

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

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.



Pesticides and Herbicides

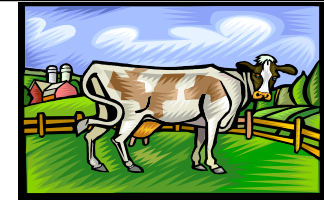
Insecticides, herbicides, and fungicides are chemicals that can enter and contaminate water through direct application, runoff and atmospheric depositions when used to kill agricultural pests. They can poison fish and wildlife, contaminate food sources, and destroy the habitat that animals use for protective cover. To reduce contamination from pesticides, farmers should use Integrated Pest Management (IPM) techniques based on the specific soils, climate, pest history, and crop conditions for a particular field.

East Vincent Township
262 Ridge Road
Spring City, PA 19475

For More Information

U.S. Environmental Protection Agency Nonpoint Source Control Branch (4503T)
1200 Pennsylvania Avenue, NW Washington, DC 20460 epa.gov/nps

Protecting Water Quality from Agricultural Runoff



What is stormwater runoff?

Stormwater runoff occurs when rain or snowmelt flows over the ground. Impervious surfaces like buildings, driveways, sidewalks and streets prevent precipitation from naturally soaking into the ground. As the water moves, it can pick up debris, chemicals, dirt and other pollutants carrying them into a storm sewer system or into a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer is discharged untreated into the waterbodies we use for swimming, fishing, and drinking water. Polluted stormwater runoff can have many adverse effects on plants, fish, animals and people. Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.

Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms cannot exist in water with low dissolved oxygen levels. Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary. Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles and birds. Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water. Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



Clean Water Is Everybody's Business

The U.S. 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, activities from working farms and ranches can adversely 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.

Pollutants that result from farming and ranching include sediment, nutrients, pathogens, pesticides, metals and salts. Impacts from agricultural activities on surface water and ground water can be minimized by using management practices that are adapted to local conditions. Many practices designed to reduce pollution also increase productivity and save money in the long run.

There are many government programs available to help farmers and ranchers 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 NPS pollution from working farms and ranches. Also, many programs funded by the U.S. Department of Agriculture and by individual states provide cost-share, technical assistance, and economic incentives to implement NPS pollution management practices.

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 man-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?

Sedimentation

Rain water carries sediment and dumps it 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, also causing algae blooms and depleted oxygen, which is deadly to most 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

Farmers apply nutrients such as phosphorus, nitrogen, and potassium in the form of chemical fertilizers, manure, and sludge. When these sources exceed plant needs, or are applied just before it rains, nutrients can wash into aquatic ecosystems. There they, too, can cause algae blooms, which can ruin swimming and boating opportunities, create foul taste and odor in drinking water, and kill fish by removing oxygen from the water. To combat nutrient losses, farmers can implement nutrient management plans that help maintain high yields and save money on fertilizers.

Animal Feeding Operations

By confining animals to 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 working 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 such as 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. Farmers and ranchers can limit discharges by storing and managing facility wastewater and runoff with appropriate waste management systems.

Livestock Grazing

Overgrazing exposes the soil, increases erosion, encourages invasion of undesirable plants, destroys fish habitat, and may destroy stream-banks and floodplain vegetation necessary for

