

---

# Honeoye Lake Watershed Management Plan

---



---

*This document was prepared for the New York State Department of State, Division of Coastal Resources with funds provided under Title 11 of the Environmental Protection Fund.*



**Final Report**

GENESEE/FINGER LAKES  
Regional Planning Council

---

## Acknowledgements

---

State of New York

Eliot Spitzer, Governor of the State of New York

Lorraine A. Cortés-Vázquez, Secretary of State

George Stafford, Director, New York State Department of State, Division of Coastal Resources

Kevin Millington, Kenneth Smith, and Stephanie Wojtowicz, New York State Department of State,  
Division of Coastal Resources

Honeoye Lake Watershed Task Force

Bonnie Drake, Canadice

Phil Faber, Naples

Al Favro, Bristol

Dan Marshall, South Bristol

Randy Pawley, Richmond

Jack Starke, Chairman

Honeoye Lake Watershed Management Plan

Technical Committee

Don Bennett, Honeoye Valley Association

Tom DeRue, Ontario County Soil and Water Conservation District

Dr. Bruce Gilman, Finger Lakes Community College

Terry Gronwall, Honeoye Valley Association

Ed Jackson, Honeoye Valley Association

Tim Jensen, Ontario County Planning Department

Kevin Schultz, Ontario County Planning Department

Jack Starke, Honeoye Lake Watershed Task Force Chairman

Princeton Hydro

Dr. Steve Souza

Genesee / Finger Lakes Regional Planning Council

Jayne Breschard, Planner

Brian Slack, Senior Planner

Andrew Stuart, Intern

David Zorn, Executive Director

GIS maps provided by Kevin Schultz, Ontario County Planning Department.

Infrared Map of Honeoye Lake provided by Underwater Technologies Inc.

Charts and graphs provided by Jack Starke and Dr. Bruce Gilman.

Cover photograph provided by William Banaszewski.

Photographic illustrations contributed by William Banaszewski, Bill Gamble, Brigitte Klement Moyer,  
Stephen Lewandowski, and Jack Starke.

---

# Honeoye Lake Watershed Management Plan

## Final Report

*In Association with the  
Honeoye Lake Watershed Task Force*



### Genesee/Finger Lakes Regional Planning Council

50 West Main Street • Suite 8107

Rochester, NY 14614

(585) 454-0190

<http://www.gflrpc.org>

[gflrpc@gflrpc.org](mailto:gflrpc@gflrpc.org)

GENESEE/FINGER LAKES  
Regional Planning Council

***This document was prepared for the New York State Department of State, Division of Coastal Resources with funds provided under Title 11 of the Environmental Protection Fund.***

### Mission Statement

*The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) will identify, define, and inform its member counties of issues and opportunities critical to the physical, economic, and social health of the region. G/FLRPC provides forums for discussion, debate, and consensus building, and develops and implements a focused action plan with clearly defined outcomes, which include programs, personnel, and funding.*



# Honeoye Lake Watershed Management Plan

Final Report – October 2007

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>X</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1 Goals and Objectives.....	2
1.2 Sponsors/Partners.....	2
<b>2. WATERSHED CHARACTERIZATION.....</b>	<b>4</b>
2.1 Watershed Study Area Delineation .....	4
2.2 Geographic Setting.....	5
2.2.1 Topography .....	5
2.2.1.1 Bedrock/Surficial Geology .....	5
2.2.1.2 Soils .....	6
2.2.2 Hydrology.....	7
2.2.2.1 Surface Hydrology .....	7
2.2.2.2 Groundwater Flow.....	7
2.2.2.3 Climate .....	8
2.2.2.4 Precipitation Chemistry .....	9
2.2.2.5 Lake Retention Time and Level.....	9
2.2.2.6 Sanitary System Disposal .....	11
2.2.2.7 Water Supply .....	12
2.2.3 Land Cover and Land Use.....	12
2.2.3.1 Land Cover-Permeable .....	12
2.2.3.2 Land Cover-Impervious.....	13
2.2.3.3 Land Use .....	14
2.2.4 Development Trends .....	15
2.2.4.1 Zoning.....	16
2.2.4.2 Population .....	16
2.2.4.3 Tourism.....	17
2.2.5 Parks, Preserves, and Lands in Public Ownership.....	17
2.2.6 Natural Resources.....	20
2.2.6.1 Wetland Habitats.....	20
2.2.6.2 Living Resources.....	21
2.2.6.3 Rare, Threatened, and Endangered Species .....	23
2.2.6.4 Living Resource Use Impairments.....	23
2.2.6.5 Habitat Loss .....	24
2.2.6.6 Invasive Species.....	24
2.2.6.7 Historic and Cultural Resources .....	24
2.2.6.8 Prior Studies.....	27
<b>3. WATER QUALITY CHARACTERISTICS .....</b>	<b>28</b>
3.1 Water Quality Classifications.....	28
3.2 Physical Characteristics .....	28

# Honeoye Lake Watershed Management Plan

Final Report – October 2007

3.2.1 Thermal Stratification, Mixing and Dissolved Oxygen.....	29
3.2.2 Water Clarity .....	31
<b>3.3 Chemical Characteristics.....</b>	<b>32</b>
3.3.1 External Source of Macronutrients.....	32
3.3.2 Internal Source of Macronutrients.....	32
3.3.2.1 Phosphorus Cycle .....	37
3.3.3 Other Lake Chemistry Parameters.....	37
3.3.3.1 Major Ions .....	38
3.3.3.2 Specific Conductivity, pH, and Alkalinity .....	39
3.3.4 Sediment Phosphorus .....	39
3.3.5 Sedimentation Rate.....	39
<b>3.4 Biological Characteristics .....</b>	<b>40</b>
3.4.1 Phytoplankton .....	40
3.4.2 Aquatic Macrophytes.....	41
3.4.3 Weed Harvesting Program .....	43
3.4.3.1 Macrophyte Management Alternatives.....	44
3.4.4 Zooplankton and Benthos.....	46
3.4.5 Deepwater Macrobenthic Survey .....	47
3.4.6 Mollusks, Amphibians and Reptiles.....	49
3.4.7 Zebra Mussels.....	49
3.4.8 Pathogens.....	50
<b>3.5 Trophic Indicators and Status.....</b>	<b>51</b>
3.5.1 Total Phosphorus .....	53
3.5.2 Chlorophyll-a.....	53
3.5.3 Water Clarity Secchi Disk Depth .....	54
3.5.4 Bottom Waters Dissolved Oxygen .....	54
3.5.5 Summer Trophic Status .....	54
<b>4. SUBWATERSHED PRIORITIZATION .....</b>	<b>55</b>
4.1 Introduction .....	55
4.2 Hydrology Methodology .....	57
4.3 Hydrology Results.....	58
4.4 Nutrient Loading Methodology.....	59
4.5 Nutrient and Sediment Loading Results.....	59
4.6 Hotspots .....	62
4.6.1 Possible Hydrocarbon Pollution.....	62
4.6.2 Possible Chemical Pollution .....	63
4.6.3 Possible Nutrient Pollution .....	63
4.6.4 Former Landfills/Mining.....	63
4.6.5 Other Possible Hot Spots .....	63
4.7 Road Crossings.....	63
4.8 Subwatershed Prioritization .....	63

# Honeoye Lake Watershed Management Plan

Final Report – October 2007

<b>5. ASSESSMENT OF LOCAL LAWS AND PRACTICES .....</b>	<b>65</b>
5.1 Basic Land Use Law Inventory.....	65
5.2 General Overview of Local Laws and Practices .....	66
5.2.1 Development .....	66
5.2.2 Agriculture and Forestry.....	70
5.2.2.1 Agriculture .....	70
5.2.2.2 Forestry .....	70
5.2.3 Waterways and Wetlands .....	71
5.2.4 Marinas.....	71
5.2.5 Highways.....	72
5.2.6 Onsite Wastewater Treatment Systems (OWTS) .....	74
5.3 Assessment of Local Laws and Practices.....	75
5.3.1 Town of Bristol .....	75
5.3.1.1 Development .....	75
5.3.1.2 Agriculture and Forestry .....	75
5.3.1.3 Waterways and Wetlands.....	76
5.3.1.4 Marinas .....	76
5.3.1.5 Highways .....	76
5.3.1.6 Onsite Wastewater Treatment Systems (OWTS) .....	77
5.3.2 Town of Canadice .....	77
5.3.2.1 Development .....	78
5.3.2.2 Agriculture and Forestry .....	78
5.3.2.3 Waterways and Wetlands.....	78
5.3.2.4 Marinas .....	79
5.3.2.5 Highways .....	79
5.3.2.6 Onsite Wastewater Treatment Systems (OWTS) .....	80
5.3.3 Town of Naples .....	80
5.3.3.1 Development .....	80
5.3.3.2 Agriculture and Forestry .....	81
5.3.3.3 Waterways and Wetlands.....	81
5.3.3.4 Marinas .....	82
5.3.3.5 Highways .....	82
5.3.3.6 Onsite Wastewater Treatment Systems (OWTS) .....	82
5.3.4 Town of Richmond.....	82
5.3.4.1 Development .....	82
5.3.4.2 Agriculture and Forestry .....	84
5.3.4.3 Waterways and Wetlands.....	84
5.3.4.4 Marinas .....	84
5.3.4.5 Highways .....	85
5.3.4.6 Onsite Wastewater Treatment Systems (OWTS) .....	85
5.3.5 Town of South Bristol .....	85
5.3.5.1 Development .....	86
5.3.5.2 Agriculture and Forestry .....	86
5.3.5.3 Waterways and Wetlands.....	86
5.3.5.4 Marinas .....	87

# Honeoye Lake Watershed Management Plan

Final Report – October 2007

5.3.5.5 Highways .....	87
5.3.5.6 Onsite Wastewater Treatment Systems (OWTS) .....	87
5.3.6 Town of Springwater.....	87
<b>6. PROTECTION AND MANAGEMENT RECOMMENDATIONS .....</b>	<b>88</b>
<b>6.1 Habitat Protection and Management Recommendations.....</b>	<b>88</b>
6.1.1 Wetland Restoration .....	88
6.1.2 Riparian Zone Management .....	88
<b>6.2 Education and Outreach Recommendations .....</b>	<b>89</b>
6.2.1 General Watershed Education .....	89
6.2.2 Develop, Publish, and Distribute New Materials .....	90
<b>6.3 Point and Nonpoint Source Management and Control Recommendations .....</b>	<b>91</b>
6.3.1 Nutrients .....	91
6.3.2 Onsite Wastewater Systems (Septic) .....	92
6.3.3 Forestry.....	92
6.3.4 Streambank/Shoreline Erosion .....	93
6.3.5 Development .....	93
6.3.6 Recreational Use.....	94
6.3.7 Agriculture.....	94
6.3.8 Pesticides .....	95
6.3.9 Salt Usage and Storage.....	96
6.3.10 Spills.....	96
6.3.11 Bulk Storage Facilities .....	97
6.3.12 Landfill, Dumps, and Inactive Hazardous Waste Sites .....	97
6.3.13 Mined Lands.....	98
<b>6.4 Local Laws and Practices Recommendations .....</b>	<b>98</b>
6.4.1 Town of Bristol .....	98
6.4.1.1 Development .....	98
6.4.1.2 Agriculture and Forestry .....	98
6.4.1.3 Waterways and Wetlands.....	99
6.4.1.4 Marinas .....	99
6.4.1.5 Highways .....	99
6.4.1.6 Onsite Wastewater Treatment Systems (OWTS) .....	99
6.4.2 Town of Canadice .....	99
6.4.2.1 Development .....	99
6.4.2.2 Agriculture and Forestry .....	100
6.4.2.3 Waterways and Wetlands.....	100
6.4.2.4 Marinas .....	100
6.4.2.5 Highways .....	100
6.4.2.6 Onsite Wastewater Treatment Systems (OWTS) .....	100
6.4.3 Town of Naples .....	100
6.4.3.1 Development .....	100
6.4.3.2 Agriculture and Forestry .....	101
6.4.3.3 Waterways and Wetlands.....	101
6.4.3.4 Marinas .....	101

# Honeoye Lake Watershed Management Plan

Final Report – October 2007

---

6.4.3.5 Highways .....	101
6.4.3.6 Onsite Wastewater Treatment Systems (OWTS) .....	101
6.4.4 Town of Richmond.....	102
6.4.4.1 Development .....	102
6.4.4.2 Agriculture and Forestry .....	102
6.4.4.3 Waterways and Wetlands.....	102
6.4.4.4 Marinas .....	102
6.4.4.5 Highways .....	102
6.4.4.6 Onsite Wastewater Treatment Systems (OWTS) .....	103
6.4.5 Town of South Bristol .....	103
6.4.5.1 Development .....	103
6.4.5.2 Agriculture and Forestry .....	103
6.4.5.3 Waterways and Wetlands.....	103
6.4.5.4 Marinas .....	104
6.4.5.5 Highways .....	104
6.4.5.6 Onsite Wastewater Treatment Systems (OWTS) .....	104
6.4.6 Town of Springwater.....	104
<b>7. IMPLEMENTATION STRATEGIES.....</b>	<b>105</b>
7.1 Intergovernmental Coordination.....	105
7.2 Basis for Decision Making .....	105
7.2.1 Gauging Public Opinion .....	106
7.2.2 Education Approach .....	106
7.2.3 Scientific Approach.....	107
7.3 Methods to Implement Action Items.....	107
7.3.1 Education and Outreach .....	108
7.3.2 Land Use Regulations.....	108
7.3.3 Structural Control Action .....	109
7.3.4 Nonstructural Control Action .....	109
7.4 Monitoring and Assessment .....	109
7.5 Staffing .....	109
7.6 Prioritized Plan .....	110
7.7 Annual Work Plan.....	110
7.8 Financing .....	112
7.8.1 Project Financial Needs for Five Years.....	112
7.8.2 Potential Funding for Five Years .....	112
<b>8. CONCLUSION .....</b>	<b>113</b>
<b>BIBLIOGRAPHY .....</b>	<b>114</b>

## LIST OF FIGURES AND TABLES

Figure ES-1: Location of Honeoye Lake in New York State .....	x
Table SUP-1: Bedrock Geology by Subwatershed (acres) .....	SUP-1
Table SUP-2: Surficial Geology by Subwatershed (acres) .....	SUP-2
Table SUP-3: Soil Type by Subwatershed (acres) .....	SUP-3
Figure 2-1: Honeoye Monthly Temperatures .....	8
Figure 2-2: Honeoye Monthly Precipitation .....	9
Figure 2-3: Honeoye Outlet Weir .....	10
Figure 2-4: Honeoye Historical Lake Level .....	11
Table SUP-4: Honeoye Lake Land Cover Type by System .....	SUP-4
Table SUP-5: Honeoye Lake Land Cover by Subsystem .....	SUP-5
Table SUP-6: Honeoye Lake Land Cover Type .....	SUP-6
Table SUP-7: Real Property Land Use (acres) .....	SUP-7
Figure 2-5: Honeoye Lake Shoreline .....	15
Table 2-1: Summary of 2003 Residential Property Assessment for Richmond and Canadice .....	15
Figure 2-6: Honeoye Lake Summer and Winter .....	16
Table 2-2: Honeoye Lake Watershed Population .....	16
Table 2-3: Lands in Public Ownership .....	17
Figure 2-7: Hunt Hollow Ski Center .....	18
Figure 2-8: Year-Round Use of Honeoye Lake .....	19
Figure 2-9: Small Wetlands Provide a Variety of Benefits .....	21
Figure 2-10: Honeoye Lake Has a Stable Fish Population .....	22
Figure 2-11: A Local Graveyard .....	27
Figure 3-1: Lake Temperature Profile .....	29
Figure 3-2: Lake Oxygen Profile .....	30
Figure 3-3: Summer Temperature Differential - Surface to Bottom .....	30
Figure 3-4: Bottom Dissolved Oxygen .....	31
Table 3-1: Summer Days with DO<2 mg/L .....	31
Figure 3-5: Water Clarity .....	32
Figure 3-6: Tributary Monitoring Sites .....	34
Figure 3-7: Tributary Flow 2003 .....	35
Figure 3-8: Tributary Total Phosphorus .....	35
Figure 3-9: Tributary Total Suspended Solids 2003 .....	35
Figure 3-10: Tributary Total Suspended Solids 2003 .....	36
Figure 3-11: Tributary Flow 2003-2005 .....	36
Figure 3-12: Phosphorus Levels 2003 .....	37
Figure 3-13: Soluble Reactive Phosphorus .....	37
Figure 3-14: Variety of Phytoplankton Occur in Honeoye Lake .....	40
Figure 3-15: Algal Abundance Monitoring .....	41
Figure 3-16: Chlorophyll-a Monitoring Data .....	41
Figure 3-17: Macrophyte Biomass Distribution .....	42
Figure 3-18: Spatial Variation in Weedbed Density .....	42
Table SUP-8: Weedbed Survey Macrophyte Species Composition .....	SUP-8
Figure 3-19: Honeoye Lake Macrophytes .....	43
Figure 3-20: Weed Harvester .....	44

# Honeoye Lake Watershed Management Plan

Final Report – October 2007

Figure 3-21: Weed Harvesting Rates over the Past Two Decades .....	44
Table 3-2: Shoreline Management Alternative Evaluation .....	45
Table 3-3: Whole Lake Management Alternative Evaluation .....	46
Figure 3-22: Ponar Dredge Sites .....	47
Figure 3-23: Benthic Species Abundance with Depth .....	48
Figure 3-24: Benthic Species Richness with Depth .....	49
Figure 3-25: Zebra Mussels .....	50
Table 3-4: Conventional Trophic Status Indicators .....	51
Table 3-5: Historical Change in Trophic Indices .....	51
Table 3-6: Historical Change Carlson’s TSI .....	52
Figure 3-26: Correlation of Trophic Status of 11 Finger Lakes with Relative Depth .....	52
Figure 3-27: Historical Total Phosphorus .....	53
Figure 3-28: Historical Chlorophyll-a .....	53
Figure 3-29: Historical Water Clarity .....	54
Figure 4-1: Inflows to Honeoye Lake .....	56
Table 4-1: Honeoye Lake Subwatershed Areas .....	57
Table 4-2: Total Yearly Inflow by Subwatershed .....	58
Table SUP-9: Estimate of Inflow Displayed by Subwatershed Monthly Inflow 10 <sup>6</sup> m <sup>3</sup> .....	SUP-9
Table 4-3: Summary of Subwatershed Loading Kg/yr .....	60
Table SUP-10: Total Annual Phosphorus Loading to Honeoye Lake by Contributing Subwatershed.....	SUP-10
Table SUP-11: Total Annual Nitrogen Loading to Honeoye Lake by Contributing Subwatershed .....	SUP-11
Table SUP-12: Total Annual Suspended Solids Loading to Honeoye Lake by Contributing Subwatershed .....	SUP-12
Table 4-4: Summary Areal Subwatershed Loading Kg/ac/yr .....	61
Table 4-5: Summary of Internal and External Nutrient and Sediment .....	62
Table SUP-13: Estimate of Road and Driveways in Watershed (miles) .....	SUP-13
Figure 7-1: Education Approach .....	107
Figure 7-2: Scientific Approach .....	107
Table 7-1: Draft Annual Work Plan – 2007-2008 .....	110

## LIST OF SUPPLEMENTARY TABLES

Table SUP-1: Bedrock Geology by Subwatershed (acres) .....	SUP-1
Table SUP-2: Surficial Geology by Subwatershed (acres) .....	SUP-2
Table SUP-3: Soil Type by Subwatershed (acres) .....	SUP-3
Table SUP-4: Honeoye Lake Land Cover Type by System .....	SUP-4
Table SUP-5: Honeoye Lake Land Cover by Subsystem .....	SUP-5
Table SUP-6: Honeoye Lake Land Cover Type .....	SUP-6
Table SUP-7: Real Property Land Use (acres) .....	SUP-7
Table SUP-8: Weedbed Survey Macrophyte Species Composition .....	SUP-8
Table SUP-9: Estimate of Inflow Displayed by Subwatershed Monthly Inflow 10 <sup>6</sup> m <sup>3</sup> .....	SUP-9
Table SUP-10: Total Annual Phosphorus Loading to Honeoye Lake by Contributing Subwatershed.....	SUP-10

# Honeoye Lake Watershed Management Plan

Final Report – October 2007

Table SUP-11: Total Annual Nitrogen Loading to Honeoye Lake by Contributing Subwatershed .....	SUP-11
Table SUP-12: Total Annual Suspended Solids Loading to Honeoye Lake by Contributing Subwatershed .....	SUP-12
Table SUP-13: Estimate of Road and Driveways in Watershed (miles) .....	SUP-13

## LIST OF MAPS

Map 1: Honeoye Lake Subwatersheds .....	M-1
Map 2: Honeoye Lake Subwatershed Statistics .....	M-2
Map 3: Honeoye Lake Environmental Features .....	M-3
Map 4: Honeoye Lake Steep Slopes .....	M-4
Map 5: Honeoye Lake Topography .....	M-5
Map 6: Honeoye Lake Bedrock Geology .....	M-6
Map 7: Honeoye Lake Surficial Geology .....	M-7
Map 8: Honeoye Lake Soils .....	M-8
Map 9: Honeoye Lake Infrared Photo and Bathymetric Map .....	M-9
Map 10: Honeoye Lake Statistics .....	M-10
Map 11: Honeoye Lake Sewer District .....	M-11
Map 12: Honeoye Lake Land Cover .....	M-12
Map 13: Honeoye Lake RPTS Property Class Codes .....	M-13
Map 14: Honeoye Lake Protected Lands .....	M-14
Map 15: Honeoye Lake NYSDEC Wetlands .....	M-15
Map 16: Honeoye Lake Hotspots .....	M-16

## APPENDICES

- A. Evaluation of Governmental Roles
- B. Past Accomplishments
- C. Towns Demography
- D. Natural Heritage Ranking System
- E. NYSDEC Surface Water Classification
- F. NYSDEC Algae Species List
- G. NYSDEC Zooplankton Data
- H. Macrobenthic Survey
- I. Minutes from Public Meetings
- J. Local Law Assessment Forms
- K. Sources of Funding
- L. Action Items
- M. Public Participation Plan
- N. Organization Acronyms
- O. Glossary