

Lake Shoreland Protection and Restoration Management Options

In fulfillment of the Requirements of Act 138

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**Vermont Agency of Natural Resources
Department of Environmental Conservation
Lakes and Ponds Section**

Selected pages

Executive Summary

According to a U.S. Environmental Protection Agency (USEPA) study of lakes across the country, the health of Vermont's lakes is less than both the northeast region and the national average in terms of percent of shoreland that is either in fair or poor condition, as measured by the extent of clearing, lawns and development near the shoreline. When a lake's natural vegetation (woodland) is removed and replaced by lawns and impervious surfaces, fish and wildlife habitat degrades, shores erode, and the lake is more vulnerable to water quality problems such as algae blooms. Cleared shores are also more susceptible to erosion during flood events.

Naturally vegetated lakeshores reduce pollution, protect property and fisheries, improve recreation, and greatly contribute to the economy. Some of the many benefits and values naturally vegetated lakeshores offer include:

Revenue and property values. Healthy lakes generate millions of dollars annually for the Vermont economy and private property maintains highest value when water quality is good.

Flood resilience. Well-vegetated shorelands provide flood resilience and play an essential part in buttressing Vermont's water resources against the effect of climate change.

Recreation and tourism. Treed shorelands are scenic, enhancing the recreational experience and contributing to Vermont's tourism economy.

In addition, a wooded shore provides ecosystem services that are essential for protecting lake ecological health:

Pollution filtration. Shoreland vegetation naturally filters phosphorus and sediment from uphill runoff.

Shoreline stability. Wooded shores provide shoreline stability with a diversity of dense root structures.

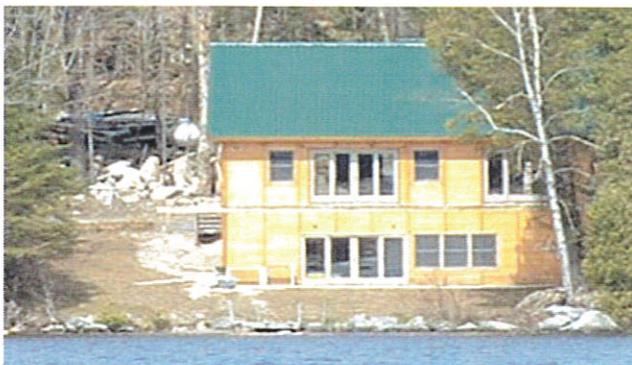


Figure 2. Common lakeshore development consists of clearing native vegetation and planting a lawn. Suburbanized shorelands diminish lake health.

Habitat for fish and aquatic species. Fallen trees and branches provide critical physical habitat for fish, amphibians, turtles and insects such as dragonflies .

Prevention of problem plant growth. Overhanging branches keep the water shaded and cool, thus helping to prevent algae and problem plant growth that thrive in warm and sunny waters.

Habitat for wildlife species. A natural shoreline enables use of the lake environment for species such as loons, kingfishers and otters.

At present, most shoreland development in Vermont involves clearing native vegetation along shorelines to establish lawns down to the water's edge, and as a result, 82 percent of Vermont's shorelands are currently in poor or fair condition. Accordingly, Vermont lakes are more threatened by phosphorus and sediment runoff from shoreland areas, habitat degradation, and flood damage than lakes in other New England states and the nation.

The Vermont Legislature passed Act 138 during the 2012 legislative session, which requires the Vermont Agency of Natural Resources (VTANR) to submit a report with options for restoring and protecting lakeshores. In particular, Act 138 calls on VTANR to address whether the state should enact statewide shoreland regulations.

Vermont's Shoreland Management Programs

Vermont's current shoreland management programs focus on education, outreach and technical assistance. At present, there is no statewide standard for shoreland management and the responsibility for developing standards falls to municipalities. Less than 20 percent of towns have implemented ordinances to protect lakeshores. Municipal adoption of effective local shoreland zoning has progressed very slowly over the last 40 years and efforts have varied in effectiveness.



Figure 3. Lake-friendly shoreland development includes: setting a lawn back from the lake; allowing native trees to stabilize the bank, while pruning lower branches for a view; leaving woodlands (duff layer, shrubs, and mature trees) in place to filter runoff and provide healthy habitat for fish and other wildlife.

Introduction

This report presents options and recommendations for strengthening Vermont shoreland management. Scientific studies in Vermont and the nation link degraded lake conditions to poorly planned and increasing lakeshore development. Most Vermont lakeshore owners manage their property with little or no knowledge or standards for lake protection. This report evaluates options for lakeshore management by reviewing Vermont's current programs as well as those of other states.

Part One - The Consequences of Cleared Shorelands

The Status of Vermont Lakes

Vermont's 800+ lakes and ponds are natural jewels left by glacial activity more than 10,000 years ago. Over time, they have provided waterways for human settlement, exploration, battles, and trade and commerce. Today, people use Vermont lakes primarily for recreation. Vermont residents and visitors may spend a day fishing or boating, go camping, or rent a lake house, and many own homes or camps on the lakeshore.

For lakes to be resilient to human activity on the land and to climate change, their first line of defense is a well vegetated shore. However, data show that in Vermont, developed sites have 96 percent fewer trees along the shores than undeveloped sites and that cleared shores pose the greatest threat to Vermont lakes.^{1,2} **Naturally vegetated shores protect lake water quality, ecology, and bank stability. Healthy lakes benefit people, property values, and the tourism economy.**^{3,4,5}

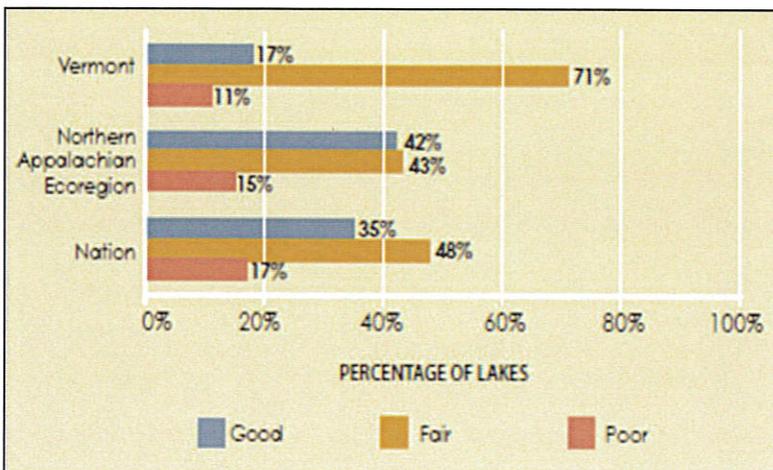


Figure 4. Extent of Lakeshore Disturbance. 83% of Vermont's shorelands are in either fair or poor condition, compared to 58% in the northeast region, and 65% nationally.

This report examines the values of a well-managed shoreland, and the current status of Vermont's lakeshores. The report then evaluates Vermont's non-regulatory shoreland management programs, and the regulatory program of three other states. Finally, regulatory options for Vermont are presented, as well as enhancements of the existing non-regulatory approaches.

A lake's first line of defense against pollution and habitat degradation is its shoreland—the surrounding land that drains directly into the lake. Naturally vegetated shorelands protect lake health and recreational values, provide flood resilience and fortify Vermont's economy.



Figure 5. Shallow water habitat structure. Fallen trees, branches and leaves, rocks, aquatic plants and the adjacent woodlands provide shelter, feeding, and breeding sites for a large variety of aquatic and terrestrial life.

• Lake Habitat For Fish and Wildlife

Recent studies in Vermont indicate that clearing shorelands of natural vegetation results in degradation of aquatic habitat.⁶ VTANR's participation in the 2007 EPA National Lake Assessment shows that in Vermont 82% of lake shorelands are in poor or fair condition because of excessive disturbance (clearing or impervious surfaces).⁷ In addition, VANR's Littoral Habitat Study shows a strong correlation between cleared shoreland and loss of shallow water habitat for fish and other organisms.⁷

Vermont lakes rank worse than the northeast region and the national average in terms of shoreland disturbance. Only 17% of Vermont lakeshores are in good condition as measured by the extent of disturbance and lawns along the shore, compared to 42% regionally and 35% nationally (Figure 4).⁶

Vermont lakes with good shoreland condition (e.g. the natural woodlands have been maintained)

have corresponding healthy shallow water habitat including a variety of sediment, woody snags, diverse aquatic plants, and boulders and cobble. These complex environments provide habitat for a wide diversity of terrestrial and aquatic organisms—from fish, to aquatic insects, to birds and mammals.

• **Bank Stability**

Clearing lakeshores of vegetation causes bank instability and erosion.⁸ As witnessed on Lake Champlain during spring 2011 flooding, well vegetated banks resisted the winds, waves, high waters, and storm water runoff better than cleared or walled shores. In addition, walled shores do not provide good habitat. Property owners who have cleared shores, often later pay for a wall to stabilize the bank. The clearing of shores is costly for owners and the lake.

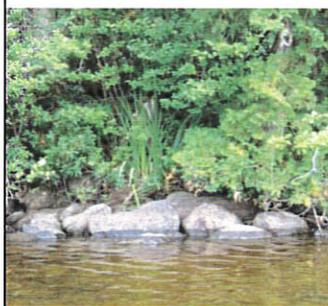


Figure 6. Eroding and Non-Eroding Shorelines. The shore above is experiencing erosion because a lawn provides little soil stability. In contrast, the mix of trees, shrubs and groundcover at left offers excellent stability due to the variety and density of root structures and mass.



Figure 7. Lake-friendly shoreland development:

- ◆ Provides bank stability with trees and shrubs
- ◆ Provides shade and overhanging vegetation for aquatic habitat
- ◆ Allows woodlands to naturally filter runoff
- ◆ Establishes lawns back from lake
- ◆ Preserves the natural lakeshore beauty

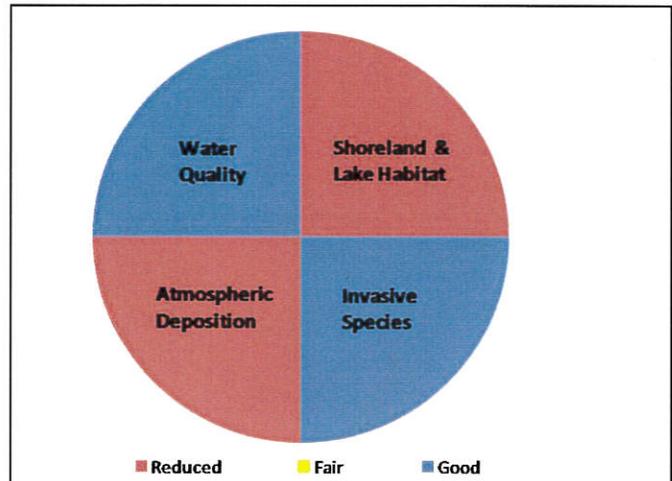


Figure 8: Score Card for Salem Lake, Derby, VT. The Vermont Lake Score Card is accessible on the Lakes and Ponds Section website and shows how each lake or Lake Champlain station is doing with respect to water quality, shoreland condition, invasive species, and atmospheric deposition (acidification and mercury contamination).

In general, water quality trends are good across the state, but the shoreland and lake habitat conditions are not. The score card for Lake Salem in Derby represents a typical lake report card with a “good” rating for water quality, but with reduced conditions for shoreland and lake habitat. Lake Salem’s lakeshore condition threatens its good water quality because more than 50% of the natural woodland shore has been converted to lawn down to the lake. (Salem Lake, like the majority of Vermont lakes, is rated “reduced” for atmospheric deposition because of a fish consumption advisory for mercury.)

• **Water Quality**

Cleared shoreland results in increased phosphorus and sediment pollution of lakes which decreases water clarity and increases algae growth. Eventually phosphorus pollution can lead to blue-green algae blooms, which can pose a serious health concern.⁹ Cleared shores contribute 18 times the sediment, five times the runoff and seven times the phosphorus to the lake than those where the shoreland is wooded.¹⁰ Shores with lawns and impervious surfaces, with little or no natural vegetation and underlying duff layer, turn the lake into a stormwater catch basin with no natural way to filter and clean run-off.

