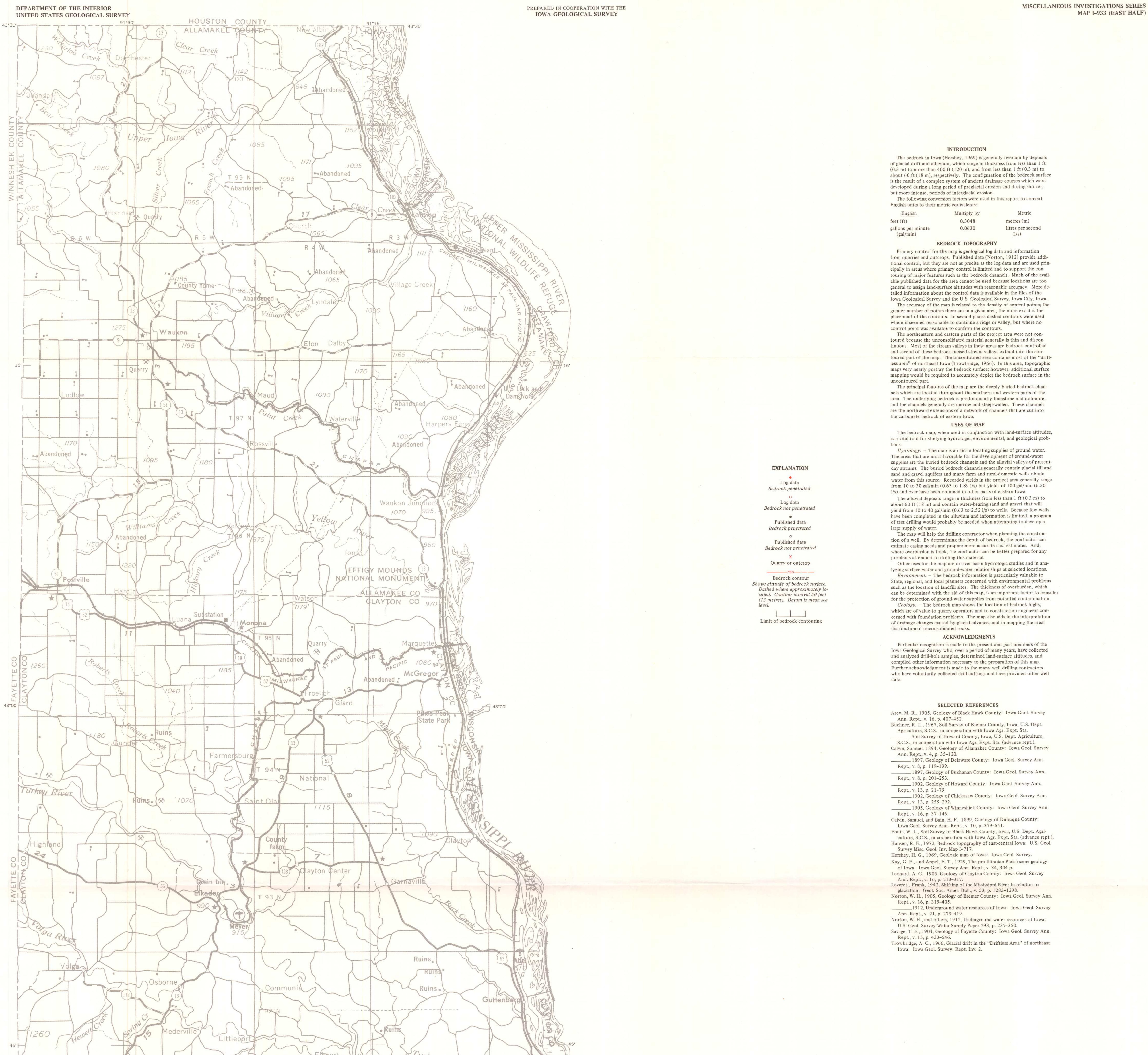
PREPARED IN COOPERATION WITH THE
IOWA GEOLOGICAL SURVEY



Base from U.S. Geological Survey 1:250,000

SCALE 1:125 000

2 0 2 4 6 8 10 MILES

2 0 2 4 6 8 10 KILOMETRES

Interior—Geological Survey, Reston, Va.—1975

INTRODUCTION

The bedrock in Iowa (Hershey, 1969) is generally overlain by deposits of glacial drift and alluvium, which range in thickness from less than 1 ft (0.3 m) to more than 400 ft (120 m), and from less than 1 ft (0.3 m) to about 60 ft (18 m), respectively. The configuration of the bedrock surface is the result of a complex system of ancient drainage courses which were developed during a long period of preglacial erosion and during shorter, but more intense, periods of interglacial erosion.

The following conversion factors were used in this report to convert English units to their metric equivalents:

English	Multiply by	Metric
feet (ft)	0.3048	metres (m)
gallons per minute (gal/min)	0.0630	litres per second (l/s)

BEDROCK TOPOGRAPHY

Primary control for the map is geological log data and information from quarries and outcrops. Published data (Norton, 1912) provide additional control, but they are not as precise as the log data and are used principally in areas where primary control is limited and to support the contouring of major features such as the bedrock channels. Much of the available published data for the area cannot be used because locations are too general to assign land-surface altitudes with reasonable accuracy. More detailed information about the control data is available in the files of the Iowa Geological Survey and the U.S. Geological Survey, Iowa City, Iowa.

The accuracy of the map is related to the density of control points; the greater number of points there are in a given area, the more exact is the placement of the contours. In several places dashed contours were used where it seemed reasonable to continue a ridge or valley, but where no control point was available to confirm the contours.

The northeastern and eastern parts of the project area were not contoured because the unconsolidated material generally is thin and discontinuous. Most of the stream valleys in these areas are bedrock controlled and several of these bedrock-incised stream valleys extend into the contoured part of the map. The uncontoured area contains most of the "driftless area" of northeast Iowa (Trowbridge, 1966). In this area, topographic maps very nearly portray the bedrock surface; however, additional surface mapping would be required to accurately depict the bedrock surface in the uncontoured part.

The principal features of the map are the deeply buried bedrock channels which are located throughout the southern and western parts of the area. The underlying bedrock is predominantly limestone and dolomite, and the channels generally are narrow and steep-walled. These channels are the northward extensions of a network of channels that are cut into the carbonate bedrock of eastern Iowa.

USES OF MAP

The bedrock map, when used in conjunction with land-surface altitudes, is a vital tool for studying hydrologic, environmental, and geological problems.

Hydrology. – The map is an aid in locating supplies of ground water. The areas that are most favorable for the development of ground-water supplies are the buried bedrock channels and the alluvial valleys of present-day streams. The buried bedrock channels generally contain glacial till and sand and gravel aquifers and many farm and rural-domestic wells obtain water from this source. Recorded yields in the project area generally range from 10 to 30 gal/min (0.63 to 1.89 l/s) but yields of 100 gal/min (6.30 l/s) and over have been obtained in other parts of eastern Iowa.

The alluvial deposits range in thickness from less than 1 ft (0.3 m) to about 60 ft (18 m) and contain water-bearing sand and gravel that will yield from 10 to 40 gal/min (0.63 to 2.52 l/s) to wells. Because few wells have been completed in the alluvium and information is limited, a program of test drilling would probably be needed when attempting to develop a large supply of water.

The map will help the drilling contractor when planning the construction of a well. By determining the depth of bedrock, the contractor can estimate casing needs and prepare more accurate cost estimates. And, where overburden is thick, the contractor can be better prepared for any problems attendant to drilling this material.

Other uses for the map are in river basin hydrologic studies and in analyzing surface-water and ground-water relationships at selected locations.

Environment. – The bedrock information is particularly valuable to State, regional, and local planners concerned with environmental problems such as the location of landfill sites. The thickness of overburden, which can be determined with the aid of this map, is an important factor to consider for the protection of ground-water supplies from potential contamination.

Geology. – The bedrock map shows the location of bedrock highs, which are of value to quarry operators and to construction engineers concerned with foundation problems. The map also aids in the interpretation of drainage changes caused by glacial advances and in mapping the areal distribution of unconsolidated rocks.

ACKNOWLEDGMENTS

Particular recognition is made to the present and past members of the Iowa Geological Survey who, over a period of many years, have collected and analyzed drill-hole samples, determined land-surface altitudes, and compiled other information necessary to the preparation of this map. Further acknowledgment is made to the many well drilling contractors who have voluntarily collected drill cuttings and have provided other well data.

EXPLANATION

Log data
Bedrock penetrated

Log data
Bedrock not penetrated

Published data
Bedrock penetrated

Published data
Bedrock not penetrated

x
Quarry or outcrop

750
Bedrock contour
Shows altitude of bedrock surface. Dashed where approximately located. Contour interval 50 feet (15 metres). Datum is mean sea level.

Limit of bedrock contouring

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BEDROCK TOPOGRAPHY OF NORTHEAST IOWA

By

Robert E. Hansen

1975

For sale by U. S. Geological Survey
Denver, Colo. 80225 and Reston, Va. 22092, price $1.25 per set.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
IOWA GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I-933 (WEST HALF)

Base from U.S. Geological Survey 1:250,000

Interior—Geological Survey, Reston, Va.—1975

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