

# WATER QUALITY

Every time water completes its cycle from vapor to liquid or solid and back to vapor again, its quality is renewed. However, water quality can be damaged by any number of pollutants in the air, on land, or from other water supplies. The amount of water available for use depends on its quality, and the availability of water dictates where we can live, build cities, and create industry.

On the average, every American uses about 150 gallons of water a day. That makes daily water consumption in the United States in 1996, approximately 39 **billion** gallons per day. It's no wonder that in some highly populated areas, water supplies are getting tight. Some areas, such as Southern California, have water conservation laws in effect to manage limited water supplies.

Each time we use water, we change its quality by adding substances to it. These materials are such things as municipal sewage, toxic chemicals, solvents, automotive oils, fertilizers, detergents, pesticides, and even extra heat. Some materials, even in small quantities, can damage water quality to the point to make it unusable. A single quart of motor oil, for example, could pollute as much as 250,000 gallons of water.

## WATER QUALITY STANDARDS

Water may have different quality "standards," depending on its use. For example, water can be of high enough quality for livestock to drink but not be pure enough for humans to consume. Or, water may provide a fine environment for bass, bluegill and other lake fish while not being cold enough or having enough oxygen content to support trout. Water quality is often in the "eye of the beholder."

Laws involving water quality date back as far as 1914. The first Federal law dealing exclusively with water quality was passed in 1948. Under this law, the states retained primary responsibility for water quality standards and protection. The Federal government supplied money primarily for research. The law provided only weak punishments for offenders. During the 1960s, amendments provided for Federal water quality standards, Federally approved state standards, and increased funding for research. However, as water pollution increased in many areas of the country, public concern resulted in passage of three more very important environmental laws.

The National Environmental Policy Act of 1969 (NEPA) required federal agencies to consider the environmental impacts of their actions. All federal agencies must prepare environmental impact statements to assess the impacts of major federal actions, such as large building or industrial projects. Because of NEPA, federal undertakings have been conducted in a manner to ensure protection of all natural resources, including water.

The Federal Water Pollution Control Act (Clean Water Act) which was passed in 1972 and amended in 1977, 1981, and 1987 provides the basis for water quality standards today. The Clean Water Act (CWA) also established the National Pollutant Discharge Elimination System (NPDES), a permitting program which has assisted in reducing discharges of pollutants to surface waters. The Safe Drinking Water Act (SDWA), passed in 1974 and amended in 1986 and 1996, requires public drinking water systems to protect drinking water sources, provide water treatment, monitor drinking water to ensure proper quality, and notify the public of contamination problems. The Environmental Protection Agency is responsible for implementing or authorizing states to implement the NPDES permitting program, establishing drinking water standards, and enforcing other provisions of the CWA and SDWA.

## LAND USE AND WATER QUALITY

Land use can have a tremendous effect on water quality. Farmlands can be the source of sediment, fertilizer, pesticides, and animal waste pollution. When forests are cut down, they can be major sources of sediment pollution. Cities pose numerous water quality problems due to: the demand for clean water, industrial and commercial pollutants, and human and pet wastes, and urban runoff from lawns and paved areas.

So it's important that when we decide to use land for a specific purpose, we take into account water quality, not just in the immediate area but within the whole watershed. This means considering the **amount** of water available as well as how it must be processed before and after use. For example, crops require tremendous amounts of water. If there's not enough rainfall to support their growth, crops must be irrigated, which means transporting water from lakes, streams, or wells. Irrigation may require so much water that aquatic life in lakes and streams may be adversely impacted, or the water table may be lowered, causing wells and wetlands to dry up. Another good example is the case of a computer chip manufacturer in California. The manufacturing plant owner/operator may take great care to avoid discharging dangerous pollutants, but still come under attack by environmentalists for the amount of water it uses in an area where water supplies are severely limited. To avoid such attacks or criticism, the plant owner/operator can make sure that it withdraws water only during periods of high flows after rain and storm events.

Certain land use practices can minimize negative impacts to the environment. For example, planting trees and other vegetation to protect soil and reduce erosion, fencing livestock to prevent access to streams, properly treating animal wastes, minimizing use of fertilizers and pesticides, properly treating all waste products from industries, using less harmful chemicals and other products in homes, businesses, and industries, and reducing, reusing and recycling commercial products can all help reduce water pollution.