



Fact Sheet

Groundwater

Air Force Base Conversion Agency, McClellan

No. 2 - 02

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This fact sheet describes McClellan's efforts to clean up the contaminated groundwater at the former McClellan Air Force Base.

McClellan Air Force Base used many chemicals to support military activities while the base was active from 1936 to 2001. Fuels were used to power vehicles, airplanes and generators; solvents were used to degrease machinery and equipment; and cleaners were used to wash aircraft parts. Sometimes these chemicals escaped to the environment from leaking tanks, being washed down floor drains or being spilled during transportation and use. Past chemical disposal practices also contributed to soil and groundwater contamination. These were accepted disposal practices but are now known to cause environmental contamination and are no longer being used. The Air Force is committed to cleaning up the soil and groundwater contaminated with fuels, solvents, and other chemicals from past activities at McClellan.

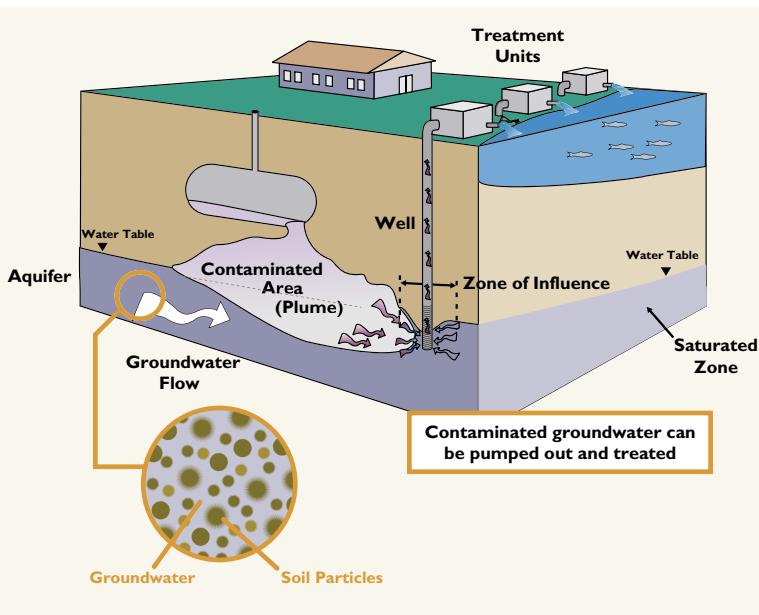
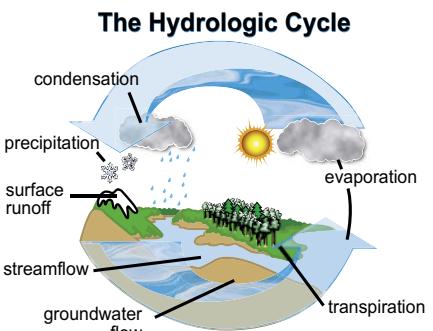
Hydrologic Cycle

When rain falls to the ground, the water does not stop moving: some of it flows along the surface in streams or lakes, some of it is used by plants, some evaporates and returns to the atmosphere, and some sinks into the ground. This movement of water around the environment is called the hydrologic cycle.

What is Groundwater?

Imagine pouring a glass of water onto a pile of sand. Where does the water go? The water moves into the spaces between the particles of sand. Groundwater is water that fills the spaces between rocks and soil particles underground. The area where water fills these spaces is called the saturated zone. The top of this zone is called the water table. The water table may be only a foot below the ground surface or it may be hundreds of feet down. At McClellan, the water table is about 90 to 105 feet below the ground surface. The water table rises and falls depending on many factors, including heavy rains, melting snow, and

extended periods of dry weather. Human activity may also draw down the water table by pumping out water for drinking water supply or irrigation.



Groundwater is stored in and moves through layers of soil, sand, and rocks called aquifers. The speed at which groundwater flows depends on the size of the spaces in the soil or rock and how well the spaces are connected. Aquifers typically consist of gravel, sand, or fractured rock. These materials are permeable because they have large connected spaces that allow water to flow through.

Groundwater supplies are replenished, or recharged, by rain and snow melt. If contamination is present in or on soil above the aquifer, rain and snow melt can carry contaminants through the soil to the aquifer. An area of contamination in groundwater is called a plume.

Groundwater Cleanup

One technology that is used to clean up contaminated groundwater involves pumping out the water and cleaning it (pump-and-treat). It is a 2-step process that uses groundwater extraction wells to remove contaminated groundwater from the aquifer. A groundwater well is a hole drilled into an aquifer supported by a pipe. A pump is used to pull water out of the ground and a screen filters out unwanted particles that could clog the pipe. Wells come in different shapes and sizes, depending on the type of soil the well is drilled in and how much water is being pumped out. A treatment system at the ground surface removes contaminants from the extracted water. Groundwater monitoring wells are used to collect groundwater samples to monitor the levels of contamination and the movement of the contaminant plume.



Magpie Creek

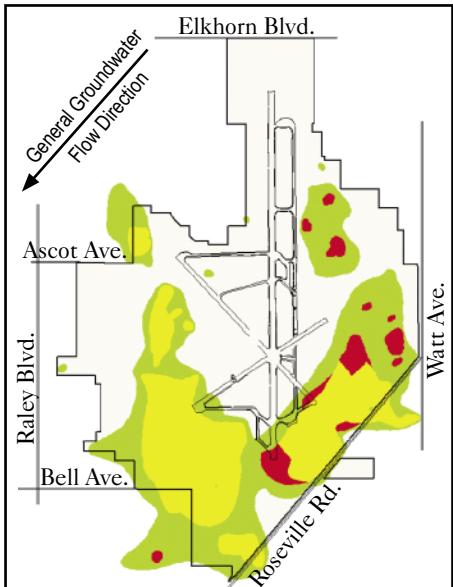
Groundwater Cleanup at McClellan

At McClellan, the groundwater is contaminated to a depth of about 400 feet below ground surface in some areas. The main groundwater contaminants being cleaned up at the former Air Force Base include solvents and cleaners. Groundwater contaminant plumes underlie approximately 1,570 of the 3,000 acres at the former McClellan Air Force Base, as shown on the map below. Groundwater under McClellan moves an average of 50-250 feet per year in a general south-westerly direction.

The pump-and-treat technology being used at McClellan includes 57 extraction wells delivering contaminated groundwater to an above-ground treatment system. Currently, this system treats about 1,200 gallons per minute (gpm) and plans are underway to expand the treatment capacity to 2,000 gpm by 2004. The treated water is tested to make sure it meets State regulations and guidelines before it is discharged to Magpie Creek (which eventually meets up with the Sacramento River).

More than 500 wells have been installed in and around McClellan to monitor contaminant concentrations and plume movement. A monitoring plan was developed in accordance with regulatory requirements to test groundwater at regular intervals (one to four times per year). Groundwater is tested to ensure that contaminated groundwater poses no threat to human health or the environment. Results of the groundwater monitoring program are presented in reports available to the public for review in our Information Repository at the former McClellan Air Force Base.

Given the current performance of the pump-and-treat system and the anticipated performance of the planned improvements, approximately 80 percent of the groundwater contamination is expected to be cleaned up by 2025. The remaining 20 percent of the groundwater contamination is expected to be cleaned up by 2150.



Groundwater Plume Location Map, Former McClellan AFB

The **yellow** and **red** areas represent groundwater contamination above the clean-up level set by the regulatory agencies; the **green** areas have low amounts of contamination and do not require cleanup. The **yellow** areas are currently being treated with the McClellan groundwater treatment system; the **red** areas will be addressed when the system is expanded (2004).

Interested in Learning More?

- Visit the website: <http://www.afbca.hq.af.mil/mcclellanem/>
- Attend the public Restoration Advisory Board (RAB) meetings
- Attend poster board sessions – a chance to ask one-on-one questions on the cleanup activities
- Sign up to be added to the mailing list
- Visit the Information Repository/Administrative Record at McClellan: Hours of Operation: 08:00 a.m. to 3:00 p.m. M-Th and every other Friday; Contact: Laraine McQuillen at (916) 643-1250, Ext. 239

Air Force Base Conversion Agency

Dawn Young, McClellan Community Relations
(916) 643-1742, Ext. 233

Department of Toxic Substances Control

Diane Fowler, Public Participation Specialist
(916) 255-6682

United States Environmental Protection Agency

David Cooper, Community Involvement Coordinator
(415) 972-3237; (800) 231-3075