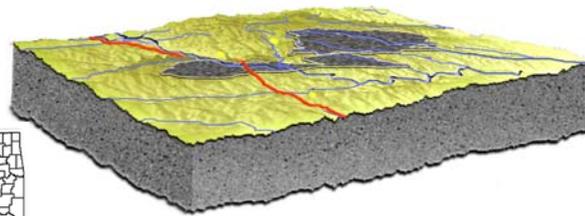


Arbuckle-Simpson Hydrology Study

Newsletter



THE OKLAHOMA WATER RESOURCES BOARD

December 2004

Board Tours Study Area

In conjunction with the OWRB's September meeting in Sulphur, Board members, OWRB staff, and guests were taken on a tour of the Arbuckle-Simpson study area. During the tour, OWRB staff, members of the Arbuckle Study Peer Review Team, and other experts discussed in detail the many geologic and hydrologic features of the aquifer at various areas of interest. They also explained how data is being collected and how it will be utilized to provide an improved understanding of the aquifer.

The tour began at Vendome Well, near downtown Sulphur at the Chickasaw National Recreation Area. OWRB geologist Noel Osborn provided an overview of the upcoming field trip and Brent Wilson explained the hydrology of Vendome well and other artesian wells in the Sulphur area. Scott Christenson (USGS) also discussed the aquifer's water chemistry.

The group then traveled to Jacobs Ranch, once owned by both former Oklahoma Governor Jim Turner and former Arkansas Governor Winthrop Rockefeller. Neil Suneson (Oklahoma Geological Survey) described local geology and Randall Ross of the U.S.



The OWRB's Noel Osborn (above) greets tour guests at Vendome Well, in Sulphur. Randall Ross (right), a hydrologist with the Kerr Environmental Research Center and member of the Arbuckle Study Peer Review Team, demonstrates aquifer recharge and discharge at the Tishomingo National Fish Hatchery, on Pennington Creek.



EPA's Robert S. Kerr Environmental Research Center in Ada talked about aquifer recharge.

At the U.S. Silica Quarry, near the town of Mill Creek, Neil Suneson provided information on the quarry, which is widely known for the clean quartz sand mined there. Todd Halihan (Oklahoma State University) explained the difficulty of studying faults in the subsurface.

Tishomingo National Fish Hatchery, located on Pennington Creek, provided

the backdrop for a discussion of streamgaging by the USGS's Bob Blazs, followed by an interesting demonstration of groundwater discharge and recharge by Randall Ross. At the Lake of the Arbuckles, Larry Walkoviak, Manager of the Bureau of Reclamation's Oklahoma-Texas Area Office, and Stephen Jolly, Manager of the Arbuckle Master Conservancy District, provided information on the lake and District prior to conclusion of the tour at Turner Falls Park.



A U.S. Geological Survey hydrologist gathers a water sample from Bitter Enders spring, the headwater spring to Honey Creek, above Turner Falls.

USGS Begins Geochemical Sampling

In October and November, the USGS conducted reconnaissance geochemical sampling of the Arbuckle-Simpson aquifer. This first round of water sampling, part of a broader analysis of the aquifer's chemical make-up, targeted five springs and 24 wells that will provide important information about major ions, nutrients, trace elements, isotopes and age-dating analytes in groundwater. Specifically, sample results will be used to determine the general water quality of the aquifer, identify possible water quality problems, gain insight into the aquifer's flow system, and provide data for more detailed geochemical studies.

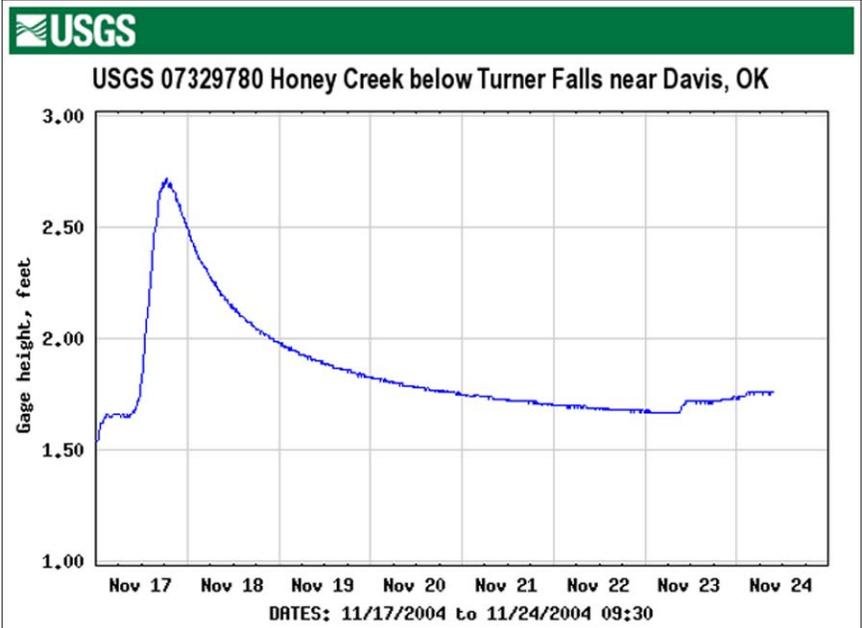
Because much of the land in the Arbuckle-Simpson region is privately-owned, landowner cooperation is essential to the study. As a courtesy, the EPA's Kerr Lab in Ada conducted bacteria analyses of the groundwater samples. That data will be furnished to landowners who provided critically important access to USGS researchers.

New Stream Gage Installed on Honey Creek

A new U.S. Geological Survey stream gage has been installed on Honey Creek, downstream of Turner Falls. Establishment of the gage was funded through the OWRB and USGS. Long-term maintenance of the gage may be turned over to the City of Davis, which owns Turner Falls State Park. Data from the gage will also be used to monitor local flooding potential.



USGS staff inspect the new Honey Creek gage.



Real-time data relayed by satellite is used to plot gage height at Honey Creek, which has a contributing drainage area of 16.4 square miles. The term "gage height" refers to the height of the water surface above the gage datum (zero point). Graphs and other data from the Honey Creek site, as well as other stream and groundwater stations throughout Oklahoma, are available online at <http://waterdata.usgs.gov/ok/nwis>.

Peer Team and Personnel Undergo Changes

Clayton Jack, a landowner in the Arbuckle study area, is the newest citizen liaison to the Arbuckle-Simpson Study Peer Review Team. Jack will represent landowner interests to the team. He is also president of Jack Exploration, an oil and gas exploration company based in Sulphur.

The Peer Review Team--experts from the OWRB, U.S. Geological Survey, Oklahoma Geological Survey, Oklahoma State University, and U.S. Environmental Protection Agency--reviews the study's scope of work to ensure the use of sound science and methods. Ada resident Dick Scalf also serves as liaison to the group.

On a related note, the OWRB's Crystal Stephens and Brent Wilson have resigned to assume jobs in the private sector.

Study Participants Inventory Karst Features

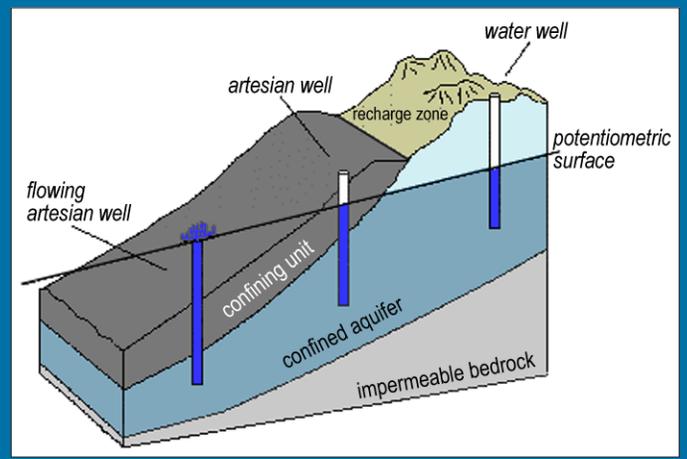
The OWRB, USGS and other study participants are conducting an ongoing inventory of karst features, specifically sinkholes and caverns, which commonly form in the soluble rocks of the Arbuckle-Simpson aquifer. The locations and properties of these features are of particular importance because they frequently indicate areas of aquifer recharge.



Scott Christenson, USGS hydrologist, peers into a 65-foot deep sinkhole

What is an Artesian Well?

An artesian well is one that has been drilled into a confined aquifer, such as the Arbuckle-Simpson aquifer, where the underground pressure is great enough for the water to rise inside the well, and in some cases, discharge to the surface without the aid of a pump. The amount of water that flows from artesian wells is a direct function of pressure within the aquifer. The pressure, also called the hydraulic head, is created as groundwater is compressed under the weight of overlying rock and newly infiltrating waters. When groundwater is forced beneath an impermeable, confining rock layer, a well drilled in a topographic low (having a potentiometric surface that is higher than ground level) will likely yield artesian flow.



To join the Arbuckle-Simpson Study mailing list, call the OWRB at 405-530-8800.

For more information, visit the OWRB's Web site at www.owrb.state.ok.us.

