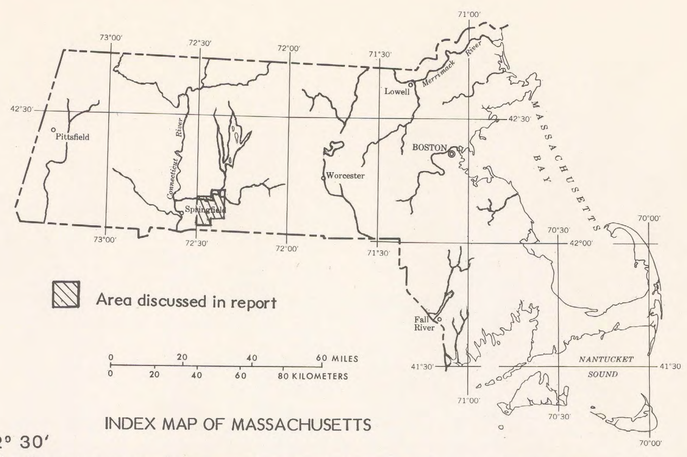
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
LOWER PIONEER VALLEY REGIONAL PLANNING COMMISSION

WATER-RESOURCES INVESTIGATIONS 79-72
OPEN-FILE REPORT



INDEX MAP OF MASSACHUSETTS

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM OF UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI):

Inch-pound units	Multiply by	To obtain SI Units
	Length	
Foot (ft)	0.3048	meter (m)
Mile (mi)	1.609	kilometer (km)
	Flow	
Gallon per minute (gal/min)	0.06309	liter per second (L/s)

Base from topographic quadrangles
U.S. Geological Survey

SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

Contour interval 10 feet
Datum is National Geodetic Vertical Datum of 1929

EXPLANATION

Availability of Water from Stratified-Drift Aquifers

Map units described below indicate the saturated thickness of stratified-drift aquifers and the estimated potential yield, in gallons per minute, of individual wells. Yields are for properly designed and constructed wells at sites selected after evaluation of exploratory drilling. Local variations of hydraulic conductivity and saturated thickness of the aquifers may result in higher or lower well yields than the ranges indicated on the map.

Unshaded areas are underlain by till and bedrock outcrops or sand and gravel of small areal extent and less than 10 feet of saturated thickness.

- Saturated thickness greater than 50 feet
  Potential well yield is greater than 300 gallons per minute
- Saturated thickness 20 to 50 feet
  Potential well yield is 30 to 300 gallons per minute
- Saturated thickness less than 20 feet bordering areas of till and bedrock outcrops
  Potential well yield less than 30 gallons per minute
- Areas where most of the saturated section is silty sand
  Potential well yield may be less than estimated
- 50 — Line of equal saturated thickness of stratified drift, in feet
- Fault (approximately located boundary between Triassic and Jurassic sedimentary rocks to the west and Paleozoic metamorphic and igneous rocks to the east)

Hydrologic-Data-Collection Sites

Symbols indicate the extent of exploratory testing and distribution of data used to estimate saturated thickness and well yield.

- Well or boring finished in unconsolidated deposits
- Exploratory well finished in unconsolidated deposits
- Well or boring finished in bedrock
- Basin boundary between the Chicopee River basin and the Mill River and Scantic River basins
- Subbasin boundary

INTRODUCTION

The ground-water resources in parts of the Chicopee and Mill River basins near Wilbraham in west-central Massachusetts were investigated by the U.S. Geological Survey in cooperation with the Lower Pioneer Valley Regional Planning Commission. This report, a product of that investigation, describes the occurrence of ground water and provides a map of areas favorable for ground-water development.

GROUND-WATER AVAILABILITY

Stratified Drift

Stratified sand and gravel deposits occur in stream valleys and lowlands of the Connecticut River valley and form the principal unconsolidated aquifers in the study area. Meltwater from wasting continental glacial ice that occupied the Connecticut River basin during the Pleistocene Epoch transported, sorted, and deposited soil and rock fragments as stratified sand and gravel in stream channels and as silt and clay in ponds and lakes. The yields of wells given for these aquifers are derived from estimates of saturated thickness and hydraulic conductivity indicated by lithologic textures. Wells in aquifers that are hydraulically connected to potential sources of infiltration, such as the Chicopee and Mill Rivers, may have greater and more dependable yields than wells in aquifers that are recharged only by the direct infiltration of precipitation.

Till

Till is a poorly sorted and generally unstratified glacial deposit of clay, silt, sand, gravel, and boulders that overlies bedrock almost everywhere in the study area. These deposits have characteristically low hydraulic conductivity. Wells in till generally yield only a few gallons per minute and are commonly more susceptible to bacterial contamination and failure during droughts than wells drilled and cased into bedrock.

Bedrock

Bedrock underlies the entire study area and contains water in joints and fractures, which are commonly narrow and represent only a small percentage of total rock volume. Consequently, bedrock-aquifer storage capacity is generally low. Nearly all wells in bedrock intercept some water-bearing fractures, and yields range from a fraction of a gallon per minute in places where fractures are small and poorly interconnected to more than 100 gal/min where fractures are numerous and interconnected. Wells in bedrock are generally capable of yielding water in quantity and quality suitable for single-family domestic supplies.

A north-south trending fault crosses the study area and separates sedimentary bedrock from metamorphic and igneous bedrock. Bedrock west of the fault is predominantly red arkosic sandstone and conglomerate of Triassic and Jurassic age. The median yield of 159 wells in sedimentary rock is 15 gal/min, and yields range from 2 to 110 gal/min.

The area east of the fault, is underlain by metamorphic and igneous rock of Paleozoic age. The median yield of 99 wells in metamorphic and igneous rock is 5 gal/min and yields range from less than 1 to 60 gal/min.

Yield of wells in bedrock may be affected by hydraulic conductivity of overlying unconsolidated deposits. Bedrock-well yields are higher in areas overlain by saturated coarse-grained stratified drift than in areas overlain by fine-grained stratified drift or till. The common occurrence of stratified drift in the west half of the study area may explain the generally higher well yields reported there.

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GROUND-WATER AVAILABILITY IN PARTS OF THE CHICOPEE AND MILL RIVER BASINS, NEAR WILBRAHAM, MASSACHUSETTS

BY

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1979