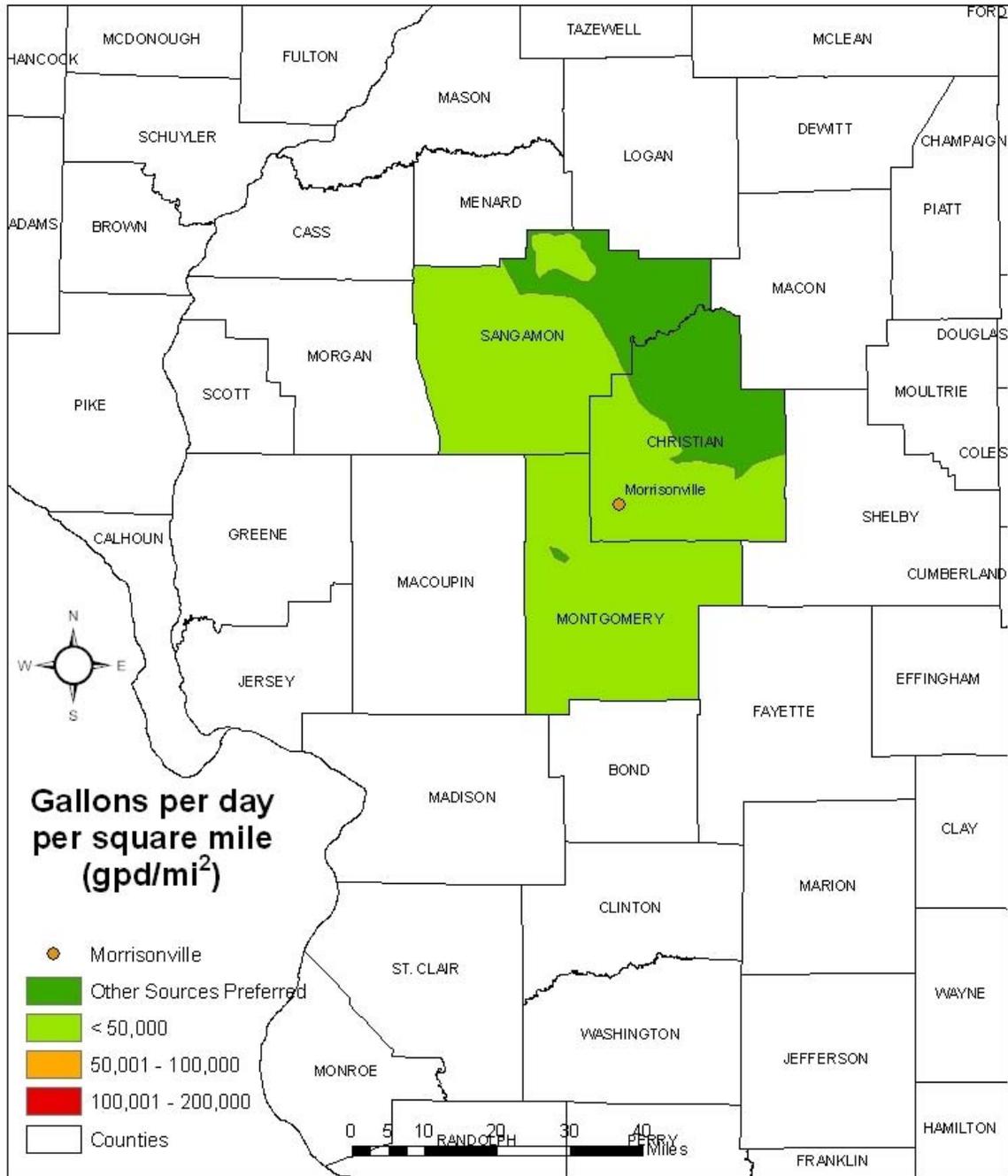


Figure 2.

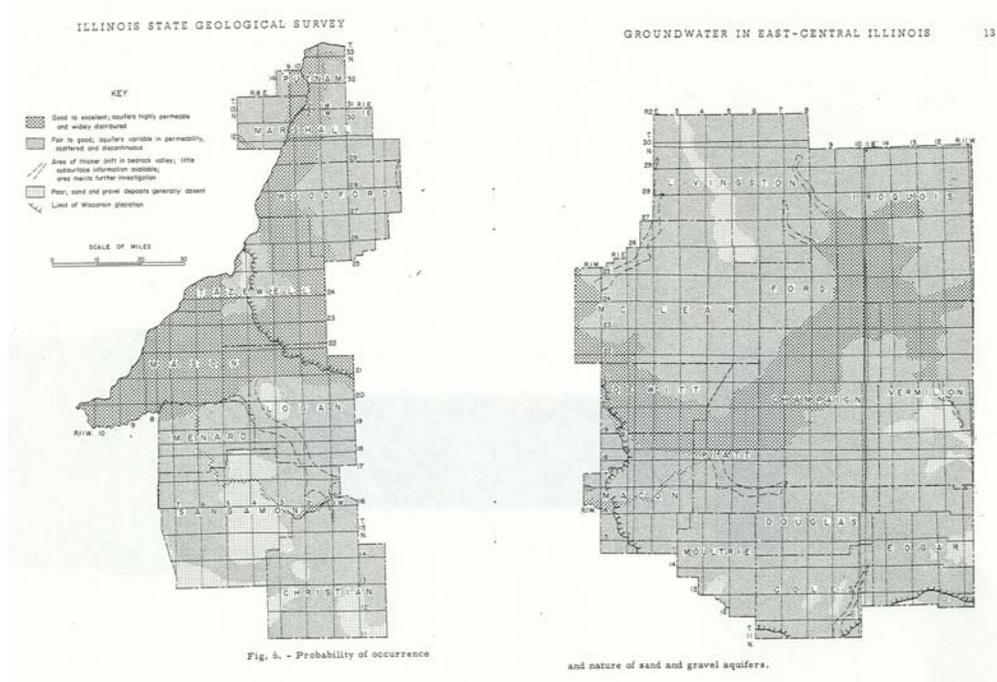


Figure 3.

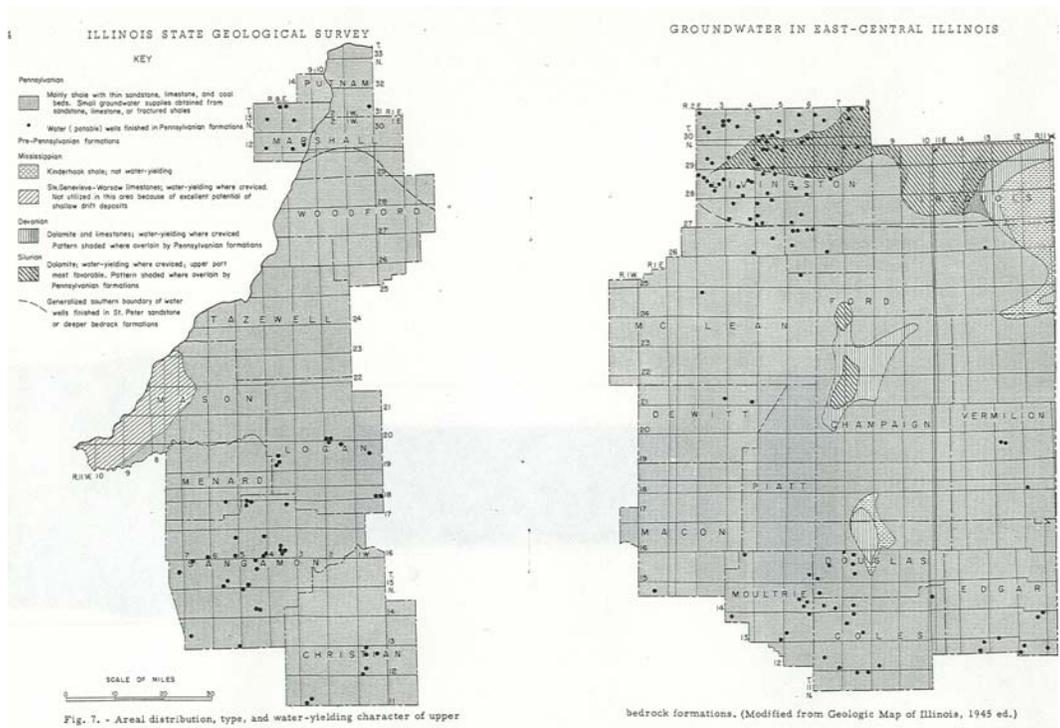


Figure 4.

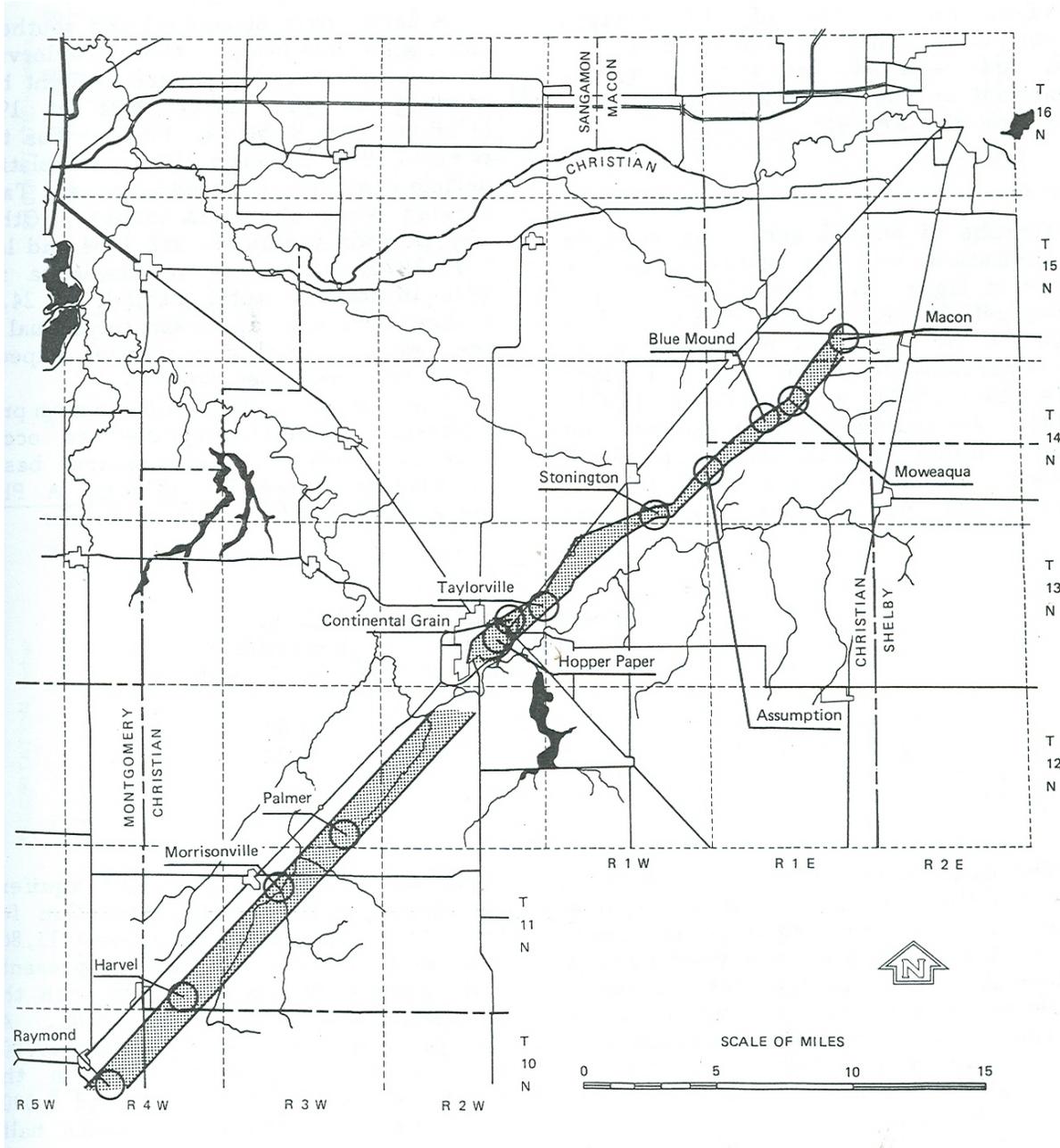


Figure 5. Municipality and well field locations for the Central Illinois Strip Aquifer. (Burriss, et.al. 1981)

## References

Burris, C.B., W.J. Morse, and T.G. Naymik. 1981. Assessment of a Regional Aquifer in Central Illinois. Illinois State Water Survey, Illinois State Geological Survey Cooperative Report 6.

Selkregg, L.F. and J. Kempton. 1958. Groundwater Geology in East-Central Illinois, A preliminary Geologic Report. Illinois State Geological Survey Circular 248.

### ISWS publications list for Morrisonville and surrounding areas.

\* = Publication is out of print.

\$ = Payment required.

## CHRISTIAN

\*1961 RI-41 Ground-water development in three areas of central Illinois. Walker-Walton. 43p.

\*1961 RS-17 Evaluating wells and aquifers by analytical methods. Walton-Walker.

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

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

1981 COOP-6 Assessment of a regional aquifer in central Illinois. Burris-Morse-Naymik. 77p.

\*1981 COOP-7 Procedures for the collection of representative water quality data from monitoring wells. Gibb-Schuller-Griffin. 66p.

\*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.

## **MONTGOMERY**

- \*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.
- 1981 COOP-6 Assessment of a regional aquifer in central Illinois. Burris-Morse-Naymik. 77p.
- \*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.

## **SANGAMON**

- \*1969 RI-62 Groundwater resources of the buried Mahomet Bedrock Valley. Visocky-Schicht. 52p.
- \*1980 CR-237 Assessment of eighteen public groundwater supplies in Illinois. Wehrmann-Visocky-Burris-Ringler-Brower. 185p.
- \*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.
- 1998 CR-627 Potential ground-water resources for Springfield, Illinois. Anliker-Woller. 197p.