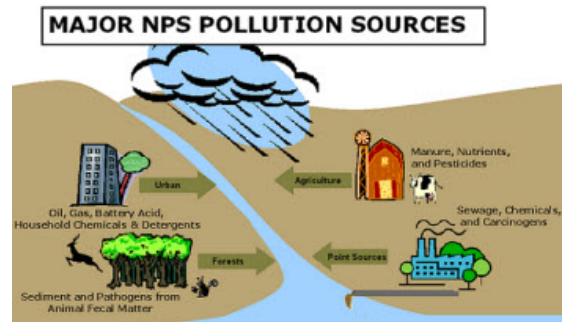


Understanding Nonpoint Source Pollution

What is Nonpoint Source Pollution?

Nonpoint Source Pollution (NPS), sometimes called polluted runoff, or people pollution, comes from a variety of sources. These terms all refer to the pollution of water that occurs as water flows across and through the land, picking up various contaminants and depositing them directly into streams, rivers and lakes, or into storm drains that lead to receiving bodies of water. These pollutants can also end up in underground water.



90% of Montana's water pollution comes from nonpoint sources.

Nonpoint source pollution is the largest source of water impairment in the US today because of the difficulty in controlling pollution that comes from contaminants on the surface of the land. In Montana the same is true - NPS pollution is the leading cause of water impairment. According to the Montana Department of Environmental Quality (DEQ), more than 75% of Montana's assessed rivers and streams, and 45% of its lakes, reservoirs and wetlands fail to meet state water quality standards largely as a result of NPS pollution impacts.

Concern for NPS pollution has resulted in numerous laws enacted to help protect the nation's waterways. The 1972 federal Clean Water Act (CWA) established a framework for protecting and improving the nation's water quality. Enactment of the CWA resulted in major improvements dealing with point source pollution from industrial and municipal wastewater discharges. The CWA was amended in 1987 to require states to address the issues of nonpoint source pollution. The passage of Section 319 of the CWA led to the creation of Montana's Nonpoint Source Pollution Control Program. Through this program, federal grant money is available to DEQ to manage a statewide effort to monitor and assess NPS impairments of state waters, and to oversee programs and projects to improve and restore the water quality of impacted water bodies.

What are the sources of NPS pollution?

Many sources add to this type of pollution. Land use from agriculture, urban and suburban development, mining, forestry, roads and other uses all generate NPS pollution. Some NPS pollution, such as sediment from erosion, occurs naturally, but most NPS pollution is human created. Consider daily human activities. Vehicles deposit oils onto roads, driveways and parking lots. Water running over these surfaces carries away these oily deposits. Flowing water picks up fertilizers applied to lawns and croplands. Pet and livestock waste contains bacteria and viruses that find their way into the nearest stream or storm drain. Many common household products such as paints, detergents and cleansers contain chemicals that are toxic to both plants and animals.

Major types of NPS pollutants and their effects

Litter and Debris – Trash from human activities creates visual distraction, poses health threats to aquatic organisms, and can lead to flooding when it clogs storm drains. An example of one of the smallest bits of discarded trash, cigarette butts, illustrates the potential damage of this source of NPS pollution. It is estimated that 1.7 billion pounds of cigarette butts that contain nicotine, heavy metals, benzene and other carcinogens gum up the world's waterways each year. (Chicago Tribune, June 18, 2008) Debris usually starts as street or ground litter and is carried by runoff into waterways.



You can help:

- *Become a litter collector and properly dispose of trash.*
- *Recycle when possible to reduce the amount of garbage sent to landfills.*



Nutrients – Nutrients are compounds like nitrogen and phosphorous that stimulate plant growth. When used properly, these nutrients are necessary and beneficial, but in high concentration, they become one of the most widespread and costly of all NPS pollution issues. Nutrient pollution results when an excess of these compounds enters the water and acts like fertilizer to stimulate growth of algae. These algal blooms cut off light to aquatic plants, causing them to die. Decaying plant life depletes the dissolved oxygen level in the water and causes the death of fish and other aquatic life. Some nutrients occur

naturally from rocks and soils in the watershed.

Human contributions to nutrient pollution comes from agricultural fertilizers, lawn care products, leaky septic systems, and yard and animal wastes. Learn about how partners worked together in the [Sun River watershed](#) to improve nutrient pollution.

You can help:

- *Apply fertilizers sparingly and according to manufacturer's recommendations.*
- *Inspect septic systems regularly.*
- *Use laundry detergents and cleaners with low phosphate content.*

Pathogens – Pathogens are microorganisms such as viruses and bacteria that cause disease. Pathogens come from fecal waste of wild animals, livestock, and pets. Even human waste from faulty septic systems and leaky sewer lines can contaminate surface and ground water and drinking water supplies. Pathogens in untreated waste pose the biggest threat to human health from all the sources of water contamination. Exposure to pathogens through ingestion or contact can cause the closure of swimming beaches or result in boil orders from the local health departments if high levels are detected.



You can help:

- *Pick up after your pets.*
- *Inspect septic systems regularly.*

Pharmaceuticals and Personal Care Products (PPCPs) – This type of NPS pollution refers to the thousands of chemicals found in prescription and over-the-counter drugs used by humans, and given to livestock and pets, and to chemicals in cosmetics and other personal care products. These chemicals enter the waterways when excreted through human and animal waste, through improper disposal of unused products, from private septic systems, and in various other ways. PPCP's are found in surface waters, especially downstream from wastewater treatment facilities, where current treatment options at most plants do not remove these chemicals. Ground water can also be impaired through leaching from landfills and cemeteries. Recent and ongoing research indicates the adverse effects of these chemicals on fish and other aquatic organisms. Scientists and researchers are learning more and more about the adverse effects on humans. Their concern is that the presence of endocrine-disrupters, anti-depressants and antibiotics in drinking water can pose health risks especially to children, but no conclusive studies have documented the level of risk. The origins and fate of PPCP's is illustrated [here](#). A good starting point to learn more about this source of NPS pollution and current research is at the [EPA website](#).



You can help:

- *Properly dispose of unused medications through local prescription drug take-back programs.*
- *If no medicine take-back program is available, follow these steps to dispose of most medicines in household trash:*
 - *mix medicines (do NOT crush tablets or capsules) with an unpalatable substance such as kitty litter or used coffee grounds*
 - *place the mixture in a container such as a sealed plastic bag*
 - *throw the container away with other household garbage.*



Salt – Salt is a naturally occurring mineral that is very soluble in water. Human activity compounds the amount of salt found in water. Road salt, used to melt ice, flows to receiving water bodies. Traditional water softeners use salt to treat hard water. This salt ends up in wastewater and septic systems. Irrigation in arid parts of the state is also a contributing factor when minerals in the soil concentrate on the soil surface. These saline seeps cause salt buildup that reduces the productivity of the land and contaminates ground and surface water that is used by livestock and wildlife as well as for domestic purposes. Increasing levels of salinity in river waters can reduce plant growth along riverbanks. Vegetation in riparian areas is important in reducing surface runoff and bank erosion. Salt changes water chemistry that can lead to fish kills.

You can help:

- *Use sand rather than salt to melt ice on sidewalks.*
- *Consider replacing your water softener that uses salt with another option such as reverse filtration osmosis, or magnetic water softeners.*

Sediment –Sediment is dirt, sand, clay, silt and other soil particles that wash away with runoff. Sediment can also consist of decomposed plants and animals. According the Environmental Protection Agency (EPA), sediment is the most common pollutant of rivers, streams, lakes and reservoirs. Sediment alters stream flow and decreases the quality of healthy aquatic habitat. Sediment can clog stormwater pipes and increases the cost of treating drinking water. Natural erosion makes up 30% of sediment, while the remaining 70% comes from accelerated erosion caused by human land use. Major sources of sediment come from poorly designed construction sites, agricultural fields, minor homebuilding projects, and roadways.



You can help:

- *Control soil erosion on your property by stabilizing erosion-prone areas and planting ground cover, trees and shrubs.*



Thermal pollution – Thermal pollution of water occurs when water temperature is altered in some way. Urban stormwater runoff from roadways and parking lots sends warmer water directly into streams, rivers and lakes. Increased temperature lowers the dissolved oxygen that in turn, affects the plant and aquatic animal life. The effect can be increased metabolic rates of both plants and animals that can alter the food chain in the warmer water. When cold water is released from a reservoir, the lower water temperature can reduce the productivity of

aquatic organisms in downstream waters.

You can help:

- *Minimize the amount of impermeable surfaces on your property by using gravel, paving blocks, ground glass or other products in place of cement or blacktop for driveways and parking pads.*
- *Consider creating a rain garden on your property that will serve to retain runoff.*

Toxic Contaminants – Toxic contaminants can harm humans and/or the health of aquatic life. These substances include **heavy metals, pesticides, oils, and organic compounds such as PCB's**. Because many toxins are resistant to breakdown, they tend to be passed through the food chain and concentrate in top- level predators. Health advisories that warn of fish consumption result from concerns over toxins in the food chain. NPS pollution from some **heavy metals** such as arsenic is natural in some watersheds, but the cumulative effect of these toxins pose health threats when levels are high. Young children are especially at risk. Childhood exposure to some toxins can result in memory impairment, nervous system



disorders, cancers, autism, hyperactivity, and learning difficulties. ([Natural Defense Resource Council – Safe Chemical Act Fact Sheets](#)).

The toxic level of **pesticides** varies depending on the chemicals. Pyrethroids and organophosphates are common residential insecticides used in lawn and garden pest control agents. Pyrethroids attach to soil particles and wash away with sediment. Organophosphates are water soluble and harmful to aquatic organisms. Major sources of toxic contaminants come

from urban, industrial and municipal runoff and include oils, grease and gasoline from roadways, and chemicals used in homes, gardens, yards and farm crops.

You can help:

- *Carefully choose pesticides to match the pests, and carefully apply pesticides only where needed.*
- *Never allow pesticides to reach storm water, drains or creeks and lakes.*

What can you do to help?

Information is your best friend when it comes to learning what you can do to protect water quality. Action is the proof of your intent. The first step is to take personal responsibility for activities that may lead to NPS pollution. Simple actions such as not littering, learning the proper disposal of drugs, following directions for proper application of fertilizers, and cleaning up pet wastes are examples of first steps. The next step may be to learn about the bigger picture of NPS pollution in your watershed. Go to meetings or join your local citizen watershed council, attend city, town or county meetings where water quality, wastewater and stormwater issues are topics of discussion. Give back to your community by becoming a stream monitor, become a member of a board or committee that deal with land use issues, or volunteer for river and highway cleanups.

The “Help Prevent NPS Pollution” links below direct you to some helpful sites.

Nonpoint Source Pollution Links

1. [Montana DEQ - Nonpoint Source Program](#)
2. [EPA - Nonpoint Source Pollution](#)
3. [EPA - Agricultural Nonpoint Source Pollution Management](#)
4. [EPA - Polluted Runoff](#)
5. [EPA – Polluted Runoff – Nonpoint Source Pollution for Kids](#)
6. [NOAA Ocean Service Education - Nonpoint Source Pollution](#)
7. [Montana Salinity Control Association](#)

Help Prevent NPS Pollution

1. [EPA – Polluted Runoff – Do’s and Don’ts Around the House](#)
2. [Protecting Water from Non-Point Source Pollution](#)
3. [How to Clean Up Our Water](#)
4. [Safe Disposal of Medications](#)
5. [Locate a Pharmacy to Dispose of Drugs](#)
6. [MT Fluorescent Bulb Recycling](#)
7. [MT Dept of Ag - Waste Pesticide Disposal Program](#)
8. [MT DEQ - 10 Steps to Prevent NPS Pollution](#)