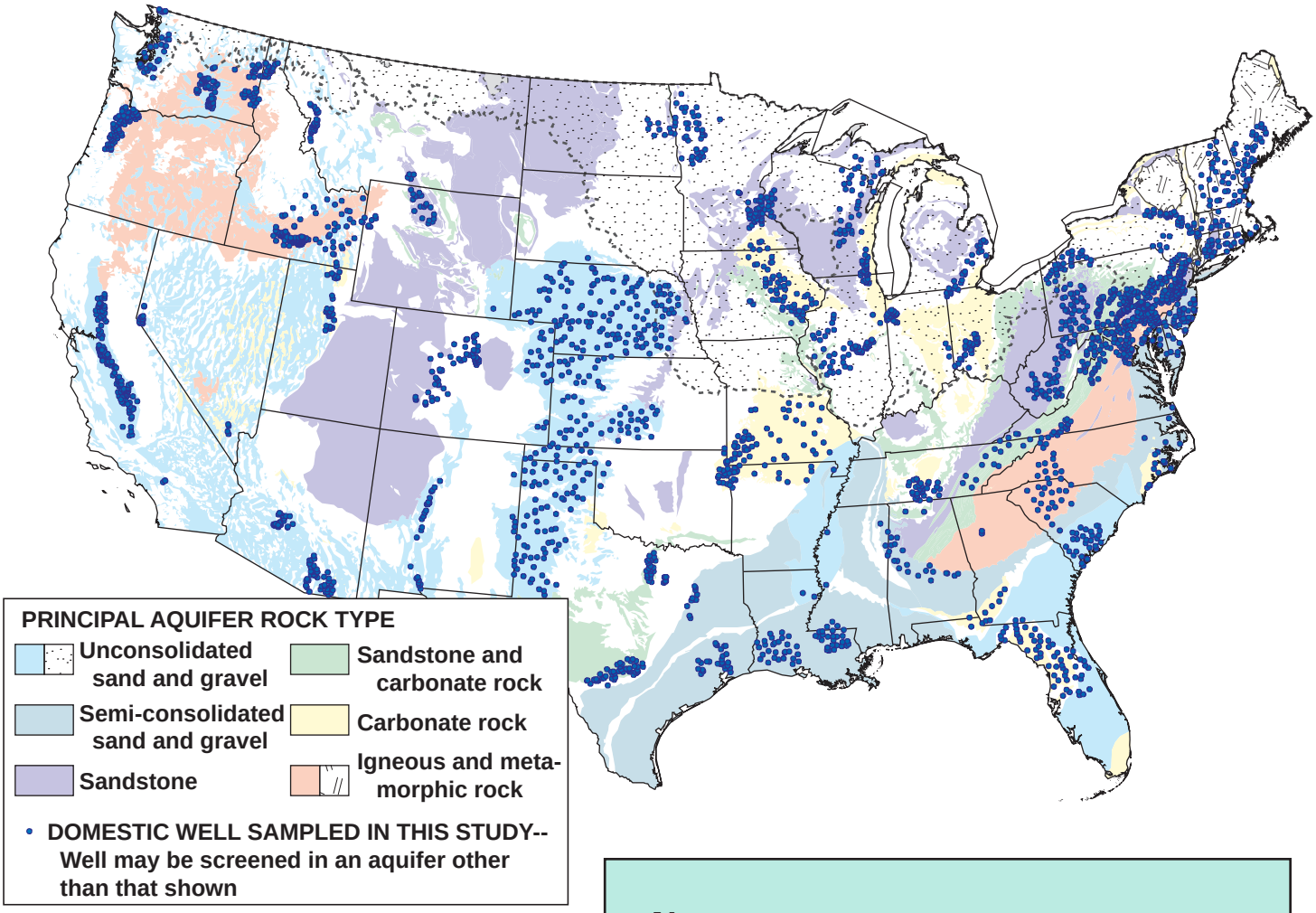
USGS
science for a changing world

Water-Quality of Domestic Wells in the United States

Data from the National Water-Quality Assessment of the U.S. Geological Survey, 1991-2004



The quality of water for domestic use supplied by homeowner wells is not regulated under the federal Safe Drinking Water Act and, in most cases, these wells are not routinely monitored for drinking-water contaminants. Thus, there has been little information available at the national scale on the quality of domestically supplied drinking water. Data from 2,725 domestic wells sampled as part of the National Water-Quality Assessment (NAWQA) program are being analyzed to characterize domestic well water quality nationally and within principal aquifers of the United States. About 220 properties and constituents are included in the analysis.

About 43 million people, or 15 percent of the U.S. population, obtain their drinking water from domestic wells.

Photo courtesy of Glenn Phillips, IMEC

About 220 water-quality properties and constituents were measured in domestic wells in the United States, including:

- **Nitrate**
- **Radon**
- **Pesticides**
- **Volatile organic compounds**
- **Trace elements, including arsenic and uranium**
- **Major ions**
- **Water properties, including pH, dissolved oxygen, and alkalinity**

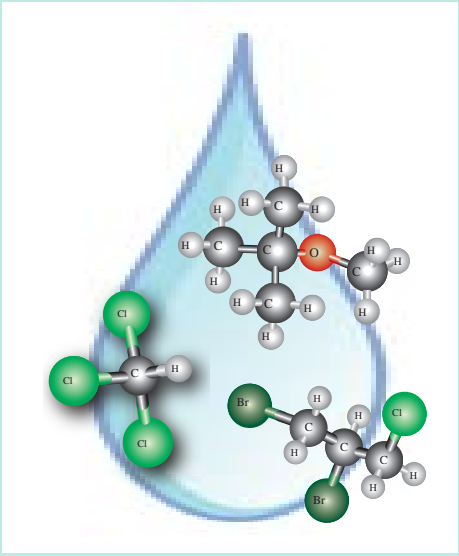
Domestic well, Early County, Georgia, USA
Credit: Alan Cressler, USGS

Statistical methods are being used to summarize properties and constituent concentrations nationally and by principal aquifer. Water-quality in domestic wells also is being related to natural features (for example, rock type), geochemical conditions, and land use.

Concentrations of selected constituents are being compared to benchmarks for human health. Benchmarks for human health include U.S. Environmental Protection Agency Maximum Contaminant Levels (MCLs) for publicly supplied drinking water (http://www.epa.gov/safewater/mcl.html) and USGS health-based screening levels (HBSLs) (http://water.usgs.gov/nawqa/HBSL). Comparisons of measured concentrations in water to MCLs and HBSLs are useful for local, State, and Federal water-resource managers and others charged with protecting and managing drinking-water resources. For example, these comparisons can indicate when measured concentrations may be of potential health concern and can provide an early indication of when contaminant concentrations in ambient water resources may warrent further monitoring or study.

Analysis of the co-occurrence (or "mixtures") of contaminants, such as the frequency of occurrence of nitrate and pesticides, is included in the domestic well study. Previous NAWQA findings suggest that a variety of mixtures are common. Thus, the total combined effects of contaminants in water may be greater than that of any single compound that is present.

Many drinking-water contaminants occur in the environment in mixtures.



For additional information about this study, contact:
Leslie DeSimone
ldesimon@usgs.gov
508-490-5000

For online information, reports, and data from the NAWQA program: **http://water.usgs.gov/nawqa/**

For related USGS studies on drinking-water quality: **http://health.usgs.gov/dw_contaminants/**