WATER POLLUTION PREVENTION

Different pollution sources have different methods of prevention. The fight against **biodegradable wastes and bacterial water pollution** is almost as old as human beings. Epidemic diseases such as cholera killed hundreds of thousands of people before the link to polluted water supplies was established. In third world countries, the lack of clean water still results in critical health problems.

Proper sewage treatment is key to stopping bacterial pollution. Modern municipal sewage treatment plants typically are capable of controlling bacterial pollution, unless storm water loads overwhelm the treatment systems. Private septic systems, however, can be a significant problem. Well-designed and properly operating septic systems will safely treat wastewater, but a failing system can lead to pollution of both ground and surface water. The Environmental Protection Agency reports that many waterborne diseases are caused by old or poorly operating septic systems. Systems should be periodically pumped out and cleaned, with the removed material disposed of properly.

Proper management of livestock and domestic animal wastes can eliminate bacterial pollution problems affecting both humans and animals. Well designed and properly managed animal waste management systems prevent water pollution and use the wastes to fertilize crops and condition soil. Special devices like "pooper-scoopers" are now required in larger cities to collect and dispose of pet waste before it washes into nearby water bodies.

Since many sources of **nutrient pollution** are human-made, they have the potential to be controlled. It has been estimated that fertilizer use has increased more than 15 times since 1945. There is discussion of reducing the use of high phosphate and nitrate fertilizers in areas where nutrient pollution is a problem, even though crop yields would be reduced. Land management practices, such as crop rotation to reduce fertilizer requirements, and biological pest control, are other options.

Homeowners can also adopt more environmentally sound lawn and garden practices. In many places, chemical tests indicate that individuals use 10 to 50 times more fertilizer than necessary for good plant health. Substituting compost as a mulch and fertilizer for gardens and landscaping can eliminate this potential pollution source. Care should also be taken when using fertilizer. (Composting also reduces waste going into landfills.)

Good sewage treatment plants only remove about 50 percent of the nitrogen and 30 percent of the phosphorus from domestic sewage. This still allows an estimated 200 to 500 million pounds of phosphates into waterways every year. The use of lower phosphate detergents has been encouraged to reduce this, along with providing more advanced sewage treatment systems to remove more nutrients before water is released.

Proper management of livestock can reduce nutrient pollution from animal wastes. Catch basins in feedlots can trap nutrient pollution. Federal and local wastewater release regulations govern industrial releases of many materials that could contribute to nutrient pollution.

Heat or thermal pollution from human-made sources can be controlled by requiring power plants and industry to have cooling towers, holding ponds, and other facilities that allow water to cool before being released back into lakes or streams.

Because many causes of **sediment pollution** are nonpoint source, finding solutions to the problem can be difficult. In some cases, solutions are ongoing activities like dredging sediment deposits and water filtration. Over 2 trillion gallons of drinking water are filtered annually to remove silt.

Many causes of sediment water pollution can be reduced or eliminated through proper land management, particularly for activities that create erosion, such as agriculture, construction, mining, or logging. Farming accounts for the largest amounts of sediment pollution. However, careful land management can cut erosion and sediment problems dramatically.

Bare earth erodes quickly, since there is no plant cover to protect soil from rainfall or wind. Construction sites and strip mined areas can lose soil to erosion at a rate up to 70 tons per acre per yearCfifteen times higher than the normal rate from croplands. Many federal and local laws require construction and mining companies to reclaim land instead of leaving it bare to the ravages of erosionCand subsequent sediment pollution. In some cases, certain harmful land use practices have been eliminated completely.

Since sediment pollution is often caused by nonpoint sources, new ways of identifying sources have been created. Aerial photography is now being used to determine land use in specific areas, identify drainage patterns, and erosion rates. Information can be quickly gathered in this manner and steps taken to reduce problems.

Better livestock management practices have also been used to reduce sediment pollution from livestock runoff. Runoff is channeled into lagoons, where sediment settles before water is released into streams. The nutrient-rich sediment is then used to fertilize croplands. And proper management of croplands and logging areas can reduce runoff, improving crop yields and making reforestation easier.

Increased concerns over **chemical pollution** have created strict regulations for most companies, ranging from large plants to small businesses such as dry cleaners, which use potentially toxic solvents. Since the effects of some toxics have not yet been determined, it is expected that even more regulations will be created in the future to limit the material that can be released into the nation=s waterways. The introduction of many new chemicals for industrial, mechanical, and other uses presents difficult challenges in determining their safety and impact on the environment. This creates a major challenge for industry to keep up with changing regulations and develop ways to meet new requirements.

Control of air emissions that cause acid precipitation are critical to eliminating this pollution problem. Burning of fossil fuels like coal, oil, and gasoline are prime contributors. The use of non-polluting methods of electric generation, such as hydroelectric, thermal, and solar, can help, as can making sure automobiles are adequately tuned, tires are properly inflated, and pollution control devices are working. Reformulated gasoline is also designed to reduce these emissions.

Solid wastes buried in landfills can cause pollution problems if harmful leachate percolates into aquifers and contaminates groundwater supplies. Newer landfills are being constructed with double liners and monitoring wells to prevent leachate from reaching groundwater supplies and detect leaks before they become a problem. Solving past problems will take research and work. One way to reduce this dilemma is to reduce the amount of waste going into landfills through recycling and by using products with less packaging and discardable materials.

RIPARIAN AREAS

Riparian areas are the green zones along the banks of rivers and streams. These are some of the most productive ecosystems in nature, and display a wide diversity of plant and animal life. In the south, Abottom lands@ are an example of riparian areas. These areas are important for flood storage, water quality, cover and shade for plants and animals.

Because of their value, rights to riparian lands are a subject of great interest, especially on public lands. Federal and state agencies have created a variety of land management programs designed to protect public riparian lands. These include leaving vegetation strips along fish bearing streams to prevent stream erosion and maintain habitats. Livestock may be prohibited from riparian lands during summer months to keep them from Acamping@ at the water=s edge and destroying vegetation or causing animal waste pollution. In some areas, beavers have been introduced into ecosystems to provide Anatural engineering@ to rehabilitate eroding streams. Land uses around riparian areas must be taken into account.

BEST MANAGEMENT PRACTICES

Not all water pollution can be avoided. Some manufacturing processes, farming, and other activities create pollutants that can contaminate water. In cases where water pollution is expected to happen, companies and individuals can use **best management practices** to control pollutants and keep them from causing damage to water supplies.

Examples of best management practices include the agricultural practice of collecting animal wastes in a lagoon to settle before discharging wastewater into streams. It may also mean waiting until certain times to spray pesticides or apply fertilizers to prevent runoff. Best management practices can mean taking water quality into account when planning a housing development or new factory, or it may mean controlling wastewater discharges and storm water discharges in conjunction with stream flow. Best management practices may mean planning wastewater treatment for a mine in advance of mining operations. Operators of saw mills can reduce pollution by storing their materials and processing their products indoors so they do not come in contact with storm water runoff. Airport employees can reduce storm water runoff pollution by using deicing chemicals only in designated collection areas and by cleaning oil and grease spills from pavement immediately. Best management practices are designed to keep any unavoidable water pollution in as much control as possible.

INDIVIDUAL ACTIONS

Individual actions can also have a big impact on pollution problems. One very effective way to reduce water pollution is to simply reduce water consumption. This can be done by changing a few habits. For example, put a bottle of water in the refrigerator rather than letting water run from the tap until it gets cold. Wash full loads. Turn off the water while brushing your teeth. Take shorter showers. Install low flow showerheads and toilets, faucet aerators, and/or toilet dams. Wash the car using buckets of water instead of a hose. And finally, water plants in early morning or late evening only when they really need it. Better yet, choose plants which require less watering. Other ways to reduce water pollution are to keep litter, pet wastes, and debris out of street gutters and storm drains as they flow directly to waterbodies. Apply lawn and garden chemicals sparingly according to package directions. Homeowners can substitute biocontrol agents, like praying mantises or ladybugs, for pesticides. Other natural insect repellents include plants like mint (which discourages ants), garlic, and marigolds. The use of herbicides should also be avoided.

Virtually every liquid in an automobile is a serious pollutant, and care should be taken to avoid spilling oil, antifreeze, or other fluids from automobiles. In some cases, it may be more ecologically sound to have repairs done by a reputable garage than to attempt messy do-it-yourself work (especially if a community does not have proper disposal centers). Dispose of used oil and antifreeze properly by taking them to a local service station or recycling center.

Household cleaners can add toxics or nutrients to water. In most cases, harsh chemicals are not necessary to do an effective cleaning job, and less damaging substances can be substituted. Baking soda can be used as a scouring powder and water softener to increase the cleaning power of soap. Soap biodegrades safely without adding phosphates or dyes to water like many detergents. Borax

cleans, deodorizes, and disinfects. An all-purpose cleaner made of a teaspoon of liquid soap, two teaspoons of borax and a teaspoon of vinegar in a quart of water is an effective grease cutter. A quarter cup of baking soda followed by a half cup of vinegar makes a good drain cleaner. Consumers should also take care in disposing of potentially dangerous household chemicals like batteries, nail polish, drain cleaner, and paint. Do not dispose of any unused portions of these items down drains, toilets, or storm sewers. Many communities offer regular hazardous waste pickups to collect these items. If your community doesn't have one, ask your local government to establish one. The EPA Resource Conservation and Recovery Act hotline (1-800-424-9346) can supply more information.

Citizens can also become more politically involved. For example, encourage local government officials to enforce construction/sediment ordinances in your community or encourage city officials to use sand instead of salt to deice roads. Participate in public meetings to plan water policy. Organize litter clean-up campaigns and hold local fairs to educate your community about water resource issues.