BASALTIC- AND OTHER VOLCANIC-ROCK AQUIFERS—Continued

Pliocene and younger basaltic-rock aquifers are the most productive aquifers in the Snake River Plain. The saturated thickness of the Pliocene and younger basaltic rocks is locally greater than 2,500 feet in parts of the eastern Snake River Plain but is much less in the western plain (**fig. 44**). Aquifers in Miocene basaltic rocks underlie the Pliocene and younger basaltic-rock aquifers (**fig. 43**), but the Miocene basaltic-rock aquifers are used as a source of water only near the margins of the plain. Unconsolidated-deposit aquifers are interbedded with the basaltic-rock aquifers, especially near the boundaries of the plain. The unconsolidated deposits consist of alluvial material or soil that developed on basaltic rock, or both, and were subsequently covered by another basalt flow.

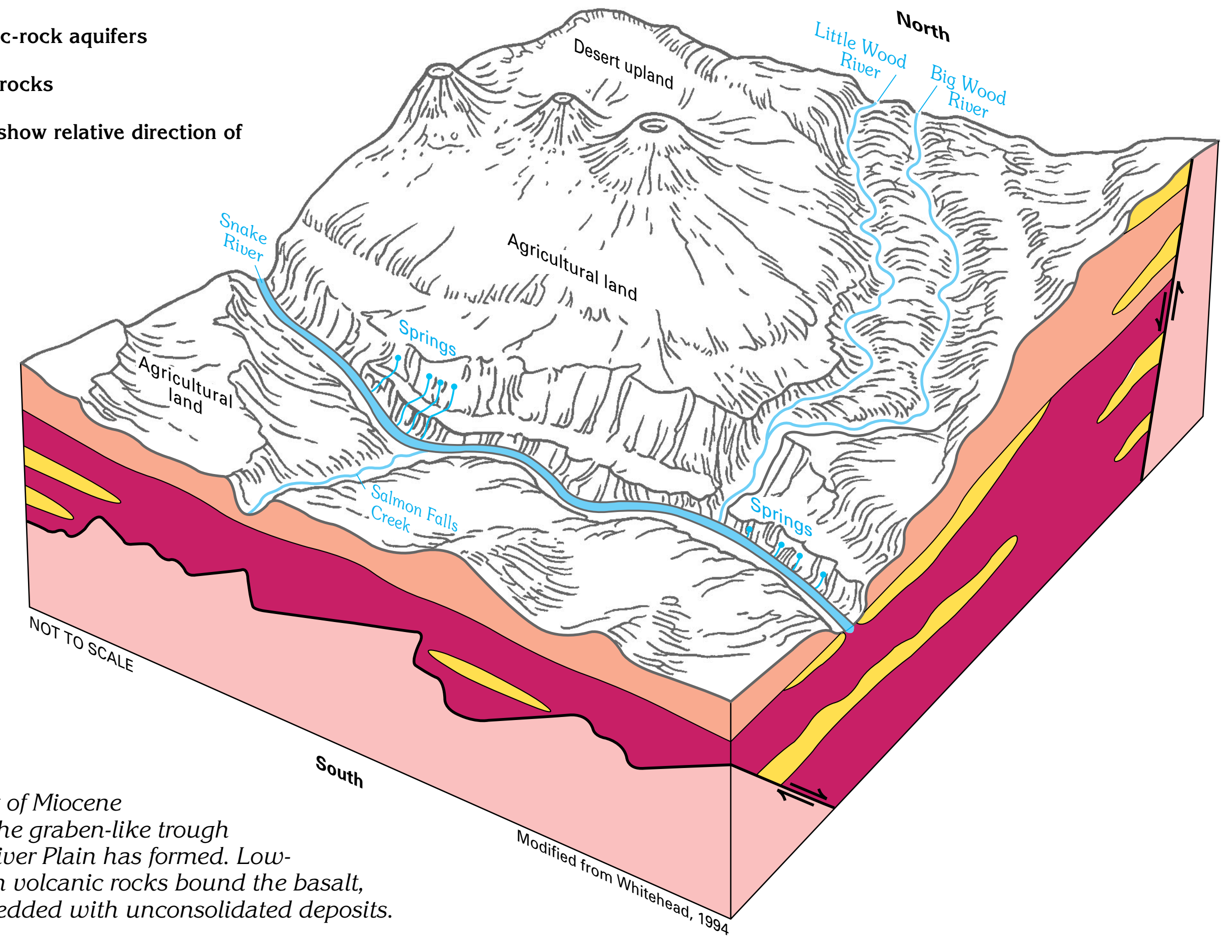
The Pliocene and younger basaltic-rock aquifers consist primarily of thin basalt flows with minor beds of basaltic ash, cinders, and sand. The basalts were extruded as lava flows from numerous vents and fissures which are concentrated along faults or rift zones in the Snake River Plain. Some flows spread outward for as much as 50 miles from the vent or fissure from which the flow issued. Shield volcanoes formed around some of the larger vents and fissures (**fig. 45**). Flows that were extruded from the volcanoes formed a thick complex of interbedded basalt.

Water in the Snake River Plain aquifer system occurs mostly under unconfined (water-table) conditions. The configuration of the regional water table of the aquifer system (**fig. 46**) generally parallels the configuration of the land surface of the plain. The altitude of the water table is greatest in Fremont County, Idaho, near the eastern border of the plain and least in the Hells Canyon area along the Idaho–Oregon border. Where the water-table contours bend upstream as they cross the Snake River (for example, near Twin Falls, Idaho), the aquifer system is discharging to the river. In a general way, the spacing between the contours reflects changes in the geologic and hydrologic character of the aquifer system. Widely spaced contours in the Eastern Plain indicate more permeable and/or thicker parts of the aquifer system, whereas closely spaced contours in the Western Plain indicate less permeable or thinner parts. Water levels in the areas where shallow aquifers or perched water bodies overlie the regional aquifer system (**fig. 46**) are higher than those in the aquifer system. These areas are underlain by rocks that have extremely low permeability.

Other basalt aquifers are the Hawaii volcanic-rock aquifers, the Columbia Plateau aquifer system, the Pliocene and younger basaltic-rock aquifers, and the Miocene basaltic-rock aquifers. Volcanic rocks of silicic composition, volcaniclastic rocks, and indurated sedimentary rocks compose the volcanic- and sedimentary-rock aquifers of Washington, Oregon, Idaho, and Wyoming. The Northern California volcanic-rock aquifers consist of basalt, silicic volcanic rocks, and volcaniclastic rocks. The Southern Nevada volcanic-rock aquifers consist of ash-flow tuffs, welded tuffs, and minor flows of basalt and rhyolite.

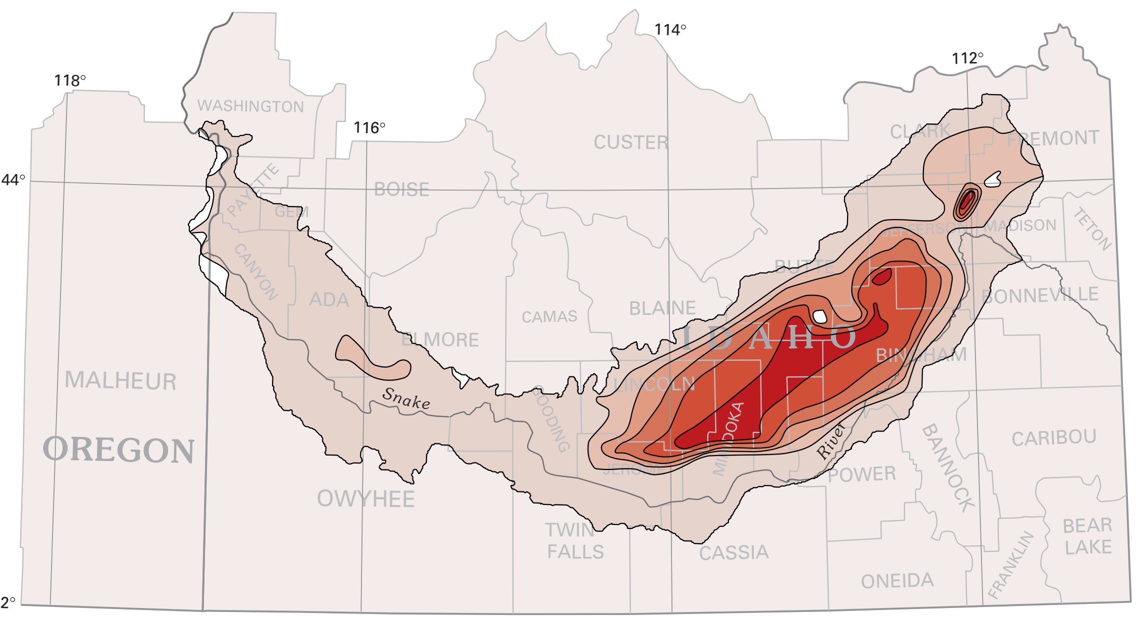
EXPLANATION

- 🟨 Unconsolidated-deposit aquifers
- ▨ Pliocene and younger basaltic-rock aquifers
- ▨ Miocene basaltic-rock aquifers
- ▨ Silicic volcanic rocks
- ⇌ Fault—Arrows show relative direction of movement



Modified from Whitehead, 1994

Figure 43. *Basalt of Miocene and younger age fills the graben-like trough on which the Snake River Plain has formed. Low-permeability, silica-rich volcanic rocks bound the basalt, which is locally interbedded with unconsolidated deposits.*



Base modified from U.S. Geological Survey digital data, 1:2,000,000, 1972

Modified from Whitehead, 1992

EXPLANATION

Saturated thickness of Pliocene and younger basaltic rocks, in feet

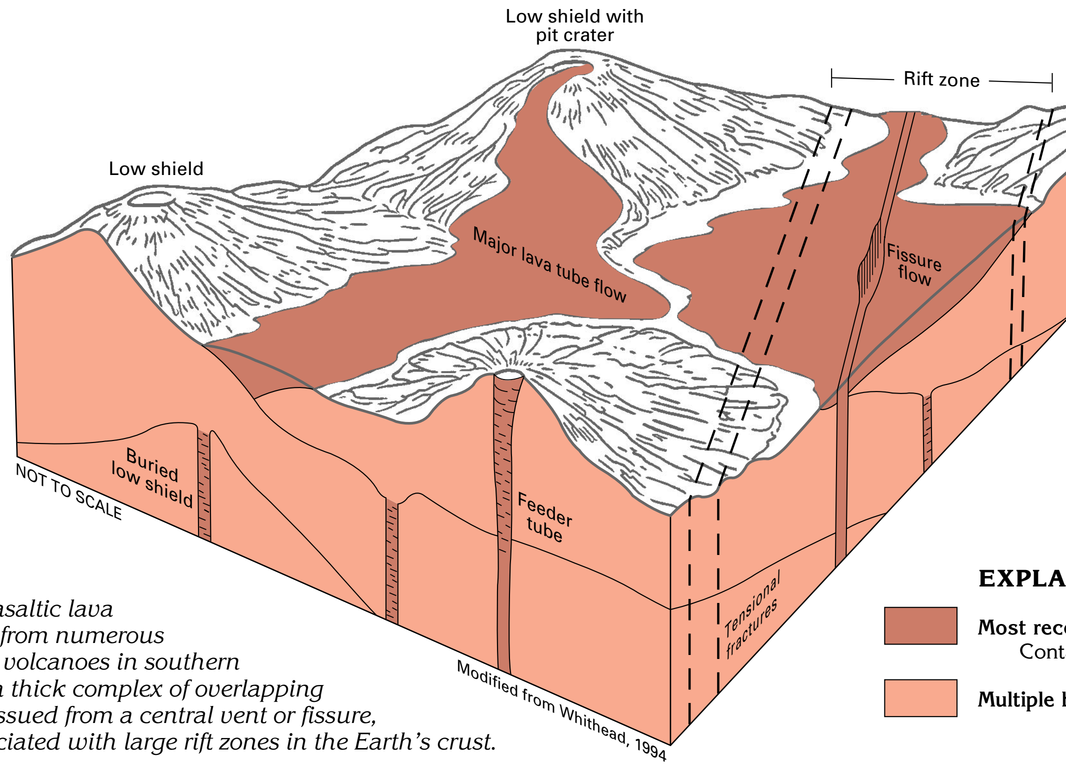
▨	500
▨	1,000
▨	1,500
▨	2,000
▨	2,500
▨	
☐	Absent

SCALE 1:4,000,000

0 25 50 MILES

0 25 50 KILOMETERS

Figure 44. *The saturated thickness of Pliocene and younger basaltic rocks is locally greater than 2,500 feet in the eastern Snake River Plain but is much less in the western plain.*

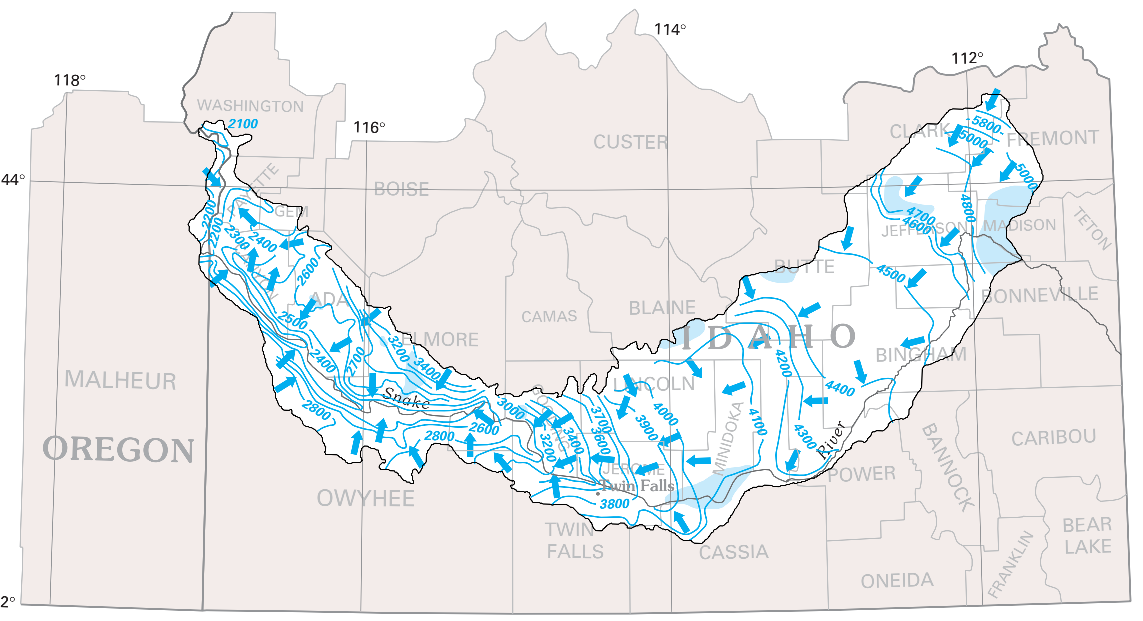


Modified from Whitehead, 1994

Figure 45. *Basaltic lava that was extruded from numerous overlapping shield volcanoes in southern Idaho has formed a thick complex of overlapping flows. Most flows issued from a central vent or fissure, and some are associated with large rift zones in the Earth's crust.*

EXPLANATION

- ▨ Most recent basalt flow—Contains some lava tubes
- ▨ Multiple basalt flows



Base modified from U.S. Geological Survey digital data, 1:2,000,000, 1972

Modified from Whitehead, 1992

EXPLANATION

- ▨ Area where local aquifers or perched water bodies overlie regional aquifer system
- —4000— Water-table contour—Shows altitude of regional water table during spring 1980. Contour interval, in feet, is variable. Datum is sea level
- ➡ Direction of ground-water movement

SCALE 1:4,000,000

0 25 50 MILES

0 25 50 KILOMETERS

Figure 46. *The regional movement of water in the Snake River Plain aquifer system is from east to west. Much of the discharge from the aquifer system is to the Snake River. Low-permeability rocks underlie shallow local aquifers or perched water bodies.*

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