Understanding and Protecting Water Quality

What is the difference between a storm drain and a sewer? Storm drains catch water from outside and transport it, untreated, directly to streams and rivers. Sewers collect water from indoors and transfer it to a water treatment facility to be cleaned before it reaches a stream or river.

Although water is our most precious natural resource, how easy it is for us to take it for granted. Perhaps it's because we use water so much that we scarcely think about it. Turn on the tap, the shower, the outdoor hose; flush the toilet. Water pours out for drinking, cleaning, bathing, and irrigation. It grows our food, supplies our industry, generates our electricity, and keeps the planet clean and alive.

Threats to Water Quality

Unfortunately, there are many threats to good water quality -- some obvious and some quite difficult to detect. The fact that we don't often think about our water sources, let alone actively care for them, is certainly a contributing problem.

Concern about water pollution is often limited to what is called **point source pollution**-- that is, **direct discharges into waterways** from pipes, including municipal and industrial sewage treatment plants, power plants, and stormwater discharges.

But most of these point sources are discharged legally through permits issued under the Clean Water Act and the National Pollution Discharge Elimination System. These permits limit the quantities and types of pollutants permitted to be contained in wastewater.

While some permit holders violate their permits, this does not represent the major cause of water quality degradation. Indeed, the major source of pollution impacting most water bodies happens as a result of our normal day-to-day activities and is known as **non-point source pollution.** In other words, you can't point to a specific single location as the source.

Non-point source pollution generally comes from contaminated runoff from roads, construction sites, agriculture, and livestock feedlots, the inflow of polluted groundwater, and faulty home septic systems. Stormwater runoff can contain chemicals such as gasoline, pesticides, fertilizers, heavy metals, oils and animal waste. In addition, toxic pollutants in the air can also condense and enter waterways in rain and snow.

Sources of Non-point Source Pollution

- **Stormwater runoff-** As water from storms washes over highways, parking lots, lawns, agricultural fields, industrial sites, logged areas, and construction sites, it picks up contaminants and carries them into water bodies.
- **Polluted rain, snow, or toxic fallout-** Contaminants collect in the air and fall out in precipitation. Acid rain is common example of this type of pollution.
- **Inflowing groundwater-** Pesticides, nitrates, and a variety of chemicals can leach into groundwater. Waste storage or disposal sites, sludge disposal sites and failing septic tanks are common culprits of groundwater contamination.
- **Land alterations-** Construction debris, logging, removal of vegetation, and increased paved surfaces contribute to erosion, soil loss, and less filtration for pollutants entering waterways.
- **Abandoned mines-** Drainage from former mines can be highly contaminated.
- **Marine sources-** Ocean dumping, dredge spoils, boat hull paints and marine sanitation devices have a direct impact on water quality.

Affects of Pollution

The influx of sediments, nutrients, and toxics can cause a variety of problems. For instance, increased sediments in a water source can be devastating for aquatic organisms because it interferes with feeding, breeding, predation and breathing. Suspended sediments also block sunlight, which is the basic energy source for photosynthesis -- the primary source of food in any ecosystem.

Nutrient pollution from both non-point and point sources such as sewage, livestock waste, and fertilizers can cause an explosive growth of algae and rooted aquatic plants. When an overabundance of aquatic plants die off and decompose, they use up oxygen, leaving little for fish and aquatic insects to respire. Pollution sensitive organisms can disappear from waters polluted by organic wastes, leaving only pollution tolerant organisms like fly larvae and aquatic worms to survive.

Finally, substances such as oil, gasoline and diesel fuel are pervasive sources of toxic pollution in urban watersheds. Toxics can impair or kill aquatic life and make consumption of water and fish unsafe.

Water Quality Protection is up to us

Identifying and reducing non-point source pollution is an enormous task because it involves so many activities and so many people. The good news is that everyone can participate in water quality protection. Simple changes in our daily lives can go a long way to ensure clean, healthy water for people and wildlife. And each of our individual actions can make a tremendous difference when repeated many times over all across North America.

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