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GUIDE TO THE AVAILABILITY OF HYDROLOGIC DATA, GREATER PITTSBURGH REGION, PENNSYLVANIA

Compiled by Robert M. Beall

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ABSTRACT

A great variety of hydrologic data are collected by many governmental agencies and other entities for diverse purposes. Some of the data are compiled and reported in readily available, widely known publications; some are not. Continuing requests for information on the locations of data collection sites and on the sources of data have suggested the need for a guide to that information.

Presently active primary-data-collection sites have been located on a map of the Greater Pittsburgh region (Allegheny, Armstrong, Beaver, Butler, Washington, and Westmoreland Counties in southwestern Pennsylvania), and the sources of data--by publication or responsible agency--have been described. Secondary data collection sites have not been shown on the map, but several agencies involved in this activity have been listed.

Hydrologic data are collected at the following numbers of identified sites under the auspices of federal, state, and interstate organizations:

Precipitation or temperature	39
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INTRODUCTION

Climatic and water-resource data are essential information not only for guidance in many day-to-day activities and operations but also for the planning, design, and implementation of land- and water-resource related conservation, development, and management practices. This guide was prepared to show the location of principal, active data-collection sites in the Greater Pittsburgh region and to summarize information on data sources and references.

The Greater Pittsburgh region as used here includes the six southwestern Pennsylvania counties: Allegheny, Armstrong, Beaver, Butler, Washington, and Westmoreland. The few data collection sites located within about 2 miles but outside of the region's boundary also are shown on the map.

Hydrologic data are collected by many agencies, organizations, and individuals for both public and private purposes; their objectives govern the general availability. The data locations shown on the map fulfill three conditions: (1) those at which systematic observations have been made over a period of time, generally greater than a year, (2) those which are in current (late 1975) operation, and (3) those operated by Federal, State, or interstate agencies for which data are published or are in public files. Data management is a large task; necessarily, there is a time lag between collection and availability in published form or in condition to be retrieved from agency files.

This compilation of information was reviewed and verified by the U.S. Army Corps of Engineers, National Weather Service, and Pennsylvania Department of Environmental Resources, Bureau of Water Quality Management, and in the Wheeling Field Office of the Environmental Protection Agency. Their assistance is gratefully acknowledged.

CLIMATOLOGICAL DATA

Climatological data here refers principally to records of precipitation and temperature, although many other elements such as wind, barometric pressure, and evaporation may be important in a number of activities. Most of these data are collected under the auspices of the National Weather Service[1] and are compiled and published by the Environmental Data Service, mostly in a monthly and annual series titled "Climatological Data--Pennsylvania" (CD-36).

A total of 39 climatological data collection sites is shown on plate 1. Both precipitation and temperature data are obtained at 17 stations, including 5 at which recording rain gages are operated. Precipitation only is observed at 22 stations, of which 7 are recording rain gages. Records from most recording rain gages are published only in the series titled "Hourly Precipitation Data--Pennsylvania" (HPD-36). Evaporation and related data are collected at one site in the Greater Pittsburgh region.

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[1] Prior to 1940, climatological records in the United States were collected and published by the U.S. Department of Agriculture, Weather Bureau. In 1940, the Weather Bureau was moved to the U.S. Department of Commerce. In 1964, a bureau called the Environmental Science Service Administration (ESSA) was created in the Department of Commerce. Within this bureau were placed the U.S. Weather Bureau and the newly-created Environmental Data Service (EDS). Beginning in January 1966, climatological data previously collected and published by the U.S. Weather Bureau were published by the EDS of ESSA. In 1970, ESSA's name was changed to National Oceanographic and Atmospheric Administration (NOAA). At the same time, the U.S. Weather Bureau's name was changed to the National Weather Service (NWS). As of 1976, both NWS and EDS are units of NOAA, and EDS continues to publish climatological records.

Additional detailed climatological data are obtained at two National Weather Service Pittsburgh Offices, Federal Building (City office), and Greater Pittsburgh (International) Airport. These data are published in the monthly and annual series "Local Climatological Data--(the station)" (LCD-36-14861 and LCD-36-94823). The airport office is the only one in the region for which weather type, barometric pressure, wind, and sky-cover information is published. These elements are, of course, observed at several airports throughout the region for flight operations purposes and are transmitted over teletype circuits from some locations not shown on this map. A weather radar (WSR-57 Plan Position Indicator) is in use at the Weather Service Meteorological Observatory near Greater Pittsburgh Airport.

Precipitation records have been collected for different periods, beginning as early as 1825 (Pittsburgh Allegheny Arsenal), at more than 50 sites that are now discontinued and, hence, not shown on the map. Information concerning these discontinued stations and many currently active stations was summarized in the U.S. Weather Bureau publication "Substation History--Pennsylvania" for periods of record through 1957. That inventory is the key to information on substation locations, instrumentation, unpublished record sites, and the several source documents for published data other than those mentioned above. Notice of the establishment or discontinuance of stations since 1957 is given in the annual summary issues of the Climatological Data series. The referenced material and information on some miscellaneous unpublished records are available for inspection at the National Weather Service Forecast Office, 2328 Federal Building, 1000 Liberty Avenue, Pittsburgh, Pa. 15222. Requests for additional climatic information should be addressed to: Director, National Climatic Center, Federal Building, Asheville, N.C. 28801.

Precipitation and temperature data are readily observable owing to the general availability of inexpensive and relatively accurate instruments and doubtless are being obtained systematically at a number of sites not acknowledged in the publications noted above or symbolized on the map.

Data from both the Climatological Data and Local Climatological Data report series cited above have been the subject of a number of studies. Among them is a comprehensive statewide analysis of rainfall depth, duration, and frequency relationships reported by Kerr and others (1970), based on data through 1966. Rahn (1973) summarized the few available evaporation records in Pennsylvania through 1971 and generalized the information on four maps, one of which showed the pattern of variation in mean annual lake evaporation. Daily and hourly observations of surface weather observations for the period February 1945 through December 1965 at Greater Pittsburgh Airport were summarized in a frequency analysis of various atmospheric phenomena by the Air Weather Service (1968). The probabilities of extreme snowfalls and snow depths for a few sites in western Pennsylvania were included in a report by Dunlap (1970), which dealt with 120 station records (1949-64) in 12 northeastern states. The National Weather Service and university departments of meteorology, earth sciences, or geography are sources of information on other studies.

SURFACE-WATER DATA

Surface-water data include stream stages continuously observed or recorded at gaging stations and stream discharges computed from many of those station records; systematic determination of annual crest stages and discharges, or systematic annual measurements of low streamflow at partial-record stations; and records of lake and reservoir stage and contents. The data also include measurements of several quality characteristics--physical, chemical, biological, and radiological--of streams, lakes, and reservoirs. The publications in which these data are reported will be described later.

Locations of 82 surface-water data sites are shown on the map, of which 31 are continuous-record stream-stage and discharge stations, 30 are continuous-record stage-only stations, 3 are crest-stage partial-record stations, 13 are low-flow partial-record stations, and 5 are lake- and reservoir-stage stations. In addition, water-quality data are being obtained currently at 69 sites (including 4 reservoir sampling stations).

Stage and Quantity

Most of the stream stage and discharge data now collected by the U.S. Geological Survey are collected in cooperation with the Pennsylvania Department of Environmental Resources or with the U.S. Army Corps of Engineers, Pittsburgh District. The Corps collects stage records at a number of sites throughout the region, on both small and large streams and on all flood-control reservoirs. These records are collected for project purposes and are not published except those in the collaborative program with the U.S. Geological Survey.

The National Weather Service River Forecast Office at Pittsburgh makes considerable use of the stream gages maintained by the Corps and Survey, and has supplemental data-transmitting instrumentation at several stations. These are symbolized on the map. In addition, the River Forecast Office independently uses gages at several sites for flood evaluation and warning purposes. Data at these gage sites are obtained intermittently, are not published, and the sites are not shown on the map. Stage and trend data for a selected list of gage sites are provided daily to the media by the River Forecast Office. Records for the Monongahela River at McKeesport and for the Ohio River at Pittsburgh are published in the Environmental Data Service annual series titled "Hydrologic Bulletin," and in "Daily River Stages".

A record of stages of the Ohio River at Pittsburgh has been obtained by various agencies continuously since August 1854. Historical accounts have been used to extend the record of flood stages back to January 1762. A detailed listing of these flood stages is maintained by the River Forecast Office at Pittsburgh.

The longest continuous record of daily discharge within the Greater Pittsburgh region is that of Crooked Creek, in the vicinity of Crooked Creek Dam where data collection began in October 1909. Other long records of daily discharge have been obtained on the Allegheny River at Kittanning (since August 1904 except for a 6 year lapse between 1928 and 1934), and on the Kiskiminetas River (at Avonmore 1907 to 1937 and at Vandergrift since 1937).

The number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time; so, the U.S. Geological Survey collects limited streamflow data at sites other than stream-gaging stations. Data collected on a systematic basis over a period of years at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. A comprehensive evaluation of the Survey's streamflow data program in Pennsylvania was reported by Page (1970).

The absence of symbolized data sites on the map does not necessarily mean an absence of surface-water data. Information sufficient for many purposes has been obtained at a number of sites no longer active (Rossow and Coll, 1970).

Quality

Water-quality data were collected by the U.S. Geological Survey as early as 1905 in the Greater Pittsburgh Region (Lewis, 1906). However, that program and several subsequent programs were of relatively short duration. The longest continuous data series are probably those in the files of the City of Pittsburgh Water Department and other large water-supply agencies and power companies using surface sources. Some of these data and those of the U.S. Geological Survey were summarized in reports by Noecker and others (1954), Whetstone (1963), and by McCarren (1967).

Water-quality stations systematically sampled by Federal, State, and interstate organizations are coordinated and catalogued by the Survey's Office of Water Data Coordination (417 National Center, Reston, Va., 22092), to implement provisions of Circular A-67 that was issued by the U.S. Office of Management and Budget. Locally, the stations reported to the Office of Water Data Coordination include those operated by the Survey, Corps, Pennsylvania Department of Environmental Resources, Environmental Protection Agency, Energy Research and Development Administration, and the Ohio River Valley Water Sanitation Commission (ORSANCO). Most of the water-quality data sites plotted on the accompanying map have been verified by the several agencies but may not reflect very recent (early 1976) program changes.

Locations of sampling sites in the Pennsylvania Bureau of Water Quality Management network are given in a report by the Pennsylvania Department of Environmental Resources (1975).

A useful assessment of the data collection activities at main stream sites was developed by the ORSANCO Ohio River Monitoring Strategy Team (1973). Some of their recommendations have been adopted, and the sites are shown on the map.

Several other water-quality sampling programs presently active in the Greater Pittsburgh region are not identified on the map because of the considerable variation in frequency and types of data collected and in the mode of data management and dissemination. These programs include:

Allegheny County Health Department, Bureau of Environmental Health (3333 Forbes Avenue, Pittsburgh, Pa. 15213). Quarterly sampling at 20 sites in 1974, and at 10 additional sites in 1975. A program report for 1974 is in preparation.

Allegheny County Works Department, Division of Tests (311 County Office Bldg., Pittsburgh, Pa. 15219). More than a dozen subwatersheds and many miscellaneous sites have been sampled at irregular intervals, for a variety of purposes. Many analyses include an extensive list of constituents. Data are not published.

Butler County Planning Commission (Court House, Butler, Pa. 16001). Since 1972, more than 200 sites have been sampled in more than 30 subwatersheds for a few constituents. Data are summarized in the Commission's annual stream survey reports.

Pennsylvania Fish Commission (Region II Field Office, R.D. #2, Somerset, Pa. 15001). Waterways Patrolmen sample extensively, for a few constituents, in connection with investigations and enforcement related to active and prospective fish stocking programs. Data are not published.

Many miscellaneous sites are not shown that are being sampled in connection with requirements of the Federal Water Pollution Control Act and its amendments--the National Environmental Policy Act--and the Pennsylvania Clean Streams Law of 1970--or in connection with the operations of many public and private water-related facilities where water quality is an important consideration.

Data for many of these and other sites have been compiled and organized pursuant to the studies supporting the statewide Comprehensive Water Quality Management Planning (COWAMP) program (Bartall and Gutierrez, 1974). The program is being administered by the Pennsylvania Department of Environmental Resources through its Bureau of Water Quality Management. That agency has recently prepared a statewide assessment of water quality that includes graphs showing trends of changes in selected constituents from 1968 through 1973 at 6 sites in the Greater Pittsburgh region (Bureau of Water Quality Management, 1975). COWAMP effort is to be integrated with a recently organized areawide water-quality management planning program.

References to a number of data reports and other studies of water quality in southwestern Pennsylvania were included in a report (Beall, 1975) on a reconnaissance of the concentrations of nutrients and other constituents in streams of the Greater Pittsburgh region.

Quantity and Quality Reports

Water measuring and sampling locations operated by the Survey through 1968 in the upper Ohio River basin were mapped and listed in a report by Rossow and Coll (1970), which also includes an extensive reference list, principally of U.S. Geological Survey publications. Summary reports of streamflow and reservoir data for the years through 1970, U.S. Geological Survey Water-Supply Papers 1305, 1725, 1907, and 2107, are listed under references below. The most recent formal publication of surface-water-quality data is that for the 1970 water year in Water-Supply Paper 2153 (1975a). However, streamflow records and related data beginning with the 1961 water year, and water-quality records beginning with the 1964 water year, have been released by the Survey in annual reports on a state-boundary basis under the title "Water Resources Data for Pennsylvania, Part 1, Surface Water records and Part 2, Water Quality Records." Beginning with the 1975 water year, data will be published in a new, annual numbered State series: U.S. Geological Survey Water Data Report, which will include streamflow data, water-quality data for surface and ground-water sites, and ground-water level data for the observation-well network with data for major basins in separate volumes.

The water year, commonly used in Survey reports on the quantity and quality of surface waters, is the 12-month period October 1 through September 30, designated by the calendar year in which it ends.

All of the referenced U.S. Geological Survey reports are available for inspection in Survey offices at:

2204 Federal Bldg., 1000 Liberty Ave., Pittsburgh, Pa. 15222
or
4th Floor, Federal Bldg., 228 Walnut St. (P.O. Box 1107),
Harrisburg, Pa. 17108

The Carnegie Library and the University of Pittsburgh Library are among the outside repositories of U.S. Geological Survey publications.

A variety of water data for key locations statewide is prepared for release by the Survey's Pennsylvania District, Water Resources Division, under the title: "Monthly Water Resources Summary for Pennsylvania." Copies are available on application to the Survey's District Chief, at the Harrisburg address shown above.

Provisional stage and discharge data for many sites are available for inspection at the Pittsburgh office on a relatively timely basis prior to publication.

All water quality data obtained by EPA for monitoring stations are available from the STORET data system. Anyone interested in obtaining these data may contact the following office:

Water Quality Monitoring Office
U.S. Environmental Protection Agency
Region III
6th & Walnut Streets
Philadelphia, Pa. 19106

Water-quality conditions in the Ohio River and its principal tributaries, are summarized monthly by the Ohio River Valley Water Sanitation Commission in their report entitled "ORSANCO QUALITY MONITOR." Further information can be obtained from the Commission office at 414 Walnut Street, Cincinnati, Ohio 45202. The Commission obtains data from a regional monitoring program that includes automatic monitors, manually-operated stations, and measurements by selected water users. Data from 5 of the 7 main stream monitor sites shown on the accompanying map, are included in this publication.

Stream-temperature data for the following sites in and near the Greater Pittsburgh region were among those recently summarized in a report by Flippo (1975):

03031500	03049655
03036500	03083000
03048500	03086060
03049000	03106000
	03106500

All stations are symbolized on the accompanying map.

GROUND-WATER DATA

Ground-water data sites plotted on the map include seven wells where water levels are being measured systematically by the U.S. Geological Survey in cooperation with the Pennsylvania Topographic and Geologic Survey. Six of these observation wells are equipped with recording instruments. Water-level data for the calendar years 1968 through 1972 for four of the wells were published in U.S. Geological Survey Water-Supply Paper 2140 (1974). That report lists also the sources of data for prior years. The longest period of record in the Greater Pittsburgh region is that for well Ws-1 in Washington County, where observations began in August 1936.

In addition to the sites mentioned above, which are in the Pennsylvania observation-well network (Poth, 1972), literally hundreds of wells have been recorded for reconnaissance-level ground-water studies. These wells are not shown on the map, but many have been listed and mapped in a series of county ground-water summary reports for the Greater Pittsburgh region prepared by Gallaher (1973), Newport (1973a, 1973b), and Poth (1973a, 1973b, 1973c) of the U.S. Geological Survey, in cooperation with the Pennsylvania Topographic and Geologic Survey.

Water samples from many wells have been analysed for dissolved-chemical constituents. Analyses for more than 200 samples are listed in the 6 reports cited above. Water-well data--physical, hydrogeologic, and chemical--for more than 1700 sites in the Greater Pittsburgh region have been processed for computer storage and retrieval. These files are maintained at the Pennsylvania Topographic and Geologic Survey's Harrisburg office under its authority for the regulation of water-well drillers' activities.

A group of 21 observation wells was measured for various periods between 1945 and 1957 in connection with studies of the ground-water resources of the valley-fill deposits of Allegheny County (Adamson and others, 1949). They are not shown on the present map but were listed and located in a report by Rossow and Coll (1970). That report provides a cross reference to well numbers used in reports by Adamson and others (1949), and Gallaher (1973).

REFERENCES

Adamson, J. H. Jr., Graham, J. B., and Klein, N. H., 1949, Ground-water resources of the valley-fill deposits of Allegheny County, Pennsylvania: Pennsylvania Geol. Survey, 4th Ser., Bull. W8, 181 p.

Air Weather Service (MAC), 1968, Revised uniform summary of surface weather observations, Pittsburgh, Pa., Parts A-F: Data Processing Div., ETAC, USAF, Asheville, N.C.

Bartal, K. A., and Gutierrez, L. V. Jr., 1974, COWAMP--A creative approach to water quality management planning: Pennsylvania Dept. of Environmental Resources, Bur. Water Quality Management Pub. 37, 28 p.

Beall, R. M., 1975, Stream reconnaissance for nutrients and other water-quality parameters, Greater Pittsburgh Region, Pennsylvania: Carnegie, Pa., U.S. Geol. Survey Water-Resources Inv. 50-74, 47 p.

Butler County Planning Commission, 1973 and 1974 Annual Stream Survey report: Butler, Pa., 39 and 94 p.

Dunlap, D. V., 1970, Probabilities of extreme snowfalls and snow depths: New Jersey Agricultural Experiment Station Bull. 821, Rutgers Univ., 14 p.

Flippo, H. N., Jr., 1975, Temperatures of streams and selected reservoirs in Pennsylvania: Pennsylvania Dept. of Environmental Resources Bull. 11, 95 p.

Gallaher, J. T., 1973, Summary ground-water resources of Allegheny County, Pennsylvania: Pennsylvania Geol. Survey, 4th ser., Water resources rept. 35, 71 p.

Kerr, R. L., McGinnis, D. F., Reich, B. M., and Rachford, T. M., 1970, Analysis of rainfall-duration-frequency for Pennsylvania: Institute for Research on Land and Water Resources, Research Pub. 70, the Pennsylvania State Univ., 152 p.

Lewis, S. J., 1906, Quality of water in the upper Ohio River basin and at Erie, Pa.: U.S. Geol. Survey Water-Supply Paper 161, 114 p.

McCarren, E. F., 1967, Chemical quality of surface water in the Allegheny River basin, Pennsylvania and New York: U.S. Geol. Survey Water-Supply Paper 1835, 74 p.

Newport, T. G., 1973a, Summary ground-water resources of Westmoreland County, Pennsylvania: Pennsylvania Geol. Survey 4th ser., Water resource rept. 37, 49 p.

_____, 1973b, Summary ground-water resources of Washington County, Pennsylvania: Pennsylvania Geol. Survey, 4th ser., Water resource rept. 38, 32 p.

Noecker, Max, Greenman, D. W., and Beamer, N. H., 1954, Water resources of the Pittsburgh area, Pennsylvania: U.S. Geol. Survey Circ. 315, 56 p.

ORSANCO Ohio River Monitoring Strategy Team, 1973, A recommended water quality monitoring strategy for the Ohio River and lower reaches of major tributaries: Ohio River Valley Water Sanitation Comm. rept., Cincinnati, O., 35 p. 10 app.

Page, L. V., 1970, A proposed streamflow data program for Pennsylvania: Pennsylvania Dept. of Environmental Resources (Forests and Waters) Tech. Bull. 3, 67 p.

(Pennsylvania) Bureau of Water Quality Management, 1975, Commonwealth of Pennsylvania 1975 water quality inventory: (Dept. of Environmental Resources), Harrisburg, Pa., Bur. Pub. 42, 187 p.

Pennsylvania Dept. of Environmental Resources, 1975, Pennsylvania water quality network, sampling station descriptions: (Bur. of Water Quality Management), Harrisburg, Pa., Bur. Pub. 33, 62 p.

Poth, C. W., 1972, The ground-water observation-well program in Pennsylvania: Pennsylvania Geol. Survey, 4th ser., Ground water rept., Bull. W20, 2 ed., 18 p.

_____, 1973a, Summary ground-water resources of Armstrong County, Pennsylvania: Pennsylvania Geol. Survey, 4th ser., Water resource rept. 34, 38 p.

_____, 1973b, Summary ground-water resources of Butler County, Pennsylvania: Pennsylvania Geol. Survey 4th ser., Water resource rept. 36, 49 p.

_____, 1973c, Summary ground-water resources of Beaver County, Pennsylvania: Pennsylvania Geol. Survey 4th ser., Water resource rept. 39, 39 p.

Rahn, J. J., 1973, Pan and lake evaporation in Pennsylvania: Institute for Research on Land and Water Resources, Info. Rept. 69, The Pennsylvania State Univ., 23 p.

Rossow, C. J., and Coll, M. B. Jr., 1970, Water resources investigations in the upper Ohio River basin: Pennsylvania Dept. of Environmental Resources (Forests and Waters) Tech. Bull. 1, 1 sh.

U.S. Geological Survey, 1957, Compilation of records of surface waters of the United States through September 1950, part 3-A. Ohio River basin except Cumberland and Tennessee River basins: U.S. Geol. Survey Water-Supply Paper 1305, 652 p.

_____, 1964, Compilation of records of surface waters of the United States, October 1950 to September 1960, part 3-A. Ohio River basin except Cumberland and Tennessee River basins: U.S. Geol. Survey Water-Supply Paper 1725, 560 p.

_____, 1971a, Surface water supply of the United States 1961-65, part 3, volume 1. Ohio River basin above Kanawha River: U.S. Geol. Survey Water-Supply Paper 1907, 621 p.

_____, 1971b, Index to surface-water records to September 30, 1970, part 3, Ohio River basin: U.S. Geol. Survey Circ. 653, 71 p.

_____, 1973, Catalog of information on water data, Water Resources Region 05 (Ohio), edition 1972: Office of Water Data Coordination rept., 213 p.

_____, 1974, Ground-water levels in the United States, 1968-72, northeastern states: U.S. Geol. Survey Water-Supply Paper 2140, 207 p.

_____, 1975a, Quality of surface water of the United States 1970, part 3. Ohio River basin: U.S. Geol. Survey Water-Supply Paper 2153, 444 p.

_____, 1976, Surface water supply of the United States 1966-70, part 3, volume 1. Ohio River basin above Kanawha River: U.S. Geol. Survey Water-Supply Paper 2107, 668 p.

Whetstone, G. W., 1963, Statement on water resources investigations in the Monongahela River basin: U.S. Geological Survey rept. presented at Dept. of Health, Education, and Welfare Enforcement Conf., Pittsburgh, Pa., Dec. 17, 1963, 23 p., 11 figs. app. 62 p.