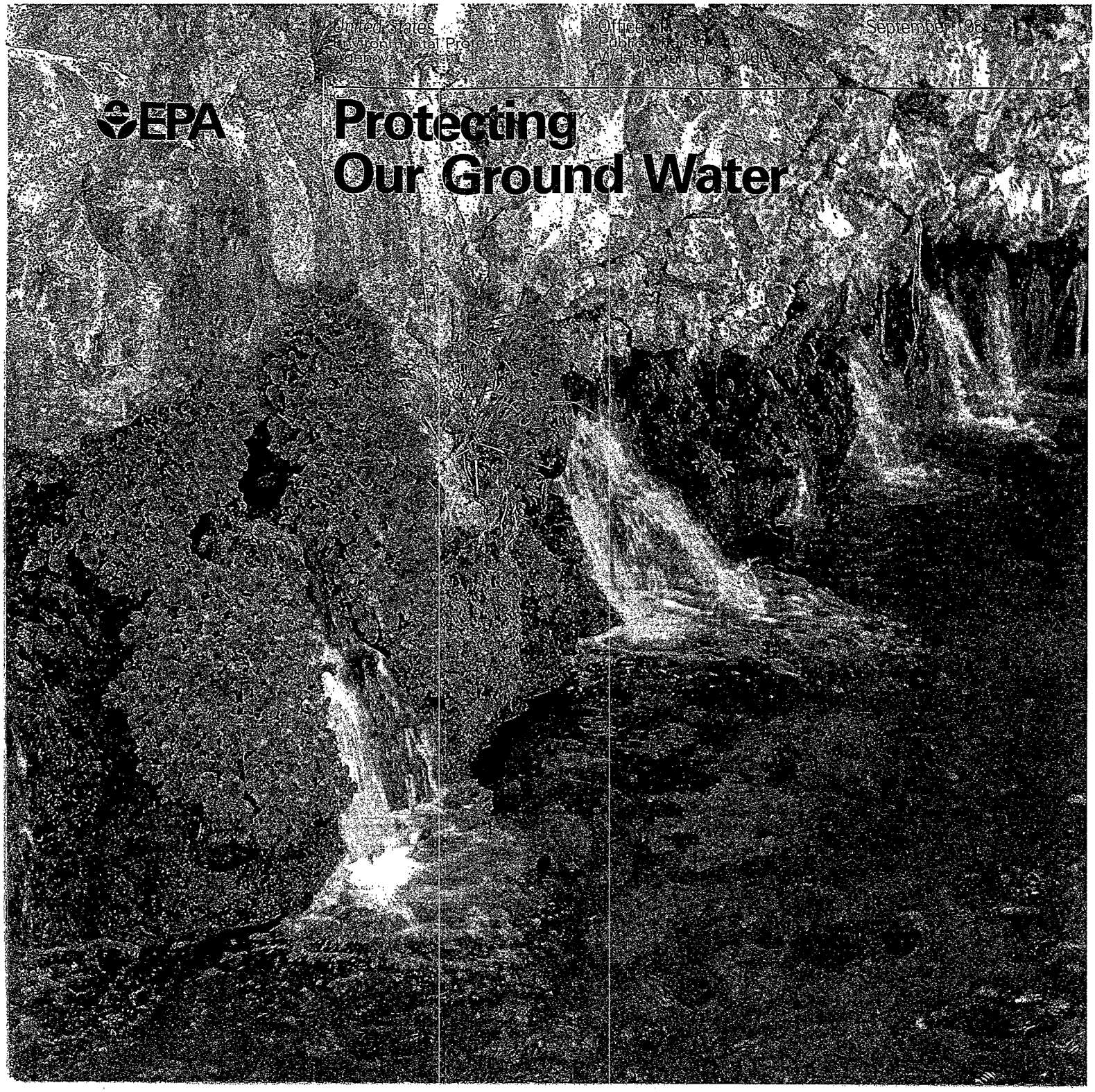
United States
Environmental Protection
Agency

Office of
Public Affairs (A-107)
Washington, DC 20460

September 1986

EPA

# Protecting Our Ground Water



# Protecting Our Ground Water

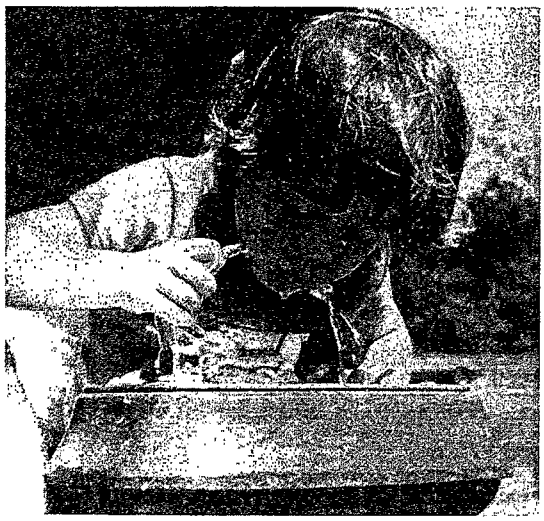
Lakes of every size, large rivers and smaller streams abound across our planet, but the largest supply of fresh water by far underlies the earth's surface. Ground water makes up 96 percent of the world's total water resources. Approximately 118 million Americans, half of the country, depend on ground water for their drinking water.

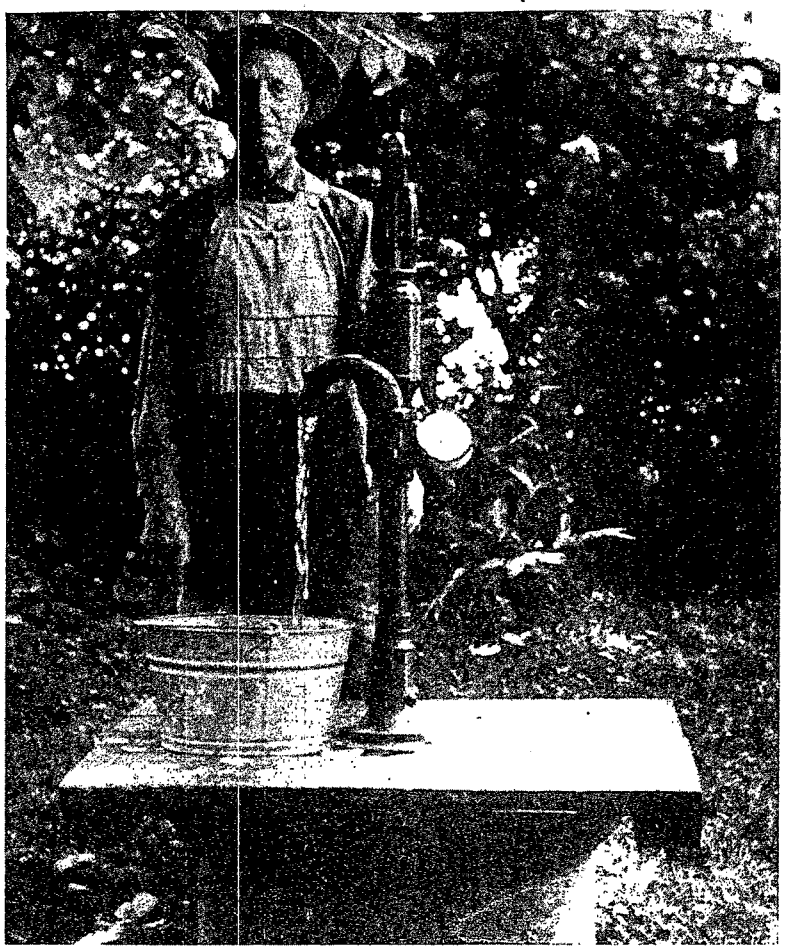
Once thought to be safe from contamination, ground water is now a threatened resource. As more incidents of ground-water pollution are discovered across the country, the public has grown increasingly aware of the potential problem of ground-water contamination. And as public concern has increased, so have demands for expanded protection of this vital resource.

## Ground-Water Facts

- Ground water is primarily stored in aquifers—geologic formations of permeable saturated zones of rock, sand or gravel—that contain enough water to yield usable amounts to wells and springs. It does not occur as underground oceans, lakes or streams (except in some rare cave-type environments).
- In general, ground water moves very slowly. In formations containing layers of consolidated clay with little fracturing, ground water may move as slowly as a few inches per year. In strata containing unconsolidated sand and gravel, ground water can move 800 feet or more a year. Ground water also may move comparatively rapidly through cavernous limestone formations.
- Aquifers are recharged (replenished) by precipitation seeping into the ground or by surface waters with which they are interconnected. In many parts of the country, recharge areas are close to the surface and may be significantly affected by agricultural, residential or industrial activities. The depth of ground water below the earth's surface, the depth and type of soils above the aquifer, and many other factors affect the potential for contamination.
- Ground water usually discharges (releases) to surface waters. In some areas of the country, aquifers contribute large quantities of water to the flow of streams. In almost all parts of the country, ground water is present in sand and gravel deposits along streams and rivers.

- Once contaminated, ground water is difficult—and sometimes impossible—to clean. Because ground water moves slowly, contaminants do not spread or mix quickly. Contaminants remain concentrated in slow-moving plumes and are typically present for many years. If ground water becomes contaminated, the contamination may eventually appear in surface water.





## EPA's Ground-Water Protection Strategy

The U.S. Environmental Protection Agency initiated a Ground-Water Protection Strategy in August 1984. This strategy provides the framework for an enhanced Federal/State partnership in protecting this resource, built on the principle of State control of ground water, a tradition deeply ingrained in our legal and institutional history.

Under this partnership the States have primary responsibility for protecting and managing ground water. EPA is responsible for regulating specific contaminants and sources of contamination and providing technical and financial support to the States. EPA's Ground-Water Protection Strategy has four major objectives:

- To build and enhance ground-water protection programs at the State level.
- To expand controls where appropriate over currently uncontrolled sources of contamination.
- To achieve greater consistency in EPA decisions on ground-water protection and clean up.
- To strengthen EPA's nationwide organization for ground-water protection.

## Highlights of EPA Ground-Water Activities

EPA has established an Office of Ground-Water Protection to coordinate Agency activities under the various laws that relate to ground water. Similar offices have been created at the regional level to work directly with States.

Here are some highlights of the Agency's ground-water protection activities:

- EPA is developing guidelines to define what ground water should be protected and the level of that protection. The guidelines will help EPA achieve more consistent decision-making about ground water across Agency programs.
- EPA is administering a $7 million grant program to support State ground-water programs and strategies.
- EPA is developing a cohesive approach for obtaining scientifically sound ground-water monitoring data that EPA, State and local officials can use in making decisions on ground water.
- EPA issued a chemical advisory to alert owners and operators of underground storage tanks to the danger of leaks and means of detection, prevention and repair. EPA has a nationwide survey under way to determine the extent and causes of leaks in underground gasoline storage tanks. The Agency is developing regulations for underground tanks under 1984 amendments to the Resource Conservation Recovery Act.
- EPA has stepped up efforts to prevent pesticide contamination of ground water. Manufacturers are now required to submit data on the leaching potential of new pesticide products. The Agency has initiated an accelerated review of over 120 previously registered pesticides that may have a potential for contaminating ground water. If a pesticide is found to pose a threat to ground water, the Agency will take steps to ban or restrict its use in areas at risk.
- EPA will issue technical information documents describing successful practices to protect ground-water quality at the State and local level.
- An EPA-sponsored university consortium will conduct several symposia to stimulate and exchange

new ideas on policies and programs for ground-water protection.

## What Private Citizens Can Do

The best protection for ground water is prevention—stopping contaminants from entering the system at the source. Federal and State agencies have expanded their efforts to prevent contamination of ground water, but private citizens also have an active role to play. Here are some steps you can take to help protect ground water in your own area.

- Become familiar with your local ground-water resources. Do you know which aquifer supplies your community's water system and private wells? How many people use it, and for what purpose?
- Become familiar with the common sources of ground-water contamination. Which of these activities take place in your community? How are they controlled?
- Find out how your community disposes of waste products. What waste products are used or produced by large industries in your area? How are toxic substances used, handled, or stored? Is there a special program for the disposal of household products such as solvents, empty paint cans or pesticide containers? Are septic tank ordinances adequate to protect ground water?
- Find out how extensively pesticides and fertilizers are used in your area. Follow label directions when you use pesticides and fertilizers yourself.
- Learn the procedures for reporting emergency spills or other kinds of contamination that may threaten water supplies. Do local agencies have contingency plans for responding to accidental spills or leaks of toxic substances?
- Find out who is responsible for managing local ground-water supplies. Participate in local water planning and conservation initiatives.
- Become familiar with State programs and activities to protect ground water. What chemicals are regulated by the State? Does the State have a ground-water classification system? Has the State developed programs to control sources of contamination? Attend and participate in public meetings and hearings on ground-water issues.
- Determine if existing ground-water protection authorities are adequate. Find out if there are local ordinances that provide ground-water protection. Is there an effective enforcement program to penalize polluters? Who should you call to report incidents of illegal waste disposal?

## Summary

The nation's health and prosperity are irrevocably linked to our supply of clean, safe ground water. The key to ensuring future availability of this critical resource is to prevent its contamination. Private citizens should become familiar with the common sources of ground-water contamination. State and local governments need support in their efforts to prevent contamination from these sources. For more information about ground-water protection, contact your State or local department of natural resources, environmental protection, or public health. Information also is available at EPA regional offices.

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## How Ground Water Becomes Contaminated

Ground water becomes contaminated when wastes and other pollutants seep into the earth and into aquifers. Major sources of ground-water contamination commonly found throughout the country include:

### Hazardous waste sites

About 19,000 abandoned and uncontrolled hazardous waste sites have been identified nationwide, and the number is expected to rise as surveys continue. Preliminary studies of 10,000 sites found some degree of ground-water contamination at about 4,000 locations.

### Other waste disposal facilities

There are approximately 93,000 landfills in the United States used by municipalities or industries to dispose of non-hazardous waste products and household waste. The great majority of these facilities are existing or potential sources of ground-water contamination.

### Surface impoundments

This term is used to describe pits, ponds, lagoons and other holding areas for liquid wastes. Impoundments are used by industries or municipalities for receiving hazardous and non-hazardous wastes. There are more than 180,000 surface impoundments in the United States. Many are located over aquifers used for drinking water and pose a serious threat of ground-water contamination. In the past, surface impoundments generally were sited and designed without safeguards for protecting ground water

### Storage tanks

Gasoline, toxic chemicals, process chemicals, heating oil, chemical waste and other liquids of countless variety are stored in tanks. Storage tanks are installed above or below ground. Leaks from either may contaminate ground water.

Current estimates indicate there are as many as 10 million underground storage tanks in place across the country. Over time, underground tanks are subject to corrosion and fractures that lead to leakage.

There are approximately 2.3 million gasoline storage tanks in the United States. At present, there is no reliable indication of the number that may be leaking, but various studies estimate between 3 percent and 25 percent are leaking. Gasoline storage tanks, of course, are located in virtually every community in the country. Many were installed in the 1950s and 1960s. Unless they are repaired or replaced, the number of leaking tanks can be expected to increase.

## Other major sources of ground-water contamination

Septic tanks, used by approximately 20 million American households, handle an estimated 3.5 billion gallons of liquid waste per day. Septic systems discharge high volumes of waste into ground water. Chemical solvents used to clean septic tanks also can contribute to contamination of ground water.

The use of pesticides and fertilizers on farms and the handling of animal waste also can result in ground-water contamination.

Highway de-icing compounds, accidental spills of fuel and chemicals, waste oil used to coat roads, and "midnight dumping" of hazardous waste all can contribute to the total load of contaminants reaching ground-water supplies.

Active or abandoned coal mines and metal mines may contaminate ground water. The underground injection of liquids and activities to increase output from oil and gas wells, when inadequately designed or operated, may contaminate ground water.

A different kind of ground-water contamination can occur along the sea coast. When ground water is pumped out faster than it is being replenished, salt water advances into fresh water aquifers, reducing the usefulness of the water.

# Ground Water and Land Use in the Water Cycle