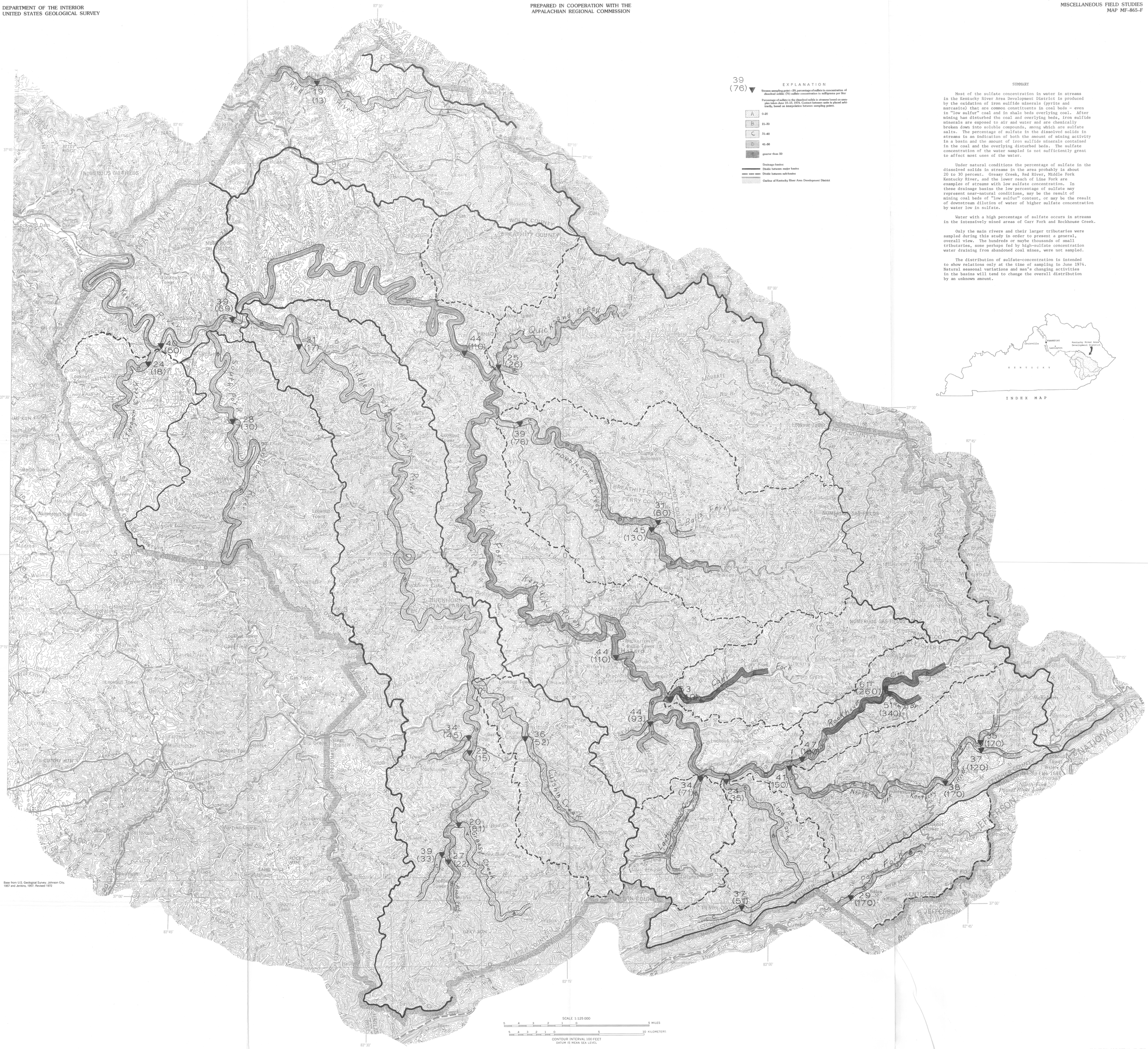
PREPARED IN COOPERATION WITH THE
APPALACHIAN REGIONAL COMMISSION






Base from U.S. Geological Survey, Johnson City, 1957 and Jenkins, 1957. Revised 1972

## SUMMARY

Most of the sulfate concentration in water in streams in the Kentucky River Area Development District is produced by the oxidation of iron sulfide minerals (pyrite and marcasite) that are common constituents in coal beds - even in "low sulfur" coal and in shale beds overlying coal. After mining has disturbed the coal and overlying beds, iron sulfide minerals are exposed to air and water and are chemically broken down into soluble compounds, among which are sulfate salts. The percentage of sulfate in the dissolved solids in streams is an indication of both the amount of mining activity in a basin and the amount of iron sulfide minerals contained in the coal and the overlying disturbed beds. The sulfate concentration of the water sampled is not sufficiently great to affect most uses of the water.

Under natural conditions the percentage of sulfate in the dissolved solids in streams in the area probably is about 20 to 30 percent. Greasy Creek, Red River, Middle Fork Kentucky River, and the lower reach of Line Fork are examples of streams with low sulfate concentration. In these drainage basins the low percentage of sulfate may represent near-natural conditions, may be the result of mining coal beds of "low sulfur" content, or may be the result of downstream dilution of water of higher sulfate concentration by water low in sulfate.

Water with a high percentage of sulfate occurs in streams in the intensively mined areas of Carr Fork and Rockhouse Creek.

Only the main rivers and their larger tributaries were sampled during this study in order to present a general, overall view. The hundreds or maybe thousands of small tributaries, some perhaps fed by high-sulfate concentration water draining from abandoned coal mines, were not sampled.

The distribution of sulfate-concentration is intended to show relations only at the time of sampling in June 1974. Natural seasonal variations and man's changing activities in the basins will tend to change the overall distribution by an unknown amount.

# MAP SHOWING SULFATE IN SELECTED STREAMS IN KENTUCKY RIVER AREA DEVELOPMENT DISTRICT, KENTUCKY

By
R. W. Davis

1978

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1976—L79460

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202