

# Protecting Water Quality from **AGRICULTURAL RUNOFF**

## Clean Water Is Everybody's Business

The United States has more than 330 million acres of agricultural land that produce an abundant supply of food and other products. American agriculture is noted worldwide for its high productivity, quality, and efficiency in delivering goods to the consumer. When improperly managed however, agricultural activities can affect water quality.

In the 2000 *National Water Quality Inventory*, states reported that agricultural nonpoint source (NPS) pollution is the leading source of water quality impacts on surveyed rivers and lakes, the second largest source of impairments to wetlands, and a major contributor to contamination of surveyed estuaries and ground water. Agricultural activities that cause NPS pollution include poorly located or managed animal feeding operations; overgrazing; plowing too often or at the wrong time; and improper, excessive, or poorly timed application of pesticides, irrigation water, and fertilizer.

Agricultural pollutants that result from these activities are sediment, nutrients, pathogens, pesticides, metals, and salts. Agricultural impacts on surface water and ground water can be minimized by using management practices that are

### What Is Nonpoint Source Pollution?

Nonpoint source (NPS) pollution, unlike pollution from point sources such as industrial and sewage treatment plants, comes from many diffuse sources. Polluted runoff is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into watersheds through lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water.

### *Did you know that runoff from farms is the leading source of impairments to surveyed rivers and lakes?*

customized for local conditions. Many practices designed to reduce pollution also save producers money in the long run.

There are many government programs available to help people design and pay for management approaches to prevent and control NPS pollution. For example, over 40 percent of section 319 Clean Water Act grants have been used to control agricultural NPS pollution. Also, many programs funded by the U.S. Department of Agriculture and states provide cost-share, technical assistance, and economic incentives to implement NPS pollution management practices. Many local organizations and individuals have come together to help create regional support networks to adopt technologies and practices to eliminate or reduce water quality impacts caused by agricultural activities.

### Sedimentation

The most prevalent source of water pollution caused by farming activities is soil that is washed off fields. Rain water carries soil particles (sediment) and dumps them into nearby lakes or streams. Too much sediment can cloud the water, reducing the amount of sunlight that reaches aquatic plants. It can also clog the gills of fish or smother fish larvae.

In addition, other pollutants like fertilizers, pesticides, and heavy metals are often attached to the soil particles and wash into the water bodies, causing algal blooms and depleted oxygen, which is deadly to much aquatic life. Farmers and ranchers can reduce erosion and sedimentation by 20 to 90 percent by applying management practices that control the volume and flow rate of runoff water, keep the soil in place, and reduce soil transport.

### Nutrients

Producers apply nutrients like phosphorus, nitrogen, and potassium in the form of chemical fertilizers, manure, and sludge. They may also grow legumes and leave crop residues to enhance production. When these sources exceed plant needs, nutrients can wash into aquatic ecosystems. There they can cause algae blooms, which reduce swimming and boating opportunities, create foul taste and odor in drinking water, and kill fish by removing oxygen from the water. High concentrations of nitrate in drinking water can cause methemoglobinemia, a potentially fatal disease in infants, also known as blue baby syndrome. To combat nutrient losses, farmers can implement nutrient management plans that help maintain high yields and save money on fertilizers.



## Animal Feeding Operations (AFOs)

By confining animals in small areas or lots, farmers and ranchers can efficiently feed and maintain livestock. But these confined areas become major sources of animal waste. An estimated 238,000 farms and ranches in the United States are considered animal feeding operations, generating about 500 million tons of manure each year. Runoff from poorly managed facilities can carry pathogens (bacteria and viruses), nutrients, and oxygen-demanding organics and solids that contaminate shellfishing areas and cause other water quality problems. Ground water can also be contaminated by waste seepage. An operator can limit discharges by storing and managing facility wastewater and runoff with an appropriate waste management system.

## Livestock Grazing

Overgrazing exposes soils, increases erosion, encourages invasion by undesirable plants, destroys fish habitat, and may destroy streambanks and floodplain vegetation necessary for habitat and water

quality filtration. To reduce the impacts of grazing on water quality, farmers and ranchers can adjust grazing intensity, keep livestock out of sensitive areas, provide alternative sources of water and shade, and promote revegetation of ranges, pastures, and riparian zones.

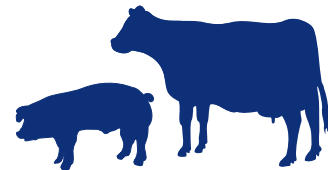
## Irrigation

Irrigation water is applied to supplement natural precipitation or to protect crops against freezing or wilting. Inefficient irrigation can cause water quality problems. In arid areas, for example, where rainwater does not carry minerals deep into the soil, evaporation of irrigation water can concentrate salts. Excessive irrigation can affect water quality by causing erosion, transporting nutrients, pesticides, and heavy metals, or decreasing the amount of water that flows naturally in streams and rivers. It can also cause a buildup of selenium, a toxic metal that can harm waterfowl reproduction. Farmers can reduce NPS pollution from irrigation by improving water use efficiency. They can measure actual crop needs and apply only

the amount of water required. Farmers may also choose to convert irrigation systems to higher efficiency equipment.

## Pesticides

Insecticides, herbicides, and fungicides are used to kill agricultural pests. These chemicals can enter and contaminate water through direct application, runoff, and atmospheric deposition. They can poison fish and wildlife, contaminate food sources, and destroy the habitat that animals use for protective cover. To reduce contamination from pesticides, producers should use Integrated Pest Management (IPM) techniques based on the specific soils, climate, pest history, and crop conditions for a particular field. IPM encourages natural barriers and limits pesticide use and manages necessary applications to minimize pesticide movement from the field.



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## Related Publications

### Turn Your Home into a Storm Water Pollution Solution!

[www.epa.gov/nps](http://www.epa.gov/nps)

This web site links to an EPA homeowner's guide to healthy habits for clean water that provides tips for better vehicle and garage care, lawn and garden techniques, home improvement, pet care, and more.

### National Management Measures to Control Nonpoint Source Pollution from Agriculture

[www.epa.gov/owow/nps/agmm](http://www.epa.gov/owow/nps/agmm)

This technical guidance and reference document is for use by state, local, and tribal managers in the implementation of nonpoint source pollution management programs. It contains information on effective, readily available, and economically achievable means of reducing pollution of surface and ground water from agriculture.

### Nonpoint Source News-Notes

[www.epa.gov/owow/info/NewsNotes](http://www.epa.gov/owow/info/NewsNotes)

News-Notes is a periodic newsletter that reports local, state, and national news on managing NPS pollution.

### National Water Quality Inventory Report to Congress (305(b) report)

[www.epa.gov/owow/305b](http://www.epa.gov/owow/305b)

EPA prepares this biennial report to inform the public about general water quality conditions in the United States. The document summarizes water quality data provided by states, territories, tribes, and others.

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## Funding Sources

**Clean Water Act Section 319(h)** funding is provided to designated state and tribal agencies to implement approved nonpoint source management programs.

**Clean Water State Revolving Fund** provides funding for the construction of municipal wastewater facilities and implementation of NPS pollution management programs and estuary protection projects.

**Environmental Quality Incentives Program** offers financial, technical, and educational assistance to install or implement structural, vegetative, and management practices designed to conserve soil and other natural resources.

**Conservation Reserve and Conservation Reserve Enhancement Programs** implemented by the U.S. Department of Agriculture provide financial incentives to encourage farmers and ranchers to voluntarily protect soil, water, and wildlife resources.

In May 2002 President Bush signed the Farm Bill, providing up to \$13 billion for conservation programs for six years. This Farm Bill represents an 80 percent increase above current levels of funding available for conservation programs designed to prevent polluted runoff. For more information, visit [www.usda.gov/farmbill](http://www.usda.gov/farmbill).

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## For More Information

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