

Assessment of the Microbial and Chemical Water Quality of Individual and Small Systems Groundwater Supplies in Arizona

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ABSTRACT

Arizona has more non-disinfected drinking water supply systems than any other state. All of these systems depend on groundwater that is subject to contamination by waterborne and waterbased pathogens. The goal of this project was to assess the microbial quality of non-disinfected individual and small groundwater drinking water systems in Arizona. In addition, data was collected on the occurrence of heavy metals. The microbiological parameters tested included total and fecal coliforms, enterococci, heterotrophic bacteria, *Helicobacter pylori*, *Aeromonas hydrophila*, enteric viruses, and somatic and male specific coliphages. Physical parameters tested included pH, turbidity, total dissolved solids (TDS) and temperature. Chemical parameters included nitrate/nitrogen, total organic carbon (TOC) and metals. Forty-nine groundwater sources were tested in seven Arizona counties. A total of 70 samples were collected over 14 months. Forty-three percent of the systems were positive for total coliforms, 16% for fecal coliforms and 4% for *E. coli*. Twenty-nine percent of the wells were positive for enterococci, and 57% were positive for *Aeromonas hydrophila*. *H. pylori*, norovirus and enterovirus were not detected by polymerase chain reaction (PCR) in any of the sites sampled. At least one primary and/or secondary Drinking Water Standard (DWS) was exceeded for heavy metals. Metals which exceeded standards included arsenic, aluminum, iron, lead, manganese, molybdenum, selenium, and uranium. Seventy-four percent of the sites sampled exceeded at least one of the primary DWS, 80% exceeded at least one secondary DWS, and 95% exceeded primary and/or one secondary standard.