



Nonpoint Source Pollution Education for Homeowners



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Nonpoint Pollution Defined

Nonpoint source (NPS) pollution, unlike pollution from sewage treatment plants and industrial discharge pipes, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away pollutants found on and in the ground. These pollutants are carried into our streams, lakes, rivers and wetlands, as well as our sources of drinking water.

NPS pollution can reach your lake directly



NPS can also reach your lake through stormdrains.

Typical NPS pollutants include

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential and recreational areas
- Oil, grease, and toxic chemicals from urban runoff
- Sediment from improperly managed construction sites, crop and forest lands, bare or worn-out yards, and eroding streambanks
- Road salt and sand
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems
- Litter and illegal dumping

NPS Pollution and Your Backyard

NPS pollution has been identified as having the greatest potential to influence the water quality of Berkshire lakes.

Nutrients, pathogens, sediments, toxic contaminants, debris, and thermal stress are pollutants that may be found in stormwater runoff. These pollutants can be associated with a wide variety of land uses including residential properties. Stormwater runoff contributes 80% of the sediment and nutrients to our lakes and ponds.

Any change in the natural landscape alters both the quantity and quality of stormwater runoff. A direct link can be made between land use and the water quality of receiving waterways. With an increased intensity of land use there tends to be a corresponding increase in water quality problems. Lakes whose watersheds are undisturbed and forested tend to have the highest water quality. Lakes whose watersheds are cleared for farming and residential development begin to experience a decline in water quality. The more dramatically the land cover is altered the more significant the pollutant load will become.

The tree canopy of forested areas intercepts falling rain, reducing the force of the raindrops. The forest floor then acts like a rough sponge, slowing down and absorbing the limited runoff that accumulates and releasing it slowly to the lake. Developed areas replace the tree canopy with grass and impervious surfaces such as buildings, parking lots, and driveways, which limit the ability of the ground to absorb and filter runoff. The result is an increased volume of runoff carrying an increased amount of pollutants traveling at an increased speed. Ultimately, the receiving waterways must tolerate a larger quantity of runoff that is of lower water quality.

Phosphorus and Lake Health

Phosphorus is a nutrient that can normally be found in the natural environment, including lakes. Phosphorus is normally described as the limiting nutrient for lakes in the Northeast, including the Berkshires. This means that the amount of phosphorus within the lake directly impacts the productivity of the lake and the ability for plant growth to flourish, just like adding fertilizer to a lawn or garden.

Excessive weed growth.



Photo by Dr. Billy Higginbotham, Texas A & M University



The runoff from cleared and developed land contains much higher amounts of phosphorus than runoff from undeveloped forests. One recent study in Maine found that even careful development of woodland into two-acre house lots caused a 2-10 fold increase in phosphorus concentrations in stormwater runoff.

Residential properties can contribute roughly 1/2 to 1 lb of phosphorus per acre to a receiving waterway each year! Less than 2 ounces of fertilizer washed into the lake can grow more than 2 pounds of algae. A lake watershed that has been altered most significantly by residential development can experience impacts to the health of the lake and its water quality.

How does this affect you?

The value of lakes is often taken for granted by those who enjoy them. Many people assume that the value of clean water is obvious. According to one survey, lakefront property owners included water clarity, quality of swimming, and scenic beauty when purchasing their home.

NPS pollution can degrade all of these factors by reducing water clarity, contributing to excessive weed growth, and causing algae blooms. Unpleasant odors and beach closures can also be linked to NPS pollution. In addition, NPS pollution can degrade aquatic habitats and reduce the diversity of fisheries and other aquatic organisms.

NPS pollution can result in weed-choked shorelines that reduce recreational appeal and aesthetic value.

A study conducted in Maine shows that with a decrease in water quality there is a corresponding decrease in property value. Lakefront property values represent huge personal investments. The study showed that on one lake 15% of the property value was dependent on water quality. This means that if water quality is reduced the resale value of a \$100,000 - \$200,000 home could be reduced by \$15,000 - \$30,000.

The study also found that the effects on property value of improving water quality are not as great as those of declining water quality. This means that it is important to protect your investment before there is a decline in water quality.

Water clarity does not affect just those that own lakefront property. Water clarity impacts all lake users and even affects the local economy. Simply having a desirable lake can create a large amount of local economic activity and employment.

What can you do?

By slightly modifying your behavior and by limiting the alterations to the natural landscape you can limit the amount of pollution that enters your lake and reduce the speed at which it gets to your lake.

1. Limit changes to the natural landscape. Lawns and driveways allow runoff to flow over the land more quickly and do not allow runoff to be filtered as adequately as natural landscapes.
2. Direct rainwater away from paved surfaces to vegetated areas or collect rainwater in a rain barrel. Rainwater is better for plants promoting the absorption of important minerals.
3. Plant your lake shore with a vegetated buffer. Plants with roots systems more complex than those of the average lawn slow down runoff and absorb pollutants. Vegetated buffer strips can also help to keep geese off of your lawn.



Stormwater runoff has scoured a channel in this lawn.

This vegetated buffer slows runoff and allows it to be filtered by the plants and the soil before it enters the lake.

Block pavers allow runoff to infiltrate the ground where it is naturally filtered by the soil.



4. Consider gravel driveways and block pavers, which allow some rainwater to soak in between the blocks.
5. Reduce or eliminate fertilizer application, use organic, no phosphate, or slow-release fertilizer. Have your soil tested before applying fertilizer. A standard test is inexpensive and may save you money by reducing the amount or frequency of fertilizer application. Testing may be available in Massachusetts through the University of Massachusetts.
6. Wash your car at a car wash or away from paved surfaces. Detergents used to clean cars often contain phosphorus. Car washes treat waste water before it reaches nearby waterways. By washing your car away from paved surfaces waste water can filter into the ground and some pollutants can be removed before entering nearby waterways. Waste water that flows into storm drains receives no treatment.
7. Maintain septic systems. Failing septic systems are far more expensive to repair in comparison to regular maintenance. Wastewater from improperly functioning septic systems can reach nearby waterways. Bacteria, pathogens and phosphorus can enter waterways through septic system waste causing excess plant growth, algal blooms, and beach closures.
8. Join your local lake association or watershed association. If you don't have a lake association, consider starting one.