
ENVIRONMENTAL Fact Sheet



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Phosphorus: Too much of a good thing

What is Phosphorus?

Phosphorus is a non-metallic chemical element that is commonly found in nature. It is an important mineral required by most living organisms. Phosphorus can be found in various forms, most commonly phosphate ($\text{PO}_4\text{-3}$). However, when measuring the amount of phosphorus in aquatic systems, total phosphorus is measured, which consists of both the particulate and dissolved forms.

What are Phosphorus Sources?

There are many sources of phosphorus in aquatic systems. These sources can be natural, such as waterfowl waste, atmospheric deposition, weathering of geologic phosphate material, and plant decomposition; or they can be human-induced, such as fertilizer, pet waste, agricultural and urban runoff, industrial and domestic sewage, or faulty or overloaded septic systems.

Generally, excess phosphorus enters a waterbody through nonpoint source pollution. Rain or snowmelt will pick up pollutants as it flows over the land and eventually discharges into a body of water. Stream channel modification, shoreline erosion, and loss of vegetative buffers around water sources exacerbate these stormwater discharges and increase phosphorus inputs.

Why is Phosphorus Important in New Hampshire Lakes?

Phosphorus in New Hampshire's lakes is considered the "limiting nutrient." Phosphorus typically limits aquatic plant (macrophytes and algae) growth because it is less available for uptake than other nutrients (e.g. nitrogen) in freshwater systems. Different forms of phosphorus are available at different rates for aquatic plants. Orthophosphate is immediately available for uptake by algae while particulate phosphorus can become available over time through decomposition.

Even a small increase in phosphorus concentration can increase levels of algae, including cyanobacteria. Excessive phosphorus concentration, along with an adequate supply of sunlight, can increase littoral macrophyte abundance and promote algal and/or cyanobacteria blooms, temporarily decreasing water transparency. As these algal cells die, they slowly settle into the deeper, darker waters of the lake bottom and decompose. The process of decomposition depletes oxygen in bottom waters, which can generate anoxic (no oxygen) conditions. Anoxic

water and sediments promote conditions that encourage the release of phosphorus from the sediments back into the water column. Once this happens, the excess phosphorus creates a cycle by becoming available to fuel future blooms.

This overall process is referred to as cultural eutrophication. For more information about eutrophication, please refer to NHDES fact sheet [WD-BB-3 "Lake Eutrophication."](#)

How can Phosphorus Sources be Managed?

The importance of managing phosphorus in the watershed is essential to protecting and maintaining a healthy lake. Identifying phosphorus sources in a lake's watershed is the first step in developing a watershed management plan.

Watershed management plans should utilize best management practices and low-impact development techniques to minimize the movement of phosphorus from the watershed to the lake. If a management plan doesn't exist, here are a few things you can do to minimize phosphorus loading.

- Plant native shrubs or other vegetation to reduce shoreline erosion and provide a vegetated buffer that helps to absorb nutrients before entering the lake.
- Infiltrate stormwater rather than divert it. For example, creating a rain garden or building infiltration steps can prevent raw stormwater from entering a lake unfiltered. [Click here for more information on DIY stormwater management projects.](#)
- Maintain a properly working septic system and have it pumped regularly to decrease the amount of phosphorus leaching into groundwater.
- Use phosphate free fertilizers or low phosphate, slow release nitrogen fertilizer (within 25-200 feet of the reference line).
- Use phosphate free soaps and/or detergents in your home (required as of July 2010).
- Do not dump leaves or grass clippings in the lake or burn brush on the lake or near the shore.
- Do not urinate or defecate in the lake and do not allow pets or livestock to do the same.
- Clean up pet waste.

For More Information

Please call NHDES at (603) 271-2457. For examples of watershed management plans, [click here](#).