

WATER QUALITY AND CONTAMINANT OCCURRENCE IN DOMESTIC WELLS IN THE UPPER FLORIDAN AQUIFER IN PARTS OF FLORIDA, GEORGIA, AND SOUTH CAROLINA

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Abstract. The Floridan aquifer system is a highly productive carbonate aquifer that provides drinking water to approximately 10 million people in Florida, Georgia and South Carolina. Water samples were collected from 148 domestic wells in the Upper Floridan aquifer in these three States from 1998 through 2005 as part of the U.S. Geological Survey National Water-Quality Assessment program. Networks of 28 to 30 wells were sampled in areas classified on the basis of confinement of the Upper Floridan aquifer (Figure 1). Samples were analyzed for major ions, metals, nutrients, pesticides, and volatile organic compounds (VOCs). Federal primary drinking-water standards were not exceeded in any samples, although secondary drinking-water standards were exceeded for 13 and 3 percent of samples for iron and manganese, respectively. Federal drinking-water standards have not been established for several of the pesticides and VOCs detected in the samples. Nitrate concentrations greater than 1.0 mg/L (as nitrogen) were present in many samples from unconfined parts of the aquifer in southwestern Georgia where dissolved oxygen concentrations were greater than 1.0 mg/L and agricultural land use was common. One or more of the targeted pesticides were detected in about 22 percent of samples and concentrations were typically less than 0.5 ug/L. The herbicides atrazine, deethylatrazine, and metolachlor were most frequently detected in unconfined areas in southwestern Georgia. One or more of the targeted VOCs, which are associated with plastics, adhesives, paints, gasoline, fumigants, refrigerants, and dry-cleaning fluids, were detected in about 64 percent of all samples. VOC detection rates varied little between confined and unconfined areas (60 to 66 percent). Chloroform, carbon disulfide, and 1,2-dichloropropane were the most frequently detected VOCs. Chloroform, a by-product of water chlorination, was most frequently detected in unconfined urban areas. Carbon disulfide, a solvent, was most frequently detected in confined areas in southern Georgia in mixture of land use areas. These results are similar to results from national ground-water assessments where hydrogeologic and anthropogenic factors were associated with the likelihood of detecting specific VOCs.

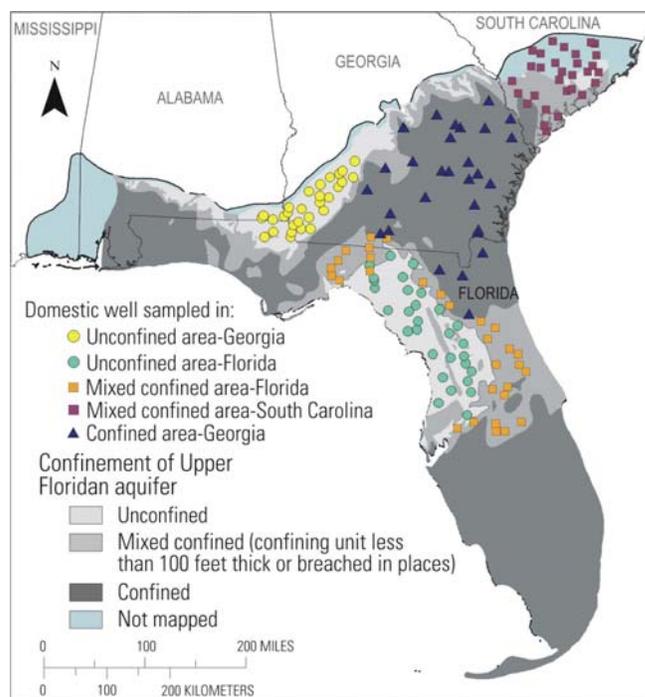


Figure 1. Location of wells sampled and confinement of the Upper Floridan aquifer. [Modified from Miller, 1986]

LITERATURE CITED

Miller, J.A., 1986, Hydrogeologic framework of the Floridan aquifer system in Florida and in parts of Georgia, Alabama, and South Carolina, U.S. Geological Survey Professional Paper 1403-B, 91 pp.