UNITED STATES
DEPARTMENT OF THE INTERIOR
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POTENTIOMETRIC SURFACE OF THE LLOYD AQUIFER ON LONG ISLAND, NEW YORK, IN JANUARY 1975

Open-File Report

Prepared in cooperation with the
Nassau County Department of Public Works,
New York State Department of Environmental Conservation,
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Abstract.--A map showing the potentiometric surface of the Lloyd aquifer was drawn from water-level measurements made in January 1975. Altitude of the potentiometric surface ranged from more than 20 feet below mean sea level in Queens County to more than 40 feet above mean sea level in Suffolk County.

INTRODUCTION

Ground water is the sole source of freshwater for more than 3 million residents of Long Island. The water supply is mainly withdrawn from three major aquifers--the upper glacial, the Magothy, and the Lloyd.

The Lloyd aquifer, the deepest of the three aquifers, extends under all but the westernmost part of Long Island. It is confined between the overlying Raritan clay and the underlying bedrock.

About 25 million gallons of water is pumped daily from the Lloyd aquifer for public supply and industrial use. Virtually all the withdrawal is in Nassau and Queens Counties; there is practically no pumpage from the Lloyd aquifer in Kings and Suffolk Counties. The water supply from the Lloyd aquifer is particularly valuable in areas where overlying aquifers are either heavily pumped, contaminated, or nonexistent.

A potentiometric surface is a surface that represents the static head in an aquifer; it is defined by the levels to which water will rise in tightly cased wells. This surface is monitored because it indicates changes in storage and movement of water in the aquifer. Changes in the potentiometric surface are generally caused by variations in the amount of water recharging to, or discharging from, the aquifer. Large head changes are usually caused by an increase or decrease in pumping.

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METHOD

Water-level measurements were taken nearly simultaneously in 60 wells in the Lloyd aquifer and in hydraulically connected lithologic units. Most of the wells are concentrated near the northwestern limit of the Lloyd aquifer in the western part of the island. The number of wells decreases toward the southeast as the depth between land surface and the Lloyd aquifer increases.

Forty of the measured wells belong to public-supply systems, and many of them are in continuous operation. Pumps on wells to be measured for this study were turned off at least 12 hours before measurement so that water levels would indicate potentiometric heads in the aquifer rather than pumping levels in the wells.

The other 20 wells are unpumped observation wells in which aquifer heads are recorded quarterly. High-tide levels were recorded in observation wells near shorelines, where potentiometric levels are affected by tides.

RESULTS

Pumping has caused a major depression in the Lloyd aquifer's potentiometric surface throughout most of Queens County (Soren, 1971, p. 15; Kimmel, 1973, p. 347). The depression was more than 20 ft (6.1 m) below mean sea level in central Queens in January 1975.

Previous records in Queens County show some levels that are higher and some that are lower than those recorded in January 1975. In 1968, lowest water levels were more than 25 ft (7.6 m) below mean sea level (Soren, 1971, pl. 2F), whereas in 1970 they were more than 20 ft (6.1 m) below mean sea level (Kimmel, 1973, p. 348).

There is a minor depression with lowest water levels of 2 ft below mean sea level in the northwest part of Nassau County. The highest known head in the Lloyd aquifer is approximately 40 ft (12.3 m) above mean sea level in the north-central part of Suffolk County.

Plate 1 shows locations of wells in which water levels were measured, and altitudes of the water levels (potentiometric heads). These water levels were correlated with older potentiometric surface maps of the Lloyd aquifer to define the January 1975 potentiometric surface.

The new water-level measurements are compared with previous ones in table 1.

REFERENCES CITED

Kimmel, G. E., 1973, Change in potentiometric head in the Lloyd aquifer Long Island, New York: U.S. Geol. Survey Jour. Research, v. 1, no. 3, p. 345-350.

Soren, Julian, 1971, Ground-water and geohydrologic conditions in Queens County, Long Island, New York: U.S. Geol. Survey Water-Supply Paper 2001-A, 39 p.

Table 1.--Water levels in selected wells screened in the Lloyd aquifer

(Water levels are in feet above or below (-) mean sea level; letters in well numbers refer to counties--K, Kings County; Q, Queens County, N, Nassau County, and S, Suffolk County)

Well	Water level January 1974	Water level January 1975	Net change
K464	- 0.12	0.22	+0.34
Q273	- 3.14	- 1.14	+2.00
Q283	- 9.83	- 3.61	+6.22
Q287	2.91	2.23	- .68
Q470	- 1.69	2.95	+4.64
Q543	1.92	1.96	+ .04
Q1241	1/ -11.55 (1973)	- 4.57	+6.98
Q2420	4.32	4.68	+ .36
N7	- 3.70	- 3.21	+ .49
N30	4.36	- 2.57	-6.93
N67	9.72	9.09	- .63
N118	36.49	35.83	- .66
N511	16.79	17.59	+ .80
N1618	- 2.16	5.18	+7.34
N1715	.37	5.05	+4.68
N1802	- 2.32	- 2.64	- .32
N2214	2.94	5.64	+2.70
N2597	3.02	2.18	- .84
N2602	20.80	14.98	-5.82
N8342	3.63	2.20	-1.43
N8354	1/ 2.44 (1972)	5.37	+2.93
S49	1/ 33.77 (1973)	35.70	+1.93
S21091	20.18	20.20	+ .20
S31734	42.44	40.67	-1.77
S33379	38.60	38.10	- .50

1/ January.