GEOLOGICAL SURVEY CIRCULAR 190

INDEX OF WATER-RESOURCES RECORDS IN THE DELAWARE RIVER BASIN TO SEPTEMBER 30, 1951

Prepared by the Pennsylvania Water Resources Council

Water Resources Division, Geological Survey

UNITED STATES DEPARTMENT OF THE INTERIOR
Oscar L. Chapman, Secretary

GEOLOGICAL SURVEY
W. E. Wrather, Director

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INTRODUCTION

This report is an index of all surface-water, ground-water, and quality-of-water data which have been or are now being collected on a continuous or periodic basis, by the U. S. Geological Survey and the cooperating agencies in the Delaware River basin, to September 30, 1951. The index is divided into two principal sections, the surface-water section relating to streams and the ground-water section to wells and springs. Each section contains an index of records on quality of water.

All surface-water data in this report are classified by stream name and state. The ground-water data are classified by state and county inasmuch as most ground-water studies and compilations are made on the basis of a county as a unit.

Lists of selected publications relating to surface and ground waters appear at the end of the respective sections. These lists include not only most of the publications issued or prepared by the Geological Survey, but also a representative group of publications prepared elsewhere, particularly reports concerned with large parts of, or the entire, basin.

Those Federal, State, and municipal agencies now engaged in cooperative water-resources investigations with the Geological Survey are listed in a section following the ground-water portion of this report.

In addition to the data indicated in this index, the Geological Survey has obtained information at many miscellaneous localities throughout the Delaware River basin. Much of this information is available to the public upon application to the Survey field offices, and to facilitate the use of these miscellaneous data, a list of the field offices having such information is given at the end of the report.

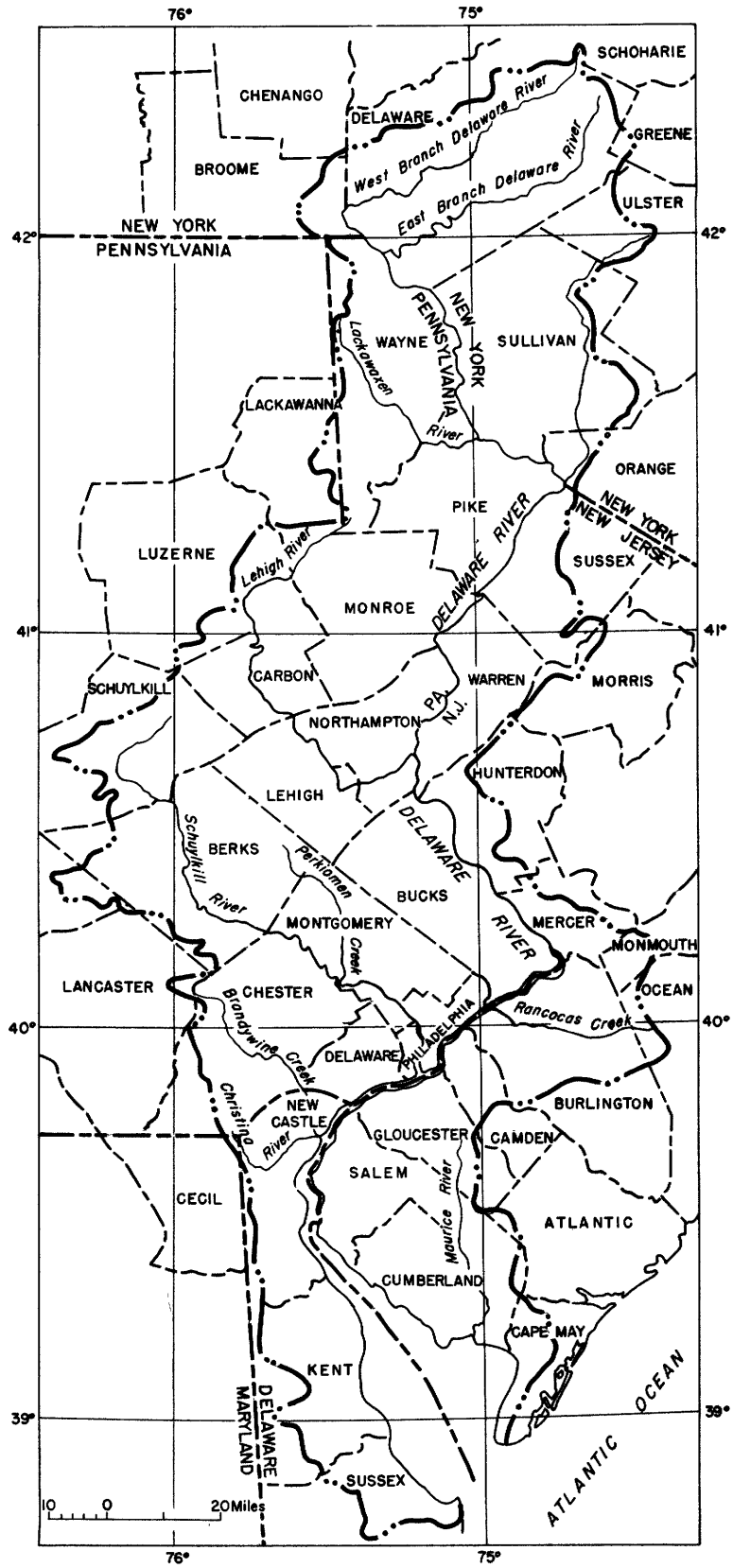

Figure 1. Outline map of the Delaware River basin.

DRAINAGE AREAS OF PRINCIPAL STREAMS

Each Delaware basin stream listed below has a drainage area of 50 square miles or more. The streams are listed in downstream order. Tributary streams are indicated by indention.

The drainage area of the entire Delaware River basin, including the tributary basin of Delaware Bay but excluding the surface area of the bay, is 12,765 square miles. The drainage area of all streams tributary to the bay only, is about 1,440 square miles.

The dividing line between Delaware River and Delaware Bay is an arbitrary line connecting Liston Point on the Delaware shore with a point below the mouth of Hope Creek on the New Jersey shore. The mouth of Delaware Bay is approximately a line connecting the points of Cape May and Cape Henlopen.

	Drainage area, in square miles, for indicated States						
	N. Y.	N. J.	Pa.	Del.	Md.	Total	Total gaged area above active gaging stations
East Branch Delaware River (head of Delaware River)	840	-------	-------	-------	----	840	783
Dry Brook	81.6	-------	-------	-------	----	81.6	---------
Beaver Kill	298	-------	-------	-------	----	298	241
Willowemoc Creek	130	-------	-------	-------	----	130	63
West Branch Delaware River	613	-------	51	-------	----	664	648
Little Delaware River	52.5	-------	-------	-------	----	52.5	49.8
Oquaga Creek	66.5	-------	-------	-------	----	66.5	66
Equinunk Creek	-------	-------	57.7	-------	----	57.7	---------
Calicoon Creek	112	-------	-------	-------	----	112	111
East Branch Calicoon Creek	74.9	-------	-------	-------	----	74.9	---------
Lackawaxen River	-------	-------	601	-------	----	601	518
West Branch Lackawaxen River	-------	-------	62.3	-------	----	62.3	---------
Dyberry Creek	-------	-------	70.0	-------	----	70.0	63.2
Wallenpaupack Creek	-------	-------	240	-------	----	240	228
West Branch Wallenpaupack Creek	-------	-------	70.7	-------	----	70.7	---------
Shohola Creek	-------	-------	84.1	-------	----	84.1	---------
Mongaup River	208	-------	-------	-------	----	208	202
Neversink River	336	10	-------	-------	----	346	302
Basher Kill	68.6	-------	-------	-------	----	68.6	---------
Bushkill Creek (Pike-Monroe Counties)	-------	-------	156	-------	----	156	117
Flat Brook	-------	65.7	-------	-------	----	65.7	65.1
Brodhead Creek	-------	-------	287	-------	----	287	259
McMichaels Creek	-------	-------	111	-------	----	111	---------
Paulins Kill	-------	177	-------	-------	----	177	126
Pequest River	-------	158	-------	-------	----	158	144
Bushkill Creek (Northhampton County)	-------	-------	74.8	-------	----	74.8	---------
Lehigh River	-------	-------	1,364	-------	----	1,364	1,306
Tobyhanna Creek	-------	-------	127	-------	----	127	---------
Tunkhannock Creek	-------	-------	50.1	-------	----	50.1	---------
Bear Creek	-------	-------	55.8	-------	----	55.8	---------
Black Creek	-------	-------	62.6	-------	----	62.6	---------
Pohopoco Creek	-------	-------	111	-------	----	111	109
Lizard Creek	-------	-------	53.8	-------	----	53.8	---------
Aquashicola Creek	-------	-------	79.4	-------	----	79.4	76.7
Little Lehigh Creek	-------	-------	188	-------	----	188	157
Jordan Creek	-------	-------	81.0	-------	----	81.0	75.8
Saucon Creek	-------	-------	58.2	-------	----	58.2	26.6
Pohatcong Creek	-------	56.2	-------	-------	----	56.2	---------
Musconetcong River	-------	158	-------	-------	----	158	143
Tohickon Creek	-------	-------	112	-------	----	112	97.4
Assunpink Creek	-------	90.8	-------	-------	----	90.8	89.4
Crosswicks Creek	-------	139	-------	-------	----	139	83.6
Neshaminy Creek	-------	-------	233	-------	----	233	210
Rancocas Creek	-------	342	-------	-------	----	342	111
Pennypack Creek	-------	-------	56.0	-------	----	56.0	---------
Big Timber Creek	-------	62.8	-------	-------	----	62.8	---------
Schuylkill River	-------	-------	1,909	-------	----	1,909	1,893
West Branch Schuylkill River	-------	-------	53.4	-------	----	53.4	---------
Little Schuylkill River	-------	-------	137	-------	----	137	122
Maiden Creek	-------	-------	216	-------	----	216	---------
Sacony Creek	-------	-------	55.8	-------	----	55.8	---------

	Drainage area, in square miles, for indicated States						
	N. Y.	N. J.	Pa.	Del.	Md.	Total	Total gaged area above active gaging station
Delaware River tributaries—Continued							
Tulpehocken Creek	-------	-------	218	-------	----	218	211
Manatawny Creek	-------	-------	90.4	-------	----	90.4	---------
French Creek	-------	-------	71.0	-------	----	71.0	---------
Perkiomen Creek	-------	-------	362	-------	----	362	279
West Swamp Creek	-------	-------	54.7	-------	----	54.7	---------
Northeast Branch Perkiomen Creek	-------	-------	62.2	-------	----	62.2	---------
Skippack Creek	-------	-------	55.2	-------	----	55.2	---------
Wissahickon Creek	-------	-------	63.8	-------	----	63.8	---------
Mantua Creek	-------	50.8	-------	-------	----	50.8	6.75
Darby Creek	-------	-------	78.6	-------	----	78.6	---------
Chester Creek	-------	-------	66.2	-------	----	66.2	61.1
Christina River	-------	-------	430	130	8	568	477
White Clay Creek	-------	-------	95	67	----	162	135
Red Clay Creek	-------	-------	28.3	25.7	----	54.0	47.0
West Branch Brandywine Creek (head of Brandywine Creek)	-------	-------	131	-------	----	131	45.8
Brandywine Creek	-------	-------	297	32	----	329	321
East Branch Brandywine Creek	-------	-------	123	-------	----	123	---------
Salem Creek	-------	112	-------	-------	----	112	14.6
Alloways Creek	-------	59.6	-------	-------	----	59.6	---------
Delaware Bay tributaries							
Smyrna River	-------	-------	-------	63.9	----	63.9	---------
Cohansey River	-------	106	-------	-------	----	106	5.03
Maurice River	-------	388	-------	-------	----	388	135
St. Jones River	-------	-------	-------	90.3	----	90.3	---------
Murderkill River	-------	-------	-------	96.0	----	96.0	---------
Mispillion River	-------	-------	-------	126	----	126	---------
Broadkill Creek	-------	-------	-------	76.5	----	76.5	---------
Delaware River basin, including Delaware Bay	2,362	2,969	6,422	1,004	8	12,765	9,874

SURFACE WATER

Explanation of Data

The index lists the stations for which records of streamflow have been, or are to be, published for periods prior to September 30, 1951. The stations are listed in downstream order. Tributary streams are indicated by indention.

Station names are given in their most recently published forms. Parentheses around part of a station name indicate that the inclosed word or words were used in an earlier published name of the station or in a name under which records were published by some agency other than the Geolgical Survey.

The drainage areas, in square miles, are the latest figures published or otherwise available at this time. Drainage areas that have been found to be inconsistent with other drainage areas on the same stream have been omitted.

Under "period of record", breaks of less than a 12-month period are not shown. A dash not followed immediately by a closing date shows that the station was in operation on September 30, 1951. The years given are calendar years. Periods of records published by agencies other than the Geological Survey are listed in parentheses and are given only when they contain more detailed information or are for periods not reported in publications of the Geological Survey.

Records both of gage height and of discharge are listed for streamflow stations. Records of gage heights only and records consisting only of monthly figures of streamflow are designated by symbols and footnotes. For early years when daily discharges were not generally published by the Geological Survey, published daily gage heights and a published rating table were considered to be equivalent to daily discharges.

Index of surface-water records

	Drainage area (square miles)	Period of record
Delaware River, East Branch (head of Delaware River), at Margaretville, N. Y.	163	1937-
Platte Kill at Dunraven, N. Y.	34.7	1941-
Mill Brook at Arena, N. Y.	25.0	1937-
Tremper Kill near Shavertown, N. Y.	33.0	1937-
Terry Clove Kill near Pepacton, N. Y.	14.1	1937-

Index of surface-water records—Continued

	Drainage area (square miles)	Period of record
Delaware River tributaries—Continued		
Fall Clove Kill near Pepacton, N. Y.	10.9	1941-43.
Coles Clove Kill near Pepacton, N. Y.	28.0	1944-
Delaware River, East Branch, at Downsville, N. Y.	373	1941-
Delaware River, East Branch, at Harvard, N. Y.	443	1934-
Beaver Kill near Turnwood, N. Y.	40.8	1948-
Beaver Kill at Craigie Clair, N. Y.	82	1937-
Willowemoc Creek at Debruce, N. Y.	40.9	1948-
Willowemoc Creek near Livingston Manor, N. Y.	63	1937-
Little Beaver Kill near Livingston Manor, N. Y.	19.8	1924-
Beaver Kill at Cooks Falls, N. Y.	241	1913-
Delaware River, East Branch, at Fishs Eddy, N. Y.	783	1912-
Delaware River, East Branch, at Hancock, N. Y.	838	1902-12.
West Branch Delaware River at Delhi, N. Y.	142	1937-
Little Delaware River near Delhi, N. Y.	49.8	1937-
West Branch Delaware River at Walton, N. Y.	331	1950-
Trout Creek at Cannonsville, N. Y.	49.5	1940-
Cold Spring Brook at China, N. Y.	1.51	1934-
Oquaga Creek at Deposit, N. Y.	66	1940-
West Branch Delaware River at Hale Eddy, N. Y.	593	1912-
West Branch Delaware River at Hancock, N. Y.	648	1902-12.
Callicoon Creek at Callicoon, N. Y.	111	1940-
Tenmile River at Tusten, N. Y.	45.0	1946-
Delaware River above Lackawaxen River, near Barryville, N. Y.	2,023	1940-
Lackawaxen River at Prompton, Pa.	59.7	1944-
Dyberry Creek at Dyberry, Pa.	63.2	1943-
Lackawaxen River near Honesdale, Pa.	164	1948-
Lackawaxen River at West Hawley, Pa.	206	(1921-24*; 1924-31)a/; 1931-38.
Middle Creek near Hawley, Pa.	78.4	1944-
Lackawaxen River at Hawley, Pa.	290	(1908-17; 1917-19*)a/; 1938-
Wallenpaupack Creek at Wilsonville, Pa.	228	(1909-18)a/; 1918-21; (1921-26)a/; 1926-
Lackawaxen River at Rowlands, Pa.	593	(1914-15*)a/.
Shohola Creek at Lords Valley, Pa.	32.0	(1911-13*)a/.
Rattlesnake Brook at Spring Brook, Pa.	13.0	(1911-16*)a/.
Shohola Creek near Shohola, Pa.	82.0	(1920-24*; 1924-28)a/.
Mongaup River near Rio, N. Y.	190	1909-13.
Mongaup River near Mongaup, N. Y.	202	1939-
Delaware River at Port Jervis, N. Y.	3,076	1904-
Neversink River at Claryville, N. Y.	61.1	1949-
Neversink River at Halls Mills, near Curry, N. Y.	68	1937-49.
Neversink River at Neversink, N. Y.	93	1941-
Neversink River at Woodbourne, N. Y.	113	1937-
Neversink River at Oakland Valley, N. Y.	222	1928-
Neversink River at Godeffroy, N. Y.	302	1903; 1909-10; 1911-14; 1937-
Neversink River at Port Jervis, N. Y.	333	1902-3.
Delaware River at Montague, N. J. (Milford, Pa.)	3,480	1936-40*; 1940-
Delaware River at Dingmans Ferry, Pa.	3,542	1936-40*.
Bushkill Creek at and near Shoemakers, Pa. (Monroe County	117	(1908-15; 1915-20*)a/; 1920-21; (1921-31)a/; 1931-
Flat Brook near Flatbrookville, N. J.	65.1	1923-
Brodhead Creek:		
Analomink Creek at Henryville, Pa.	30.2	(1908-11; 1913-15)a/.
Brodhead Creek at Analomink, Pa.	120	(1908-13*)a/.
McMichaels Creek at and near Stroudsburg, Pa.	64.4	(1911-15; 1915-20*)a/; 1920-21; (1921-31)a/; 1931-38.
Pocono Creek near Stroudsburg, Pa.	38.0	(1911-15; 1915-19*)a/.
McMichaels Creek (Seventh Street Bridge) at Stroudsburg, Pa.	108	(1908-10)a/.
Brodhead Creek at Minisink Hills, Pa.	259	1950-
Delaware River at Portland, Pa.	4,165	1936-40*.
Paulins Kill at Blairstown, N. J.	126	1921-
Paulins Kill at Columbia, N. J.	179	1908-9.

Index of surface-water records–Continued

	Drainage area (square miles)	Period of record
Delaware River at Delaware, N. J.	4,351	1936-40*.
Pequest River at Huntsville, N. J.	31.4	1939-
Pequest River at Pequest, N. J.	108	1921-
Beaver Brook near Belvidere, N. J.	36.2	1922-
Delaware River at Belvidere, N. J.	4,535	1922-
Delaware River at Easton, Pa.	4,717	1936-40*.
Lehigh River at Stoddartsville, Pa.	91.7	1943-
Lehigh River at Tannery, Pa.	322	(1914-19*)a/; 1919-21; (1921-26; 1926-27*; 1927-28) a/; 1928-
Mud Run:		
Dilldown Creek near Long Pond, Pa.	2.39b/	1948-
Lehigh River at Lehighton, Pa.	591	1945-48.
Pohopoco Creek:		
Wild Creek at Hatchery, Pa.	16.8	1941-
Pohopoco Creek near Parryville, Pa.	109	1940-
Aquashicola Creek at Palmerton, Pa.	76.7	1939-
Lehigh River at Walnutport, Pa.	889	1946-
Little Lehigh Creek near Allentown, Pa.	80.8	1945-
Little Lehigh Creek at Allentown, Pa.	106	(1921-32*)a/.
Jordan Creek at Allentown, Pa.	75.8b/	1944-
Monocacy Creek at Bethlehem, Pa.	44.5	1948-
Lehigh River at Bethlehem, Pa.	1,279	1902-5; 1909-13; (1913-18)a/; 1918-21; (1921-28)a/; 1928-
Saucon Creek at Lanark, Pa.	12.0	1948-
South Branch Saucon Creek at Friedensville, Pa.	10.6	1948
Saucon Creek at Friedensville, Pa.	26.6	1948-
Lehigh River at Easton, Pa.	1,364	1909.
Delaware River at Riegelsville, N. J.	6,328	1906-
Lake Hopatcong at Landing, N. J.	25.6	(1887-1940*)c/.
Musconetcong River at outlet of Lake Hopatcong, N. J.	25.6	1928-
Musconetcong River near Hackettstown, N. J.	70.0	1921-
Musconetcong River at Asbury, N. J.		1903.
Musconetcong River near Bloomsbury, N. J.	143	1903-7; 1921-
Delaware River at Milford, N. J.	6,381	1936-40*.
Delaware River at Frenchtown, N. J.	6,420	1936-40*.
Delaware River at Point Pleasant, Pa.	6,473	1936-40*.
Tohickon Creek near Pipersville, Pa.	97.4	1935-
Tohickon Creek at Point Pleasant, Pa.	107	1883-99; (1900)a/; 1901-13.
Delaware River at Lumberville, Pa.	6,598	1936-40.
Delaware and Raritan Canal at Kingston, N. J.		1947-
Delaware River at Stockton, N. J.	6,656	1936-40.
Delaware River at Lambertville, N. J.	6,680	1897-1902; 1903-8*; 1936-40*.
Delaware River at Washington Crossing, N. J.	6,735	1936-40*.
Delaware River at Yardley, Pa.	6,772	1936-40*.
Delaware River at Trenton, N. J.	6,780	1913-
Assunpink Creek at Trenton, N. J.	89.4	1923-
Crosswicks Creek at Extonville, N. J.	83.6	1940-
Neshaminy Creek at Rushland (below Forks), Pa.	134	1884-1912; 1931-34.
Neshaminy Creek near Langhorne, Pa.	210	1934-
Rancocas Creek:		
North Branch Rancocas Creek at Pemberton, N. J.	111	1921-
Schuylkill River at Pottsville, Pa.	53.4	1943-
Schuylkill River at Schuylkill Haven, Pa.	127	(1914-16; 1916-19*)a/.
Schuylkill River at Landingville, Pa.	133	1947-
Schuylkill River at Auburn, Pa.	157	1947-51.
Little Schuylkill River at Tamaqua, Pa.	42.9	(1916-19*)a/; 1919-21; (1921-31)a/; 1931-
Little Schuylkill River at Drehersville, Pa.	122	1947-51.
Little Schuylkill River at Molino, Pa.	130	(1914-19*)a/.
Schuylkill River at Berne, Pa.	355	1947-
Tulpehocken Creek near Reading, Pa.	211	1950-
Schuylkill River at Reading, Pa.	880	(1914-15; 1915-19*)a/; 1919-21; (1921-30)a/.

Index of surface-water records–Continued

	Drainage area (square miles)	Period of record
Schuylkill River at Pottstown, Pa.	1,147	(1927-31)a/; 1931-
Perkiomen Creek near Frederick, Pa.	162	1884-1912.
Perkiomen Creek at Graters Ford, Pa.	279	(1914-16; 1916-26*; 1926-31)a/; 1931-
Schuylkill River at Norristown, Pa.	1,760	(1927-31)a/; 1931-33.
Schuylkill River at Conshohocken, Pa.	1,800	(1914-16*; 1921-22*)a/
Wissahickon Creek near Philadelphia, Pa.	65.0	1897-1902; 1905-06.
Schuylkill River near and at Philadelphia, Pa.	1,893	1898-1912; 1931-
Mantua Creek at Pitman, N. J.	6.75	1940-
Darby Creek at Lansdowne, Pa.	35.0	(1911-16)a/.
Crum Creek at Woodlyn, Pa.	33.3	1931-37.
Ridley Creek at Moylan, Pa.	31.9	1931-
Chester Creek near Chester, Pa.	61.1	1931-
Oldmans Creek near Woodstown, N. J.	19.3	1931-40.
Christina River at Coochs Bridge, Del.	20.5	1943-
White Clay Creek near Newark, Del.	87.8	1931-36; 1943-
Mill Creek at Stanton, Del.	12.3	1931-33.
Red Clay Creek at Wooddale, Del.	47.0	1943-
West Branch Brandywine Creek at Coatesville, Pa.	45.8	1943-
Brandywine Creek at Chadds Ford, Pa.	287	(1911-18*)a/; 1918-21; (1921-31)a/; 1931-
Brandywine Creek at Wilmington, Del.	314	1946-
Shellpot Creek at Wilmington, Del.	7.5	1945-
Salem Creek at Woodstown, N. J.	14.6	1941-
Delaware Bay tributaries		
Cohansey River:		
West Branch Cohansey River at Seely, N. J.	2.69	1951-
Loper Run near Bridgeton, N. J.	2.34	1937-
Leipsic River near Cheswald, Del.	9.2	1931-33; 1943-
Maurice River at Norma, N. J.	113	1932-
Manantico Creek near Millville, N. J.	22.3	1931-
Murderkill River near Felton, Del.	14.2	1931-33.

* Gage heights, or gage heights and discharge measurements only.
a/ In reports of Pennsylvania Department of Forests and Waters.
b/ Revised.
c/ In Special Report 9 of New Jersey State Water Policy Commission (Hartwell, 1944).

Selected Publications on Surface Water

Note: See also "Selected Publications on Quality of Surface Water," page 10.

Ayer, G. R., 1949, A progress report on an investigation of the influence of reforestation of streamflow in state forests in central New York: U. S. Geol. Survey and New York State Dept. Cons., 185 pp. (Edition limited to 100 copies.)

Board of Consulting Engineers, 1946, Development of an upland source of water supply and suitability of existing sources of supply with augmented facilities: Board of Consulting Engineers report to the Philadelphia Water Commission, 98 pp. plus appendices.

Cross, W. P., 1935, A program for the investigation of the influence of forests on streamflow in the State of New York: Ohio State University, thesis for degree of civil engineer, 128 pp. (Manuscript report in files of U. S. Geol. Survey, Albany, N. Y.)

Freeman, G. D., 1940, Progress report on the investigation of the influence of reforestation on streamflow in the State of New York: U. S. Geol. Survey manuscript report, 85 pp. (In files of U. S. Geol. Survey, Albany, N. Y.)

Graham, J. B., Mangan, J. W., and White, W. F., Jr., 1951, Water resources of southeastern Bucks County, Pa.: U. S. Geol. Survey Circ. 104, 21 pp.

Grover, N. C., 1937, Floods of March 1936, Part 2, Hudson River to Susquehanna River region: U. S. Geol. Survey Water-Supply Paper 799, 380 pp.

Harrington, A. W., 1947, Flood of August 16-17, 1947, in the Callicoon Creek basin in New York, U. S. Geol. Survey manuscript report, 10 pp. (In files of U. S. Geol. Survey, Albany, N. Y.

Hartwell, O. W., 1929, Surface water supply of New Jersey, to Sept. 30, 1928: New Jersey Dept. Cons. and Devel. Bull. 33, 301 pp.

Hartwell, O. W., 1936, Surface water supply of New Jersey, Oct. 1, 1928 to Sept. 30, 1934: New Jersey Water Policy Comm. Special Rept. 5, 253 pp.

—— 1944, Surface water supply of New Jersey, Oct. 1, 1934 to Sept. 30, 1940: New Jersey Water Policy Comm. Special Rept. 9, 444 pp.

Heacox, C. E., 1949, Information on New York City water supply: New York State Dept. Cons., 18 pp.

Horton, R. E., and VanVliet, Richard, 1940, The Delaware River basin–Flood volumes: Interstate Commission on the Delaware River Basin, 38 pp.

Interstate Commission on the Delaware River Basin, 1940, The Delaware River basin, physical facts, 36 pp.

Malcolm Pirnie Engineers, and Albright and Friel, Inc., 1950, Report on the utilization of the waters of the Delaware River basin: Consulting engineers report to the Interstate Commission on the Delaware River Basin, 154 pp.

Mangan, J. W., 1936, The floods of March 1936 in Pennsylvania: Pennsylvania Dept. Forests and Waters, 129 pp.

—— 1937, The drought of 1930 in Pennsylvania: Pennsylvania Dept. Forests and Waters, 22 pp.

—— 1940, Natural water losses from Pennsylvania drainage basins: Pennsylvania Dept. Forests and Waters, 73 pp.

—— 1942, Elevations of major floods along Pennsylvania rivers: Pennsylvania Dept. Forests and Waters, 28 pp.

—— 1942a, The floods of May 1942 in the Delaware and Lackawanna River basins: Pennsylvania Dept. Forests and Waters, 29 pp.

—— 1946, Temperatures of natural waters in Pennsylvania: Pennsylvania Dept. Forests and Waters, 222 pp.

—— 1950, Flood discharge records relating to Pennsylvania streams: Pennsylvania Dept. of Forests and Waters, 59 pp.

Mangan, J. W., and Bernard, Merrill, 1939, Report of cooperative hydrologic investigations: Pennsylvania Dept. of Forests and Waters, U. S. Weather Bureau, and U. S. Geol. Survey, 168 pp.

Pennsylvania Department of Forests and Waters, 1922-41, Streamflow records of Pennsylvania; issued at intervals of 1 to 4 years for water years 1921-22 to 1940-41.

—— 1938, Flood discharge records relating to Pennsylvania streams, 37 pp.

Pennsylvania State Planning Board, 1934, Preliminary report of Pennsylvania State Planning Board, 682 pp.

—— 1937, Drainage basin study of Pennsylvania, part 1, 142 pp.

—— 1947, Industrial utility of water in Pennsylvania, chemical character of surface water, 1944 to 1946: Pennsylvania State Planning Board Pub. 17, 172 pp.

Pennsylvania Water Supply Commission, 1912-22, Report of the Water Supply Commission of Pennsylvania, issued at intervals of 1 to 2 years and containing streamflow records for calendar years 1908 to 1913 and for water years 1913-14 to 1920-21.

—— 1917, Water resources inventory report, part 3, Gazetteer of streams, 657 pp.

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Uhl, W. F., 1929, The development of the Mongaup River: Jour. Boston Soc. Civil Eng., 62 pp., May. (Also published separately by Rockland Light and Power Co.)

U. S. Army Department, 1930, Report from the Chief of Engineers, U. S. Army on Mongaup River, N. Y.: 71st Cong., 3d sess., H. Doc. 660., 19 pp.

—— 1931, Report from the Chief of Engineers, U. S. Army, on the Neversink River, N. Y., covering navigation, flood control, power development, and irrigation: 72d Cong., 1st sess., H. Doc. 147, 25 pp.

—— 1934, Report from Acting Chief of Engineers, U. S. Army, on the Delaware River for the purposes of navigation and efficient development of its water power, the control of floods, and the needs of irrigation: 73d Cong., 2d sess., H. Doc. 179, 174 pp. (This report is also referred to as the Corps of Engineers' "308" report on the Delaware, one of a series of river-basin reports authorized by enactment of the provisions of House Document 308, 69th Congress, 1st session.)

U. S. Geological Survey, issued annually, Surface water supply of the United States, Part 1, North Atlantic Slope basins.

The following table gives the number of the water-supply paper containing records for the year shown. Prior to 1914 the records were published on a calendar-year basis. Since 1914 the records cover the year ending September 30.

Table 1.–Annual Water-Supply Papers containing streamflow records

Year	W. S. P. No.	Year	W. S. P. No.	Year	W. S. P. No.	Year	W. S. P. No.
1899	35	1913	351	1927	641	1940	891
1900	47, 48	1914	381	1928	661	1941	921
1901	65, 75	1915	401	1929	681	1942	951
1902	82	1916	431	1930	696	1943	971
1903	97	1917	451	1931	711	1944	1001
1904	125	1918	471	1932	726	1945	1031
1905	166	1919-20	501	1933	741	1946	1051
1906	202	1921	521	1934	756	1947	1081
1907-08	241	1922	541	1935	781	1948	1111
1909	261	1923	561	1936	801	*1949	1141
1910	281	1924	581	1937	821	**1950	1171
1911	301	1925	601	1938	851	**1951	1202
1912	321	1926	621	1939	871		

* In press.
** In preparation.

White, W. F., Jr., 1951, Industrial utility of water, chemical character of surface water in Pennsylvania, 1946 to 1949: Pennsylvania State Planning Board Pub. 23, 169 pp.

White, W. F., Jr., and Lindholm, C. F., 1950, Water resources investigations relating to the Schuylkill River restoration project, Oct. 1947 to Dec. 1949: Pennsylvania Dept. Forests and Waters, 125 pp.

Index of Chemical and Sediment Sampling Station and Water Temperature Records

Specific conductance is measured daily at each daily sampling station established since 1943. At these stations a complete or partial analysis is made of a 10-day composite sample or of one weekly or biweekly sample, as indicated by footnotes. Monthly samples of Delaware River water downstream from Trenton are collected at or near the beginning of each month. No monthly samples were collected in February 1951.

A complete chemical analysis as made by the Geological Survey usually includes tests as given below for most of the constituents and properties normally found in ground and surface waters in significant amounts. Partial analyses include only a few tests for these constituents and properties.

Silica	Carbonate	Hardness as calcium carbonate
Iron as Fe	Bicarbonate	Color
Manganese	Sulfate	Hydrogen ion concentration (pH)
Calcium	Chloride	Specific conductance
Magnesium	Fluoride	
Sodium	Nitrate	Temperature, measured at site
Potassium	Dissolved solids	

Samples of suspended sediment are collected with a type U. S. D-43 sampler. Additional samples of suspended sediment are obtained during flood periods.

Observations of water temperature were made at most daily sampling stations.

The sampling stations are listed in downstream order. Tributary streams are indicated by indention.

	Frequency of sampling	Period of record	
		Chemical quality	Suspended sediment
Delaware River at Narrowsburg, N. Y.	Daily a/	Oct. 1948-	——
Delaware River at Dingman's Ferry, Pa.	.....do a/....	Oct. 1950-	——
Delaware River at Belvidere, N. J.	.....do a/....	Oct. 1944 to Sept. 1947	——
Delaware River at Easton, Pa.	.....do a/....	Oct. 1947-	——
Lehigh River at Walnutport, Pa.	.....do.....	——	July 1948-
Lehigh River at Catasauqua, Pa.	.....do a/....	Oct. 1944-	——
Lehigh River at South Bethlehem, Pa.	.....do.....	Sept. 1906 to Sept. 1907	——
Delaware River at Lambertville, N. J.	.....do.....	Sept. 1906 to Sept. 1907	——
Delaware River at Trenton, N. J.	.....do a/....	Oct. 1944-	Aug. 1949-
Delaware River at Burlington, N. J. (Bristol-Burlington Bridge)	Monthly b/	Dec. 1949-	——
Delaware River at Torresdale, Philadelphia, Pa.	.....do c/....	Dec. 1949-	——
Delaware River at Lehigh Ave., Philadelphia, Pa.	.....do c/....	Dec. 1949-	——
Delaware River at Vine St., Philadelphia, Pa. (Philadelphia-Camden Bridge)	.....do b/....	Dec. 1949-	——

Index of Chemical and Sediment Sampling Station and Water Temperature Records–Continued

	Frequency of sampling	Period of record	
		Chemical quality	Suspended sediment
Delaware River at Wharton St., Philadelphia, Pa.....	.....do c/....	Dec. 1949-	———
Delaware River at League Island, Philadelphia, Pa...	.....do c/....	Dec. 1949-	———
Schuylkill River at Port Carbon, Pa.....	Daily d/	Feb. 1949 to June 1951	Feb. 1949-
Schuylkill River at Landingville, Pa.....	.....do e/....	Sept. 1947-	Sept. 1947-
Schuylkill River at Auburn, Pa.....	.....do e/....	Sept. 1947 to June 1951	Sept. 1947-
Little Schuylkill River at South Tamaqua, Pa.....	.....do d/....	Apr. 1950-	Apr. 1950-
Little Schuylkill River at Drehersville, Pa.....	.....do e/....	Sept. 1947 to June 1951	Sept. 1947-
Schuylkill River at Berne, Pa.....	.....do a/....	Feb. 1948-	Sept. 1947-
Schuylkill River at Pottstown, Pa.....	.....do a/....	Oct. 1944-	Mar. 1948-
Perkiomen Creek at Graters Ford, Pa.....	.....do.....	———	Apr. 1948-
Schuylkill River at Manayunk, Philadelphia, Pa...	.....do.....	———	Nov. 1947-
Schuylkill River at Belmont Filter Plant, Philadelphia, Pa.....	.....do a/....	Oct. 1945-	———
Delaware River at Eddystone, Pa.....	Monthly c/	Dec. 1949-	———
Delaware River at Marcus Hook, Pa.....	.....do b/....	Dec. 1949-	———
Christina River:			
Brandywine Creek at Wilmington, Del.....	Daily	———	Dec. 1946-

a/ Complete analysis for each 10-day composite first year or two; 5 completes, 31 partials each succeeding year; daily temperature.

b/ Samples from 5 bottom and 5 top points spaced evenly across river; complete analyses made of 3 to 5 of bottom samples, partial analyses of remaining samples.

c/ Samples from 3 bottom and 5 top points in river; partial analyses made of all samples.

d/ Complete analysis for one sample every 2 weeks.

e/ Complete analysis for one sample each week.

Selected Publications on Quality of Surface Water

Note: For references to Delaware basin publications on streamflow, floods, drought, and water resources as a whole, see "Selected Publications on Surface Water, page 7.

Clarke, F. W., 1924, The composition of the river and lake waters of the United States: U. S. Geol. Survey Prof. Paper 135, 199 pp. (Contains analyses of several surface-water sources in the Delaware River basin.)

Collins, W. D., and Howard, C. S., 1928, Quality of the surface waters of New Jersey: U. S. Geol. Survey Water-Supply Paper 596-E, pp. 89-119. (Contains analyses of one to four samples each from 3 locations on Delaware River and 12 tributaries in New Jersey.)

Collins, W. D., Lamar, W. L., and Lohr, E. W., 1934, The industrial utility of public water supplies in the United States, 1932: U. S. Geol. Survey Water-Supply Paper 658, 135 pp. (Contains analyses of most of the larger public water supplies in the Delaware River basin, many of which are from surface-water sources.)

Dole, R. B., 1909, The quality of surface waters in the United States, Part 1, Analyses of waters east of the one hundredth meridian: U. S. Geol. Survey Water-Supply Paper 236, 123 pp. (Contains analyses of composites of daily samples collected in 1906-07 from Delaware River at Lambertville, N. J., and from Lehigh River at South Bethlehem, Pa.)

Graham, J. B., Mangan, J. W., and White, W. F., Jr., 1951, Water resources of southeastern Bucks County, Pa.: U. S. Geol. Survey Circ. 104, 21 pp. (Contains analyses of surface waters in southeastern Bucks County, Pa.)

Malcolm Pirnie Engineers, and Albright and Friel, Inc., 1950, Report on the utilization of the waters of the Delaware River basin: Consulting Engineers' report to the Interstate Commission on the Delaware River Basin, 154 pp. (Contains analyses of surface waters at 25 sites throughout the Delaware basin in July 28, Aug. 16, and Sept. 20, 1949, as well as other quality-of-water data, relating chiefly to selected constituents, especially chloride, in the lower Delaware basin.)

Mangan, J. W., 1946, Temperatures of natural waters in Pennsylvania: Pennsylvania Dept. Forests and Waters, 222 pp. (Contains daily temperature measurements at 24 other stations, Delaware basin, Oct. 1, 1944 to Sept. 30, 1945.)

Mason, W. D., and Pietsch, W. H., 1940, Salinity movement and its causes in the Delaware River estuary: Am Geophys. Union Trans., vol. 21, part 2, pp. 457-463. (Contains 2 graphs relating to observed and computed salinity in Delaware River downstream from Philadelphia, based on studies by the Delaware River Conservation Association and its Engineering Board.)

Pennsylvania Department of Health, 1935, Final report on the salinity survey of the Delaware River: Pennsylvania Dept. Health, Bur. Eng., report to the

Sanitary Water Board, 75 pp. plus supplements and appendices. (Contains 17 analyses of surface waters of lower Delaware River and Delaware Bay, 1931-32, and a copy of the analyses, Delaware River at Lambertville, 1906-7, given in U. S. Geol. Survey Prof. Paper 135 (Clarke, 1924), as well as more than 60 maps, graphs, and tables concerning lower Delaware River salinity in relation to streamflow and tides, 1907-34.)

Pennsylvania State Planning Board, 1947, Industrial utility of water in Pennsylvania, chemical character of surface water, 1944 to 1946: Pennsylvania State Planning Board Publication 17, 172 pp. (Contains analyses of many surface waters in Lehigh and Schuylkill River basins, and in other parts of the Delaware River basin in Pennsylvania.)

Philadelphia Inquirer, The, 1950, Water—a study of its hardness in the Philadelphia retail trading area: The Philadelphia Inquirer, Philadelphia Market Facts (report) 5, 16 pp. (Contains analyses, principally of hardness, of surface waters used for public supplies of Philadelphia metropolitan area, consisting of the Delaware and Schuylkill Rivers, and Brandywine, Crum, Neshaminy, and Pickering Creeks.)

Pietsch, W. H., 1934, The cause and extent of brackish water incursions into the fresh water section of the Delaware estuary: Delaware River Cons. Assoc., 8 pp. (Contains 9 graphs relating to observed and computed salinity in Delaware River downstream from Philadelphia, especially during low-flow periods of 1930 and 1931.)

Storey, H. C., 1951, Forest and water research project, Delaware-Lehigh Experimental Forest: Pennsylvania Dept. Forests and Waters, U. S. Forest Service and U. S. Geol. Survey, 44 pp. (Contains 7 analyses of surface water of Dilldown Creek, 1950, as well as periodic temperature measurements 1949-50.)

U. S. Corps of Engineers, 1952, Delaware River model study, report 3—Effects of proposed channel enlargement between Philadelphia and Trenton: U. S. Waterways Exper. Sta. Tech. Mem. 2-337, 14 pp. (Contains graphical data on existing salinity in lower Delaware River during low flow in 1930 and 1932, and possible future salinity during low flow in the deepened channel as based upon model studies at Vicksburg, Miss.)

U. S. Geological Survey, 1949, Quality of surface waters of the United States, 1945: U. S. Geol. Survey Water-Supply Paper 1030, 335 pp. (Contains analyses of surface waters in Delaware River basin made in 1945 water year.)

—— 1950, Quality of surface waters of the United States, 1946: U. S. Geol. Survey Water-Supply Paper 1050, 486 pp. (Contains analyses of surface waters in Delaware River basin made in 1946 water year.)

White, W. F., Jr., 1951, Industrial utility of water, chemical character of surface water in Pennsylvania, 1946 to 1949: Pennsylvania State Planning Board Pub. 23, 169 pp. (Contains analyses of many surface waters in Lehigh and Schuylkill River basins, and in other parts of the Delaware River basin in Pennsylvania.)

White, W. F., Jr., and Lindholm, C. F., 1950, Water resources investigations relating to the Schuylkill River restoration project, Oct. 1947 to Dec. 1949: Pennsylvania Dept. Forests and Waters, 125 pp. (Contains analyses of many sources of surface water in the Schuylkill River basin.)

GROUND WATER

Explanation of Data

The index lists each well in which measurements of water level have been, or are being, made on a continuous basis, or on a periodic basis such as weekly, monthly, or quarterly. These measurements are largely of static water levels. Some observation wells are far removed from any wells being pumped, while others are at, or near, the center of areas of large ground-water pumpage. A detailed description of each well is given with the published record of the first year of water-level measurements made at the well.

Most continuous or periodic measurements of water level appear in published form in the annual series of U. S. Geological Survey Water-Supply Papers entitled Water levels and artesian pressure in observation wells in the United States, part 1, northeastern states. These Water-Supply Papers are listed by year and number on page 18. Those measurements not published are available for public inspection at the field office of the Ground Water Branch in the state in which the well is located.

Index of water-level records for observation wells

State, county, and municipality	Sub-basin	Well name or number a/	Period of record
DELAWARE			
Kent			
Camden	St. Jones River	Jd11	1950-
Dover	do	Id4	1950-
Frederica	Murderkill River	Ke4	1950-
Harrington	do	Ld8	1950-
Kenton	Leipsic River (Little Duck Creek)	Ic4	1950-
New Castle			
Newark	Christina River (White Clay Creek)	Ca3	1950-
Do.	do	Cb123	1951-
New Castle	Broad Dyke Creek	Cd2	1950-

Index of water-level records for observation wells—Continued

State, county, and municipality	Sub-basin	Well name or number a/	Period of record
DELAWARE—Continued			
St. Georges	Scott Run	Ec7	1950-
Smyrna	Smyrna River	Gc5	1950-
Wilmington	Christina River (Brandywine Creek)	Bd10	1950-
Sussex			
Ft. Miles	Delaware Bay	Ni1	1944-
Do.	do	Ni2	1944-
Lewes	do	Ni3	1949-
Milford	Mispillion River	Mf3	1950-
NEW JERSEY			
Burlington			
Beverly	Delaware, lower	Beaunitt Mills	1950-
Camden	Cooper Creek	Camden test	1950-
Do.	Delaware, lower	Esterbrook Pen	1950-
Do.	Cooper Creek	Hollingshead	1950-
Do.	Pensauken Creek	Morris test-3	1924-
Do.	Delaware, lower	NJ Water-10	1932-
Do.	do	NJ Water-27th St.	1932-
Do.	do	NY Ship-5A	1950-
Do.	do.	RCA	1950-
Merchantville (E of)	Puchack Creek	Amon Heights	1932-
Pettys Island	Delaware, lower	Cities Service	1949-
Cumberland			
Bridgeton (N of)	Cohansey River	Miller-Ware	1951-
Do.	do	Seabrook-dehydration	1950-
Do.	do	Seabrook-spinach	1950-
Do.	do	Seabrook-spreading-1	1950-
Do.	do	Seabrook-spreading-2	1950-
Gloucester			
Gibbstown	Delaware, lower	Repauno-1	1947-
Do.	do	Repauno-2	1949-
Paulsboro	do	Socony-32	1950-
Do.	do	Socony-39	1950-
Westville (W of)	do	Texas-1	1949-
Do.	do	Texas-2	1949-
Do.	do	Texas-3	1949-
Do.	do	Texas-4	1949-
Mercer			
Hamilton Square (NE of)	Assunpink Creek	Drew	1945-46
Hamilton Square (N of)	do	Everett	1944-
Hamilton Square (NE of)	do	Hofling	1945-
Lawrenceville (NE of)	do	Anderson	1944-
Lawrenceville (E of)	do	Gibeau	1945-
Salem			
Deepwater	Delaware, lower	Obs-31	1940-
Do.	do	Obs-51	1940-
Do.	do	Obs-52	1940-51
Do.	Salem Creek	Obs-54	1940-
Do.	do	Obs-55	1940-
Do.	do	Obs-62	1940-
Do.	do	Obs-63	1941-
Do.	do.	Obs-64	1941-
Do.	do	Obs-65	1940-
Do.	Delaware, lower	Obs-71	1940-
Do.	Salem Creek	Obs-72	1940-
Do.	Delaware, lower	Obs-E16	1940-
Do.	Salem Creek	Obs-R8	1940-
Pedricktown (W of)	Delaware, lower	Obs-7	1940-
Pedricktown (SW of)	Oldmans Creek	Obs-R2	1940-
Penns Grove (S of)	Delaware, lower	Clemente-deep	1941-

Index of water-level records for observation wells–Continued

State, county, and municipality	Sub-basin	Well name or number a/	Period of record
NEW JERSEY–Continued			
Salem			
Penns Grove (S of)	Salem Creek	Layton-6	1949-
Penns Grove	Oldmans Creek	Obs-6	1940-
Do.	Delaware, lower	Obs-9	1940-
Do.	Oldmans Creek	Obs-10	1940-
Penns Grove (E of)	do	Obs-11	1940-
Penns Grove	Delaware, lower	Obs-12	1940-
Do.	do	Obs-13	1940-
Do.	Salem Creek	Obs-14	1940-
Do.	Delaware, lower	Obs-15	1941-
Do.	Salem Creek	Obs-21	1940-45
Do.	Delaware, lower	Obs-22	1939-
Do.	do	Obs-24	1941-
Penns Grove (S of)	do	Obs-32	1940-
Penns Grove	Salem Creek	Obs-35	1940-
Do.	do	Obs-36	1940-
Do.	Delaware, lower	Obs-41	1941-
Do.	do	Obs-E14	1940-
Do.	do	Obs-E15	1940-
Do.	Salem Creek	Test-R5	1940-
Do.	do	Test-R7	1940-
Pennsville	do	Obs-73	1940-
Do.	do	Obs-74	1940-
Do.	do	Obs-81	1940-45
Do.	do	Obs-84	1940-
Pennsville (S of)	Delaware, lower	Obs-91	1940-51
Pennsville (SE of)	Salem Creek	Obs-92	1940-
Sharptown (NE of)	Oldmans Creek	Seabrook-5	1950-
Shirley (N of)	Maurice River	Thornthwaite	1949-
NEW YORK			
Delaware			
China	West Branch Delaware River	D-157	1934-
PENNSYLVANIA			
Berks			
Bally	Schuylkill River (Perkiomen Creek)	Be-1(114)	1936-48
Do.	do	Be-5(133)	1949-
Berne (NE of)	Schuylkill River	Be-2(128)	1948-
Elverson (NE of)	Schuylkill River (French Creek)	Be-3(F4a)	1948-
Do.	do	Be-4(F4b)	1948-
Bucks			
Morrisville (SE of)	Delaware, lower	Bk-2	1948, 1950-
Morrisville (S of)	do	Bk-3	1950-
Point Pleasant (NW of)	Tohickon Creek	Bk-1(F3)	1948-49
Chester			
Avondale	Christina River (White Clay Creek)	Ch-1(113)	1936-37
Brandywine Manor (SE of)	Christina River (Brandywine Creek)	Ch-3	1951-
Chadds Ford (NW of)	do	Ch-9	1951-
Coatesville (S of)	do	Ch-4	1951-
Coatesville (W of)	do	Ch-15	1951-
Cochranville (NE of)	do	Ch-13	1951-
Doe Run	do	Ch-10	1951-
Doe Run (S of)	Christina River (White Clay Creek)	Ch-8	1951-
Downingtown	Christina River (Brandywine Creek)	Ch-11	1951-
Embreeville (N of)	do	Ch-5	1951-
Glenmoore (E of)	do	Ch-14	1951-
Hamorton (NW of)	do	Ch-7	1951-
Honeybrook (NE of)	do	Ch-12	1951-
Ludwigs Corner	Schuylkill River (French Creek)	Ch-2	1951-
West Chester (W of)	Christina River (Brandywine Creek)	Ch-6	1951-
Delaware			
Elam (SW of)	do	De-3	1951-

Index of water-level records for observation wells–Continued

State, county, and municipality	Sub-basin	Well name or number a/	Period of record
PENNSYLVANIA–Continued			
Lackawanna			
Thornhurst (NW of)	Lehigh River	Lk-3(F8)	1948-49
Monroe			
Long Pond (W of)	Lehigh River (Dilldown Creek)	Mo-1	1948-
Do.	do	Mo-2	1948-
Do.	do	Mo-3	1948-
Montgomery			
Graterford (N of)	Schuylkill River (Perkiomen Creek)	Mg-3(131)	1948-
Pottstown	Schuylkill River	Mg-2(126)	1948-51
Trappe	Schuylkill River (Perkiomen Creek)	Mg-4	1949-
Northampton			
Hellertown (E of)	Lehigh River	Np-1	1951-
Philadelphia			
Philadelphia	Schuylkill River	P-1	1943-48
Do.	Delaware, lower	P-3	1943-
Do.	do	P-4	1943-
Do.	Schuylkill River	P-5	1944-
Do.	do	P-6	1944-
Do.	Delaware, lower	P-7	1944-45
Do.	do	P-8	1944-
Do.	do	P-9	1947-
Do.	do	P-10	1950-
Do.	do	P-N5	1944-
Do.	do	P-NO1	1945-
Do.	do	P-NO2	1944-
Do.	do	P-NO3	1945-
Do.	do	P-NO4	1945-
Do.	do	P-NO5	1945-
Do.	do	P-NO6	1945-
Do.	do	P-NO8	1946-
Do.	do	P-NO9	1946-
Do.	do	P-NO10	1946-
Do.	Schuylkill	P-NOM1	1944-46
Pike			
Bushkill (NW of)	Bushkill Creek	Pi-1(F5)	1948-
Dingmans Ferry (W of)	Bushkill Creek (Little Bushkill Creek)	Pi-2(F6)	1948-
Lords Valley (NW of)	Lackawaxen River	Pi-3(F7)	1948-
Schuylkill			
Auburn	Schuylkill River	Sc-5(132)	1948-
Drehersville	Schuylkill River (Little Schuylkill River)	Sc-2(127)	1948-51
Landingville	Schuylkill River	Sc-4(130)	1948-
Tamaqua (SE of)	Schuylkill River (Little Schuylkill River)	Sc-3(129)	1948-
Wayne			
Hawley	Lackawaxen River	Wn-1(83)	1931-42, 1944

a/ Pennsylvania well numbers in parentheses appear in reports of water levels measured prior to 1951.

Index of Chemical Sampling of Ground Water

Location of wells sampled periodically

The following wells have been, or are being, sampled periodically during the course of special studies of chemical quality of ground water in the vicinity of the U. S. Naval Base, Philadelphia, and of ground water in relation to bottom waters of the Delaware River in the Philadelphia-Camden area. The first sample collected at each site is usually analyzed for the constituents and properties given below. Thereafter, most analyses are limited and include tests for only a few of the constituents and properties.

Silica
Iron as Fe
Manganese
Calcium
Magnesium
Sodium
Potassium
Carbonate
Bicarbonate
Sulfate
Chloride
Fluoride
Nitrate
Dissolved solids
Hardness as calcium carbonate
Color
Hydrogen ion concentration (pH)
Specific conductance

Temperature, measured at site

PENNSYLVANIA

Philadelphia County

(The land surface at the following sites drains to the Delaware River between Frankford Creek and the Schuylkill River.)

Location of site	Well sampled	Frequency of sampling	Period of record
Abbotts Daries, Inc. 2d and Lombard Sts., Phila.	Abbott-2 or Abbott-3.	Monthly or bimonthly.	Dec. 1949-
General Cold Storage Co. Oregon Ave. and Weccacoe St., Phila.	GCS-1, GCS-2, or GCS-3.	Monthly or bimonthly.	Dec. 1949-
Lummis & Co. Delaware Ave. near Race St., Phila.	Lummis-4	Monthly or bimonthly.	Dec. 1949-
Publicker Industries, Inc. Delaware Ave. and Bigler St., Phila.	Publicker-7	Monthly or bimonthly.	Dec. 1949-
	Publicker-12	Monthly	Dec. 1949-
U. S. Naval Base S. Broad St., on League Island, Phila.	P-N1	Biweekly.	Nov. 1945-Mar. 1947
	P-N2	Biweekly.	Nov. 1945-Mar. 1947
	P-N3	Biweekly.	Nov. 1945-Mar. 1947
	P-N4	Biweekly.	Nov. 1945-Mar. 1947
	P-N6	Biweekly.	May 1946-Mar. 1947
	P-N7	Biweekly.	Nov. 1945-Mar. 1947
	P-N8	Biweekly.	Nov. 1945-Mar. 1947

Location of miscellaneous analyses of ground water

The following table indicates the general scope of work done by, or for, the Geological Survey with respect to chemical quality of ground water in the Delaware basin, other than periodic analyses made in connection with special studies (see preceding page). The analyses are tabulated by counties in conformity with the established practice of compiling and publishing most ground-water data on a county basis. However, wells and springs located in only that part of a county within the basin are included in the list below. In addition to the Survey analyses tabulated here, the Geological Survey also compiles as part of county well-inventory reports a number of analyses made by other laboratories.

The complete analyses include tests for most of the constituents and properties normally found in ground and surface waters. Partial analyses include tests for only a few of these constituents and properties.

State and county	Number of wells and springs analyzed	Number of complete analyses	Number of partial analyses
DELAWARE			
Kent	9	9	0
New Castle	11	11	0
Sussex	9	9	12
NEW JERSEY			
Burlington	49	58	0
Camden	57	86	48
Cape May	5	0	5
Cumberland	2	2	0
Gloucester	42	42	0
Mercer	a/7	7	0
Salem	26	15	11
Sussex	1	0	1
NEW YORK			
Delaware	20	1	b/19
Greene	2	0	b/ 2
Orange	5	0	b/ 5
PENNSYLVANIA			
Berks	5	5	0
Bucks	56	c/29	c/18
Carbon	4	2	2
Chester	23	c/22	0
Delaware	7	7	0

State and county	Number of wells and springs analyzed	Number of complete analyses	Number of partial analyses
PENNSYLVANIA–Continued			
Lancaster	1	1	0
Lebanon	2	2	0
Lehigh	4	4	0
Luzerne	2	1	1
Monroe	12	4	8
Montgomery	16	c/ 12	0
Northampton	12	c/ 11	0
Philadelphia	48	37	46
Pike	5	2	3
Schuylkill	3	1	2
Wayne	10	5	5

a/ Includes one spring that is actually a group of springs of uncertain number.
b/ Analyses made for Geological Survey by New York State Department of Health.
c/ Includes one or more analyses of composite samples, each sample representing the combined waters from more than one well or spring.

Selected Publications on Ground Water, Including Chemical Quality

The two-letter symbols preceding the authors' names indicate, in order of importance, the general content of each publication with respect to ground water:

Av–availability or use of ground water.
Ge–geology, including one or more geologic maps, scale 1:62,500 or 1:125,000, unless indicated otherwise.
Qu–quality of ground water, including one or more chemical analyses.
WL–water levels, including tabular or graphical data.

Av Barksdale, H. C., 1945, Ground-water problems of New Jersey: Jour. Am. Water Works Assoc., vol. 37, no. 6, pp. 563-568.

Ge Bascom, Florence, and Miller, B. L., 1920,
Av Elkton-Wilmington folio, Md.-Del.-N. J.-Pa.:
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Qu Cons. and Devel. Bull. 39, 80 pp. (Parts of Burlington, Camden, and Gloucester Counties.)

WL United States Geological Survey, 1936-50, issued annually (see below), Water levels and artesian pressure in observation wells in the United States (supplementary title since 1940—Part 1, Northeastern states): U. S. Geol. Survey Water-Supply Papers.

Table 2.—Annual Water-Supply Papers containing water-level records

Year of report	Water-Supply Paper no.	Delaware part of area (pages)	New Jersey part of area (pages)	New York part of area (pages)	Pennsylvania part of area (pages)
1935	777	-	-	128-129	-
1936	817	-	174-175	199	268, 272; 300-301
1937	840	-	242-243	256	351, 353, 364
1938	845	-	200-201	302	417, 432
1939	886	-	343-344	469-470	628, 637
1940	906	-	85-87	109	217, 226
1941	936	-	80-81, 112-128	131	241, 251
1942	944	-	80-82, 100-109	112	233, 242
1943	986	-	90-92, 118-133	136-137	279, 285-287
1944	1016	23-24	124-126, 149-166	169	323, 329-335, 338
1945	1023	20-21	150-152, 174-190	200	339, 345-356, 359
1946	1071	18-19	174-177, 198-211	218	421, 428-441, 444
1947	1096	19-20	186-188, 207-223	232	424, 431-443, 446
1948	1126	17-18	184-185, 196-200	209	384, 388-401, 404

NOTE. Pending publication, manuscript copies for the years 1949, 1950, and 1951 are available for inspection at the respective U. S. G. S. field offices of these four states.

COOPERATING AGENCIES IN THE DELAWARE BASIN STATES

The water-resources investigations in the Delaware River basin are conducted cooperatively with the following agencies. The branch of the Water Resources Division, U. S. Geological Survey, with which each agency is cooperating is indicated by two-letter symbols: GW—Ground Water Branch; QW—Quality of Water Branch; SW—Surface Water Branch.

	Branch symbol
DELAWARE	
State Highway Department, Dover	GW and SW
City of New Castle	GW
City of Newark	GW
University of Delaware and Geological Survey, Newark	GW
Corps of Engineers, Philadelphia District	SW
New Castle County Soil Conservation District	QW
NEW JERSEY	
Department of Conservation and Economic Development	GW and SW
North Jersey District Water Supply Commission	SW
Corps of Engineers, Philadelphia District	SW
NEW YORK	
Department of Conservation	GW and SW
Department of Public Works	SW
New York City Board of Water Supply	SW
Corps of Engineers, Philadelphia District	SW
PENNSYLVANIA	
Department of Internal Affairs	GW
Department of Forests and Waters	SW and QW
Department of Commerce, State Planning Board	QW
City of Philadelphia	QW
Corps of Engineers, Philadelphia District	SW and QW

All water-resources activities of the U. S. Geological Survey within the Delaware basin states are closely coordinated with the Interstate Commission on the Delaware River basin (Incodel). Similarly, work in the Brandywine Creek basin has been coordinated with the Brandywine Valley Association.

ADDRESSES OF GEOLOGICAL SURVEY FIELD OFFICES IN DELAWARE BASIN STATES

Note: "U. S. Geological Survey" should precede the part of each address shown below. Each district office is preceded by an asterisk (*).

Branch symbols: GW–Ground Water
QW–Quality of Water
SW–Surface Water

STATE City and zone	Branch symbol	Address of office (U. S. Geological Survey, –)
DELAWARE		
Dover[1/]	SW	P. O. Box 707.
Newark[2/]	GW	Post Office Bldg.
MARYLAND		
*College Park	SW	P. O. Box 37, Engineering Bldg., University of Maryland.
Salisbury	GW	Brown St.
NEW JERSEY		
*Trenton 7	SW	P. O. Box 967, 228 Federal Bldg.
*Trenton 7	GW	P. O. Box 1689, 430 Federal Bldg.
NEW YORK		
*Albany 1	SW	P. O. Box 948, 526 Federal Bldg.
Albany 1	GW	P. O. Box 590, 332 Federal Bldg.
Ellenville	SW	P. O. Box 49.
*Mineola	GW	230 Old Country Road.
PENNSYLVANIA		
*Harrisburg	SW	P. O. Box 421, 490 Education Bldg.
*Philadelphia 6	QW	1304 U. S. Custom House, 2d and Chestnut Sts.
*Philadelphia 3	GW	Academy of Natural Sciences, 19th and Race Sts.
Schuylkill Haven	QW	P. O. Box 251, 202 East Liberty St.

1/ Sub-office of College Park, Md. district office.
2/ Sub-office of Salisbury, Md., area office.

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