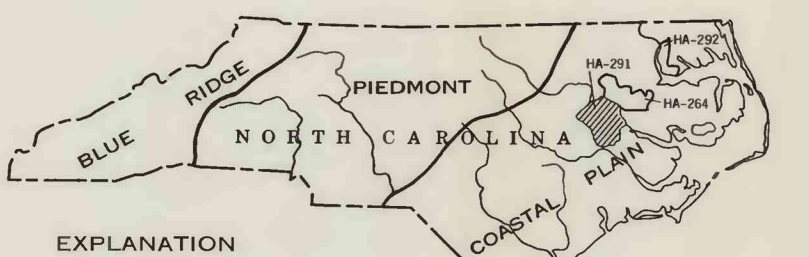


INTRODUCTION

Pitt County comprises an area of 656 square miles in the Atlantic Coastal Plain of east-central North Carolina (see map below). It is in a subtropical, moist climatic region characterized by warm summers, cool winters, moderate precipitation during all seasons, but having a maximum seasonal rainfall during the summer (Yust and Hudson, 1949). Average annual temperature at the Greenville weather station is about 62° F, and average annual precipitation is about 48 inches. In 1960 the population of Pitt County was 69,942. Agriculture is the basis of Pitt County's economy, but industrial development is increasing rapidly.



EXPLANATION

Physiographic province boundary
0 50 100 MILES
Map showing location of Pitt County, physiographic provinces, and published reports

GEOLOGY

Ground water occurs in unconsolidated sediments that overlie an eastward-sloping erosional surface of the basement metamorphic complex analogous to that exposed in the Piedmont province to the west. The basement complex is not an aquifer in Pitt County. The sedimentary sequence ranges in thickness from about 300 feet in the western part of the county to nearly 1,200 feet in the southeastern part. The penetrated sediments range from Lower Cretaceous to post-Miocene in age. Aquifers, or water-yielding sands within the sediments are in reality aquifer systems, consisting of more than one water-yielding sand layer separated by layers of semipermeable silts and clays. Average porosity of sediments in the Pitt County area is about 30 percent.

GROUND WATER

Beneath the shallow unconfined water-table aquifer, seven artesian or confined aquifer systems are defined in Pitt County. Their depths and extent are shown on the aquifer characteristics map and the sections. The quality of water from selected wells is given in the chemical analyses. **Aquifer 1.** This is the lowermost or deepest aquifer in Pitt County. Its average thickness is about 50 feet, and it attains its greatest thickness of about 100 feet in southeastern Pitt County. It consists predominantly of poorly sorted fine to coarse sand and gravel with interbedded green and brown silty clay. Aquifer 1 provides soft bicarbonate-type water to municipal wells at Farmville. At Greenville and in the eastern part of Pitt County, water in Aquifer 1 is brackish, having more than 250 ppm (parts per million) chloride-ion concentration.

Aquifer 2. This aquifer system is also present throughout Pitt County. Its average thickness is 50 feet, and its greatest thickness is about 150 feet in southeastern Pitt County. It consists of fine to coarse arkosic sands with interbedded gray silts and clays. Glauconite is commonly present. Aquifer 2 provides soft bicarbonate-type water to municipal wells at Bethel, Farmville, and Fountain. At Greenville and in the eastern part of Pitt County, water from this aquifer is brackish, having more than 250 ppm chloride-ion concentration.

Aquifer 3. This is the principal system of water-yielding sands in Pitt County. Its average thickness is 125 feet, and its greatest thickness is about 150 feet in the vicinity of Greenville and in the vicinity of Grifton. It consists of dark gray, fine to coarse sands, silts, and clays in which lignite, pyrite, glauconite, and colophane are common. Aquifer 3

provides soft bicarbonate-type water of excellent quality to municipal wells at Aiden, Bethel, Farmville, Fountain, Greenville, and Grifton. Only in the easternmost part of the county does the chloride-ion concentration of water in Aquifer 3 exceed 250 ppm.

Aquifer 3A. This relatively thin aquifer does not extend throughout Pitt County. Its average thickness is 40 feet, and its greatest thickness is about 100 feet in the vicinity of Grifton. It consists of lenticular green and gray fine to coarse sands interspersed with dark-gray silt, clay, and marl. Glauconite and colophane are common. Aquifer 3A thins to disappearance north and northwest of Greenville, but provides soft bicarbonate-type water. The quality of water in this aquifer system is not known to vary appreciably where it is present in Pitt County.

Aquifer 4. Except for a small area in the westernmost corner, this aquifer system extends throughout Pitt County. Average thickness of Aquifer 4 is 40 feet, and its greatest thickness of more than 75 feet is attained in northeastern-Pitt County. It consists of gray and green lenticular and gradational fine to coarse sands, silts, and clays. Glauconite and colophane are common. Aquifer 4 provides soft bicarbonate-type water of excellent quality to municipal wells at Aiden, Bethel, Grifton, and Grimesland. In the westernmost corner of the county, where the aquifer is nearer the land surface, its water is slightly hard.

Aquifer 5. This aquifer system is limited to the eastern part of Pitt County. It thins to disappearance at a northward trending margin about midway between Greenville and Grimesland. Average thickness of Aquifer 5 is 30 feet, and its greatest thickness is about 50 feet in southeastern-Pitt County. It consists of fine to medium glauconitic "salt and pepper" sand with thin dark-gray layers of clay and silty marl. Aquifer 5 is not extensively developed for water supplies, but it provides soft and slightly hard bicarbonate-type water to home and farm wells in eastern Pitt County. Generally this water is of excellent quality except near the western margin of the aquifer where soluble iron and hardness may be greater than desirable.

Aquifer 6. Limited to the eastern part of Pitt County, this aquifer system thins to disappearance at a north-northeast-trending margin a short distance west of Grifton. It consists of coarse light-gray sandy coquina limestone. Glauconite and phosphorite are common. Average thickness of Aquifer 6 is 20 feet, and its greatest thickness is about 70 feet in southeastern Pitt County. It provides hard calcium-carbonate type water to home and farm wells. Aquifer 6 is not extensively developed for water supplies in Pitt County.

Aquifer 7. This is the unconfined water-table aquifer present throughout Pitt County. The average thickness of Aquifer 7 is about 25 feet, and its greatest thickness is about 50 feet near Bethel. It consists of light-tan fine to medium sands and silts. Sands of Aquifer 7 yield water to many shallow wells. Water in this aquifer is slightly acidic, hard, and has noticeably large amounts of soluble iron. Locally, the water in this aquifer may be contaminated from waste disposal at the land surface.

Utilization of ground water in Pitt County has a very large potential, but remains as yet relatively undeveloped. Municipal pumpage is about 15 percent of estimated ground-water recharge in Pitt County; nearly all industrial requirements are met by municipal water systems. There has been no industrial contamination of ground water or salt water encroachment in Pitt County.

SELECTED REFERENCES

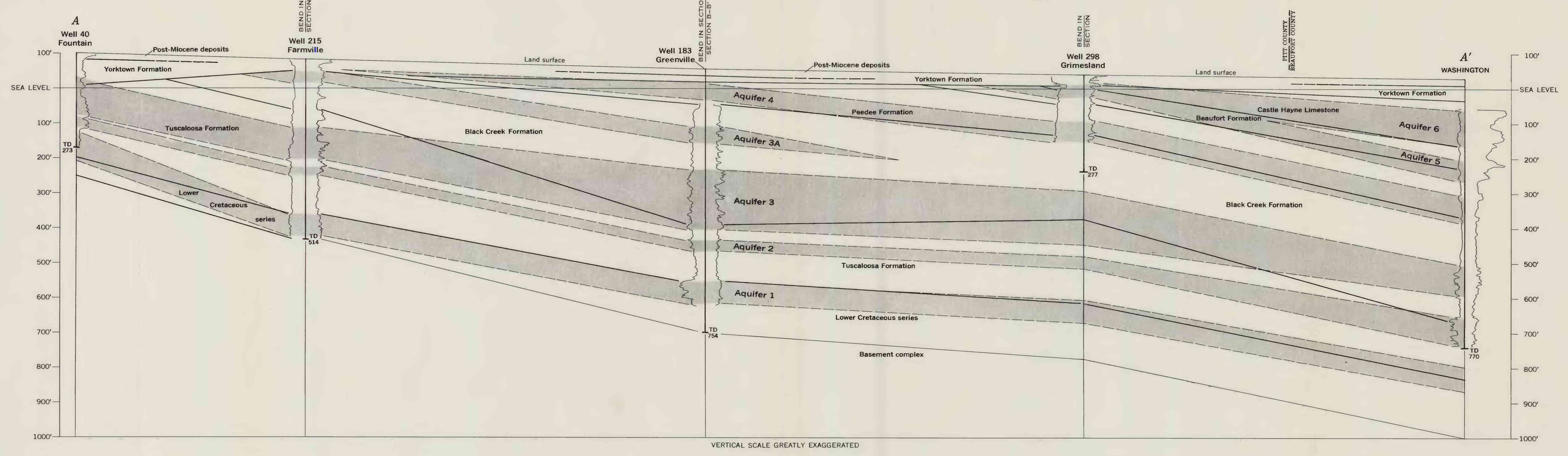
- Brown, P. M., 1958, Well logs from the Coastal Plain of North Carolina: North Carolina Dept. of Conserv. and Devel. Bull. No. 70, p. 5-6.
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CHEMICAL ANALYSES OF GROUND WATER FROM SELECTED WELLS IN PITT COUNTY¹

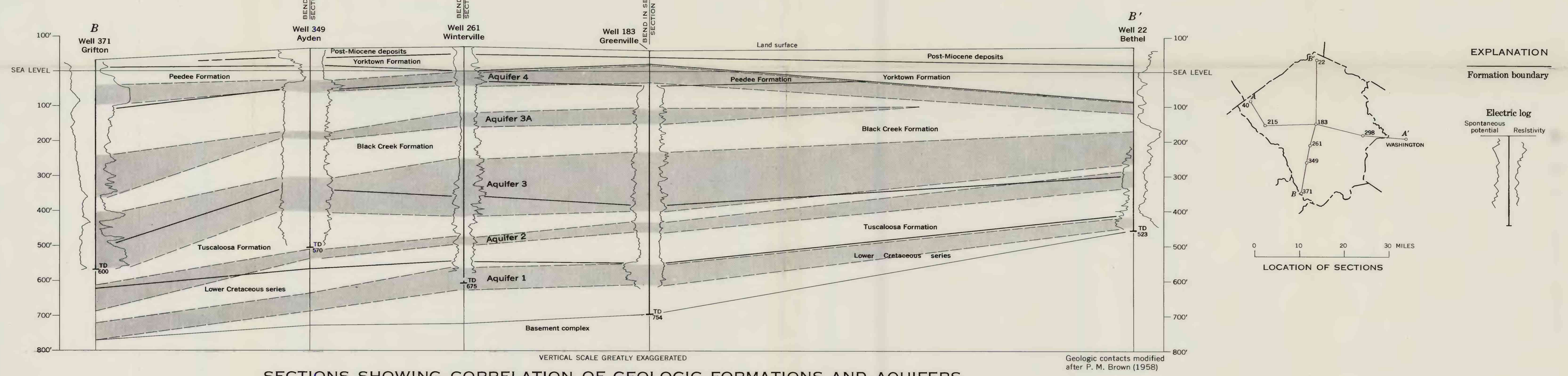
| Well number and location | 22 Bethel | 40 Fountain | 183 Greenville | 215 Farmville | 261 Winterville | 288 Grimesland | 349 Aiden | 371 Grifton |
|---|--------------|----------------|-------------------|------------------|--------------------|-------------------|--------------|----------------|
| Screened interval in feet | 240-320 | 132-213 | 165-460 | 192-335 | 500-510 | 134-188 | 240-470 | 280-580 |
| Silica (SiO ₂) | 23.0 | 28.0 | 18.0 | 13.0 | 16.0 | 17.0 | 10.0 | 11.0 |
| Aluminum (Al) | 0.1 | 0.49 | 0.08 | 0.15 | 0.1 | 0.14 | 0.06 | 0.07 |
| Iron (Fe) | 0.0 | — | — | — | 0.02 | 0.00 | 0.01 | — |
| Manganese (Mn) | 0.5 | 7.2 | 2.4 | 18.0 | 2.0 | 13.0 | 0.9 | 0.6 |
| Calcium (Ca) | 2.1 | 3.2 | 0.5 | 3.7 | 4.7 | 5.4 | 0.0 | 0.1 |
| Magnesium (Mg) | 17.0 | 38.0 | 90.0 | 76.0 | 104.0 | 84.0 | 104.0 | 68.0 |
| Sodium (Na) | 18.0 | 7.8 | 7.5 | 10.0 | 6.1 | 22.0 | 4.7 | 4.5 |
| Potassium (K) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Carbonate (CO ₃) | 31.0 | 137.0 | 286.0 | 282.0 | 211.0 | 300.0 | 314.0 | 177.0 |
| Bicarbonate (HCO ₃) | 40.0 | 5.4 | 5.5 | 2.8 | 28.0 | 8.4 | 11.0 | 6.0 |
| Sulfate (SO ₄) | 72.0 | 4.4 | 12.0 | 4.0 | 34.0 | 9.4 | 18.0 | 11.0 |
| Chloride (Cl) | 1.5 | 0.2 | 1.5 | 0.3 | 1.2 | 2.1 | 1.1 | 0.5 |
| Fluoride (F) | 0.0 | 0.0 | 0.3 | 0.2 | 0.2 | 0.1 | 0.8 | — |
| Nitrate (NO ₃) | 0.7 | 1.1 | 1.5 | 0.1 | 2.0 | 0.0 | 1.2 | 2.0 |
| Phosphate (PO ₄) | 13.0 | 31.0 | 8.0 | 30.0 | 8.0 | 56.0 | 2.0 | 2.0 |
| Hardness as CaCO ₃ | 7.6 | 7.5 | 8.1 | 7.5 | 8.6 | 7.7 | 8.6 | 8.0 |
| Specific conductance in micromhos at 25° C. | 750.0 | 230.0 | 416.0 | 461.0 | 551.0 | 496.0 | 430.0 | 290.0 |

¹Constituents are in parts per million.
²Intervals are intermittently screened except for well number 261.

MAP SHOWING AQUIFER CHARACTERISTICS



SECTIONS SHOWING CORRELATION OF GEOLOGIC FORMATIONS AND AQUIFERS



SUMMARY OF THE GEOLOGY AND GROUND-WATER RESOURCES OF PITT COUNTY, NORTH CAROLINA

By
Carlton T. Sumsion

