

Threats from the Watershed and Lake Protection Tips

Amy Smagula

In the previous article, Frank Wilhelm provides a great overview of lake formation, and the interaction of the physics, chemistry, and biology within lake basins, which is a great basis for defining and understanding some of the common workings of lakes.

Another key factor to consider is the watershed or catchment of a lake, which is the land that surrounds the lake, that drains into the lake (Figure 1). It is important to remember that this is not just the nearshore zone, but land that can extend miles beyond the shoreline. For this reason, it is important to know the boundaries of your watershed (this information can be obtained from a municipality, local university cooperative extension, state natural resources agency or consultant hired to delineate the watershed).

Watershed activities and water quality

Any activity in the watershed of a lake that increases sediment, nutrient, bacteria or other type of pollutant loading to a waterbody can lead to water quality problems. These can be natural sources of pollutants like nutrients and bacteria from waterfowl and wild animal waste, or from atmospheric deposition (blown in with dust particles in the wind), or breakdown of nutrient or metal rich bedrock in the watershed. Pollutants can also (and often) be the result of human-related

activities in the landscape. As you walk or drive around your lake, here are just some of the activities that you might see that can affect water quality in your lake:

- Construction
- Erosion
- Mining
- Forestry activities
- Lawn and garden fertilizing
- Outdoor washing (cars, boats, etc.)
- Faulty septic systems
- Agriculture (crops/animals)
- Gasoline/oil spills
- Development (urban, commercial, rural)

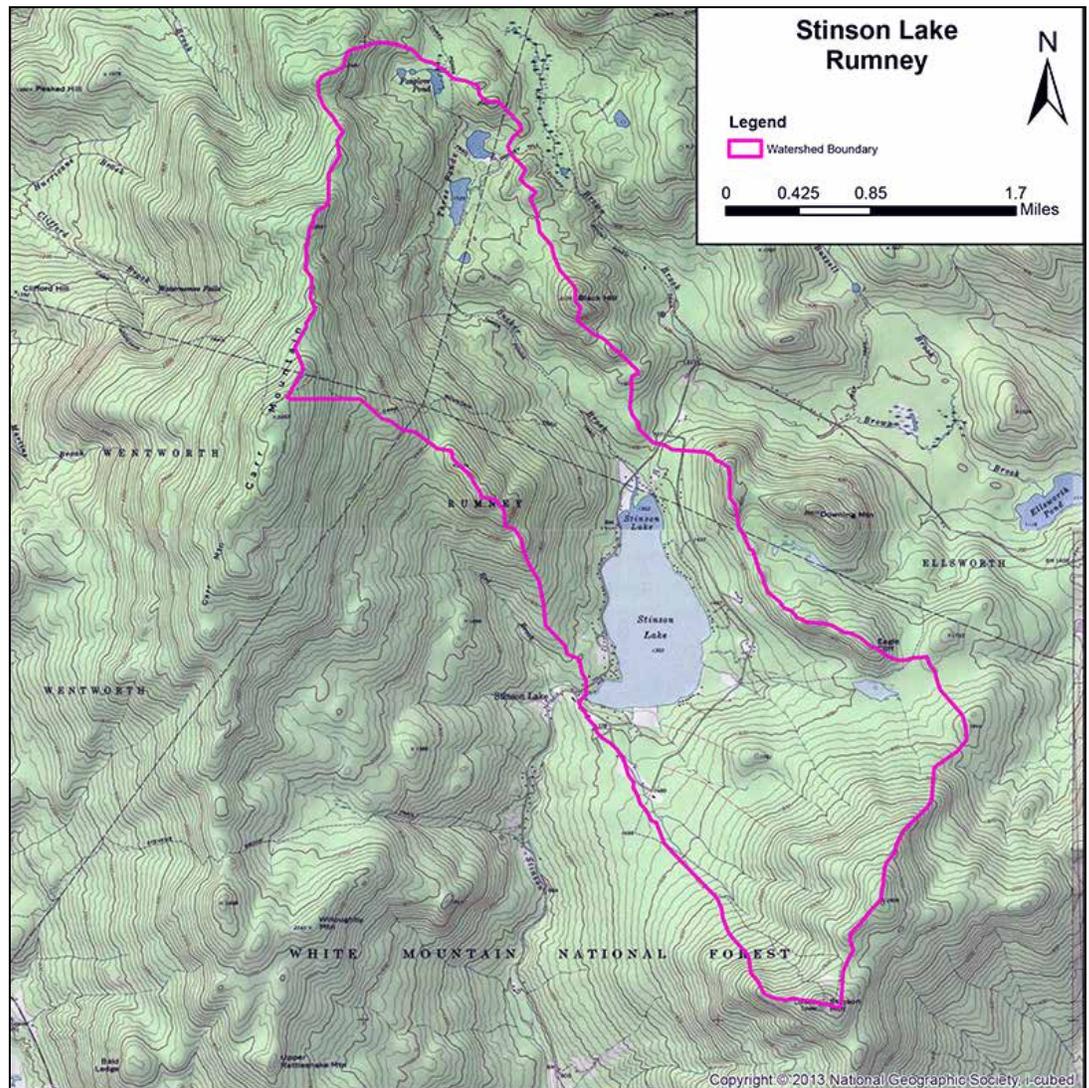


Figure 1. A map showing Stinson Lake and its watershed boundary (pink line).

- Increases in impervious areas (roads, parking lots, buildings)
- Unmanaged pet waste
- Road salting

In many cases, pollutants like nutrients, sediments, and bacteria generated from sources above enter a waterbody through nonpoint sources of pollution – in other words, they can be multiple small sources throughout a watershed, and they are not derived directly from a factory pipe or other direct or point source. Non-point sources of pollution can be hard to trace and pinpoint, and even harder to control if the sources are numerous.

Overland flow of water from rain or snow melt will pick up these pollutants and carry them over land or downstream, where they will eventually find their way into a lake or pond.

Water quality impacts

The addition of pollutants to a waterbody can have a number of impacts to the receiving waters of a lake, including:

Increases in:

- Sediment in the lake, including sediment deltas at the lake edge at inflowing streams or culverts
- Nutrients
- Bacteria counts
- Metals
- Chlorides (salts)
- Toxic contaminants
- Trash and debris in the lake
- Temperature
- Suspended sediments (Figure 2)
- Algal blooms (Figure 3)

Decreases in:

- Lake clarity
- Water quality
- Aesthetics
- Recreational values
- Ecological health and habitat

The importance of protecting and managing a lake's watershed is critical to protecting and ensuring good water quality.

Lake protection tips

Balancing watershed and in-lake impacts will help protect your lake and preserve water quality in the long-term. Below are recommendations for lake protection (modified from NHDES 2019).

- Pump out your septic tank every three to five years, or when the sludge level exceeds one-third of tank capacity. Maintain your system regularly and properly, it should be designed to handle the load it receives. A leach



Figure 2. Turbidity in stream caused by upstream disturbance.

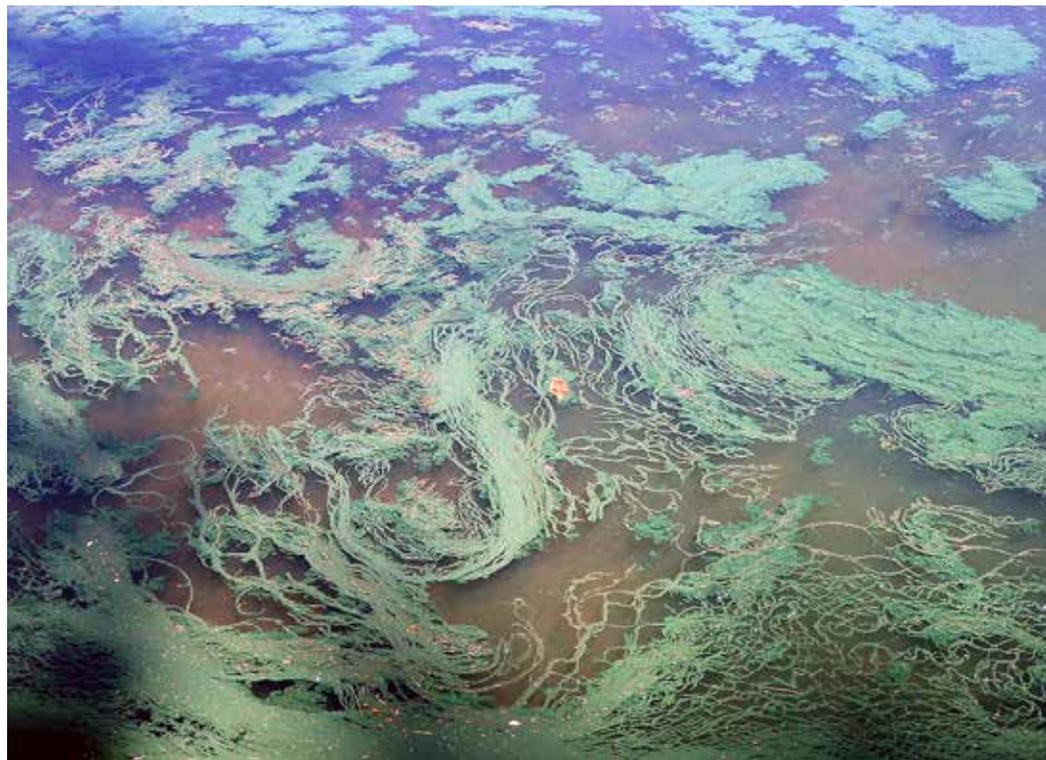


Figure 3. Cyanobacteria bloom on a lake.

field should be increased in size whenever the frequency (seasonal to year-round) or volume (additional people, washing machines) increases. Check your leach field for soft or wet areas or septic smells. Replace faulty systems.

- Do not bathe, shampoo, or wash boats, pets, or other objects in the lake with soap or phosphorus-containing detergents. Do not wash vehicles near lakes where detergents can run into the lake.
- Do not use fertilizers on shorefront property or near any area that drains to waterbody.
- Keep land clearing and alteration to a minimum. Soil disturbance will increase runoff to the lake. Paths to the waterfront should be curved to minimize erosion.
- Divert runoff from rooftops to rain gardens or rain barrels, or divert the flow to a vegetated area of your property.
- Do not burn brush or leaves near the shore; nutrients remain behind and can be washed into the lake with the next rain event. Do not dump leaves or grass clippings near the shore, they too add excess nutrients to the water.
- Do not urinate or defecate into the lake, and do not allow pets to do the same. Farm animals should not be kept near the lake, the phosphorus in their manure can be washed into the lake by rainfall runoff.
- Do not feed ducks or other aquatic life – there is plenty of natural food available for them. Nutrients in the feed material will be added to the lake through the organism's feces. Also, by discouraging the duck population, you reduce the risk of inviting swimmer's itch to your area.
- Plant native shrubs or other vegetation to reduce shoreline erosion and provide a vegetated buffer that helps to absorb nutrients before entering the lake (again, avoid fertilizer use near the lake).
- Use phosphate-free fertilizers or low-phosphate, slow-release nitrogen fertilizer.

- Clean up pet waste.
- Do not use powerful boat motors in shallow areas, and do not power-load boats when putting them on trailers. The nutrient-enriched bottom sediments can be churned into the overlying water, resulting in increased algae growth.
- Avoid removing trees along the waterfront, they provide stabilizing root systems and shade in the nearshore zone of the waterbody.
- Reduce road salt use in sensitive drainage areas, work with your municipality or road agent to implement a wise plan for road salt use that is protective of public safety, but also receiving waters.
- Work with your local municipality to create protective zoning overlays around waterbodies to limit dense development and impervious surfaces, and protect against runoff that could affect the lake.
- Promote wise land stewardship, and encourage municipalities, cooperative extensions, lake and watershed groups, and others to disseminate educational materials about lake and watershed protection.
- Be a watchdog for development and construction activities that could pollute, ensure that silt fencing/hay bales or other temporary stabilizations structures are in place before and during phases of construction and land disturbance, and until the grounds are vegetated and stabilized, to prevent erosion. Report any possible violations or water quality concerns to your local municipality or state agency.
- Larger development projects often have permitting and public hearing phases. Formulate a letter with your concerns and questions, and send them to the review team, or

attend a public hearing and listen in, and speak when discussion blocks are opened to the public.

- Form a lake and/or watershed association to help promote wise stewardship activities on the local level.

To find more resources on watershed protection, please visit the NALMS website at www.nalms.org, and also visit the Environmental Protection Agency's Healthy Watershed Protection page at <https://www.epa.gov/hwp>. This page includes a number of links to fact sheets and publications which contain much more information than could be included in this short article.

References

NH Department of Environmental Services. 2019. WD-BB-9: Lake Protection Tips Fact Sheet.

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