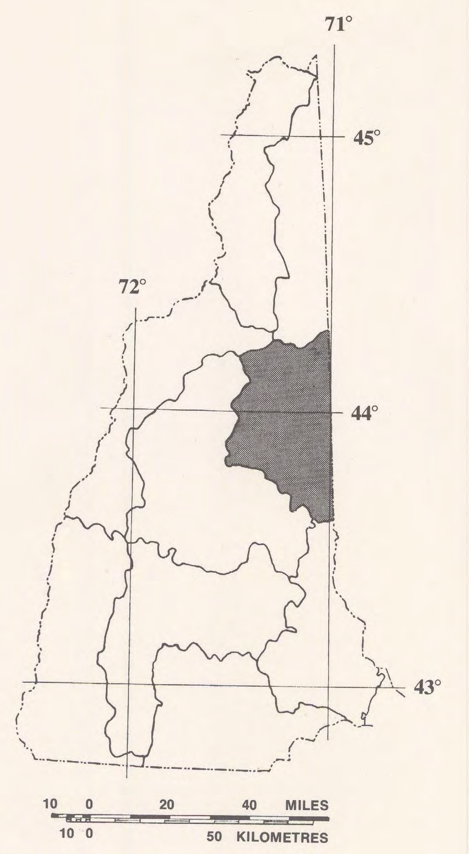


FIGURE 1. — INDEX MAP SHOWING LOCATION OF THE SACO RIVER BASIN

EXPLANATION

Patterns used below to designate areas apply only to the Saco River basin and not to the adjoining areas.

Areas inferred to be underlain by medium to very coarse sand or sand and gravel with sufficient saturated thickness to have high potential to yield water. Included are areas with fine-grained surficial deposits which are inferred to be underlain by medium to very coarse sand or sand and gravel. Wells located by systematic ground-water exploration within these areas should yield sufficient quantities of water to meet or augment municipal and industrial requirements. Deposits are thinner and wells would be less productive along the margins of these areas. Pumping wells adjacent to streams or lakes may induce surface water to infiltrate the aquifer.

Areas inferred to be underlain by medium to very coarse sand or sand and gravel with limited saturated thickness and which have medium potential to yield water. Shallow wells and infiltration galleries located by systematic ground-water exploration within these areas may yield sufficient quantities of water for small municipal and rural water districts, and commercial and light industrial use. Deposits are thinner and wells would be less productive along the margins of these areas except where they border areas of high potential. Pumping wells adjacent to streams or lakes may induce surface water to infiltrate the aquifer.

Areas inferred to be underlain by very fine and fine sand, silt, and clay have low potential to yield water. These deposits may yield sufficient water to wells for domestic and light commercial use. In places, thin lenses of coarse sand or sand and gravel with higher potential may occur within or underlie these deposits, but these lenses may or may not have adequate storage or recharge to provide higher sustained well yields.

Areas in which glacial till (hardpan) and bedrock (ledge) are at or inferred to be near the surface have low potential to yield water. Included are areas with thin deposits of gravel, sand, silt, or clay underlain by till or bedrock, and areas of relatively thick deposits of sand or sand and gravel (high terraces) with little or no saturated thickness during dry periods. Wells in till and bedrock commonly yield sufficient water for single family domestic use. In places, where wells penetrate extensive, saturated fracture zones, bedrock wells yield moderate amounts of water.

Well

Depth of well, in feet
70-80 — Depth to bedrock, in feet (omitted if unknown)
350 — Yield of well, in gallons per minute

To convert feet to metres, multiply by 0.3048
To convert gallons per minute to litres per second, multiply by 0.06309

st,c 8
g 10
s 18
R

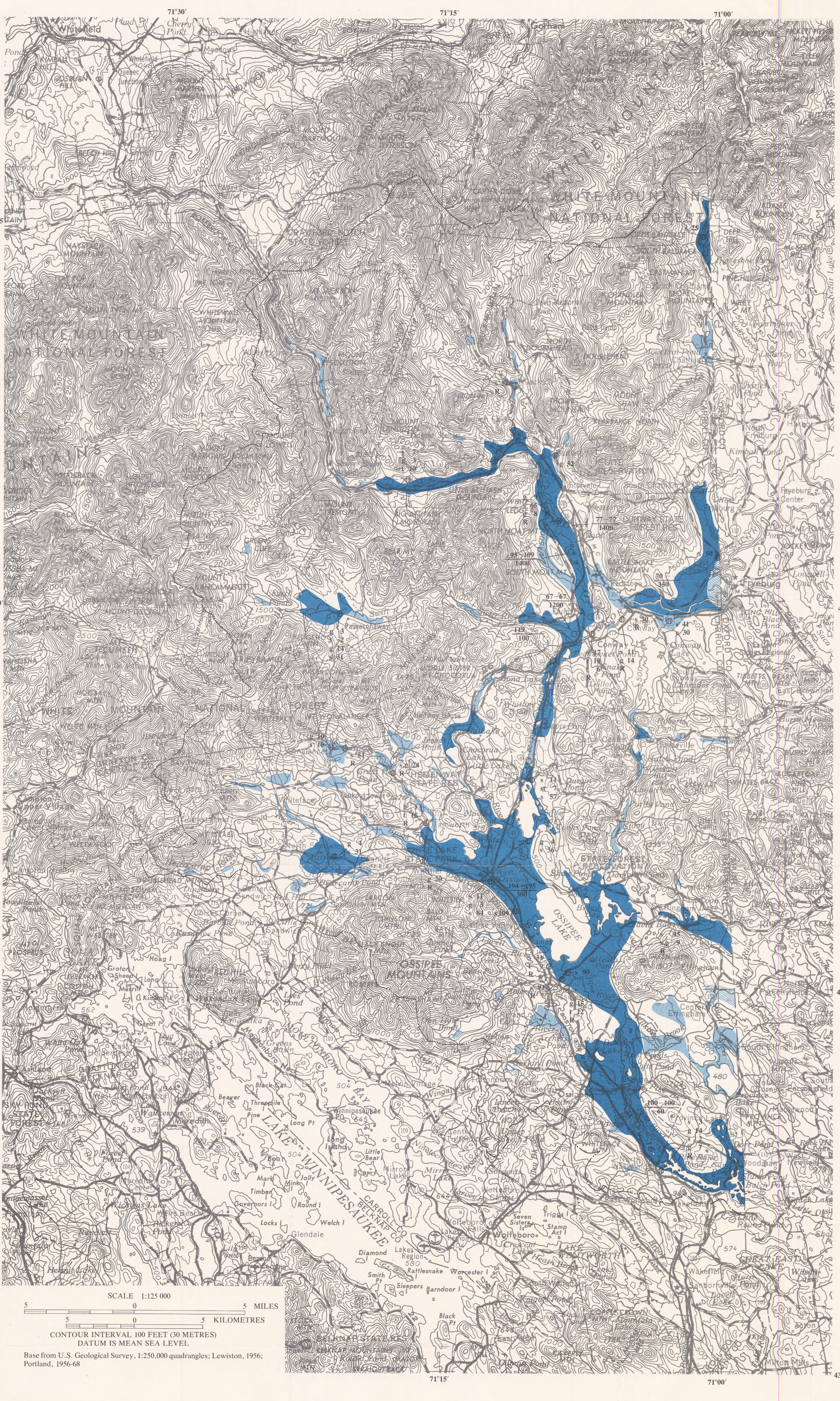
Boring

Generalized description, stratigraphic position, and approximate thickness, in feet, of material. Data based on borings by or for the N.H. Dept. of Public Works and Highways

g - gravel	st - silt	t - till
s - sand	c - clay	R - refusal

To convert feet to metres, multiply by 0.3048

Basin boundary



SCALE 1:125 000
5 0 5 MILES
5 0 5 KILOMETRES

CONTOUR INTERVAL 100 FEET (30 METRES)
DATUM IS MEAN SEA LEVEL

Base from U.S. Geological Survey, 1:250,000 quadrangles; Lewiston, 1956; Portland, 1956-68

OCCURRENCE OF GROUND WATER

The map below provides a preliminary assessment of the availability of ground water in the Saco River basin as determined by estimating the capability of the aquifers to store and transmit water. On the map aquifers are rated as having high, medium, or low potential to yield ground water. This report provides a guide for ground-water exploration and for water- and land-use planning and management.

Bedrock or ledge (crystalline rock) in most of this river basin is covered by a thin veneer of unconsolidated glacial deposits of till and layered (stratified) gravel, sand, silt, and clay. The bedrock is hard and compact; it contains recoverable water only in open fractures. The size, number, distribution, and interconnection of fractures are highly variable, but the fractures commonly are so limited in these properties that wells penetrating bedrock generally do not yield enough water to sustain supplies for municipal or industrial use. However, several small village centers in other river basins are partly supplied by one or more low-yielding bedrock wells. Bedrock commonly yields dependable supplies of good quality water to individual wells in amounts adequate for single family domestic needs. Zones where bedrock is extensively fractured might yield larger supplies of water.

Glacial till, locally called hardpan, is an unsorted mixture of clay, silt, sand, gravel, and boulders. Deposits of till are widespread and overlie bedrock. The average thickness of till is probably less than 30 feet (9 metres), but in places the thickness exceeds 100 feet (30 metres). A significant amount of water is stored in thick till, but moves very slowly through the available small open spaces. Accordingly, till is a poor aquifer and normally does not yield enough water to meet municipal, industrial, or commercial needs. In some places till will yield enough water to large diameter dug wells to supply single family domestic needs, but this yield may not be dependable during droughts when the water table declines and there is less water in storage.

Stratified deposits of gravel, sand, silt, and clay occur chiefly in the valleys. These materials have abundant pore space between grains to store ground water; these openings may amount to 30 percent or more of the total volume of the deposit. In places the saturated thickness of these deposits is more than 100 feet (30 metres). The average grain size and the average size of openings between grains of these deposits varies greatly, and thus, the ability of these deposits to transmit water varies greatly. The size of openings between grains of clay, silt, and fine sand are so small that water flows slowly through them. The relatively large spaces between grains of medium to very coarse sand and gravel allow relatively rapid transmission of water. Because sand and gravel can both store and transmit large quantities of water, ground-water exploration and development in New Hampshire has been most successful in thick, water-saturated sand and gravel deposits.

GROUND-WATER QUALITY

Ground water in the Saco River basin is generally of good chemical quality. Most of it is clear and colorless, contains no suspended matter and practically no bacteria, and is low in dissolved-solids concentration. Also, it is generally soft (0-60 mg/l-milligrams per litre of hardness), requiring little soap to produce suds, or moderately hard (61-120 mg/l).

Several water-quality problems may occur within the basin. Iron and manganese may occur in concentrations greater than the recommended limits for drinking water, 0.3 and 0.05 mg/l respectively, suggested by the U.S. Public Health Service (1962). In places, excessive amounts of iron and manganese may restrict usefulness of the water. Fluoride concentrations greater than 1.5 mg/l (the upper limit recommended by the U.S. Public Health Service (1962) for areas where the annual average of maximum daily air temperature is within the range of 53.8° to 58.3°F, 12.1° to 14.6°C) may be common in water from bedrock wells. Ground water in unconsolidated deposits is generally weakly acidic, and locally it may have enough acidity to be slightly corrosive to metal plumbing.

Locally, the chemistry of ground water may reflect land-use practices. Degradation of water quality may occur in unsewered residential and village areas, near solid-waste-disposal sites, agricultural land, and major highways.

If surface water induced into an aquifer in response to pumping a well reaches the well, water quality of the pumped water will reflect the chemistry of both the surface water and the original ground water. At present (1974), surface-water quality may not always meet the proposed standards (classes A and B*) for this basin; where the standards are met, ground-water quality is expected to be unimpaired. Locally, surface waters contain relatively high concentrations of organic material (commonly termed brown water). Chemical changes may occur when this water is induced to infiltrate an aquifer. For example iron, manganese, and color might increase to levels in excess of those recommended by the U.S. Public Health Service (1962) for public drinking supplies.

*New Hampshire Water Supply and Pollution Control Commission and U.S. Environmental Protection Agency (1971). Class A — Potentially acceptable for public water supply after disinfection. No discharge of sewage or other wastes. (Quality uniformly excellent). Class B — Acceptable for bathing and recreation, fish habitat and public water supply after adequate treatment. No disposal of sewage or wastes unless adequately treated. (High esthetic value).

GROUND-WATER EXPLORATION

This preliminary resource appraisal is a guide for ground-water exploration, development, and planning in the Saco River basin. Evaluations of potential aquifer yield, whether regional or local in scope, could include geophysical exploration, test drilling, and aquifer tests to determine aquifer hydraulic properties and boundaries and to determine relationships between surface water and ground water.

SELECTED REFERENCES

New Hampshire Water Supply and Pollution Control Commission and U.S. Environmental Protection Agency, 1971, Water-quality standards summary (New Hampshire): New Hampshire Water Supply and Pollution Control Comm., 91 p.

U.S. Public Health Service, 1962 (revision), Public Health Service drinking water standards: U.S. Dept. Health, Education, and Welfare, Public Health Service, pub. no. 956, 61 p.

AVAILABILITY OF GROUND WATER IN THE SACO RIVER BASIN, EAST-CENTRAL NEW HAMPHSIRE

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OPEN-FILE REPORT
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