

Pennsylvania's Aquifers

Pennsylvania's complex geological history has provided us with a diverse set of rock types and a varied physical geography which make generalizations about groundwater difficult. Nevertheless, hydrogeologists have identified four principal types of aquifers in the state: sand and gravel, sandstone and shale, carbonate rock, and crystalline rock.

Sand and gravel aquifers are located in the southeastern coastal plain along the Delaware River, along the Lake Erie shoreline, and in most major stream valleys. Those in the Delaware estuary were deposited when the area was covered by oceans millions of years ago. Those in the rest of the state are glacial outwash and alluvial (stream) deposits from the time when part of the state was covered by glaciers. Sand and gravel aquifers contain large quantities of water which can be easily withdrawn; well yields of 1000 gallons per minute (gal/min) are common. The natural quality of the water is good to excellent.

Sandstone and shale aquifers contain the sandstones, silts, stones, and shales that are the predominant component of Pennsylvania's bedrock. In the bedrock, these components are interlayered and there can be more than one waterbearing zone in a vertical thickness. Where sandstones are dominant the water is soft; where shales predominate the water is hard. Yields from these aquifers are lower than those from sand and gravel aquifers with shale yielding 5-20 gal/min and sandstone yielding 5-60 gal/min. However, drilling on a fracture intersection can increase these yields substantially.

Carbonate rock aquifers, consisting of limestone and dolomite, are located in the valleys in the central and southeastern parts of Pennsylvania. The caves, solution channels, and sinkholes of these regions are caused by water dissolving portions of the carbonate rock. As a result water can be very hard and contain relatively large amounts of dissolved solids. Yields of several thousand gallons per minute are possible.

Crystalline rock aquifers are located in most of southeastern Pennsylvania. The rock has very small fractures so storage capacity and yield are relatively low. Water is generally soft. Yields are commonly 5 to 25 gal/min.

See Illustration 12 for a map of Pennsylvania aquifers.

Excerpted from: *Groundwater: A Primer for Pennsylvanians*. The PDF version is available on the WREN Website at <http://pa.lwv.org/wren/pubs/primer.html>. To obtain a print copy of the *Primer* or to learn about other resource materials available from WREN, call the WREN Resource Center at 1-800-692-7281. Or visit the WREN website at: <http://pa.lwv.org/wren/>

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