

# Gregg Lake Watershed Management Plan

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Prepared by:

In collaboration with:



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# Gregg Lake Watershed Management Plan

## Summary

To address rising concerns about the water quality of Gregg Lake, a group of seasonal and year-round Antrim residents formed the Gregg Lake Watershed Management Plan Committee, obtained Watershed Assistance Grant funding from the New Hampshire Department of Environmental Services (NHDES), hired an environmental consultant and prepared a watershed management plan for Gregg Lake. This plan incorporates the nine elements required by the US Environmental Protection Agency in a watershed plan.

Trophic surveys performed by NHDES in 1978 and 1994–5 established oligotrophic status for Gregg Lake, and water quality data has been collected through the NHDES Volunteer Lake Assessment Program (VLAP) periodically since 1997. Since 2005, Gregg Lake has been listed as Impaired for Aquatic Life Integrity on the NHDES 303(d) List of Impaired Waters due to high levels of chlorophyll-*a* and total phosphorus and low pH. Analysis of all available water quality data for Gregg Lake showed chlorophyll-*a* (algae) levels above the threshold for an oligotrophic lake, increasing water turbidity and low dissolved oxygen levels in bottom waters. Since chlorophyll-*a* levels normally vary in response to phosphorus levels, and water turbidity is strongly affected by suspended sediments, watershed sources of phosphorus and sediment, as well as nitrogen, were assessed using models supported by ground-truthing and measured water quality parameters. A septic survey was conducted, and erosion hotspots were identified and individually assessed for phosphorus, sediment and nitrogen loads. A broad community group set water quality goals to reverse Gregg Lake's impaired status.

This watershed management plan recommends actions to mitigate phosphorus and sediment inputs, including projects to control stormwater runoff from Brimstone Corner Road, White Birch Point Road and Holt Hill Road, and efforts to control erosion along shoreline stretches of Gregg Lake Road and its causeway. Stormwater runoff management, shoreline erosion control, septic upgrades and conservation easements on private lakeshore properties will be needed to meet water quality goals. In addition, the plan recommends lake management measures to reduce shoreline erosion and limit suspension of aquatic vegetation and bottom sediments caused by motorboat wakes and propeller wash.

## I. Introduction

Gregg Lake, located within the Town of Antrim in the Monadnock Region of southwestern New Hampshire, is a 195-acre natural lake whose water has been raised approximately 3 meters (10 feet) by a dam at its outlet. Gregg Lake hosts Antrim's popular public swimming beach and boat launch, a community of summer and year-round homes and a youth summer camp. The warm-water fishery attracts anglers and wildlife, including nesting loons, and nature enthusiasts who paddle the predominantly wooded shoreline and marshes. According to the New Hampshire Fish and Game Department, the Gregg Lake watershed contains some of the "Highest Ranked (Wildlife) Habitat" in New Hampshire. However, elevated phosphorus and chlorophyll-*a* and low dissolved oxygen levels put Gregg Lake in the "Slightly Bad" category in NHDES ratings for water quality and threaten the lake's capacity to support wildlife and recreation. According to the New Hampshire Non-Point Source Pollution (NPS) Management Program, Gregg Lake also ranks high in "Recovery Potential." Two lake associations and the Town of Antrim actively support conservation through Lake Host, Weed Watch and VLAP water testing programs. New Hampshire Audubon and the Harris Center for Conservation Education hold conservation easements on substantial parcels of land in the watershed, and along with other conservation easements, 34% of the watershed is conserved.

Gregg Lake began to experience unprecedented blooms of filamentous algae in 2015 and saw its first documented appearance of cyanobacteria in 2018. A coalition of year-round and seasonal Antrim residents was formed to identify pollutant sources and set long-term goals for restoring Gregg Lake's water quality. FB Environmental Associates was hired to work as consultants on the project, along with Horsley Witten Group for conceptual engineering designs and DK Water Resource Consulting for modeling support. All documentation was reviewed and approved by NHDES.

As required to be eligible for federal funding to implement non-point source pollution controls, the Gregg Lake Watershed Management Plan incorporates the nine key elements required by the US Environmental Protection Agency (Table 1).

**Table 1. Gregg Lake Watershed Management Plan chapters and EPA-required elements.**

EPA Element	Gregg Lake Watershed Management Plan Chapter (Author)
I.	Introduction (GLWMPC*)
<i>a: Identify pollution causes and sources</i>	
II.	Water Quality Summary (GLWMPC)
	a. WQ Appendix A: 2018 VLAP Report (NHDES)
	b. WQ Appendix B: 2008 NH Fish & Game Report
	c. WQ Appendix C: 2009 NH Fish & Game Report
	d. WQ Appendix D: Patterns of Bioaccumulation (Ward, et al)
	e. WQ Appendix E: 2018 NH Fish & Game Report
III.	Septic Survey Summary (GLWMPC)
IV.	Lake Loading Response Model (FBE)
V.	Build-out Analysis (FBE)
<i>b: Estimate pollution reductions needed</i>	
VI.	Water Quality Goal Memo (FBE)
<i>c: Actions needed to reduce pollution, d: Costs &amp; authority, f: Schedule</i>	
VII.	Action Plan (GLWMPC)
	a. AP Appendix A: BMP Matrix (FBE)
	b. AP Appendix B: Conceptual BMPs (HWG)
	c. AP Appendix C: Boat Ramp Memo (HWG)
<i>e: Outreach and education</i>	
VIII.	Outreach Strategy (GLWMPC)
<i>g: Milestones, h: Success indicators and evaluation, i: Monitoring plan</i>	
IX.	Milestones, Monitoring & Tracking Strategy (GLWMPC)
X.	WMP Appendices
	a. Appendix A: RFQ (GLWMPC)
	b. Appendix B: Contract Agreement (GLWMPC & FBE)
	c. Appendix C: SSPP (GLWMPC & FBE)

*\*Abbreviations: GLWMPC, Gregg Lake Watershed Management Plan Committee; NHDES, NH Department of Environmental Services; FBE, FB Environmental Associates; HWG, Horsley Witten Group*

## Acknowledgements

Development of the Gregg Lake Watershed Management Plan was a community volunteer effort supplemented with a great deal of advice from NH Department of Environmental Services, FB Environmental Associates and NH Fish & Game. Seasonal and year-round Antrim residents, including town officials, contributed many volunteer hours. We thank everyone who was able to donate time and/or expertise to the effort.

### **Core Group**

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David Ward  
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George Caughey  
Michelle Caughey  
Susan Ward  
Diane Chauncey

### **Bathymetry**

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### **VLAP Testing**

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Melissa Lombard  
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### **WQ Report**

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### **Ground-Truthing**

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### **Action Plan**

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### **Gregg Lake Association**

**White Birch Point Association**  
**Pump and Circumstances**  
**Brown Bag Coalition**  
**Avenue A Teen Center**  
**Antrim Home & Harvest**  
**The Limrik**

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