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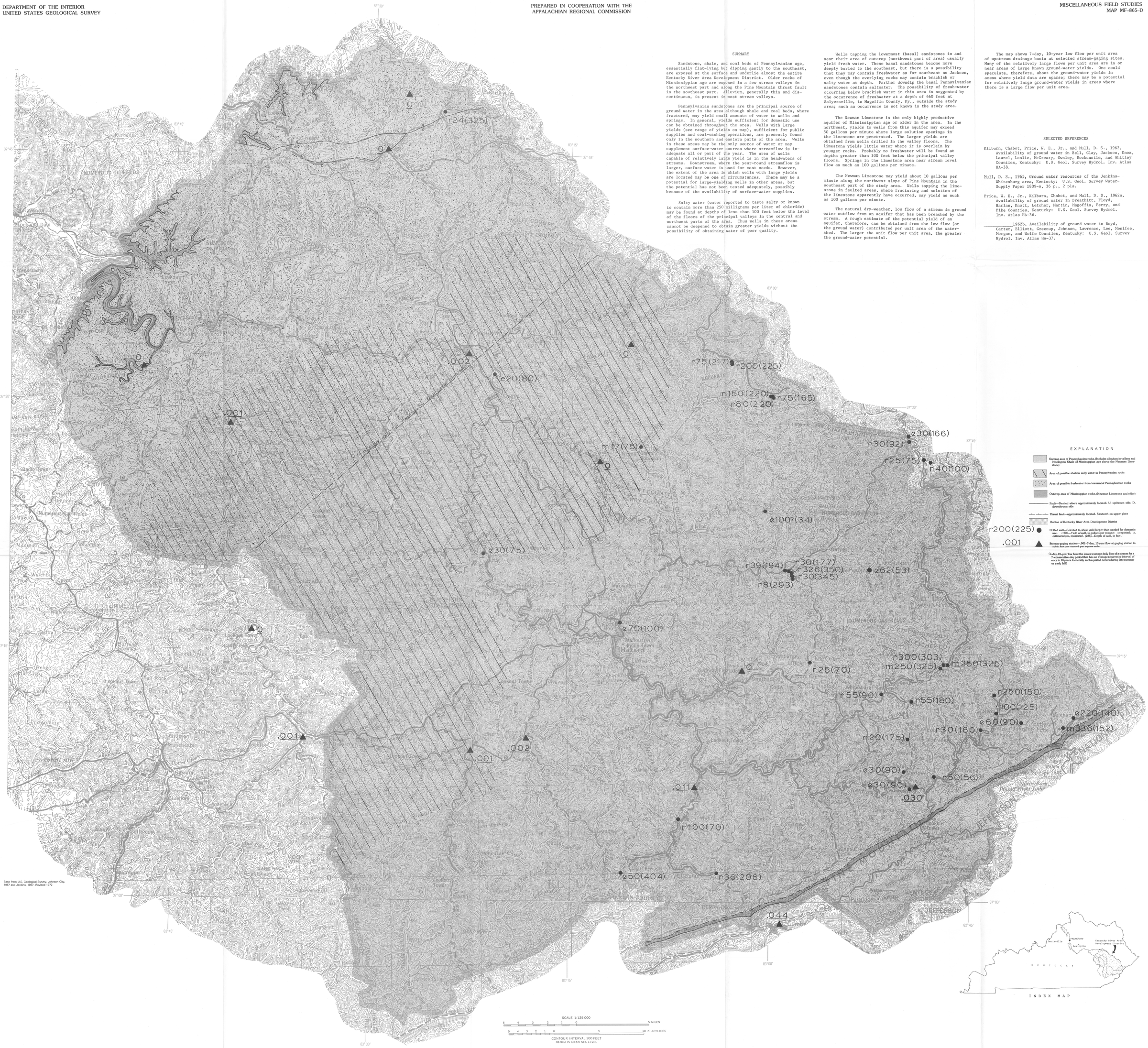

MAP SHOWING AVAILABILITY OF GROUND WATER IN KENTUCKY RIVER AREA DEVELOPMENT DISTRICT, KENTUCKY

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1978

SUMMARY

Sandstone, shale, and coal beds of Pennsylvanian age, essentially flat-lying but dipping gently to the southeast, are exposed at the surface and underlie almost the entire Kentucky River Area Development District. Older rocks of Mississippian age are exposed in a few stream valleys in the northwest part and along the Pine Mountain thrust fault in the southeast part. Alluvium, generally thin and discontinuous, is present in most stream valleys.

Pennsylvanian sandstones are the principal source of ground water in the area although shale and coal beds, where fractured, may yield small amounts of water to wells and springs. In general, yields sufficient for domestic use can be obtained throughout the area. Wells with large yields (see range of yields on map), sufficient for public supplies and coal-washing operations, are presently found only in the southern and eastern parts of the area. Wells in these areas may be the only source of water or may supplement surface-water sources where streamflow is inadequate all or part of the year. The area of wells capable of relatively large yield is in the headwaters of streams. Downstream, where the year-round streamflow is larger, surface water is used for most needs. However, the extent of the area in which wells with large yields are located may be one of circumstances. There may be a potential for large-yielding wells in other areas, but the potential has not been tested adequately, possibly because of the availability of surface-water supplies.

Salty water (water reported to taste salty or known to contain more than 250 milligrams per liter of chloride) may be found at depths of less than 100 feet below the level of the floors of the principal valleys in the central and northwest parts of the area. Thus wells in these areas cannot be deepened to obtain greater yields without the possibility of obtaining water of poor quality.

Wells tapping the lowermost (basal) sandstones in and near their area of outcrop (northwest part of area) usually yield fresh water. These basal sandstones become more deeply buried to the southeast, but there is a possibility that they may contain freshwater as far southeast as Jackson, even though the overlying rocks may contain brackish or salty water at depth. Farther downdip the basal Pennsylvanian sandstones contain saltwater. The possibility of fresh-water occurring below brackish water in this area is suggested by the occurrence of freshwater at a depth of 660 feet at Salyersville, in Magoffin County, Ky., outside the study area; such an occurrence is not known in the study area.

The Newman Limestone is the only highly productive aquifer of Mississippian age or older in the area. In the northwest, yields to wells from this aquifer may exceed 50 gallons per minute where large solution openings in the limestone are penetrated. The larger yields are obtained from wells drilled in the valley floors. The limestone yields little water where it is overlain by younger rocks. Probably no freshwater will be found at depths greater than 100 feet below the principal valley floors. Springs in the limestone area near stream level flow as much as 100 gallons per minute.

The Newman Limestone may yield about 10 gallons per minute along the northwest slope of Pine Mountain in the southeast part of the study area. Wells tapping the limestone in faulted areas, where fracturing and solution of the limestone apparently have occurred, may yield as much as 100 gallons per minute.

The natural dry-weather, low flow of a stream is ground water outflow from an aquifer that has been breached by the stream. A rough estimate of the potential yield of an aquifer, therefore, can be obtained from the low flow (or the ground water) contributed per unit area of the watershed. The larger the unit flow per unit area, the greater the ground-water potential.

The map shows 7-day, 10-year low flow per unit area of upstream drainage basin at selected stream-gaging sites. Many of the relatively large flows per unit area are in or near areas of large known ground-water yields. One could speculate, therefore, about the ground-water yields in areas where yield data are sparse; there may be a potential for relatively large ground-water yields in areas where there is a large flow per unit area.

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INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1978—L78078

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