

The Facts about Nutrient Pollution

Nutrient (aka nitrogen and phosphorus) pollution is one of America's most widespread, costly and challenging environmental problems. It is caused by excess nitrogen and phosphorus in the air and water. Nutrients are chemical elements that all living organisms—plants and animals—need to grow. When too much nitrogen and phosphorus enter the environment—usually from a wide range of human activities—the air and water can become polluted.

Sources of Nutrient Pollution

The primary sources of nutrient pollution are fertilizer, animal manure, sewage treatment plant discharge, detergents, stormwater runoff, cars and power plants, failing septic tanks and pet waste. In the Mississippi River Basin, which spans 31 states and ultimately drains into the Gulf of Mexico, nutrients from row crops, large farms and concentrated animal feeding operations contribute the most nutrient pollution.

Effects of Nutrient Pollution

Excessive nitrogen and phosphorus in water and the air can cause health problems, damage our land and water, and take a heavy toll on the economy.

Human Health

Nutrients can lead to a massive overgrowth of algae, known as an algae bloom. Certain types of algae emit toxins that are absorbed by shellfish; consuming these tainted shellfish can lead to stomach illness and short-term memory problems. Drinking or coming into contact with toxins from algae blooms can cause stomach aches, rashes and more serious problems. Excess nitrogen is a common drinking water contaminant in agricultural areas and can pose particular risk to infants younger than six months old. Chemicals used to treat nutrient-polluted drinking water can pose additional risks to human health. These chemicals, including chlorine, can react with the algae in the water to form disinfection by-products that have been associated with reproductive and developmental health problems. Nitrogen pollutants in the air from burning fossil fuels can contribute to a variety of respiratory problems for children, the elderly and those with lung ailments.

The Environment

Nutrient pollution damages the environment and harms water quality. Algal blooms consume large amounts of oxygen that fish, shellfish and other organisms need to survive. Algal blooms can make water cloudy, reduce the ability of aquatic life to find food, and clog the gills of fish. Some algal blooms produce toxins that can cause illnesses or death for animals like turtles, seabirds, dolphins, fish and shellfish.

Nutrient Pollution: The Numbers

15,000	Estimated number of water bodies in the United States impaired* by nutrients
101,000	Miles of rivers and streams impaired* by nutrients in the United States**
3,500,000	Acres of lakes and reservoirs impaired* by nutrients in the United States**
78%	Percentage of the continental U.S. coastal waters that exhibit an overgrowth of algae*
> 20%	Percentage of shallow household wells in agricultural areas with nitrate levels above drinking water standards. More than 90% of people living in Mississippi get their drinking water from ground water.
60%	Percentage of Americans whose actions or food choices consume (directly or indirectly) freshwater from the Mississippi River Basin

*Waters that do not meet one or more basic uses like swimming or fishing

**Based on state Clean Water Act 305 (b) reports available in EPA's Assessment and Total Maximum Daily Load Tracking and Implementation System (<http://www.epa.gov/waters/ir>) as of March 14, 2012.



Photo credit: U.S. Geological Survey, Binder Lake, Iowa.

Nutrient pollution causes green slime that affects drinking water, recreation, businesses and property values. In Tennessee alone, nutrients impair nearly 3,000 river/stream miles and more than 15,000 acres of lakes and reservoirs.

Airborne nitrogen can also pose environmental risks. Nitrogen compounds released into the air by burning fossil fuels can react with water, oxygen and other chemicals to form nitric acid. When it falls to earth, the *acid rain* can damage an entire ecosystem, including streams, estuaries, forests and grasslands. Airborne compounds like nitrogen oxides contribute to the formation of other air pollutants, such as ozone—a component of smog—which can restrict visibility. Wind and weather can carry ozone many miles from urban to rural areas, where it can damage trees.

The Economy

Nutrient pollution has diverse and far-reaching effects on the U.S. economy, impacting many sectors that depend on clean water. The tourism industry loses close to \$1 billion each year, mostly from losses in fishing and boating activities because of nutrient-polluted water bodies. In Mississippi alone, tourism in the three counties that border the Gulf Coast accounts for about \$1.6 billion in visitor expenditures, 32 percent of state travel and tourism tax revenues, and 24,000 direct jobs.

Nutrient pollution causes annual losses to the commercial fishing and shellfish industry in the tens of millions of dollars. When oxygen levels are low, fishery yields are reduced. During harmful algal blooms, consumers become wary that seafood could be tainted by toxins. Algal blooms can also negatively impact waterfront property values. Algal blooms in drinking water sources can drastically increase treatment costs and subsequently increase consumer utility bills. Costs to clean up polluted water bodies, such as the Chesapeake Bay, can cost billions of dollars. Airborne nutrient pollution can also affect visibility at outdoor tourist destinations, like national parks. Airborne nitrogen compounds can damage structures, especially ones made of marble and limestone.



Photo credit: Bill Yates, St. John's River, Florida

Impacts on Drinking Water and the Economy

Algal blooms in drinking water sources can increase treatment costs and consumer utility bills.

How Are We Addressing Nutrient Pollution?

EPA is working with its many partners to address nutrient pollution across the country. EPA

- ▶ Provides technical guidance and resources to help states develop water quality criteria for nitrogen and phosphorus
- ▶ Awards grants to states, watershed groups, and wastewater facilities to address nutrient-driven water quality problems
- ▶ Oversees permits that restrict nutrient discharges from industries
- ▶ Conducts research
- ▶ Works with state and federal partners on the Mississippi River/Gulf of Mexico Watershed Nutrient Taskforce to reduce the dead zone in the Gulf

State environmental agencies are working to develop water quality criteria for nutrients. Some states have already developed statewide nutrient criteria for certain types of water bodies. Other states have developed site-specific nutrient criteria. Still others are just beginning to develop criteria and have identified important milestones toward proposing and approving nutrient criteria.

What Can You Do?

We can all take action to reduce nutrient pollution through the choices we make on our farms, around our homes, with our pets, in lawn care and in transportation. Families, individuals, students and teachers can access online resources to find out more about the health of their local waterways and to learn how to join community efforts to restore and protect them for the benefit of people and wildlife. A variety of resources and links is provided online at www.epa.gov/nutrientpollution.

For More Information

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On the Web, visit:

EPA Nutrient Pollution website:
www.epa.gov/nutrientpollution

Natural Resources Conservation Service website:
www.nrcs.usda.gov/wps/portal/nrcs/main/national/water

U.S. Geological Survey website:
<http://water.usgs.gov/nawqa/nutrients/>

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