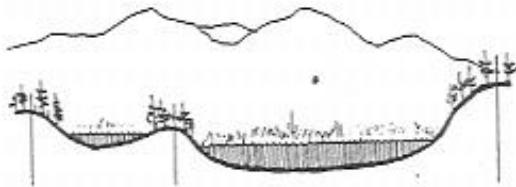


What is a watershed?

A watershed consists of all the land which contributes water to a lake - it involves far more than just the shoreline. To outline watershed boundaries, connect the points of highest elevation around a lake on a topographic map. Water falling within this 'catchment basin' flows by gravity, in streams and groundwater, to the lake.

Any substance within the watershed which can be transported by water eventually reaches the lake and affects water quality. It is not only shoreline use, but activities anywhere within a lake's watershed which affect water quality.

"EVERYTHING MUST GO SOMEWHERE."
— Barry Commoner, 1971—

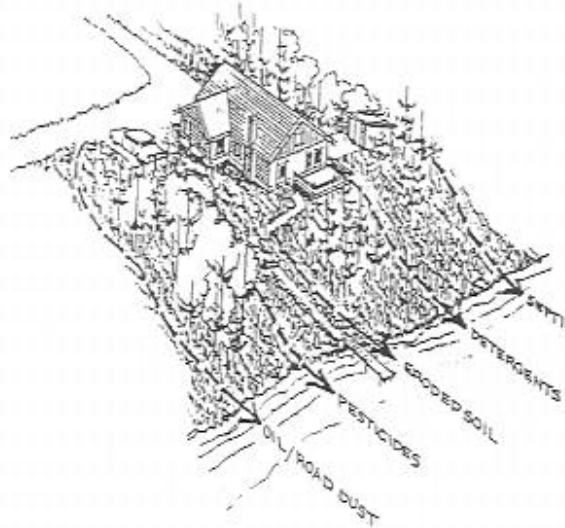


A lake's watershed. The consequences of even distant land uses eventually drain into the lake, although often indirectly through brooks and streams.

The phosphorus factor

Excessive phosphorus is the primary cause of degraded lake water quality. Phosphorus is a fertilizer. It promotes plant growth in lakes, just as it does in home gardens. However, in lakes the crop is algae, and sometimes aquatic plants, rather than garden vegetables.

Every lake can receive a limited amount of phosphorus from the watershed without unwanted effects on water quality. However, if the amount of phosphorus flowing into the lake increases and stays above normal, the lake will become overfertilized and produce excessive amounts of algae.



Typical sources of phosphorus and other contaminants generated by a home on a lake. A significant source of phosphorus in some areas is eroded soil washed into the lake due to lack of appropriate vegetation.

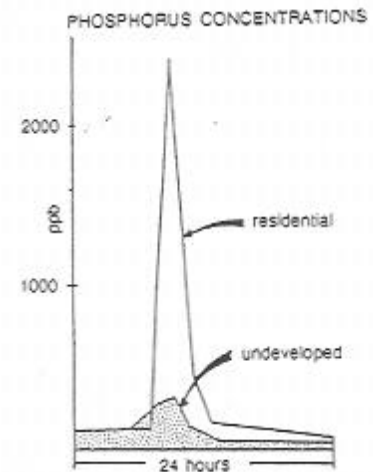
Link to land development

Dramatic changes occur when forestland is cleared and developed, especially when the natural vegetation buffer along shorelines and streambanks is removed. Without vegetative cover to catch and store rainfall, more water reaches the ground quickly. Paved areas and buildings reduce the amount of soil to absorb water. As a result, surface water accumulates quickly in developed watersheds and runs off in much greater volume than it did prior to clearing and development.

The increase in surface runoff accelerates the erosion of soil. Since sediment carries phosphorus, soil erosion is a significant source of phosphorus in developed watersheds. Also, phosphorus is more easily washed from the smooth surfaces common in developed watersheds, such as driveways and cleared waterfronts and hillsides.

It has been scientifically shown that the increased volume of water running off developed land contains much higher amounts of phosphorus than runoff from undisturbed woodland. This phosphorus comes from eroded soil, lawn fertilizers, road dust, grass clippings, yard debris, pet droppings, motor oil, effluent from failing septic systems, and other sources.

A recent study in Maine found that even careful development of woodland into 2-acre house lots caused a two- to tenfold increase in phosphorus concentrations in stormwater runoff alone. (Sewage was not a factor, since all houses were connected to a system that carried sewage away

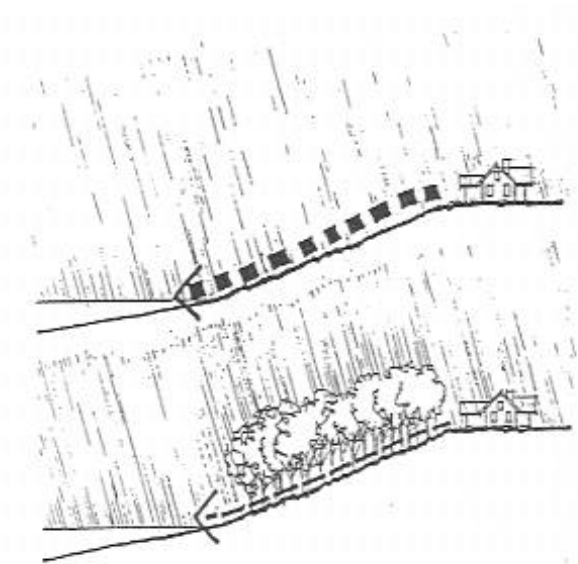


This chart compares stormwater runoff from a residential development and runoff from adjacent forest for only one storm. The residential development gave up seven times as much phosphorus!
..... Chart by Jeff Dennis, Maine DEP

Algae: unwelcome visitor

Algal blooms turn water a cloudy green or brown, deplete the water's oxygen supply, and have an unpleasant smell. They alter wildlife habitat, reduce the recreational appeal of the lake, and depress property values.

Once polluted, a lake recovers slowly if at all. Unlike rivers and streams, lakes are slow to exchange their water and sediments build up. Water quality will not improve until specific actions are taken to reduce sources of phosphorus in the watershed.



A densely vegetated buffer strip retains and filters water, and removes phosphorus

What you can do

You should preserve or mimic as many natural processes in the watershed as possible so that nature can accomplish its water purification task:

- * Leave natural buffer strips of trees and other vegetation along banks of lakes and streams.
- * Avoid disturbing natural soil by extensive site clearing, paving, etc.
- * Direct surface runoff into natural depressions where water can seep into the ground slowly.
- * Minimize the use of harmful chemicals.

A general principle: avoid doing anything to any lake that you would not do to your own swimming pool or drinking water supply.

Shoreline Alterations

Please contact the NYS Department of Environmental Conservation or the Adirondack Park Agency before undertaking any of the following activities on or near a shoreline:

- placement of sand or any other materials
- dredging or removal of any lake bottom material
- dock construction
- construction of retaining walls along the shoreline
- construction of piers or other structures
- any other encroachment in the lake
- application of any chemicals to the water
- mechanical plant control
- installation of bottom barrier materials for (used for aquatic plant control)
- changes to wetlands

_____ Please Contact _____
NYS DEC Region 5 (518) 891-1370 Adirondack Park Agency
NYS DEC Region 6 (315) 785-2513 PO Box 99
Ray Brook, NY 12977
(518) 691-4050

Save that lake!

*What YOU can do to
preserve water quality*



Pristine waters and undisturbed shorelines add beauty and diversity to the landscape and enhance recreational opportunities throughout the year.

In undisturbed watersheds, nature purifies water flowing into lakes. -When we alter watersheds to clear land and build houses, we impair the process of natural purification. Consequently, we must all assume responsibility for maintaining water quality.

This pamphlet explains how lakes are affected by our use of land and how we can protect water quality for our own future and for generations to come.

Activity	Do's and <u>Don'ts</u>	Reason
Site disturbance, yardwork, clearing, landscaping	Do keep site disturbance to a minimum, especially removal of natural vegetation and exposure of bare soil. Seed and mulch bare soil within two weeks of clearing and install hay bales down slope of cleared areas.	Site disturbance dramatically increases surface runoff and erosion which contributes phosphorus to lakes. Hay bales trap sediments and the phosphorus they carry.
	Do leave naturally vegetated areas (buffer strips) along lake shores, streambeds, road ditches, intermittent streams. An undisturbed buffer width of 100 feet is suggested, <i>with</i> more on steep slopes or erodible soils such as fine silts or clays.	Buffer strips intercept runoff and filter sediment and phosphorus from water before it reaches the lake or stream.
	Do plant deep rooted, woody, native vegetation along lake shores, streambeds, and road ditches.	Plant roots stabilize the shoreline, prevent erosion, and take up nutrients carried by water before they reach the lake.
	Do preserve natural topography (lay of the land) and drainage systems	Natural drainage systems evolve over years and effectively control sediment and phosphorus.
	Do use fertilizer sparingly. Avoid large single doses. Hay mulch is preferable.	Solid, inorganic fertilizers are readily dissolved by water and transported in runoff.
	Don't use herbicides and pesticides in excess on your garden and lawn. Avoid their use if possible.	Many of these products are toxic to fish and wildlife and can get into the water.
Shoreline changes	Do leave existing rocks in place along the shore. Plant vegetation for erosion control, or use riprap as a last resort.	Large rocks are the most effective buffer against erosion because they diffuse wave action.
	Do minimize shoreline alteration, such as removal of vegetation, construction of piers, breakwaters, etc. (DEC permit required for shoreline alterations and work beyond mean water level. APA permit and local town permits may be required as well.)	Shorelines are generally stable due to years of wind, wave and ice action. Alteration of the natural shoreline de-stabilizes the shoreline, increases erosion and impairs fish and wildlife habitat. Vegetation offers critical shade that keeps stream and shallow lake water cooler.
Tree cutting, forestry	Do leave trees and shrubs along the shoreline or streambank, consult with APA, town zoning for vegetative cutting restrictions.	Trees and natural cover best protect against shoreline erosion and sedimentation of lakes.
	Do leave ground cover plants and natural forest litter intact.	An intricate system of live roots is the net that solidly holds the shoreline together.
	Don't manicure the ground underneath larger trees	Shading of streambeds and near shore waters promotes cool and stable temperatures important to fish and aquatic life during the summer
Septic systems	Do check sludge level in septic tank every year. Pump when sludge fills half of the tank (average is every 2-3 years for year-round residents, 5-6 years for seasonal residents.)	Septic systems must be maintained if they are to function properly. If settled solids are not removed from the tank, they will wash into and clog the leach field.
	Do organize neighborhood septic tank pumping.	Pumpers usually charge less for large volume jobs.
	Don't use your toilet as a wastebasket.	Trash fills up the septic tank quickly and cannot be broken down by microorganisms.
	Don't install or use an in-sink garbage disposal.	Kitchen garbage overburdens your septic tank and slows its functions.
Don't use commercial products that claim to clean your septic tank without pumping	These products can cause clogging of your leach field and may contain chemicals which can contaminate drinking and lake water.	

Detergents	<p>Do use non-phosphate detergents. (Check the labels on detergents purchased outside of New York.)</p> <p>Don't wash anything in the lake (e.g. dishes, your dog, yourself) with soap or a cleaning agent, and don't wash cars or boats near lakes, streams or drainage ditches</p>	<p>Phosphate detergents add more phosphorus to the lake, contributing to algal growth</p> <p>These activities will put phosphorus directly into the water. Runoff should be diverted to vegetated areas, and allowed to seep into the ground where phosphorus can be removed.</p>
Runoff from driveways, roofs, lawns, etc.	<p>Do prevent driveway, roof, lawn, etc. water from running directly into lakes and streams. Detain in where depressions or divert flow to flat, wooded areas.</p>	<p>Flowing water carries phosphorus-laden sediment. Dispersing water allows it to filter into the soil sediment and phosphorus are filtered out.</p>
Roads	<p>Do plant vegetative buffer strips along roads and stabilize road ditches by seeding or riprapping. Use natural vegetation whenever possible.</p> <p>Don't allow water to run directly off roads into lakes or streams.</p>	<p>Plants slow runoff from the roads and help to remove sediment and phosphorus before they reach lakes or streams.</p> <p>Water running off roads contains sediment, phosphorus and pollutants from cars.</p>
Houses, decks, sheds	<p>Don't build close to the water, (APA regulations specify 50 to 100 foot setback distances, depending on land use area).</p>	<p>Setbacks protect the lake because shoreline disturbance dramatically increases sedimentation in the lake.</p>
Sand beaches	<p>Don't build new beaches (placing sand in the lake requires a permit from DEC and may require an APA wetlands permit).</p>	<p>Sand contains phosphorus. Sand which is not stabilized by vegetation washes into the lake, where it accelerates filling of the lake and provides poor bottom habitat for fish and wildlife.</p>
Filling/dredging	<p>Don't fill or dredge along the lakeshore unless necessary. (Both activities require a permit from DEC, and may require an APA wetlands permit.)</p>	<p>Filling and dredging stir up sediment and impair natural habitat.</p>
Hazardous materials	<p>Do store hazardous materials in a contained area</p> <p>Don't dispose of oil, paint thinner or chemical products on the ground</p>	<p>Containment prevents contamination of water supplies and lake waters by undetected leaks.</p> <p>These products cannot be removed by soil and can contaminate ground water and lake water.</p>

For more information about lake water protection, contact the Adirondack Park Agency at P.O. Box 99, Ray Brook NY 12977, (518) 891-4050. We are grateful to the Southern Maine Regional Planning Commission and the York County Soil and Water Conservation District for permission to present material in this pamphlet.