

In cooperation with the Pennsylvania Department of Environmental Protection

Selected Ground-Water-Quality Data in Pennsylvania— 1979-2006

Data Series 314

**U.S. Department of the Interior
U.S. Geological Survey**

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By Dennis J. Low, Douglas C. Chichester, and Linda F. Zarr

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U.S. Geological Survey
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Conversion Factors, Datums, and Abbreviations

Multiply	By	To obtain
Length		
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
Area		
square mile (mi ²)	259.0	hectare (ha)
square mile (mi ²)	2.590	square kilometer (km ²)
Volume		
gallon (gal)	3.785	liter (L)
gallon (gal)	0.003785	cubic meter (m ³)
Radioactivity		
picocurie per liter (pCi/L)	0.037	becquerel per liter (Bq/L)

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$^{\circ}\text{C}=(^{\circ}\text{F}-32)/1.8$$

Horizontal coordinate information is referenced to either the North American Datum (NAD 1927) or the North American Datum of 1983 (NAD 83).

Water-Quality Units

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter (µg/L). A milligram per liter is a unit expressing the concentration of chemical constituents in solution as mass (milligrams) of solute per unit volume (liter) of water. One-thousand micrograms per liter is equivalent to 1 milligram per liter. For concentrations less than 7,000 mg/L, the numerical value is the same as for concentrations in parts per million. Bacterial concentrations are reported in units of colonies per 100 milliliters (col/100 mL). Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25°C). Turbidity is reported in nephelometric turbidity units (NTU).

Radioactivity Units

A commonly used unit of measure for radioactivity is the picocurie. One Curie is the activity of one gram of radium-226, which is equal to 3.7×10^{10} atomic disintegrations per second; a picocurie is 10^{12} Curies, which is about equal to 2.2 atomic disintegrations per minute. Activity refers to the decay of a radioactive substance, which is measured by the number of particles emitted by a radionuclide per unit of time. The rate of decay is proportional to the number of atoms of a radioactive substance present, and inversely proportional to its half life, which is the time necessary for the substance to lose half its radioactivity. Activity is defined as being equal to $n \times I$, where n is the number of atoms of a radionuclide and I is the decay constant. The decay constant, I is equal to the natural logarithm of 2 divided by the half-life of the radionuclide.

Selected Abbreviations

305b – Pennsylvania Department of Environmental Protection 305b Network

Act537 – Pennsylvania Department of Environmental Protection Act 537

CV – Borough of Carroll Valley

CCHD – Chester County Health Department

MCHD – Montgomery County Health Department

NCRO – Pennsylvania Department of Environmental Protection – North-Central Region Bureau of Water Supply Management

PADWIS – Pennsylvania Drinking Water Information System

FSN – Pennsylvania Department of Environmental Protection – Ambient and Fixed Station Network

PennAg – Pennsylvania Department of Agriculture

SCRO – Pennsylvania Department of Environmental Protection – South-Central Region Waste Management Section

PAGS – Pennsylvania Topographic and Geologic Survey

SRBC – Susquehanna River Basin Commission

USEPA – U.S. Environmental Protection Agency

USGS – U.S. Geological Survey

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Abstract

This study, by the U.S. Geological Survey (USGS) in cooperation with the Pennsylvania Department of Environmental Protection (PADEP), provides a compilation of ground-water-quality data for a 28-year period (January 1, 1979, through December 31, 2006) based on water samples from wells and springs. The data are from 14 source agencies or programs—Borough of Carroll Valley, Chester County Health Department, Montgomery County Health Department, Pennsylvania Department of Agriculture, Pennsylvania Department of Environmental Protection 2002 Pennsylvania Water-Quality Assessment, Pennsylvania Department of Environmental Protection Agency Act 537 Sewage Facilities Program, Pennsylvania Department of Environmental Protection-Ambient and Fixed Station Network, Pennsylvania Department of Environmental Protection-North-Central Region, Pennsylvania Department of Environmental Protection-South-Central Region, Pennsylvania Drinking Water Information System, Pennsylvania Topographic and Geologic Survey, Susquehanna River Basin Commission, U.S. Environmental Protection Agency, and the U.S. Geological Survey. The ground-water-quality data from the different source agencies or programs varied in type and number of analyses; however, the analyses are represented by 11 major analyte groups: antibiotics, major ions, microorganisms (bacteria, viruses, and other microorganisms), minor ions (including trace elements), nutrients (predominantly nitrate and nitrite as nitrogen), pesticides, pharmaceuticals, radiochemicals (predominantly radon or radium), volatiles (volatile organic compounds), wastewater compounds, and water characteristics (field measurements, predominantly field pH, field specific conductance, and hardness). For the USGS and the PADEP-North-Central Region, the pesticide analyte group was broken down into fungicides, herbicides, and insecticides.

Summary maps show the areal distribution of wells and springs with ground-water-quality data statewide by source agency or program. Summary data tables by source agency or program provide information on the number of wells and springs and samples collected for each of the 35 watersheds and analyte groups.

The number of wells and springs sampled for ground-water-quality data varies considerably across Pennsylvania. Of the 24,772 wells and springs sampled, the greatest concentration of wells and springs is in the southeast (Berks, Bucks, Chester, Delaware, Lancaster, Montgomery, and Philadelphia Counties) and in the northwest (Erie County). The number of wells and springs sampled is relatively sparse in north-central (Cameron, Elk, Forest, McKean, Potter, and Warren Counties) Pennsylvania. Little to no data are available for approximately one-fourth of the state. Nutrients and water characteristics were the most frequently sampled major analyte groups—43,025 and 30,583 samples, respectively. Minor ions and major ions were the next most frequently sampled major analyte groups—26,972 and 13,115 samples, respectively. For the remaining 10 major analyte groups, the number of samples collected ranged from a low of 24 samples (antibiotic compounds) to a high of approximately 4,674 samples (microorganisms).

The number of samples that exceeded a maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) by major analyte group also varied. Of the 4,674 samples in the microorganism analyte group, 50.2 percent had water that exceeded an MCL. Of the 4,528 samples collected and analyzed for volatile organic compounds, 23.5 percent exceeded an MCL. Other major analyte groups that frequently exceeded MCLs or SMCLs included major ions (18,343 samples and a 27.7 percent exceedence), minor ions (26,972 samples, 44.7 percent exceedence), pesticides (4,868 samples, 0.7 percent exceedence), water characteristics (30,583 samples, 19.3 percent exceedence), and radiochemicals (1,866 samples, 9.6 percent exceedence). Samples collected and analyzed for antibiotics (24 samples), fungicides (1,273 samples), herbicides (1,470 samples), insecticides (1,424 samples), nutrients (43,025 samples), pharmaceuticals (28 samples), and wastewater compounds (328 samples) had the lowest exceedences of 0.0, 2.4, 1.2, <1.0, 8.3, 0.0, and <1.0 percent, respectively.

