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Identifying the location and population served by domestic wells in California

Tyler D. Johnson*, Kenneth Belitz

US Geological Survey, National Center, Reston, VA, USA

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ABSTRACT

Study region: California, USA.
Study focus: Identification of groundwater use is an important step in the regional-scale assessment of groundwater quality. In California, 1990 US Census data indicate that domestic wells provide drinking-water to about 1.2 million people. However, the location of these domestic well users of groundwater is poorly identified because the census tracts can be quite large (up to 20,000 km^2). The purposes of this paper are to present methods used for (1) estimating the location of domestic wells, (2) estimating the location of households using domestic well water; and (3) identifying where in California groundwater is an important source of domestic drinking supply.
New hydrological insights for the region: Aggregating the results indicates that three hydrogeologic provinces contain nearly 80% of all domestic wells and also have the highest density of domestic well users: Central Valley (31.6%), Sierra Nevada (31.5%), and Northern Coast Ranges (16.6%). Results were also aggregated into groundwater basins and highland areas, collectively called Groundwater Units (GUs). Twenty-eight of the 938 GUs contain more than 50% of the total population served by domestic wells, 70 GUs contain more than 75%, and 150 GUs contain 90%. The 28 GUs are mostly located in the eastern and southern San Joaquin Valley (11), the Sacramento Valley (7), and the western foothills of the Sierra Nevada province (5). Using the information presented in this research along with other information about domestic-well use, the US Geological Survey has begun sampling high-use GUs for the Shallow Aquifer Assessment component of the Groundwater Ambient Assessment (GAMA) program.

* Corresponding author at: US Geological Survey, California Water Science Center, San Diego, CA, USA. Tel.: +1 619 225 6100; fax: +1 619 225 6101.
E-mail address: tyjohns@usgs.gov (T.D. Johnson).

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