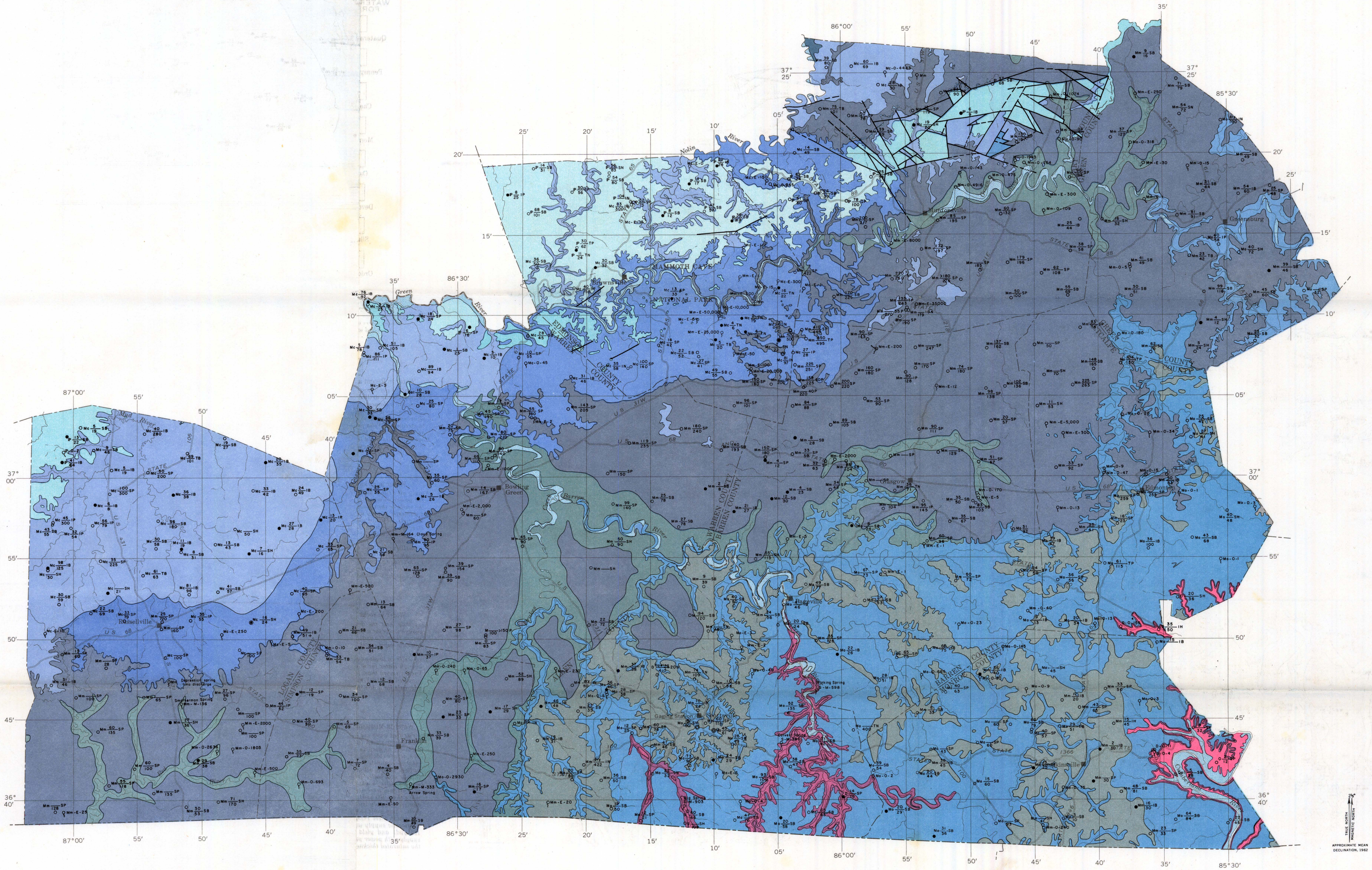
PREPARED IN COOPERATION WITH THE COMMONWEALTH OF KENTUCKY
THE DEPARTMENT OF ECONOMIC DEVELOPMENT
AND THE KENTUCKY GEOLOGICAL SURVEY, UNIVERSITY OF KENTUCKY



WATER-BEARING FORMATION

Qal — Quaternary alluvium

CARBONIFEROUS:

IP — Pennsylvanian age

MISSISSIPPIAN:

Mc — Chester age

Mm — Meramec age

Mo — Osage age

D — Devonian age

S — Silurian age

O — Ordovician age

Contact

Fault
Dashed where approximately located; dotted where concealed

EXPLANATION

Water in Recent and Pleistocene alluvium

Some water is obtained from fine sand, silt, and clay, but most wells drilled in these materials are inadequate for a domestic supply with bucket or bailer. Coarse sand and gravel may be encountered in the alluvium where rocks of Pennsylvanian age are close to streams. Wells penetrating these deposits yield as much as about 50 gpm (gallons per minute).

Most dug wells yield less than 100 gpd (gallons per day) and are inadequate for a domestic supply with bucket or bailer.

1 — Water in rocks of Pennsylvanian age

Nearly all drilled wells in the upland are inadequate for power pumps (less than 500 gpd). About half the wells in the upland do not yield enough water for a domestic supply with bailer or bucket (less than 100 gpd). Drilled wells in lowland areas bordering streams generally yield enough water for a domestic supply with bailer or bucket, and a few yield enough for power pumps (more than 500 gpd).

Dug wells in lowland areas bordering streams yield enough water for a domestic supply with bailer or bucket (more than 500 gpd) if adequate storage is provided for peak needs. Very few dug wells are adequate for a domestic supply with power pump.

2 — Water in rocks of Pennsylvanian age

Less than half the drilled wells in this area yield enough water for a domestic supply with power pump (more than 500 gpd), but most are adequate for a domestic supply with bailer or bucket (more than 100 gpd).

Dug wells in lowland areas bordering streams yield enough water for a domestic supply with bailer or bucket (more than 100 gpd) if adequate storage is provided for peak needs. Very few dug wells are adequate for a domestic supply with power pump.

1 — Water in Mississippian rocks of Chester age

Most drilled wells are adequate for a domestic supply with power pump (more than 500 gpd). Adequate wells are as deep as 500 feet. Yields of as much as 50 gpm are obtained from wells that penetrate large solution channels in the limestone of the Girken formation. Nearly all wells are adequate for a domestic supply with bailer or bucket (more than 100 gpd).

Most dug wells in which water level is close to perennial stream level are adequate for bailer or bucket more than 100 gpd), and many are adequate for a domestic supply with power pump (more than 500 gpd). Dug wells in the Big Clifty sandstone, on the Mammoth Cave Plateau, are generally adequate for a domestic supply with bailer or bucket (more than 100 gpd) and yield enough water for a domestic supply with power pump (more than 500 gpd) where the saturated thickness is large.

A spring horizon is present at the shale-limestone contact of the Hardinsburg sandstone and the Glen Dean limestone, and a second conspicuous horizon occurs at the base of the Big Clifty sandstone. Flows are as much as 100 gpm. Seepage springs occur at other horizons, but most are seasonal.

A few large springs occur near the Chester-Meramec contact. The lower Chester limestone is lithologically similar to the Meramec, and solution openings are well formed in places. Flows are as much as 1,000 gpm.

2 — Water in Mississippian rocks of Chester age

More than half the drilled wells are inadequate for a domestic supply with bucket or bailer (less than 100 gpd). A few wells yield enough for a domestic supply with power pump (more than 500 gpd) from depths of 150 feet or more. Most shallow drilled wells are inadequate for a domestic supply (less than 100 gpd).

Most dug wells are inadequate for a domestic supply (less than 100 gpd). An adequate domestic supply with bucket or bailer may be obtained in some places close to streams if water bodies in sandstone formations are intercepted. Most wells in the Leitchfield formation are inadequate for domestic use (less than 100 gpd).

A minor spring horizon is present at the base of the Big Clifty sandstone and at the contact of the Hardinsburg sandstone and the Glen Dean limestone. Flows are as much as 50 gpm. Seepage springs occur at other horizons but most are seasonal.

1 — Water in Mississippian rocks of Meramec age

More than three-fourths of the drilled wells in this area yield enough water for a domestic supply with a power pump (more than 500 gpd). Very few wells are inadequate for domestic use (less than 100 gpd). Wells that penetrate large solution channels in limestone yield more than 5 gpm, and some yield more than 50 gpm.

Dug wells are inadequate for a domestic supply (less than 100 gpd) except where water levels are close to perennial streams levels.

Springs are present where there are minor surface streams. Flows are as much as 500 gpm. Many of the springs are of the depression type and yield more than 100 gpm when pumped.

2 — Water in Mississippian rocks of Meramec age

Springs with low flows ranging from less than 10 gpm to about 1,500 gpm occur at or near stream level. Maximum flows range from less than 100 gpm to more than 100,000 gpm. Minimum flows generally occur in early fall, maximum flows in late winter. A few drilled wells in this area that intercept major solution openings in limestone yield as much as the flow of the springs from these openings, but most wells are inadequate for domestic use (less than 100 gpd).

Dug wells are inadequate for a domestic supply (less than 100 gpd) except in lowland areas bordering streams.

3 — Water in Mississippian rocks of Meramec age

More than half the drilled wells in this area are inadequate for a domestic supply with a bailer and bucket (less than 100 gpd). Very few wells yield enough water for a domestic supply with power pump (more than 500 gpd).

Nearly all dug wells are inadequate for a domestic supply (less than 100 gpd).

Small springs and wet-weather seeps occur near the base of the Warsaw limestone. Flows are as much as 100 gpm, but most are less than 2 gpm.

1 — Water in Mississippian rocks of Osage age

Most drilled wells are adequate for a domestic supply with bailer or bucket (more than 100 gpd). A few wells in lowland areas bordering streams will yield enough for a domestic supply with power pump (more than 500 gpd). Most wells obtain water from fractures and small solution openings in limestone. Where large quantities of shale or siltstone are penetrated, yields will be lower.

Most dug wells in lowland areas bordering streams are adequate for a domestic supply with bailer or bucket (more than 100 gpd).

2 — Water in Mississippian rocks of Osage age

Yields of about half the drilled wells are adequate for a domestic supply with bailer or bucket (more than 100 gpd). A few wells in lowland areas bordering streams yield enough for a domestic supply with power pump (more than 500 gpd). Most wells penetrate perched water bodies of small areal extent in limestone at a shale contact. In some wells water from these perched water bodies migrates below any openings in the wells during rainless periods. These wells are then dry until rainfall reestablishes a perched water body.

Most dug wells obtain water from the contact of mantle and bedrock or from shallow perched water bodies in the bedrock. These wells usually go dry during extended dry periods in late summer and fall.

There are numerous small springs and seeps that discharge from the Osage. Most discharge from small solution openings in limestone and are supported by shale layers. Flows are as much as 20 gpm, but most have minimum flows of less than 1 gpm.

Water in rocks of Mississippian and Devonian age

Nearly all drilled wells in the Chattanooga shale are inadequate for domestic use with bailer or bucket (less than 100 gpd). Where limestone is penetrated, wells may be adequate for domestic use with bucket or bailer (more than 100 gpd) in lowland areas bordering streams.

Nearly all dug wells are inadequate for domestic use with bailer or bucket (less than 100 gpd).

Seepage springs are present along much of the area in which the Chattanooga shale crops out. Flows are generally less than 1 gpm, and most dry up during late summer and fall.

Water in rocks of Silurian age

Drilled wells in lowland areas bordering streams yield enough water for a domestic supply with power pump from large solution channels (more than 500 gpd). Where solution channels are not penetrated at shallow depth, wells will yield sulfurous or saline water. Upland wells that tap water in the Silurian rocks under the Chattanooga shale generally yield brines.

Yields of dug wells are similar to those of drilled wells, but generally are less dependable because of the small saturated thickness.

A major spring horizon is present along Barren River and its tributaries in southern Barren and Allen Counties, where Silurian rocks crop out near stream level. Flows may exceed 20,000 gpm. Variability of flow of most of the springs is relatively slight.

Water in rocks of Ordovician age

Drilled wells in lowland areas near the Cumberland River yield enough water for a domestic supply with a power pump (more than 500 gpd). In tributary valleys, most wells are dry.

Dug wells are generally inadequate for a domestic supply with a bucket or bailer (less than 100 gpd).

Yields from fault zones generally are greater than shown by the availability pattern; however, some wells yield much less than is shown by the pattern.

○ Drilled well

◎ Drilled observation well

● Dug well

⊙ Dug observation well

$Mm \frac{25}{59}$ 60 P
- 25 — Depth to water below land surface, in feet
- P — Type of lift
- 60 — Yield of well
- 59 — Depth of well below land surface, in feet
- Mm — Water-bearing formation

TYPE OF LIFT

- B Bailer or bucket
- H Hand force pump
- P Power pump
- N No pump, bucket, or bailer

YIELD

- 60 Gallons per minute, where known
- S Satisfactory supply for domestic use
- I Inadequate supply for domestic use
- T Yield not determined
- SB, SH Minimum yield of well reported 100 gallons per day
- SP Minimum yield of well reported 500 gallons per day
- IB, IH, IP Will not yield a minimum supply with type of lift installed

Spring

Mm–E–3000
- Mm — Formation
- 3000 — Yield
- E — Method used to determine yield figure

METHOD USED TO DETERMINE YIELD

- E Estimated on basis of one observation
- M Measured with pygmy meter or flume more than one time. Minimum measured flow shown.
- O Measured with pygmy meter or flume one time. Observed measured flow shown

YIELD

5000 Gallons of flow per minute

Base maps are county highway maps and adjacent county groups may not match

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—10414

AVAILABILITY OF GROUND WATER IN ALLEN, BARREN, EDMONSON, GREEN, HART, LOGAN, METCALFE, MONROE, SIMPSON, AND WARREN COUNTIES, KENTUCKY

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