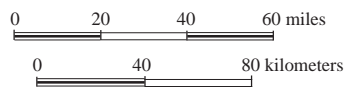
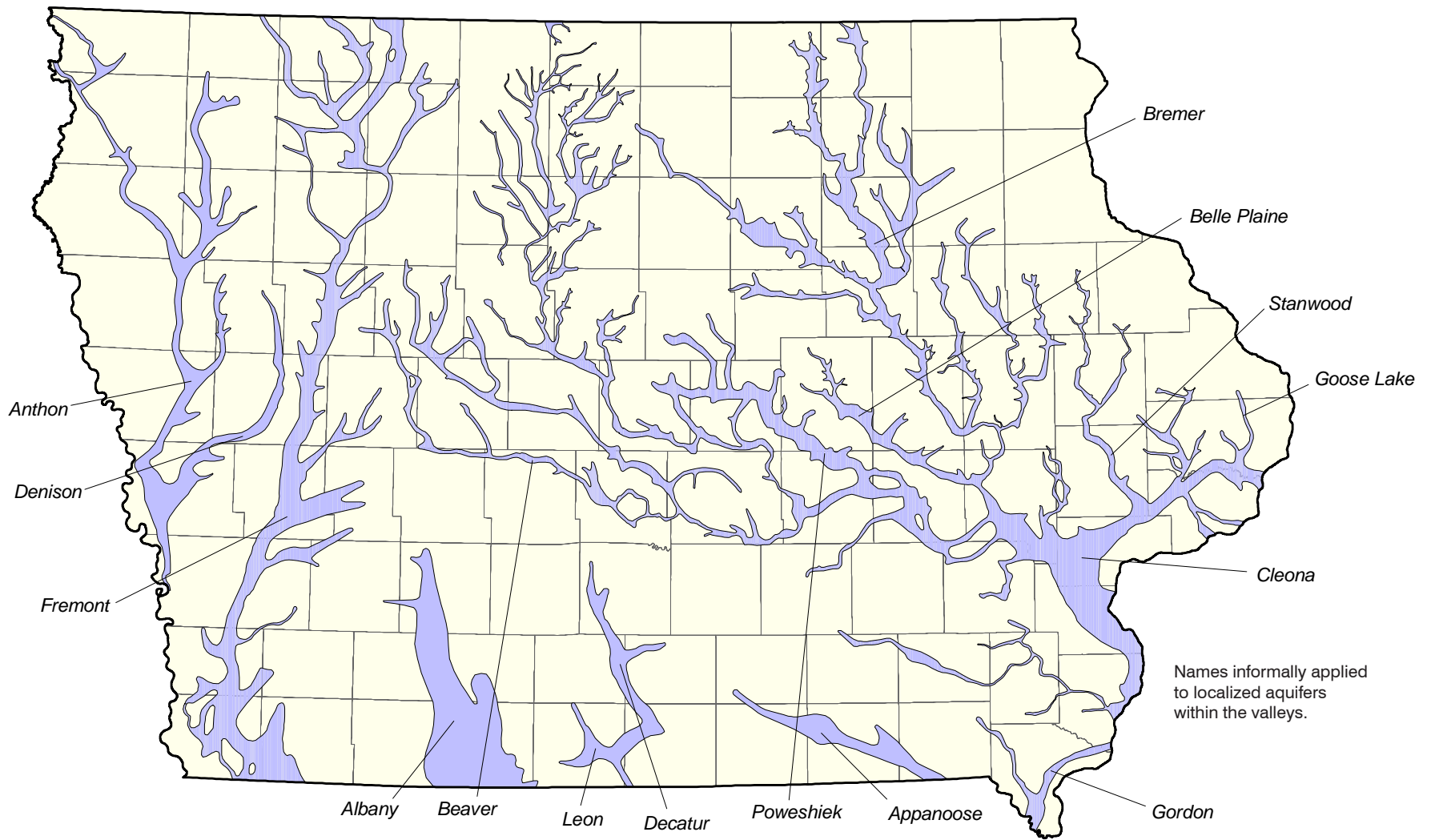


BURIED-VALLEY AQUIFERS OF IOWA

2004



Iowa Department of Natural Resources

Geological Survey • 109 Trowbridge Hall • Iowa City, Iowa 52242-1319

BURIED-VALLEY AQUIFERS

Buried-valley aquifers occur along ancient river valleys once carved into the underlying bedrock surface across Iowa. These aquifers are composed of sand and gravel, but are now buried by younger impermeable glacial tills, thus confining the aquifers and creating artesian pressure. These old valleys were partially filled with outwash sand and gravel prior to or between glacial episodes. Buried valleys are easily recognized on topographic maps of the bedrock surface. However, they usually show no visible expression on the modern landscape because they are blanketed by glacial drift and are known only from well records. In areas of sparsely distributed well data, details of these old valleys are poorly known. It is worth noting, however, that in places they do influence the routes taken by modern drainage. A number of Iowa rivers have segments that follow the course of one of these deeper buried valleys.

The glacial till covering most buried-valley aquifers slows the infiltration of precipitation and surface water to these aquifers. Buried-valley aquifers composed of coarse alluvium may produce 100 gallons per minute (gpm) or more from wells. Where the aquifers coincide with modern river valley deposits, yields of 500 to 1,000 gpm are possible. The most widely used buried-valley aquifers occur in central and southeastern Iowa, while a few others are tapped in the western and southwestern part of the state. Iowa's buried valleys continue to be mapped in better detail as more data from new wells become available.

A buried-valley aquifer along the Belle Plaine Channel through Tama, Benton, and Iowa counties made history in 1886. The drilling of a new well for fire protection in Belle Plaine tapped buried sand and gravel. Flows estimated at 30,000 to 50,000 gpm gushed from the well, nicknamed "Jumbo," hurling tons of sand, two-pound stones, and chunks of fossil wood. Although the flow diminished to about 2,000 gpm after two weeks, efforts to stem the flow ultimately took over 13 months.

Water quality in buried-valley aquifers is quite variable. It is often more highly mineralized than in shallow alluvial aquifers. This is because of the longer time that water has been in the ground and often because of its contact with an adjacent bedrock aquifer. Buried-valley aquifers tend to have high concentrations of total dissolved solids, with iron, sulfate, and ammonia being particular problems.

For further information: Iowa's Groundwater Basics by Jean C. Prior and others, 2003, Iowa Dept. of Natural Resources, Iowa Geological Survey Educational Series 6, 83 pages.