**How Groundwater Quality Is Affected**

Most groundwater is brought to the surface by pumping it from a well. Groundwater quality can be contaminated by both naturally-occurring and man-made contaminants. Naturally-occurring chemicals typically come from dissolving rocks, soil, and decaying plant material.

Fertilizers and pesticides contaminate groundwater when applied or used incorrectly. Leaking underground storage tanks, human waste from leaking septic tanks (photo above), broken sewer pipes and wastewater systems, and contaminated irrigation water are also sources of contamination. All of these can result in contaminants entering groundwater including nitrate (fertilizers), salts, pesticides, pharmaceuticals, and bacteria.

**Protecting Groundwater Quality**

Groundwater use, quality, and regulation are the responsibility of state and local agencies, and every Californian. The State and Regional Water Boards protect and restore groundwater quality through specific programs and actions, including:

- Updating groundwater basin plans and integrated regional water management
- Regulating discharges to prevent contaminants from reaching groundwater
- Continuing the State Water Board's critical Groundwater Ambient Monitoring and Assessment (GAMA) Program to help better understand groundwater quality
As part of the State Water Board’s GAMA Program, scientists from Lawrence Livermore National Laboratory sample an agricultural supply well.

- Developing salinity management and control in the San Joaquin Valley (a long term threat to agriculture)
- Investigating and cleaning up over 10,000 leaking underground storage tank sites
- Addressing groundwater concerns with irrigated agriculture, septic tanks, wastewater treatment plants, industrial facilities, confined animal facilities, and water storage/reuse
- Remediation at thousands of cleanup sites, including military sites, abandoned mines, brownfields, and Superfund sites.
- Development and implementation of a recycled water policy.

For more information, please visit the following website: http://www.waterboards.ca.gov/water_issues/programs/outreach/groundwater.shtml

Drinking Water From Wells
Groundwater pumped from the over 14,000 active public supply wells provides part or all of the drinking water to over 80 percent of California residents. Over 6,000 wells have been shut down since the 1980s, many for water quality reasons. In addition, up to two million California residents are served either by the estimated 250,000 to 600,000 private domestic wells or by water systems serving fewer than 15 service connections. Unlike public drinking water systems, there are no federal or state regulations covering water quality served from private domestic wells.

Monitoring Groundwater
Monitoring is an important tool used for assessing groundwater quality and helping prevent groundwater contamination. Agencies and planning experts have used monitoring test results to manage groundwater and to make sure it is safe to use. The State Water Board’s Groundwater Ambient Monitoring and Assessment (GAMA) Program tests water wells throughout the state to determine levels of naturally-occurring and man-made chemicals. The GAMA Program has four active projects: Priority Basin Project, Special Studies Project, Domestic Well Project, and GeoTracker GAMA groundwater information system:

- Priority Basin Project has sampled over 2,500 wells that provide over 95 percent of the groundwater used for public drinking water. The US Geological Survey is project’s technical lead.
- Special Studies Project: focuses on issues at a project scale, including nitrate contamination from dairies and pharmaceuticals in groundwater. The project’s technical lead is Lawrence Livermore National Laboratory.
- Domestic Well Project: State Water Board staff has sampled over 1,000 private domestic wells in six counties: Yuba, El Dorado, Tehama, Tulare, San Diego, and Monterey County.
- GeoTracker GAMA: an online groundwater information system that provides the public with access to over 200,000 wells with over 175 million analytical results, all on an interactive Google maps interface. Access GeoTracker GAMA at: http://www.waterboards.ca.gov/gama

These projects and others are key components in the Water Boards’ efforts to enhance, protect, and restore California’s vital groundwater resources.