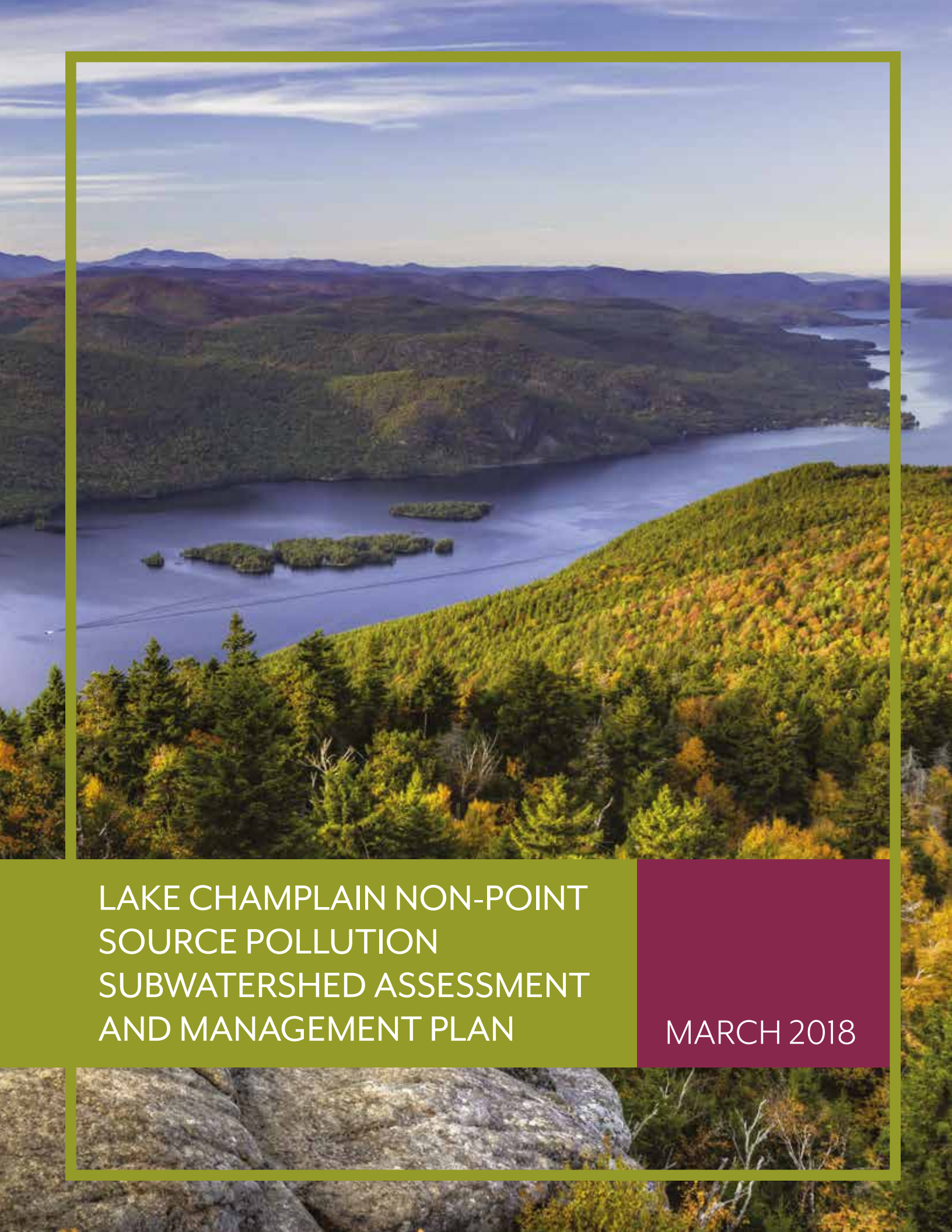

LAKE CHAMPLAIN NON-POINT SOURCE POLLUTION SUBWATERSHED ASSESSMENT AND MANAGEMENT PLAN

MARCH 2018

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CHAMPLAIN WATERSHED
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AS WELL AS

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LGA
EST. 1885

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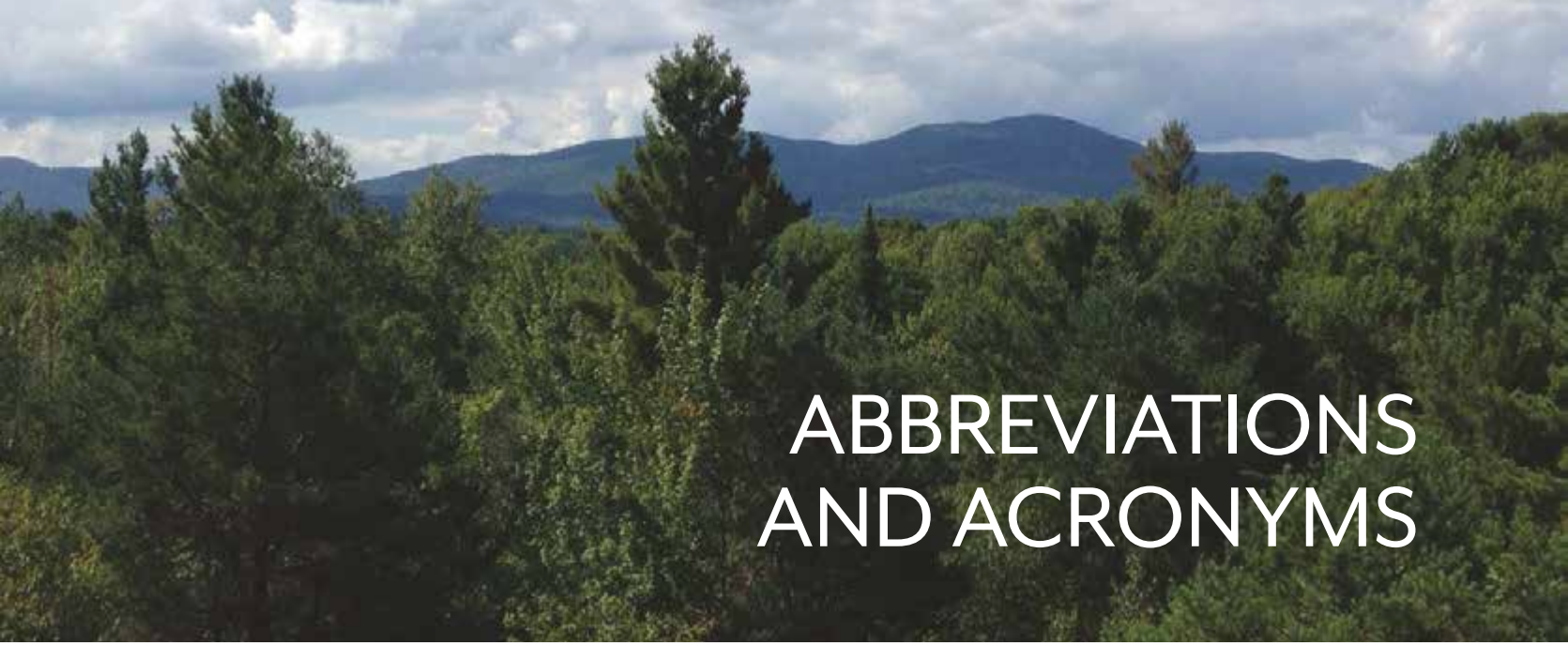


ABBREVIATIONS AND ACRONYMS

APA	Adirondack Park Agency
BMP	Best Management Practice
BYA	Billion Years Ago
CAFO	Concentrated Animal Feeding Operation
CAT	Category
CNMP	Comprehensive Nutrient Management Plan
CSO	Combined Sewer Overflow
CWICNY	Champlain Watershed Improvement Coalition of New York
DEM	Digital Elevation Model
DPW	Department of Public Works
ECL	Environmental Conservation Law
EPA	United States Environmental Protection Agency
FCC	Feature Class Code
FEMA	Federal Emergency Management Agency
FSA	Unites States Department of Agriculture Farm Service Agency
GI	Green Infrastructure
GIS	Geographic Information System
HUC	Hydrologic Unit Code
I&I	Inflow and Infiltration
LCBP	Lake Champlain Basin Program
LCLGRPB	Lake Champlain – Lake George Regional Planning Board
LGA	Lake George Association
MS4	Municipal Separate Strom Sewer System
mt/yr	Metric Tons per Year
MYA	Million Years Ago
NBRC	Northern Borders Regional Commission
NLCD	National Land Cover Dataset
NY	State of New York
NYS DAM	New York State Department of Agriculture and Markets
NYS DEC	New York State Department of Environmental Conservation
NYS DOS	New York State Department of State
NYS DOT	New York State Department of Transportation
NYS EFC	New York State Environmental Facilities Corp
NYS GPO	New York State GIS Programs Office
PWL	Priority Waterbodies List
RC&D	Greater Adirondack Resource Conservation & Development Council
SPDES	State Pollution Discharge Elimination System
SSO	Sanitary Sewer Overflow
SSURGO	Soil Survey Geographic
SUNY	State University of New York
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
Trib	Tributary
USDA NRCS	United States Department of Agriculture Natural Resource Conservation Service
USDA RD	United States Department of Agriculture Rural Development
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
USHUD	United States Department of Housing and Urban Development
VT	State of Vermont
WQCC	Water Quality Coordinating Committee
WWTP	Wastewater Treatment Plant
YA	Years Ago

EXECUTIVE SUMMARY

In 2002, the US Environmental Protection Agency approved a joint New York and Vermont Total Maximum Daily Load (TMDL) for phosphorus within Lake Champlain. The TMDL document outlines the need for phosphorus reduction efforts on both sides of the watershed from an array of sources, most notably Wastewater Treatment Plants (point-sources) and urbanized, forested and agricultural lands (non-point sources).

In an effort to assist local and regional resource managers in New York in identifying targeted projects and programs for water quality protection and improvement, this Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan (Subwatershed Assessment) has been created. The goal of this Plan is to identify specific planning and implementation efforts that, if completed, will reduce phosphorus inputs into surface waters from an array of non-point sources. Those that are of most concern include stormwater runoff from urbanized areas, agricultural operations, streambank and roadside erosion, and aging public and private wastewater infrastructure. The need for this Plan is driven by the fact that phosphorus levels in Lake Champlain still exceed the standards set forth in the TMDL documents and from pressure to ensure that funded projects are maximizing the effect of available implementation funds.

To achieve the goals set forth in the Subwatershed Assessment, the 79 HUC-12 subwatersheds within the Lake Champlain watershed were used and each was scored based on its potential for phosphorus inputs into surface water. A suite of 15 parameters were identified within five categories: water quality, geology, human use, phosphorus pollution vectors and land use and cover. The parameters include information taken from the NYS Department of Environmental Conservation Priority Waterbodies List, lake segment target reduction goals, slope, soil type, waterbody classifications, public water supplies, miles of tributaries, miles of road, identified roadside erosion sites, current land use and cover, percent impervious surfaces and percent row crops. To score each HUC-12 subwatershed, a ranking matrix was created utilizing an array of GIS information obtained from several sources. Each parameter was given an individual point system, with a total score for all 15 parameters ranging from 15 – 95 points. The higher the score, the greater the potential for phosphorus loading and associated negative effects there are within the particular HUC-12 subwatershed.

Of the 79 HUC-12 subwatershed, the highest priority subwatershed had a score of 74 points, while the lowest was 20 points (Map 4-2). Based on the scores, 19 high-priority subwatersheds were identified (scores ranging from 74 points – 44 points). Within these Priority Subwatersheds, on-the-ground projects and planning efforts were identified including upgrades of municipal stormwater and wastewater infrastructure, impervious surface reduction, replacement of undersized and/or failing culverts, implementation of agricultural buffer and cover cropping programs, streambank restoration projects, and creation of septic management districts around surface waters. Hundreds of projects throughout the Lake Champlain Watershed have been identified, totaling almost $187,000,000 in funding needs for water quality improvement and natural resource protection efforts.

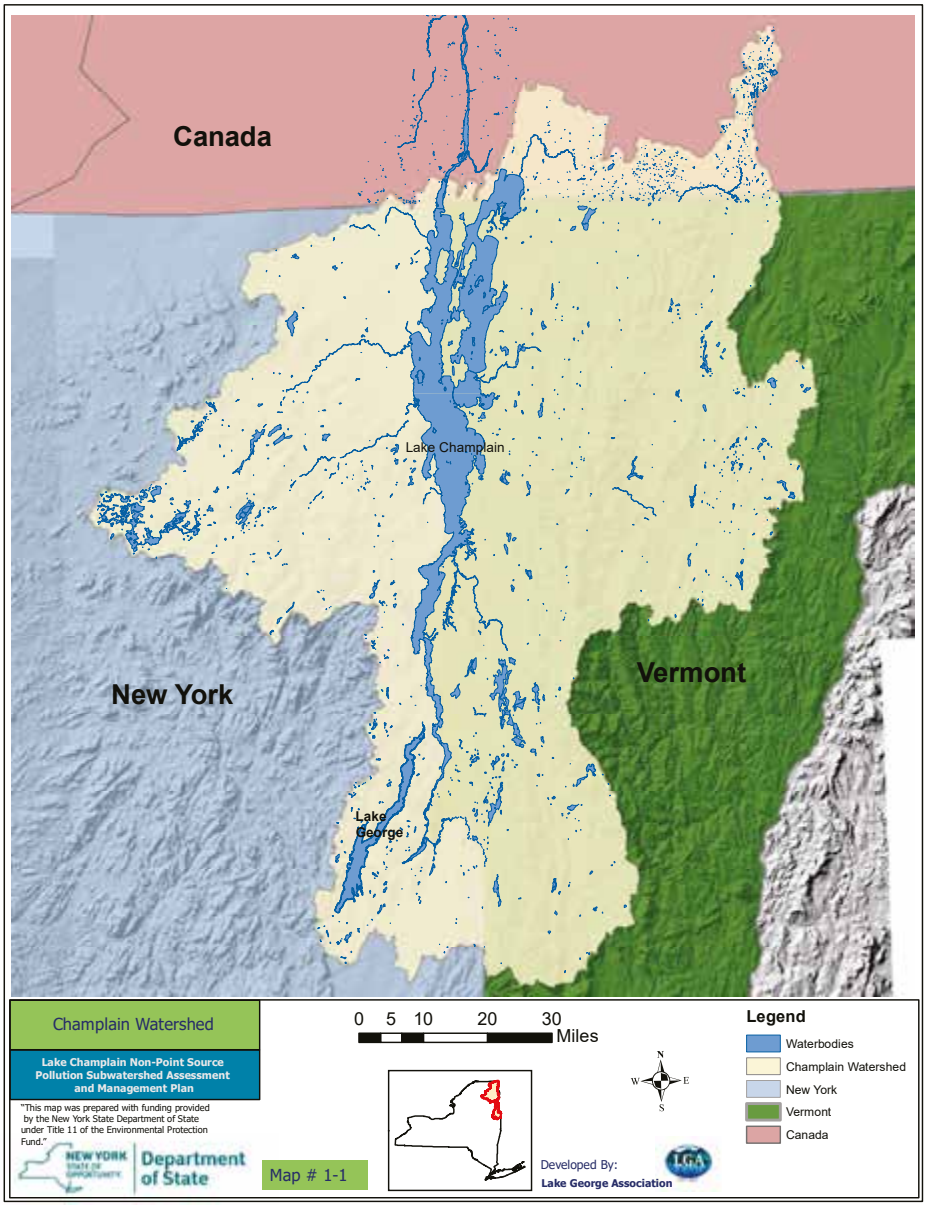
This Subwatershed Assessment was created through a strong partnership between the Lake Champlain – Lake George Regional Planning Board, Lake George Association, Champlain Watershed Improvement Coalition of New York, Lake Champlain Basin Program, NYS Department of State, NYS Department of Environmental Conservation, and the Plan's Advisory Committee. It is the intent for this Subwatershed Assessment to be a living document that will be updated as projects are implemented and new project needs arise to continue working towards the phosphorus reduction goals set forth for New York State.

01.

Introduction

Lake Champlain, at 120 miles long with a surface area of 435 square miles, is one of the largest lakes in the United States. There are over 70 islands and nearly 600 miles of shoreline. Its watershed spans 8,234 square miles and includes land within two states, New York and Vermont, as well as the Province of Quebec in Canada. The lake flows north from Whitehall, NY into the Richelieu River in Canada, which eventually outlets into the St. Lawrence River. The lake is situated in a valley with the Adirondack Mountains of New York to the west and Green Mountains of Vermont to the east.

There are several notable rivers within the Lake Champlain watershed, including The Boquet, Ausable, Great Chazy, Mettawee and Poultney Rivers in New York and the Lamoille, Missisquoi, and Winooski Rivers in Vermont. Large lakes within the watershed include Lake George, Chazy Lake, and the Saranac Chain of Lakes in New York and Lake St. Catherine and Lake Bomoseen in Vermont.



1.1. *Evolution of the Lake Champlain Valley*

The Lake Champlain Basin has a rich geologic history from the Grenville Mountains (1.3 – 1 BYA) and Iapetus Ocean (600 – 300 MYA) to Lake Vermont (12,500 YA), but the Valley that we now know was formed at the end of the last glaciation, the Wisconsinan, approximately 9,000 years ago. As the massive glacier that covered much of North America melted and retreated north, large swaths of rocks being pulled back by the glacier carved out valleys and deposited fertile sediment and sands, while melt water created rivers that cut through bedrock and although now dry, can still be seen throughout the watershed.

The progression and subsequent retreat of the glacier also smoothed the tops of the Adirondack Mountains, creating their signature dome shape.

As the glacier melted, a pathway for salt water was opened via the St. Lawrence River, and the Champlain Sea was formed. This salt water sea existed until the glacier fully retreated. Once the weight of the glacier was no longer pressing down the bedrock, the rock rebounded and created the modern shape of the valley. With no more salt water input and fresh water coming from rain and snowmelt throughout the Adirondack and Green Mountains, the Champlain Sea gradually became a fresh water lake, which we now know as Lake Champlain (9000 YA – present day) (Map 1-1).

1.2. *Cultural History of the Lake Champlain Valley*

French and Indian War

Historically, Lake Champlain was utilized as a trade route by Europeans who settled the area in the early 1600's due its north-south orientation between the St. Lawrence River and the Hudson River. By the late 1600's, conflicts between the French and British over who laid claim to the valley had started to emerge, which led to several wars between the two nations, most notably the French and Indian War (1754 – 1763). This led to the construction of Fort Ticonderoga by the French on Lake Champlain's South Bay and Fort William Henry by the British on the southern end of Lake George. Throughout the war, Lake George and Lake Champlain were utilized to transport troops and provisions as each of the nation's strove to remove the other from the Champlain Valley. By the end of the war, the French had been driven out of the Champlain Valley north to Canada, and the area became widely settled by British colonists, many of whom were former soldiers given land grants by the King of England in return for their military service (Lake Champlain Maritime Museum, 2016).

Revolutionary War

The new settlers cleared the land and built dams, sawmills and gristmills on settlements along the lake and its tributaries, which provided them with power and transportation access to the Quebec markets. However, the next large military conflict, the Revolutionary War (1775 – 1783), brought fighting back to the Champlain Valley when the American forces, led by Benedict Arnold and Ethan Allen, captured the weakly defended Fort Ticonderoga and the fort at Crown Point, as well as the loyalist settlement at Skenesborough (now Whitehall, NY) (Map 1-2). It is here that Benedict Arnold assembled several ships to protect the American stronghold on Lake Champlain and is why Whitehall, NY is known as the birthplace of the American Navy. In 1776, the newly crafted American Navy met with the British Navy, brought down from Montreal, at the Battle of Lake Champlain, which took place on the western side of Valcour Island (near the present day City of Plattsburgh, NY). The American troops were forced to

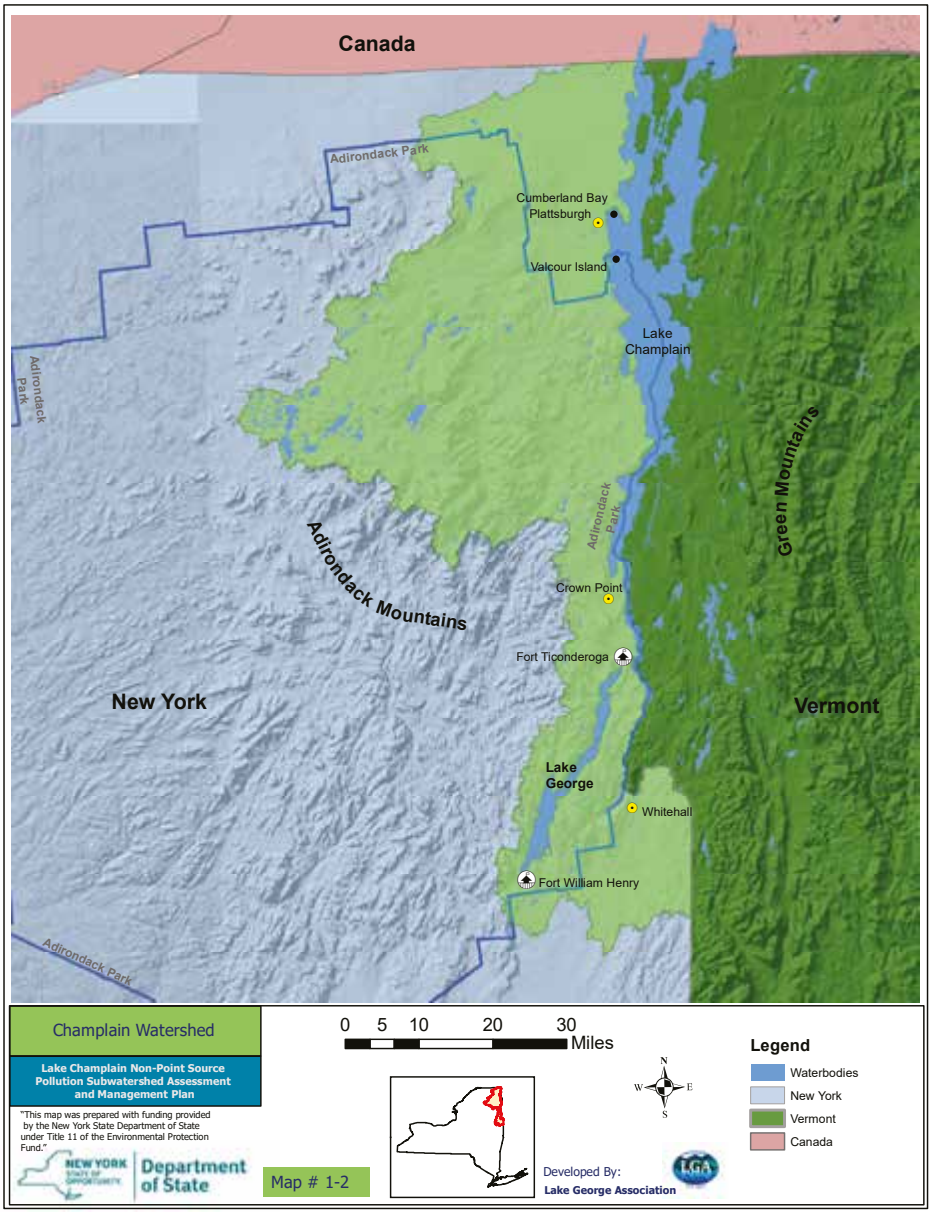
retreat south to Ticonderoga, and did so by paddling in canoes past the British lines in the dead of night. With the British now controlling Lake Champlain, they were able to move south with their sights set on Albany, NY, but were ultimately defeated at the Battle of Saratoga in 1777. This battle is known as the turning point in the Revolutionary War because it is when the French were persuaded to join the American's efforts and the American forces ultimately prevailed (Lake Champlain Maritime Museum, 2016).

War of 1812

In the year's following the Revolutionary War, the Champlain Valley was widely settled, with lands to the east as part of the independent republic of Vermont and lands to the west as part of New York. The watershed, with its vast virgin forests and plentiful waterways for power creation and transport, quickly turned into a bustling hub for commerce between the United States and Canada. However, the War of 1812 between America and Britain ended that trade relationship, as each entity once again strived to permanently drive the other out of the Valley. The American and British fleets engaged in battle in 1814 in Cumberland Bay. Although there were many casualties on both sides, the American forces eventually defeated the British, who withdrew to Canada. The War of 1812 ended soon after (Lake Champlain Maritime Museum, 2016).

Champlain Canal

During the War of 1812, commercial ties between the Champlain Valley and the Hudson Valley were created, which remained intact after the war. However, transporting bulk cargo south proved difficult due to the lack of navigable waters from the south end of Lake Champlain to the Hudson River. The Champlain Canal, which spans 64 miles from Whitehall, NY to Waterford, NY was opened in 1823, and economic development in the Champlain Valley exploded soon thereafter. Raw materials including timber, stone, slate and iron, as well as semi-perishable goods not previously traded including apples, potatoes, grain, butter and cheese, were easily shipped to the more urbanized areas along the Hudson River. However, the development of rail lines throughout the Valley, beginning in 1845, connected Burlington, VT and the northern Adirondack towns to Boston, Montreal, Albany and New York City, and by the 1870's drastically reduced the area's reliance on the canal and lake commerce. As a result, the State of New York enlarged the size of the canal in 1916 to accommodate larger shipping vessels, however it did not have the positive effect on the shipping industry that was anticipated (Lake Champlain Maritime Museum, 2016).



Development and the Beginning of Recreation in the Champlain Valley

During the shipping years, tourism throughout the valley was dominated by passenger ferries. But with the construction of the Champlain Bridge between Crown Point, NY and Chimney Point, VT in 1929, as well as the construction of the Rouses Point Bridge and the Missisquoi Bay Bridge in 1938, passenger vehicles became the dominate source of transportation in the Valley. By 1945, several causeways had been constructed at the northern end of the lake that connected almost all of the Champlain Islands, and the demand for improved roads and bridges increased. These new and improved transportation routes increased recreation throughout the watershed. After the end of World War II, the solid financial state within the Valley, along with emerging technology, allowed much of the population to purchase small pleasure boats for improved recreation on the lake, and the number of public beaches and beach visitors increased. Development along the lakeshore also steadily increased as property was subdivided and purchased for recreational use and secondary homes. In was in this era

An excerpt from the Lake Champlain Basin Program's 2015 State of the Lake Report

"The Lake Champlain Basin Program (LCBP) was created by the Lake Champlain Special Designation Act of 1990. Our mission is to coordinate the implementation of the Lake Champlain management plan, Opportunities for Action. Program partners include New York, Vermont, and Québec, the US Environmental Protection Agency (EPA) and several other federal agencies, and local government leaders, businesses and citizen groups. The New England Interstate Water Pollution Control Commission manages business operations of the LCBP on behalf of the Steering Committee.

The Lake Champlain Steering Committee leads the LCBP. Its members include many of the program partners, and the chairpersons of technical, cultural heritage and recreation, education, and citizen advisory committees. The LCBP's primary annual funding is received through an EPA appropriation under the Federal Clean Water Act. The program also receives funding from the Great Lakes Fishery Commission and the National Park Service."

Courtesy of Guy Middleton

that business in the Champlain Valley shifted from a focus on raw materials extraction to tourism (Lake Champlain Maritime Museum, 2016).

1.3. *The Beginning of Water Quality Concerns in Lake Champlain*

As development pressures along the lakeshore and its tributaries increased, there became increased concern for the quality of water in the lake. Generations of raw materials extraction and clearcutting in the Adirondack Mountains, coupled with shoreline development and extensive agricultural operations on both sides of the lake, were shown to adversely affect the lake ecosystem. Large quantities of nutrients, mainly phosphorus, were being discharged into the lake and its tributaries from wastewater treatments plants, agriculture, and stormwater runoff from urbanized areas.

In response, the Lake Champlain Special Designation Act of 1990, within Section 120 of the Clean Water Act, authorized the assembly of a Lake Champlain Management Conference and the establishment of the Lake Champlain Basin Program. The goal of the Conference was to create a Comprehensive Pollution Prevention, Control and Restoration Plan for Lake Champlain. The overarching goal of this Plan was to "reduce phosphorus inputs to Lake Champlain to promote a healthy and diverse ecosystem for sustainable human use and enjoyment of the lake." The Plan was approved by both state governors and the Government of Quebec in 1996. The Lake Champlain Management Conference was designed to sunset with the release of the new management plan in 1996, and turned oversight of the Lake Champlain Basin Program over to the newly formed Lake Champlain Steering Committee. The LCBP, with funds from the EPA, supported the Lake Champlain Long-Term Monitoring Program, which collected the data that were used to inform the Lake Champlain Total Maximum Daily Load (TMDL) for phosphorus that was established in 2002.

Total Maximum Daily Load

A Total Maximum Daily Load (TMDL) is a federally approved document that outlines the estimated quantity of a specific pollutant that can be discharged to a waterbody without causing impairment to the receiving waters. The 2002 Lake Champlain TDML, developed jointly by New York and Vermont, established target phosphorus reduction goals from two primary sectors: wastewater treatment facilities (point sources) and non-point source pollution. Individual waste load allocations were created for every wastewater treatment facility in New York and Vermont, as well as for runoff from agricultural, developed and forested land. Based on land use, the TMDL defined a target reduction goal for 13 major subwatersheds in the Champlain Basin, of which there are seven in New York. In 2011, the EPA disapproved the phosphorus TMDL for the Vermont-portion of the watershed, and issued a new TMDL in 2016. The 2002 TMDL for the New York-portion of the watershed remains in effect today.

1.4. *New York's Response to Water Quality Decline*

In response to the TMDL, the New York State Department of Environmental Conservation (NYS DEC) created the Lake Champlain Phosphorus Reduction Plan, which was last updated in June 2014. This document, which utilizes the adaptive management technique for watershed protection, identifies several strategies and opportunities for phosphorus reduction in the watershed. In the update, the NYS DEC identifies 27 initiatives. These include continuing NYS DEC Programs such as the Agricultural Engineering Assistance Program, various Agronomy and Conservation Assistance Programs and Trees for Tribs, assisting with establishing a line item in the New York State Environmental Protection Fund for Champlain watershed specific work, and assisting with funding the best management practices identified in this Subwatershed Assessment. In this document, the NYS DEC concludes that "efforts targeting key phosphorus loading vectors such as agricultural operations, the developed landscape, road drainage networks, and eroding stream corridors must be enhanced and adequately funded," (New York State Department of Environmental Conservation, 2014).

As more focus has grown on improving water quality in the Lake Champlain watershed, several local entities within the New York watershed recognized the need for

a coordinated approach for implementation of the goals stated in the LCBP's Opportunities for Action document and the NYS DEC's Lake Champlain Phosphorus Reduction Plan. As a response, the Champlain Watershed Improvement Coalition of NY (CWICNY) was formed in 2002, with a mission statement of "providing a coordinated effort to improve water quality and other natural resources within the New York Lake Champlain Counties through project implementation." Current membership consists of staff from the Clinton, Essex, Franklin, Warren, and Washington County Soil and Water Conservation Districts (SWCD), members of the Water Quality Coordinating Committees (WQCC) from these five counties, and the Lake Champlain – Lake George Regional Planning Board. Since its inception, CWICNY has brought millions of federal and state dollars into the watershed, including a $900,000 Federal Targeted Watershed grant and two Aid to Locality grants from State Senator Betty Little's office.

The Planning Process

In 2012, ten years after its creation, the CWICNY membership was successful in obtaining a grant from the New York State Department of State (NYS DOS) Local Waterfront Revitalization Program to evaluate the subwatersheds on the New York side of the Lake Champlain Basin based on their potential for phosphorus inputs into waterbodies. This grant has resulted in the creation of this Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan (Subwatershed Assessment). The goal of this effort is to determine where partners should focus any additional limited resources so that the future projects being implemented are getting the best "bang-for-the-buck" in pollutant reductions. This need is mostly driven by the fact that phosphorus levels in Lake Champlain still exceed the standards set forth in the TMDL documents and from pressure to ensure that funded projects are maximizing the effect of available implementation funds.

The creation of this Subwatershed Assessment has been completed through a strong partnership between CWICNY and partner organizations, including the NYS DOS, NYS DEC, NYS Soil and Water Conservation Committee, Lake Champlain Basin Program, and the Greater Adirondack Resource Conservation and Development Council. Additional input has been provided by members of the Advisory Committee that was created to oversee the work completed for this Assessment, which includes staff from the City of Plattsburgh, Town of Queensbury, Essex County Department of Community Resources, SUNY Plattsburgh, and Washington County Department of Public Works.

The process and results of identifying which subwatersheds hold the greatest potential for phosphorus inputs into Lake Champlain and its tributaries is discussed throughout this document. This information will be used to target phosphorus reduction efforts on the New York side of the Lake Champlain basin by the state and federal government, as well as local government agencies, non-profit organizations and citizen groups.

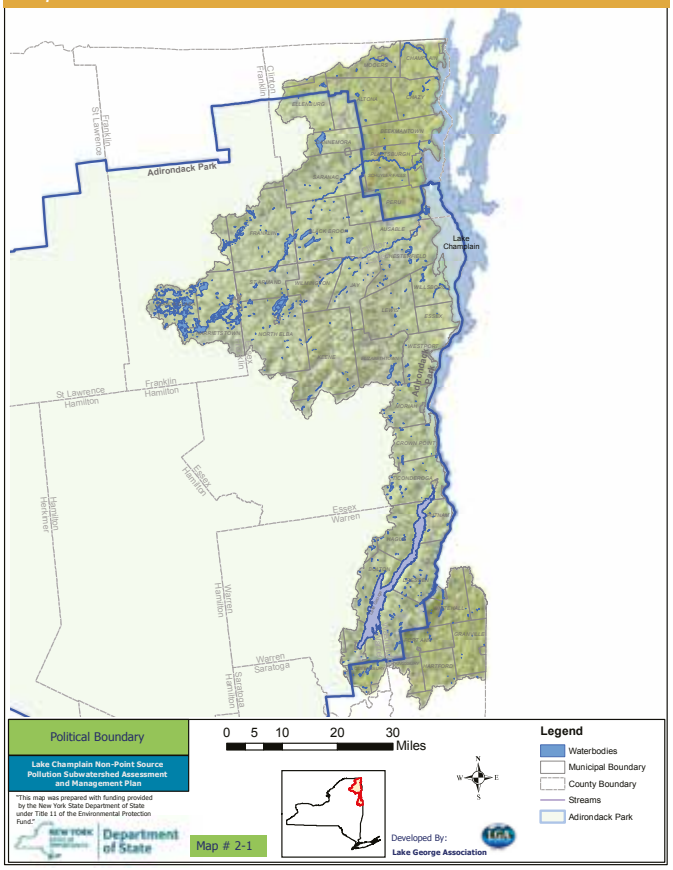
Advisory Committee Meeting

02.

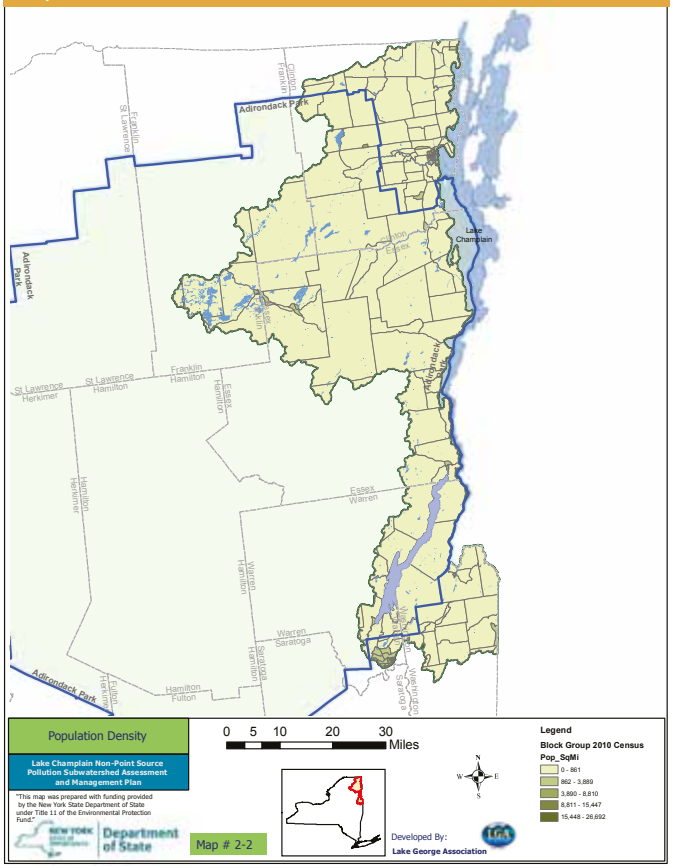
Watershed Characterization

The New York portion of the Lake Champlain watershed is 3,050 square miles and encompasses land in the counties of Clinton, Essex, Franklin, Warren and Washington. This equates to 37% of the total Lake Champlain Watershed. The majority of the New York watershed is located within the Adirondack Park, which is a 6 million acre state park created in 1892 as a result of widespread deforestation by the logging industry. Of these 6 million acres, 2.6 million are owned by New York State, while the remaining 3.4 million acres are privately owned. Land use on privately owned property is regulated by the Adirondack Park Agency (APA), which was established in 1971. The Adirondack Mountains are most famous for their 46 Adirondack High peaks, the highest of which is Mount Marcy (5,343 feet above sea level). This mountain is not only the highest in the Adirondack Park, but is the highest in New York State. The original cartographic maps of the region used a blue line to dictate the borders of the Adirondack Park, which has since led to the use of the term "within the Blue Line" to refer to lands within the Adirondack Park.

Map #2-1



Map #2-2



2.1. *Political Boundaries and Population*

There are a total of 62 municipalities; 51 towns, nine villages and two cities, either partially or wholly within the watershed (Map 2-1). The largest population center in the watershed is the City of Plattsburgh, which is located about 20 miles south of the Canadian border directly on the Lake Champlain shoreline. Additional population centers include the Villages of Lake Placid and Saranac Lake at the westernmost part of the watershed and the Town of Queensbury and City of Glens Falls at the southern most part of the watershed. Smaller population centers include the Towns of Peru and Ausable and the Village of Rouses Point in Clinton County, Town of Ticonderoga in Essex County, Village of Lake George in Warren County and Villages of Granville and Whitehall in Washington County (Map 2-2). The county seats of Warren, Essex, Clinton and Franklin counties can all be found within the watershed.

The total watershed population in 2010 was 186,847, as estimated by the 2010 Census Block Data. Population per county and within the watershed can be found in Table 2-1. The largest percentage of the population in Clinton County lives within the watershed, as Clinton County has the greatest percentage of its landmass within the watershed. However, only 54.4% of Essex County's landmass is within the watershed, but 92% of the population lives there. This is due to presence of the Adirondack Mountains and its High Peaks located in the western part of the county, and therefore the majority of the settlements were made in the Lake Champlain valley. Warren County also has a high percentage of population within the watershed compared to total land mass, but this can be attributed to the development in the Town Queensbury and City of Glens Falls.

Table 2-1. 2010 Population per County and within the Lake Champlain Watershed of NY.

County	Total 2010 Population	Total 2010 Population in Lake Champlain Watershed	Percent of Population living in Lake Champlain Watershed	Total Percentage of Land Mass within the Lake Champlain Watershed
Clinton	82,128	80,283	97.7%	78.8%
Essex	39,370	36,225	92.0%	54.4%
Franklin	51,599	7,677	14.8%	19.4%
Warren	65,707	38,232	58.1%	19.7%
Washington	63,216	24,430	38.6%	48.5%

2.2. *Topography and Geology*

The topography of the Lake Champlain Basin varies throughout the counties, from the low, fertile valleys in the north, south and along the

lakeshore to the high peaks of the Adirondack Mountains in the west. Coming from the steep mountain terrains in the center of the watershed are an array of narrow river valleys, which are conversely flanked by meandering rivers basins that work their way through the fertile lowlands. Much of the difference in topography is a result of elevation (Map 2-3), with the highest elevation of the watershed at Mount Marcy, 5343 feet above sea level, in the Town of Keene, Essex County.

As discussed in Chapter 1, the geology of the Lake Champlain Basin has changed many times, but Lake Champlain itself was formed about 9,000 years ago at the end of the last glacial period. The majority of the bedrock in the New York portion of the watershed is crystalline rock, with smaller patches of carbonate rock, sandstone and shale. The Adirondack Mountains are composed mainly of crystalline metamorphic rocks, such as granitic gneiss, metanorthosite and olivine metagabbro. The lowlands are mostly underlain with sandstone, carbonate rocks, shale and other metamorphic clastic rocks (Nystrom, 2009). The surficial geology varies greatly throughout the watershed. Glacial till is the predominate earth material as a result of the last glaciation. Silt and clay are found within the Champlain Valley, which provides fertile soils for agricultural production. There are also an abundance of bedrock outcrops scattered throughout the region, along with large pockets of sand and gravel (Map 2-4).

2.3. *Climate and Precipitation*

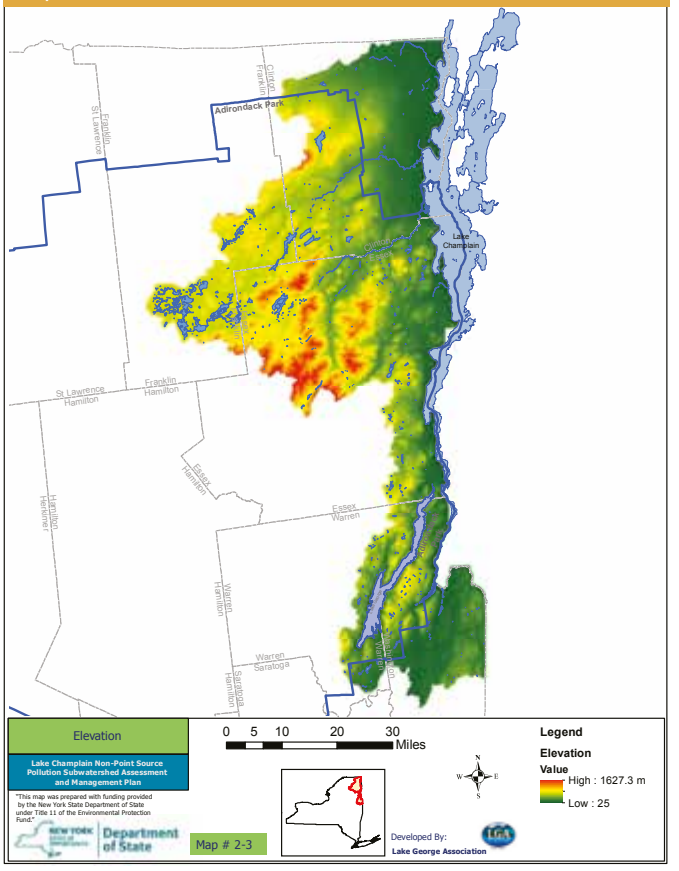
The climate within northeastern New York is defined as Continental, which consists of long, snowy winters and shorter growing seasons. Temperatures vary from below zero in the winter months to the high nineties (°F) in the summer months, with average temperatures in the watershed from 1981 – 2010 ranging from 43° F to 49° F. However in recent years, large temperature variations within the seasons have become common. In January 2017, the average temperature in the Champlain Valley was 25.8° F, a departure from normal temperatures that usually range ten degrees cooler (Northern Regional Climate Center, 2017).

Precipitation within the watershed averages around 37.5 inches a year (Map 2-5), with the majority of precipitation falling in the summer and autumn months. A report released by the Lake Champlain Basin Program indicates that precipitation in New York has increased 0.22% from 1951 to 2006. Not only is the amount of precipitation increasing, but trends have shown that precipitation is falling more frequently in the form of rain, rather than snow, during the winter months. This rain is also coming in more intense events, dropping large quantities of water in shorter amounts of time. In fact, it is estimated that the amount of precipitation falling in the heaviest 1% of daily rains has increased more than 70% from 1958 - 2010 (Lake Champlain Basin Program, 2017).

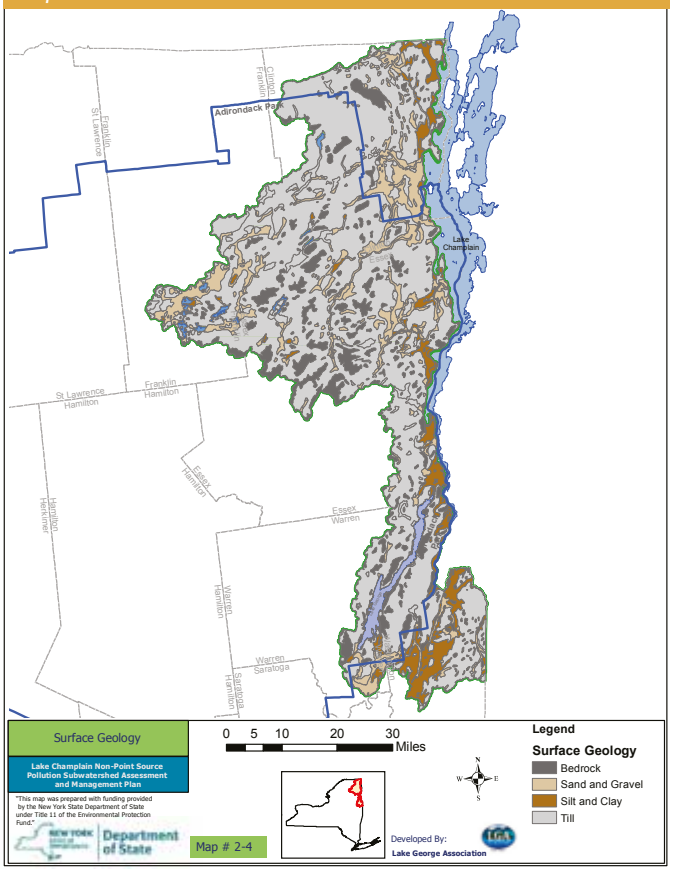
2.4. *Habitat and Sensitive Areas*

The Adirondack Park and Lake Champlain Watershed comprise the southernmost part of the Eastern forest – boreal transition eco-region.

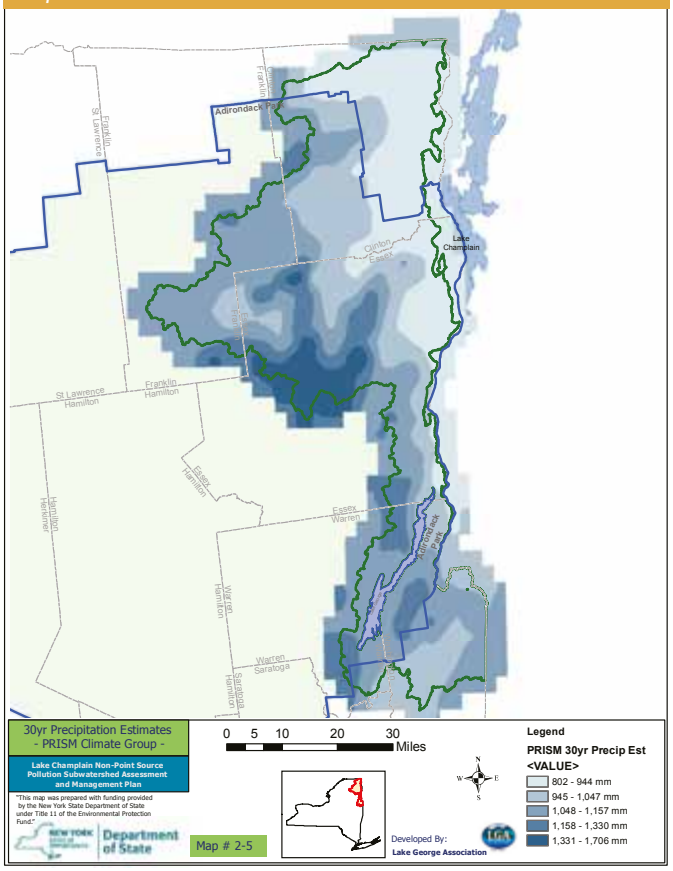
Map #2-3



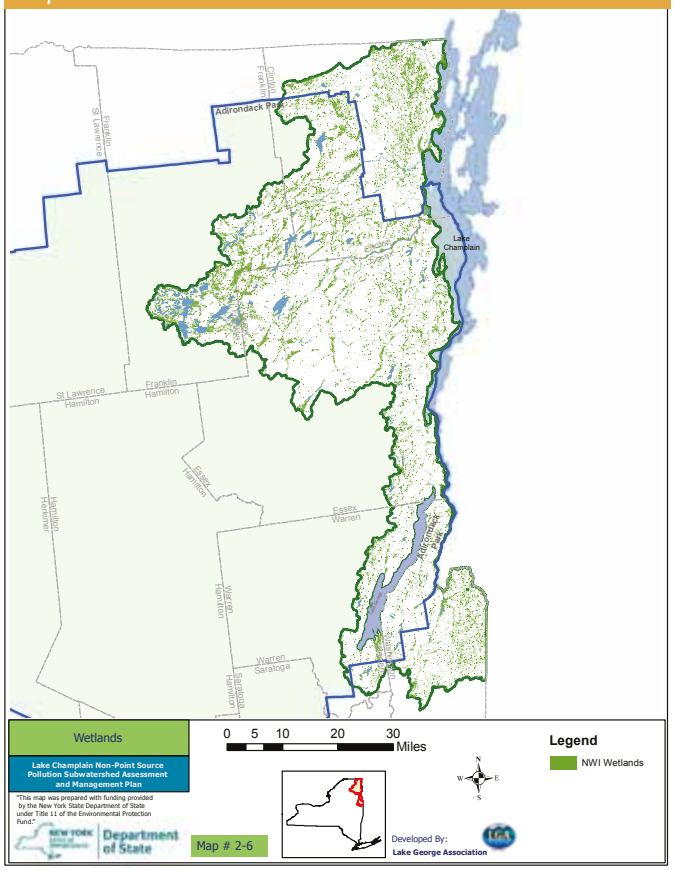
Map #2-4



Map #2-5



Map #2-6



This region boast an array of habitat types, from bogs that make up much of the lowland to the alpine forests found on the Adirondack's High Peaks. The six major habitat categories in the watershed include mixed northern forests, lowland boreal forests, beaver flows, bogs, old growth forest and the alpine zone. They all provide habitat for numerous wildlife species and are comprised of a variety of plants and trees including spruce, hemlock, beech, pine and several broad-leafed species. Their numbers and distribution are all dependent on the microclimate of the area.

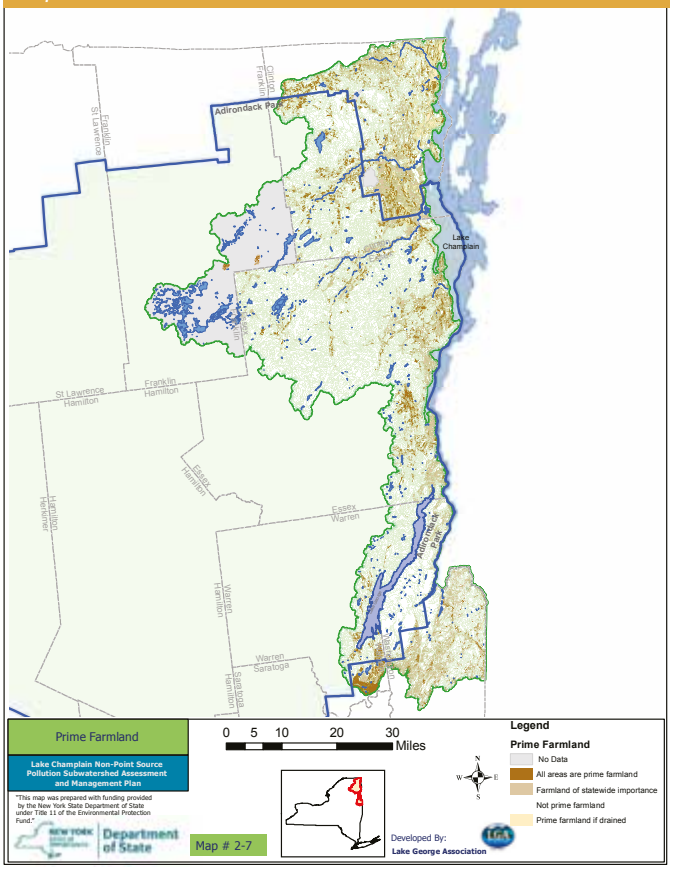
In addition to the diverse habitat, there are many environmentally sensitive areas within the Champlain Basin, including wetlands, steep slopes, hydric soils, floodplains, and prime farmland. These areas are considered sensitive because they play a vital role in maintaining the balance between the ecosystems of the watershed, and heightened protection and reduced degradation of these areas will assist in reducing phosphorus loading to Lake Champlain and its tributaries.

Wetlands are a critical part of any ecosystem as they are considered "nature's sponges," meaning that they absorb and contain water, pollutants, nutrients and sediments, therefore not allowing them into surface waters. A way of identifying wetlands is by looking for hydric soils, which are defined as soils that are permanently or seasonally saturated with water. This produces anaerobic conditions, which are consistent with a wetland habitat. There are a total of 203,666 acres of wetland in the Champlain basin, which accounts for 11.2% of the land area (Map 2-6). Wetlands in the watershed that are also within the Adirondack Park are under the jurisdiction of the Adirondack Park Agency and have heightened protections, whereas wetlands outside of the Adirondack Park are under the jurisdiction of the NYS DEC. These habitats are critical to the health of Lake Champlain and its tributaries, and should be preserved, maintained and restored at all costs.

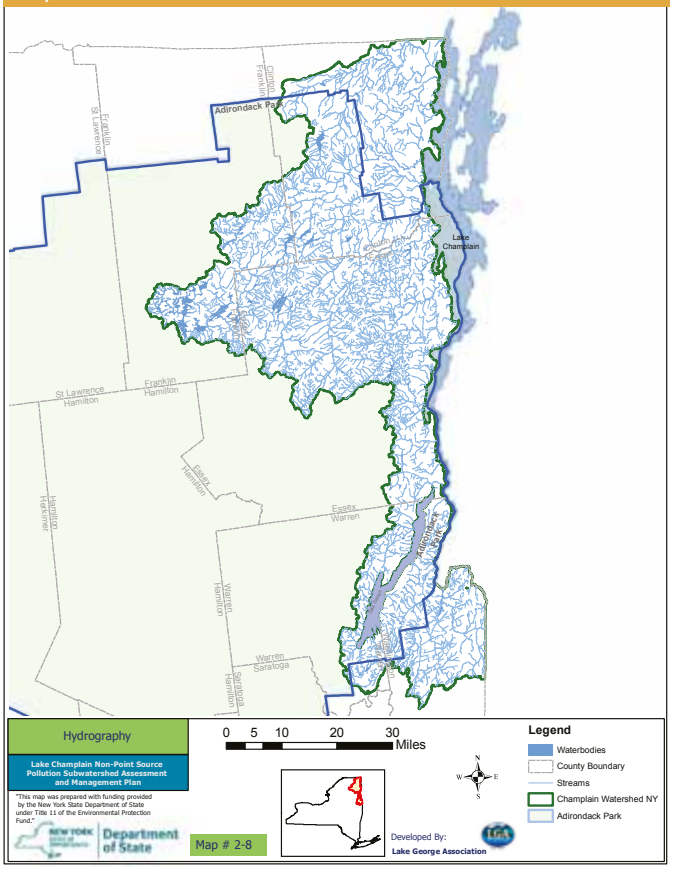
Steep slopes are considered a sensitive area because disturbing them can cause massive erosion that can result in land slippage and slides that have the potential to degrade water quality and harm infrastructure. In general, steep slopes are considered those that are greater than 15%. As much of the headwaters for the tributaries to Lake Champlain are located within the High Peaks region of the Adirondack Park, there are numerous areas that have steep slopes. A more in depth description of the slopes found in the watershed can be found in Chapter 3.

Floodplains are abundant within the Champlain Watershed, and are an important part of mitigating flooding. Unfortunately, throughout the watershed, human infrastructure has been built within floodplains, which has resulted in the damage that was seen in the 2011 spring lake floods and Tropical Storm Irene in August 2011. Floodplains are necessary for any river, stream or lake system because they are, by definition, a place for the water to go when the banks overflow. Plants growing in these wetland areas can withstand periodical flooding, and assist in slowing down water velocity as it is spread over a larger area outside of the general river channel. It is important to remember that the rivers within the watershed will overflow at some point, and the reduction of infrastructure within floodplains can reduce impacts to humans in these areas.

Map #2-7



Map #2-8



Prime farmland is a designation that is provided by the US Department of Agriculture to identify areas that have the most suitable physical and chemical characteristics to support the growth of food, feed, forage, fiber and oil seed. Areas that are designated as prime farmland have a reliable water source, a favorable temperature for growing, the proper amount of acidity or alkalinity, salt and sodium content in the soils, and are not particularly rocky. These areas also do not erode easily or flood frequently (United State Department of Agriculture, 2017). There are a total of 360,866 acres of prime farmland within the watershed (Map 2-7). Of this designated prime farmland, 72.3%, or 260,954 acres, is currently used for agriculture.

2.5. *Wildlife and Fisheries*

The Lake Champlain Basin boasts an array of terrestrial and aquatic wildlife, both native and non-native. The most well-known species within this portion of the Adirondack Park and Champlain Valley include North American moose, black bear, bobcat, northern coyote, beaver, river otter, bald eagle, common loon, peregrine falcon, great horned owl, snapping turtle and timber rattlesnake. Large predators, including timber wolves and eastern cougars, were once abundant, however deforestation and over-hunting have caused extirpation of these species in the region over 100 years ago (Adirondack North Country Association, 2011).

There are more than 100 species of birds in the Adirondack Park, and because of the eastern region's rich and diverse ecology there are also several Important Bird Areas, as designated by Audubon New York. These include The Lake Champlain Birding Trail, Adirondack High Peaks, and Adirondack Loon Complex. Lake Champlain and its wetlands are also part of the Atlantic Flyway, which is a migratory bird corridor that is utilized by waterfowl and other wetland birds as part of their migration from north to south and back each year (Adirondack.net, 2016).

According to the Lake Champlain Basin Program (2014), 72 native and 16 non-native species of fish have been identified within Lake Champlain itself. Many of these are considered sport fish and highly sought after by anglers including large and smallmouth bass, northern pike, lake trout, landlocked Atlantic salmon, rainbow trout and brown trout. Additional fish species throughout the watershed include brook trout (native and non-native), walleye, perch and sunfish.

In 2016, the Lake Champlain Basin Program compiled a list of all of the Endangered and Threatened Animal species in the watershed. There are a total of 21 species listed as endangered or threatened in the New York portion of the watershed, and can be seen in Table 2-2.

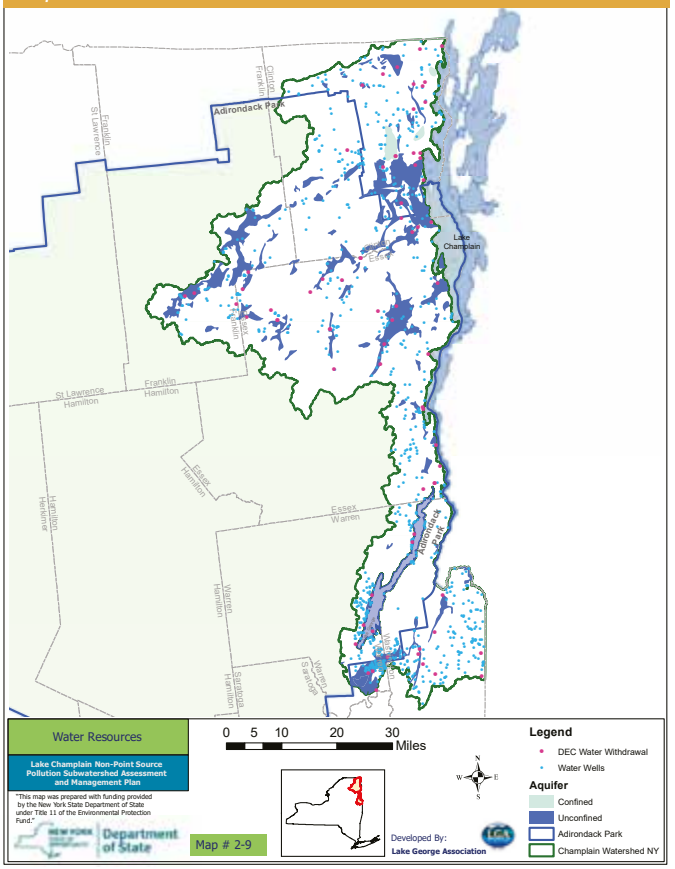
2.6. *Water Resources*

The NYS DEC estimates that there are 4,883 miles of freshwater rivers and streams within the Lake Champlain watershed, with major tributaries consisting of the Ausable, Saranac, Great Chazy, Boquet, Mettawee and the Poultney rivers. There are also 235 significant freshwater lakes, ponds and reservoirs including Lake George, Upper and Lower Saranac Lakes, and Lake Placid (Map 2-8).

Table 2-2. New York State-listed threatened and endangered species in the Lake Champlain Watershed as of 2016. Information provided by the LCBP

	Common Name	Scientific Name	Threatened	Endangered
Fish	Eastern Sand Darter	*Ammocrypta pellucida*	X	
	Lake Sturgeon	*Acipenser fulvescens*	X	
	Round Whitefish	*Prosopium cylindraceum*		X
Reptiles	Timber Rattlesnake	*Crotalus horridus*	X	
Birds	Bald Eagle	*Haliaeetus leucocephalus*	X	
	Common Tern	*Sterna hirundo*	X	
	Golden Eagle	*Aquila chrysaetos*		X
	Henslow's Sparrow	*Ammodramus henslowii*	X	
	Least Bittern	*Ixobrychus exilis*	X	
	Loggerhead Shrike	*Lanius ludovicianus*		X
	Northern Harrier	*Circus cyaneus*	X	
	Peregrine Falcon	*Falco peregrinus*		X
	Pied-billed Grebe	*Podilymbus podiceps*	X	
	Sedge Wren	*Cistothorus plantensis*	X	
	Short-eared Owl	*Asio flammeu*		X
	Upland Sandpiper	*Bartramia longicauda*		X
Mammals	Indiana Bat	*Myotis sodalis*		X
Insect	Frosted Elfin (butterfly)	*Callophrys irus*	X	
	Karner Blue Butterfly	*Lycaeides melissa samuelis*		X
	Persius Duskywing (butterfly)	*Erynnis persius*		X
	Pine Pinion Moth	*Lithophane lepida lepida*		X

Map #2-9



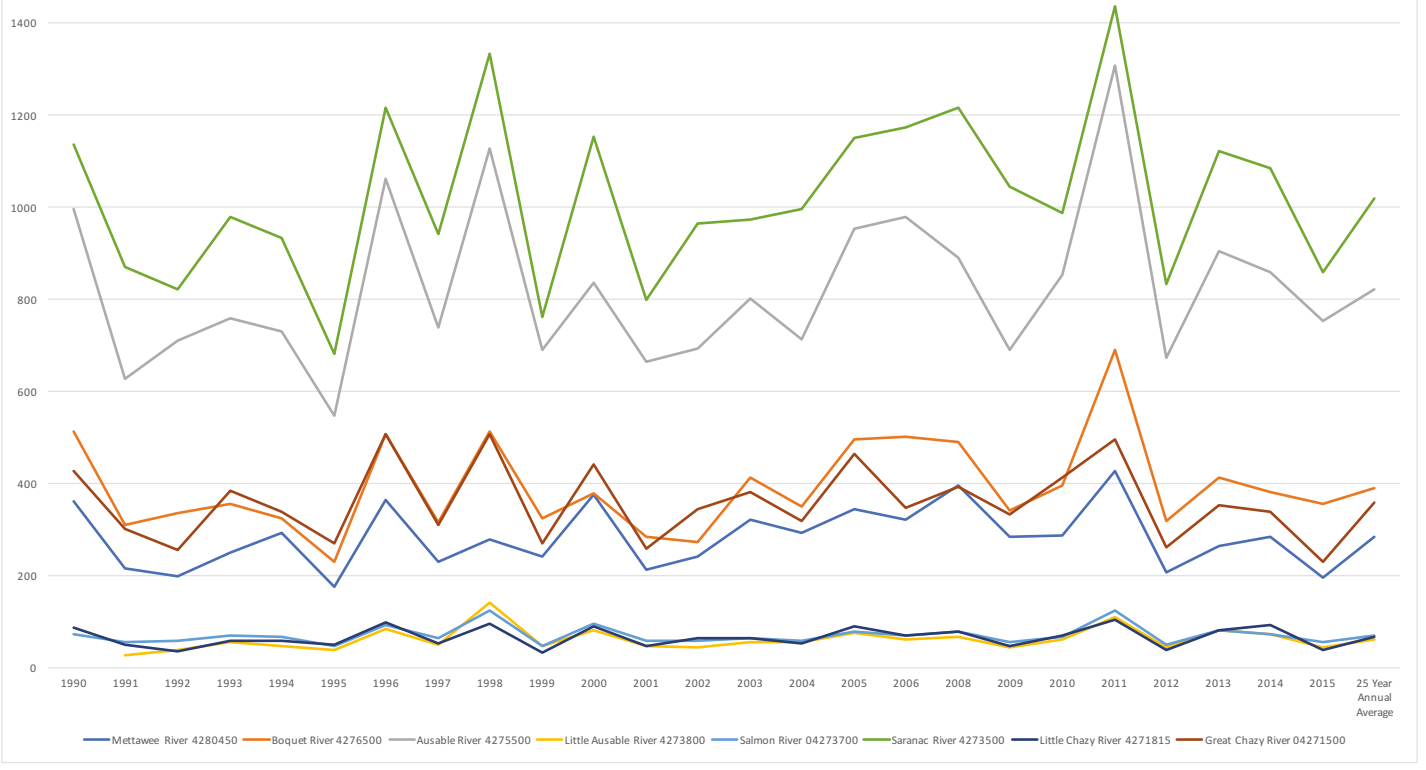
Many of the surface waters within the watershed serve as drinking water sources, along with an array of wells accessing groundwater supplies. Map 2-9 illustrates NYS DEC permitted water withdrawals, along with wells and confined and unconfined aquifers. The Lake Champlain region has an abundance of clean, fresh waters that are accessed for human consumption, as well as to maintain the large agricultural industry in the watershed, making its protection even more vital for the future.

The United States Geologic Survey (USGS) hosts a total of nine surface water gauge sites within the Lake Champlain Basin to monitor tributary flow. Real time data on these stream gauges can be found at https://maps.waterdata.usgs.gov/mapper/. Information collected at these gauges helps resource managers monitor the hydrologic networks in the watershed and inform analytical and flood forecasting tolls. Data has been collected on many of these gauges for decades, and the average annual yearly flow from 1990 - 2015 of eight of the gauges is summarized in Figure 2-1. The ninth gauge, Putnam Creek (04276842), has had sparse readings collected since 1990 and has been closed since 2014 due to funding restrictions, and therefore does not have a complete data set to display.

Additionally, the USGS is monitoring the lake level in Lake Champlain in Rouses Point, NY. The annual average of the lake level from 1990 -2015 at this spot on Lake Champlain can be found in Figure 2-2.

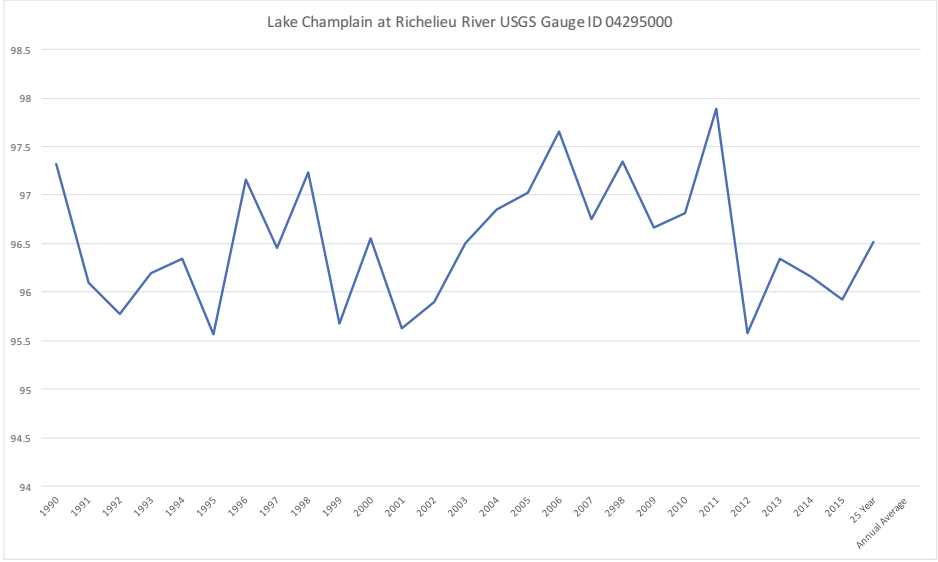
Water quality chemistry data on Lake Champlain is collected by the Lake Champlain Long-Term Monitoring Program, which is supported with funding from the Lake Champlain Basin Program, and by the Vermont Agency of Natural Resources and NYS DEC. The monitoring

Figure 2-1. Average annual yearly flow in cubic feet per second from eight tributaries in the Lake Champlain Watershed, 1990 - 2015.

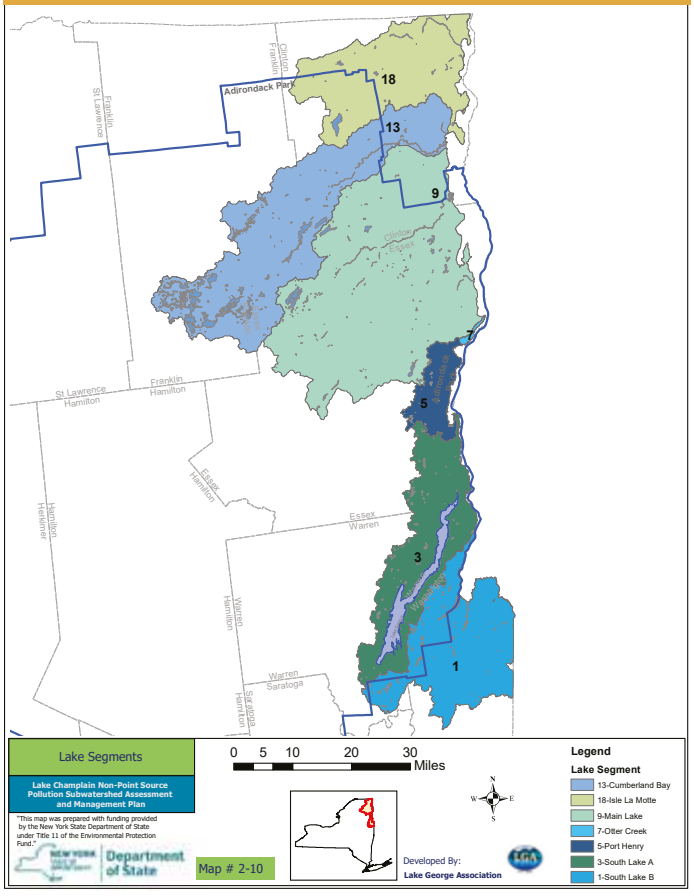


effort is currently conducted by staff from the Lake Champlain Research Institute at SUNY Plattsburgh, the State of Vermont, and the Lake Champlain Basin Program. There are a total of 15 lake stations on the New York and Vermont portions of the lake. Within NY, sampling sites are located near the towns of Putnam and Crown Point, mouth of the Boquet River, the towns of Westport and Essex, mouth of the Saranac River, Town of Beekmantown, and Village of Rouses Point. Several chemical and biological parameters are measured, including several forms of phosphorus and nitrogen, chloride, sodium, dissolved silica, temperature, oxygen, conductivity, pH, chlorophyll, phytoplankton, zooplankton, mysids and zebra mussel veligers. This information was originally collected in the early 1990's to assist with creating a phosphorus budget for the lake, and has since evolved to include a wider array of parameters and a broader scope. The online database for water chemistry and biological data collected through this program can be found at https://anrweb.vermont.gov/dec/_dec/LongTermMonitoringLakes.aspx. Data are currently available from 1992 – 2016.

Figure 2-2. Average Annual lake level of Lake Champlain at Rouses Point, NY in feet above Mean Sea Level, 1990 -2015.



Map #2-10



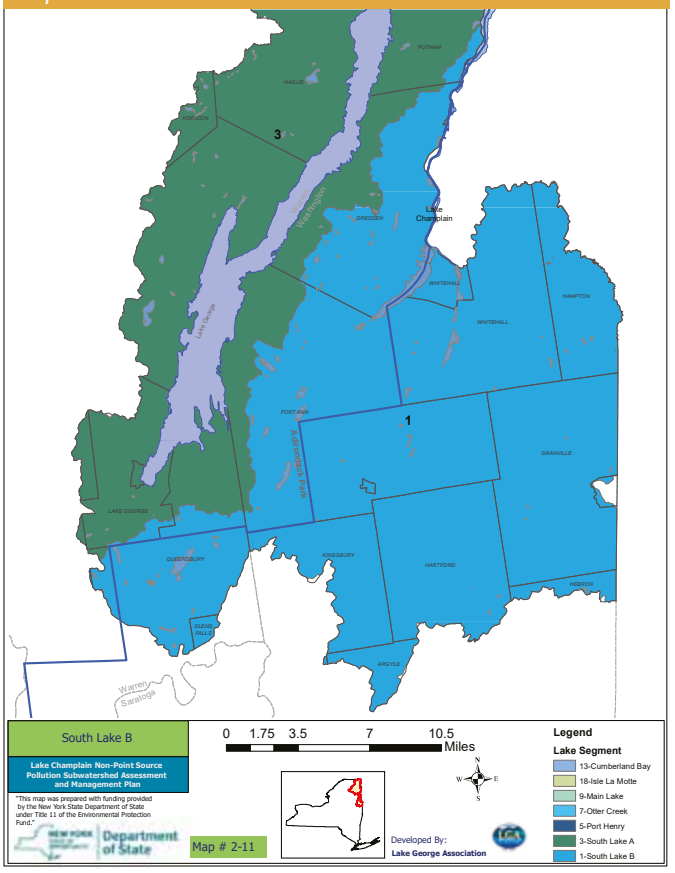
2.7. *Lake Segments*

For management purposes within the TMDL document, the Lake Champlain watershed was broken into several lake segments that correlate with the major tributaries of the lake. There are seven lake segments within New York; from south to north they are South Lake B, South Lake A, Port Henry, Otter Creek, Main Lake, Cumberland Bay and Isle La Motte. (Map 2-10).

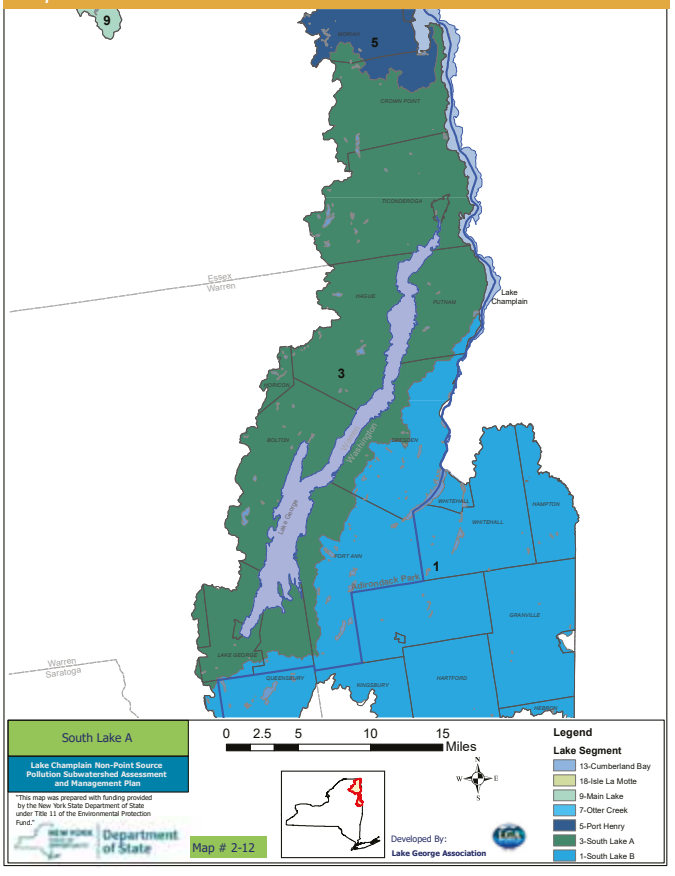
South Lake B

South Lake B consists of the drainage areas from the Poultney and Mettawee Rivers, as well as Halfway Creek and portions of the Champlain Canal, totaling 378 square miles. Both the Poultney and Mettawee Rivers originate in the State of Vermont and flow west into New York. Halfway Creek flows east through Warren and Washington Counties before it empties into the Champlain Canal. The Champlain Canal has several tributaries, including Wood Creek, and is also hydrologically connected to the Hudson River (Map 2-11). The soils of the region consists of both sand, found in the Warren County portion of the Halfway Creek watershed, and clay, typically found in Washington County's productive river valleys. As in many historically settled areas, the population centers with South Lake B are located directly on its waterways. Several villages and hamlets dot the landscape along the rivers and canal, separated by rolling agricultural fields. The largest population centers in this lake segment are the Town of Queensbury and City of Glens Falls in Warren County, and the Village of Whitehall, in Washington County, which borders the southernmost part of Lake Champlain. Business within South Lake B consists mainly of slate quarries and agriculture.

Map #2-11



Map #2-12



The Poultney River is 40 miles long and enters into New York State in the Town of Hampton and then flows northwest, defining the border between the two states, until it discharges into the South Bay of Lake Champlain north of the Village of Whitehall. The river's streambank remains relatively undeveloped in Vermont, however intensive agricultural operations are present within its immediate watershed in New York.

The Mettawee River enters New York State in the Village of Granville, where it then flows northwest into the Champlain Canal just south of the Village of Whitehall. The River is known for its incredible recreational opportunities, including fly-fishing, kayaking and whitewater.

The Halfway Creek headwaters can be found in the Luzerne Mountains at the Wilkie Reservoir (a drinking water source for the City of Glens Falls). These mountains divide the Lake Champlain watershed from the Hudson River watershed, located just on the other side of the mountain. The main branch of Halfway Creek is 26 miles long and flows east out of the mountains through the Town of Queensbury. The Creek then continues east through agricultural fields in Washington County where it outlets into the Champlain Canal in the Village of Fort Ann.

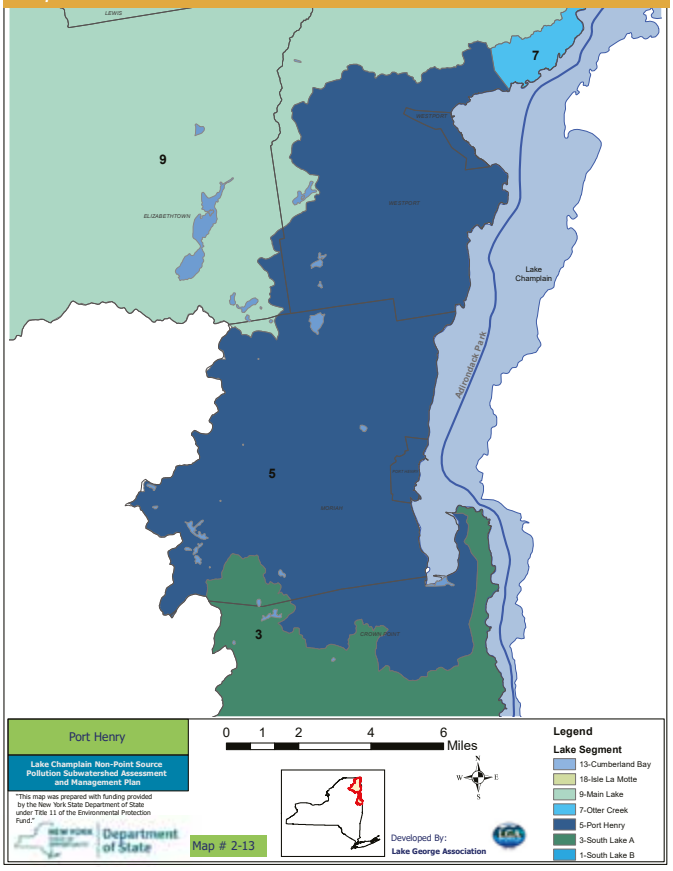
The Champlain Canal was completed in 1822 and connects the Hudson River to Lake Champlain. At 60 miles long, it was built to increase the shipping capacity of goods from the Atlantic all the way to Lake Champlain. Shortly after opening, additional water was needed to fill the canal's highest part in Fort Edward, so the Feeder Canal was built in Glens Falls with the purpose of conveying water from the Hudson River to the Champlain Canal (Feeder Canal Alliance, 2016). In more recent times, both of these canals have been used for recreational purposes.

South Lake A

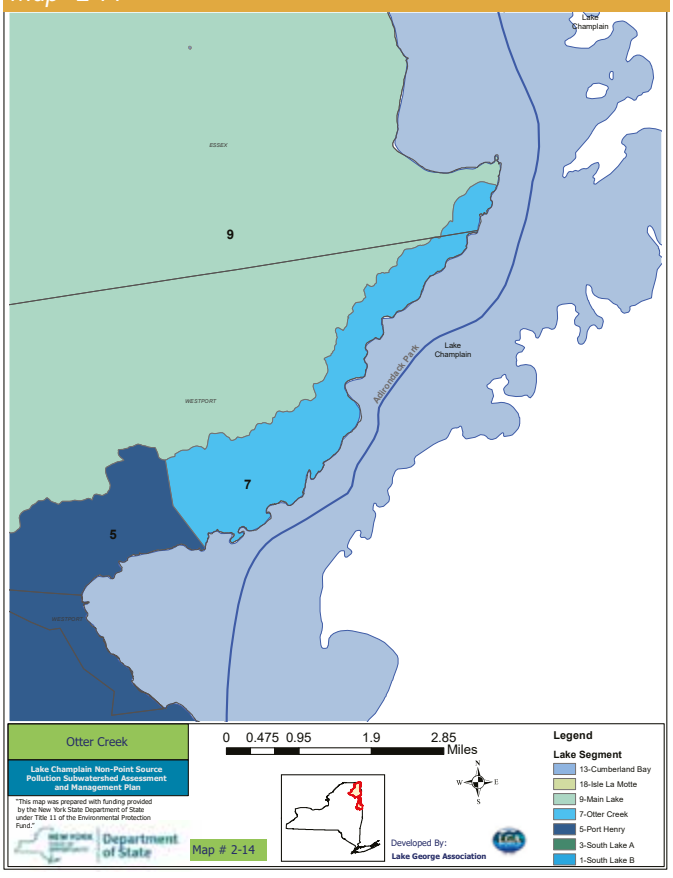
The South Lake A lake segment consists of the Lake George watershed, which is the only lake system in the watershed that is a major tributary to Lake Champlain, as well as a small portion of direct drainage to Lake Champlain within the Town of Crown Point (Map 2-12). The boundary for the South Lake area is the Crown Point Bridge, which connects Crown Point on the New York side of the basin to Chimney Point on the Vermont side. In total, South Lake A consists of 372 square miles of land. The soils within South Lake A consist mainly of the Warren County sands, but in many portions there is shallow bedrock and pockets of clay soils in Washington and Essex Counties. The tourism industry is the largest part of the economy within this subwatershed.

There are two tributary systems within South Lake A that are not hydrologically connected. The largest is the Lake George watershed, which is a total of 233 square miles. Lake George was formed over 10,000 years ago by glaciers, is a total of 32 miles long with a maximum depth of 200 feet and is 2 miles at its widest point. The lake flows south to north, where it outlets into the LaChute River in the Town of Ticonderoga. The LaChute River then drops a total of 226 feet in 2 miles and empties into Lake Champlain. Lake George itself has over 141 streams that feed the lake including eight major streams, in addition to many underground springs. Over 40% of the land in

Map #2-13



Map #2-14



the Lake George watershed is State forest preserve, and an additional 7% is protected under conservation easements. The second tributary system within South Lake A is Putnam Creek, which begins at Penfield Pond in the Town of Crown Point and flows east into Lake Champlain.

Major populations within South Lake A are concentrated at the southern and northern portions of Lake George. The Towns of Lake George, Bolton, Queensbury and Ticonderoga, and the Village of Lake George, have seen tremendous residential development since 1970 (Lake George Data Atlas, 2016). Development in the Lake George watershed is regulated by the Lake George Park Commission, which oversees construction activities and ensures that adverse impacts from those activities are kept to a minimum.

There are three hamlets within the Town of Crown Point, one located directly on the shores of Lake Champlain and the others located in the middle of what was a bustling iron ore operation. Monitor Bay Park and Marina is a Town-owned boat launch site and the New York State Department of Parks and Recreation maintains the Crown Point State Historic Site along the shoreline. This site has ruins from two fortifications that were built by the French and British.

Port Henry

The Port Henry lake segment is the second smallest lake segment in the watershed at 93 square miles (Map 2-13). It encompasses an area of direct drainage to Lake Champlain in lower Essex County within the Towns of Moriah and Westport, as well as the recently dissolved Village of Port Henry. The main tributary within this subwatershed is McKenzie Brook, which originates in the mountains in the Town of Moriah and outlets into Bulwagga Bay. The soils within this area are mostly clay with poor drainage. Several sites on the Lake Champlain Birding Trail are located in this subwatershed, including Loon Mountain Preserve, Webb Royce Swamp and the Westport Boat Launch.

The major population area in this lake segment is in the hamlet of Westport. This was once a sought-after resort area in the mid-nineteenth century, and many of its large Victorian homes still remain. After a mid-century decline in the tourism industry, the area has seen a resurgence in the real estate market with sales of second homes along the lakeshore, which are providing a boost to the local economy. The other population center in the subwatershed is the hamlet of Port Henry in the Town of Moriah. Timber harvesting and milling was the major industry in the area in the 1800's, followed by a booming iron ore extraction industry. Now, the area is mostly a tourist destination for its historic buildings and Bulwagga Bay, which is a Town-owned camp site located directly on Lake Champlain.

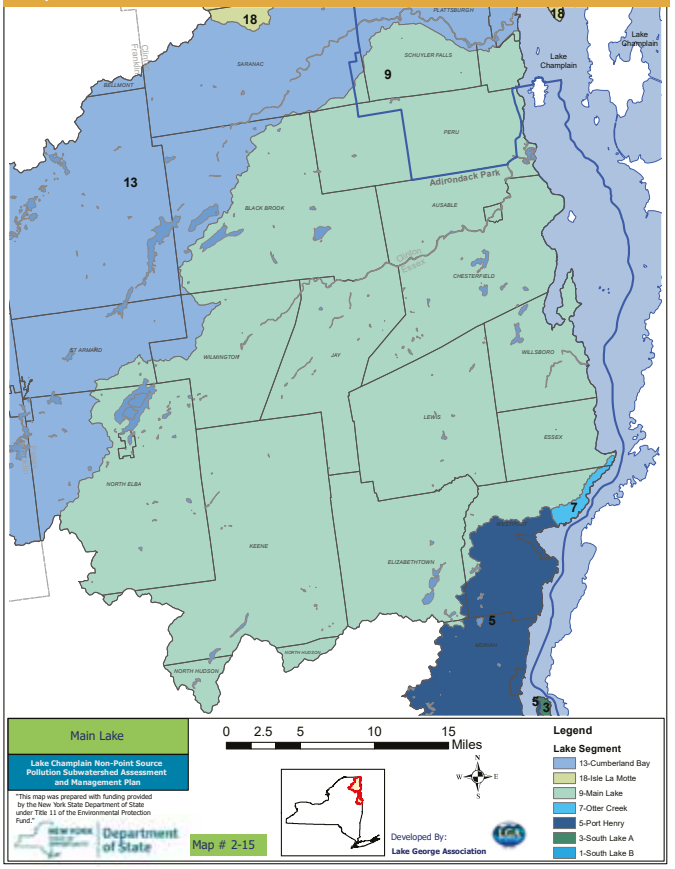
Otter Creek

The Otter Creek subwatershed is the smallest within the New York subwatersheds at only 4 square miles (Map 2-14), and is mainly forested with clay soils. This subwatershed includes direct drainage to Lake Champlain and was created because it drains to the same narrow portion of Lake Champlain as the large Otter Creek subwatershed on the Vermont side. There are no population centers within this subwatershed.

Main Lake

The Main Lake subwatershed is the largest of the subwatersheds

Map #2-15



on the New York side of the basin, 994 square miles, and includes three of the major river tributaries to Lake Champlain: the Ausable, Boquet and Salmon rivers (Map 2-15). The tributaries in this portion of the watershed are known for their world-class fishing in rivers that begin in the High Peaks of the Adirondack Mountains and work their way down to outlet in Lake Champlain. There are also several lakes throughout this subwatershed including Lake Placid, Mirror Lake, Augur Lake, Taylor Lake, Long Pond, and Lincoln Pond.

Population centers within the Main Lake subwatershed include several hamlets built along the rivers, most notably the Village of Lake Placid and the hamlet of Elizabethtown, where the Essex County seat is located. The majority of the land that is not developed is forested, much of it part of the Adirondack Preserve. The current economy of the area focuses around tourism, which is reliant upon healthy fisheries that attract fly fisherman from around the world. Whiteface Mountain in the Town of Wilmington, a prominent ski resort, also is located in this subwatershed.

The Ausable River watershed covers 512 square miles and includes 94 miles of river channel, 27 of which are in the Adirondack High Peaks. The headwaters of the river's East and West Branches begin on opposite shoulders of Mount Marcy and converge at Au Sable Forks to form the Ausable's Main Stem. Altogether, the river is fed by more than 70 streams before it outlets into Lake Champlain in the Town of Peru in Clinton County. Soils within the watershed are mostly sand, with rocky mountain soils in the upland areas. The watershed is a destination for world-class trout fishing, wilderness hiking, rock climbing, white-water recreation, and many winter sports, including downhill, backcountry, and cross-county skiing.

The Boquet River headwaters are located on Dix Mountain in the Town Keene. The 47 mile long river flows east through Elizabethtown, Lewis, Wadhams, and Whallonsburg, and outlets into Lake Champlain in the Town of Willsboro. Major tributaries to the river include the North Branch, The Little Boquet (also referred to as "The Branch"), Spruce Mill Brook and Lincoln Pond/Black River. Soils vary greatly within the watershed, with rocky mountain soils at the headwaters, sands in the Elizabethtown area, and heavy clays once the river reaches the Champlain Valley. Within this 47 miles, the river descends more than 2,700 feet, making it the steepest river in New York State. This, however, creates an environment where flash floods and erosion are problematic. The Boquet River is also known for its abundant fisheries, and there are numerous fishing access points along the river. Over 80% of the river's 280 square mile watershed is forested, with the remaining land uses consisting of farms, residential homes, and scattered mines/quarries.

The Salmon River, whose headwaters share the watershed divide between the Saranac River to the northwest and Ausable River to the southwest, is 27 miles long and flows through Clinton County before it outlets into Lake Champlain near Valcour Island. This watershed is roughly 70 square miles composed of sandy soils that is mostly forested, however, non-forested areas within the watershed are mostly agricultural. There are no major population centers within its watershed, except for the two small hamlets of Peasleeville and Schuyler Falls.

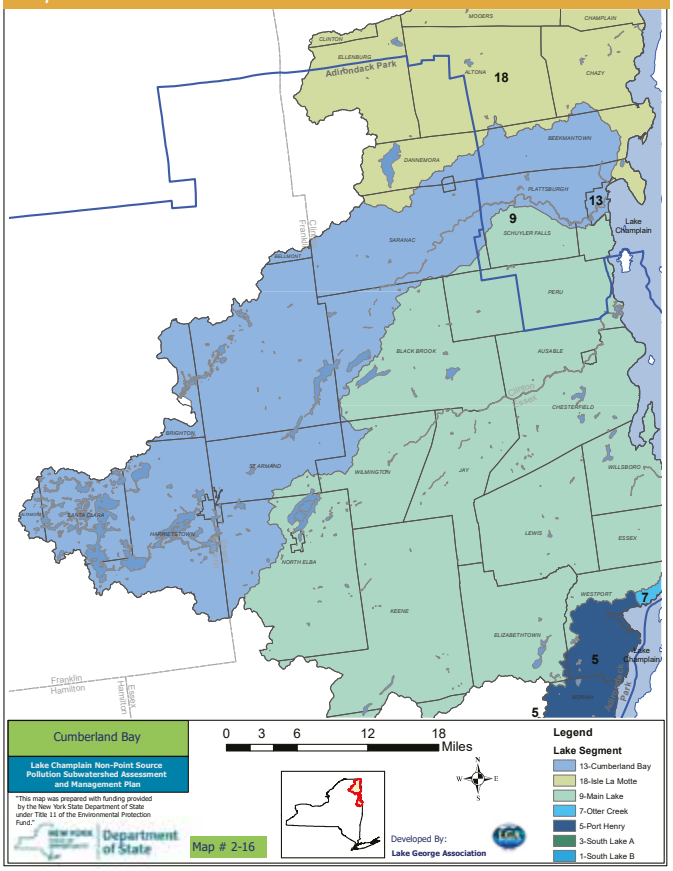
Cumberland Bay

The Cumberland Bay subwatershed is 659 square miles and includes the westernmost portion of the Champlain watershed within Franklin, Essex and Clinton Counties (Map 2-16). It has one major river system, the Saranac River, and numerous lake systems, most notably the Saranac Chain of Lakes. This area has a strong agricultural community, and is ripe with recreational opportunities.

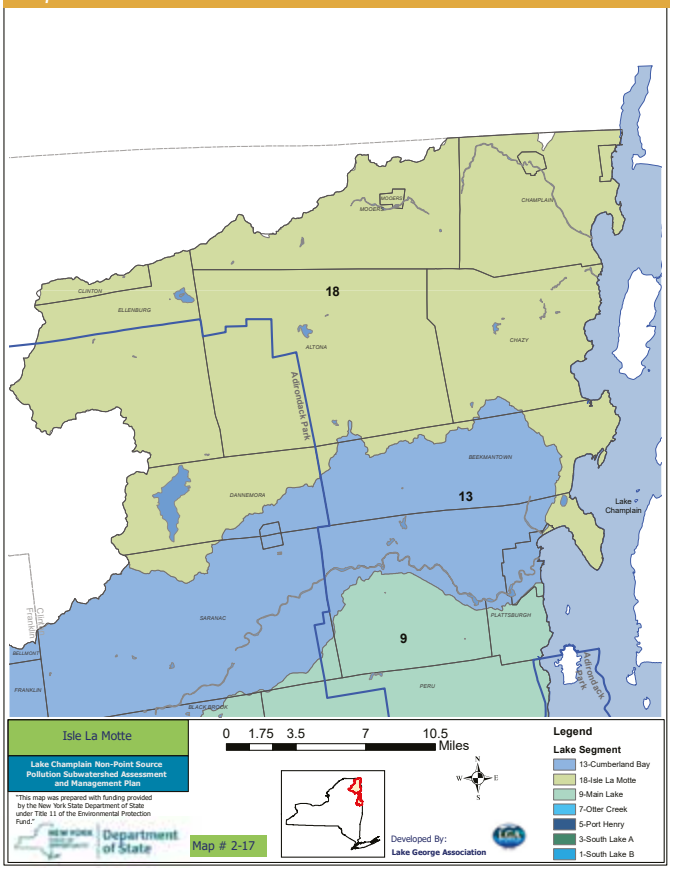
This portion of the watershed is rich with history, as discussed in Chapter 1, and its economy had historically relied upon timbering and milling operations and agriculture. During the Cold War era, the City of Plattsburgh was home to the Plattsburgh Air Force Base, which housed the US Military's Strategic Air Command's primary East Coast wing. This included the 380th Bombardment, Aerospace, and Refueling Wings that stored 52 Bombers, air-refueling "tankers" and FB-111s. However, with the end of the Cold War, the federal government reduced its need for post-war missions and closed the base in 1995. This led to a significant dip in the economy of the City and its surrounding region, which has rebounded in the past decade thanks to investments from new industries and large manufactures, including Georgia Pacific and Bombardier (City of Plattsburgh, 2016).

The Saranac River is an 81 mile long river with a watershed size of 613 square miles that includes several population centers, most notably the City of Palttsbrugh, the largest population center in the northern part of the watershed. The majority of the river basin is within the Adirondack Park. The Saranac River begins at Lake Flower in the Village of Saranac Lake where it flows east and outlets into Lake Champlain in the City of Plattsburgh. The river has more than three

Map #2-16



Map #2-17



dozen source lakes and ponds, including Upper, Middle and Lower Saranac Lakes, Union Falls Pond and Franklin Falls. The northern third of watershed is heavily agricultural. Whitewater kayaking and canoeing are popular on the river as it drops steeply towards its outlet, which creates navigable rapids. Fishing is also popular on the river, which supports a diverse fishery including largemouth and smallmouth bass, northern pike, brown trout and landlocked salmon.

Isle La Motte

The Isle La Motte subwatershed is the northernmost subwatershed and includes 389 square miles of land in Clinton County (Map 2-17). Its lands are located mainly in the Champlain Valley, and because of its flat land and fertile clay soils, the subwatershed includes one of the most intensive agricultural areas in New York State with a large number of medium and large Concentrated Animal Feeding Operations (CAFOs). There are two main river systems that flow through this subwatershed, the Great Chazy River and the Little Chazy River. Major population centers in this subwatershed include the Villages of Champlain and Rouses Point.

The northern branch of the Great Chazy River's headwaters can be found in the Adirondack Mountains surrounding Chazy Lake in the Town of Dannemora, while the southern branch originates from Chazy Lake. The two converge in Mooers Forks where the river then flows northeast through wilderness areas, mixed forest, hamlets and heavy agricultural areas before emptying into Lake Champlain in the Town of Champlain. The rivers main tributary, Corbeau Creek, empties into the Great Chazy near Coopersville in the Town of Champlain, shortly before it empties into the lake. Agriculture has always been the main industry in the area, as well as hydroelectric power from several dams built on the river. Currently, there is abundant trout fishing on the Great Chazy River, however human activities within the subwatershed are thought to be causing a decline in the water quality of the river. The Little Chazy River's headwaters are located in the Flat Rock State Forest in the Town of Altona. This river also flows through intensive agricultural areas within the Towns of Altona and Chazy, where it eventually outlets into Lake Champlain near Chazy Landing. Recreationally, the river is known as an area for fly fishing.

2.8. *Non-Point Source Pollution and Phosphorus Loading in the Lake Champlain Watershed*

Phosphorus is an essential nutrient for all life forms, and is especially necessary for plant growth as it's an integral part of many of the metabolic functions in plants. When there is not enough phosphorus available in an ecosystem, plant growth ceases until more phosphorus is made available within the environment. Naturally, usable phosphorus is found in very low concentrations within a freshwater ecosystem, making it the "limiting nutrient" that controls plant and algal growth. However, if an increased amount of phosphorus is added to a freshwater system, then plant and algal growth within the system will become excessive, which has negative effect on the waterbody. Increased plants and algal mats on the surface of a lake can shade out the sun, reducing the amount light penetration into the water. When plants and algae die and sink to the bottom, bacteria decompose the plant matter, reducing the amount of available dissolved oxygen in the water needed by fish and other

aquatic animals. Increased plant and algal growth can reduce the clarity and change the color of the water, and decomposition creates unpleasant odors and mucky lake bottoms, which can affect recreational opportunities and the lake ecosystem. If the surface water is used as a drinking water source, the excessive plant and algae decomposition can create taste and odor problems and increase the cost of treating the water. Most notably, excessive phosphorous can cause toxic cyanobacteria (blue-green algae) blooms, such as the ones seen on Lake Champlain in Missisquoi Bay, Vermont. These algal blooms are detrimental not only to the environment, but can be hazardous to human and animal health.

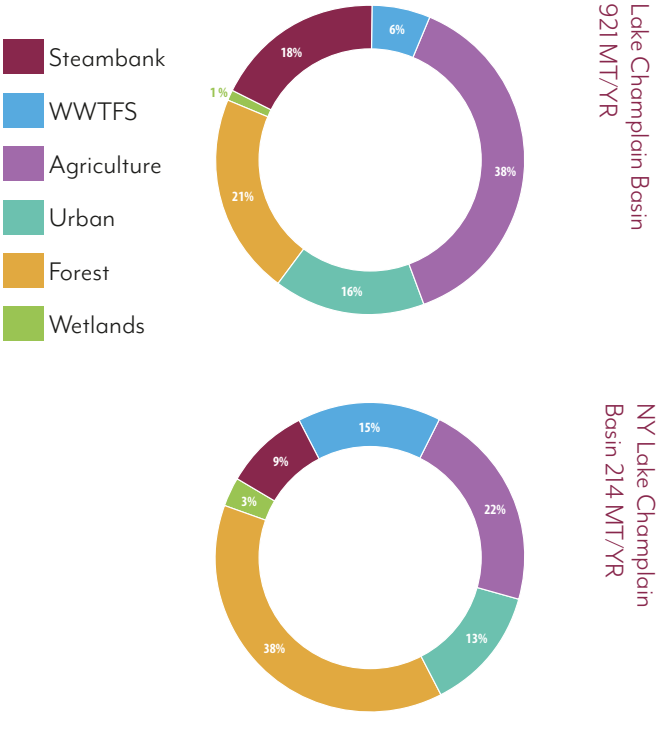
Excessive phosphorus enters into a surface water through point source and non-point source pollution. The most common form of point-source pollution in the Champlain watershed are wastewater treatment plants (WWTPs). Human waste contains phosphorus, as do many detergents, toothpastes, and pharmaceuticals. Treated effluent from WWTPs is piped into Lake Champlain and its tributaries, increasing phosphorus loads to the lake. Since the adoption of the TMDL for the lake, phosphorus concentrations within WWTP effluent have been dramatically reduced through the efforts of Villages, Towns and County Planning Departments, with support from state and federal funding.

Non-point source phosphorus enters into surface waters from both natural and human-derived sources in the watershed. Natural sources include old-growth forests, phosphorus leached from sediments in the watershed, and the release of phosphorus from lake sediments during annual turnover. These sources help maintain the natural balance of available phosphorus in a waterbody to support the ecosystem. Human-derived phosphorus inputs include runoff from urbanized areas and agricultural lands that contain fertilizers and pet/animal waste. Phosphorus particles also easily bind to and are then transported by sediment particles, so any excessive sediment loading to a waterbody will also increase phosphorus loading. Human-derived sources of sediment loading include: construction sites; streambank erosion from poorly managed riparian corridors, undersized culverts, and channel degradation; roadside ditches; and poorly-managed forestry and agricultural practices. All of these sources increase the amount of the available phosphorus in a waterbody, throwing off the natural balance and resulting in increased plant and algal growth. In terms of the Lake Champlain watershed, whose watershed land area to lake surface area ratio is 19:1, non-point source pollution accounts for a monumental amount of phosphorus loading from activities in the watershed.

Figure 2-3 illustrates the total phosphorus loading to Lake Champlain by land use for both the Lake Champlain watershed as a whole (NY, VT and Québec) and for New York State only, as adopted from the LCBP's 2015 State of the Lake Report. As indicated on the figure, agricultural operations account for the majority of phosphorus loading within the watershed as a whole, but those numbers account for large agricultural inputs from Vermont (41% of VT load) and Québec (58% of QC load). The portion of the Lake Champlain watershed in New York State only accounts for 22% of the total phosphorus loading to Lake Champlain. The total is 214 metric tons/year, of which the majority, 38%, comes from forested land. The main reason that the inputs from forests are higher in New York than Vermont and Québec is because of the Adirondack Park, which accounts for 75% of the land area in the NY watershed. Furthermore, 25% of the Adirondack Park within the watershed is forest preserve (Map 2-18), or commonly referred to as "Forever Wild," in which Article XIV of the New York State Constitution states "The lands of the state, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed." These protections placed on the forest preserve allow resource managers to focus their phosphorus reduction management efforts on other land uses, mainly agriculture (22% of total load) and urban (13% of total load), and forest practices on lands with fewer protections than those located under the preserve designation.

In an effort to address New York's 214 metric tons/year of phosphorus loading, each lake segment was given a phosphorus loading allocation and target phosphorus reduction goal within the TMDL document (Table 2-3). In general, only South Lake A was not exceeding its allocated load in 2010, while the majority of the subwatersheds require reductions of over 50%. The greatest reduction is required in the Main Lake subwatershed, which is the largest subwatershed in New York. South Lake B, located in Washington County, also requires one of the largest load reductions, even though it is less than half of the land area of the Main

Figure 2-3. Phosphorus loading to Lake Champlain by land use for the Lake Champlain Watershed as a whole (NY, VT and Québec) and for the New York portion of the Lake Champlain Watershed. Numbers and charters adapted from the Lake Champlain Basin Program's 2015 State of the Lake Report.



Lake subwatershed. The Otter Creek subwatershed was not provided with an allocation due to its small and undeveloped nature, so any loading detected from the area will result in a high reduction requirement percentage, as seen in the table. However, the phosphorus loading into this lake segment can generally be attributed to normal erosional processes. The Port Henry segment, although also small in terms of land area, includes a relatively large urbanized area, which accounts for its load. Cumberland Bay and Isle La Motte are also exceeding their phosphorus load allocations, although not to the extent of some of the other lake segments.

With such a large amount of area to cover, 3,050 square miles, and an array of phosphorus producing activities to address, resource managers in the watershed needed a way to determine how to best focus efforts to achieve phosphorus loading allocations for each lake segment. This was the onus of the creation of this Subwatershed Assessment, and the ultimate identification of hundreds of implementation and outreach projects totaling almost $187,000,000 in funding needs.

Map #2-18

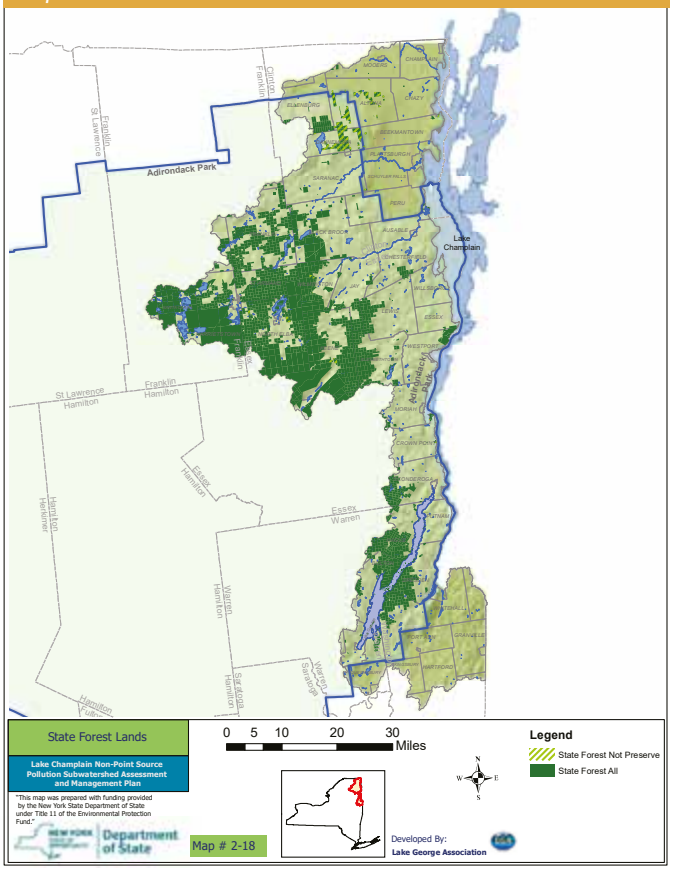


Table 2-3. Phosphorus reduction requirements for each lake segment within the New York portion of the Lake Champlain Watershed.

Segment	Sub-watershed	2010 P Allocation mt/yr	2010 Actual P Load mt/yr	Reduction Required mt/yr	Reduction Required %
South Lake B	Mettawee River Poultney River Champlain Canal Halfway Creek	23.9	50.5	26.6	52.7
South Lake A	Lake George La Chute River Putnam Creek	11.2	7.7	0	0
Port Henry	Direct Lake Mackenzie Brook	3.4	7.2	3.8	52.9
Otter Creek	Direct Lake	0	0.2	0.2	100
Main Lake	Boquet River Ausable River Little Ausable River Salmon River	33.7	72.4	38.7	53.4
Cumberland Bay	Saranac River	25.2	35.8	10.6	29.6
Isle La Motte	Little Chazy River Great Chazy River	22.3	27.7	5.4	19.4

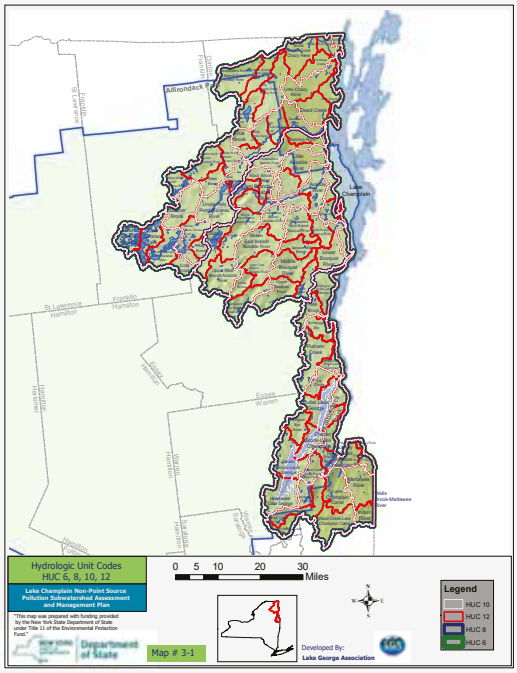
03.

Subwatershed Assessment

This Subwatershed Assessment was developed to compliment the work already identified in the LCBP's Opportunities for Action document and the NYS DEC's Phosphorus Reduction Plan by utilizing a method to determine which of the subwatersheds within New York State has the greatest potential for phosphorus input and impacts from those inputs, based on a suite of parameters associated with phosphorus loading. This was achieved by building a digital matrix that utilized Geographic Information System (GIS) data to rank subwatersheds from highest to lowest priority. By identifying high priority subwatersheds, this process narrowed down the area to be addressed, and identification and implementation of on-the-ground projects to reduce non-point source pollution is more streamlined, and will have a greater benefit to the Lake and its tributaries.

To achieve this goal, a total of 79 HUC-12 (Hydrologic Unit Code; see insert) subwatersheds were identified within the Champlain watershed. HUC-12 level subwatersheds were chosen because their relatively small size would help narrow down priorities to the maximum extent practicable and still remain manageable. Once the level of subwatersheds was identified, working groups were formed to assist in the identification of parameters. The main group was the Advisory Committee, who met for day-long workshops to discuss the potential methods for creating the matrix and the important parameters and scoring ranges to include. A smaller subcommittee, made up of representatives from the Lake Champlain – Lake George Regional Planning Board, NYS DEC, NYS DOS and LGA, was formed to work through the tedious tasks of identifying and obtaining the necessary data needed to create and utilize the matrix. This work aided in better defining the goals and limitations of the assessment.

Hydrologic Unit Codes (HUC)



The US Geological Survey has delineated all the major subwatersheds within the United States and the Caribbean utilizing a national standard that is based on surface hydrologic features. This was done with a hierarchical system with four levels; first-field (region), second-field (sub-region), third-field (accounting unit) and fourth-field (cataloguing unit). Within the US and Caribbean, there are 21 regions, 221 sub-regions, 378 accounting units and 2264 cataloguing units.

A hydrologic unit is defined as an area that accepts surface water from upstream drainage areas. A hydrologic unit is not necessarily synonymous with a watershed, since they don't always include every upstream water sources or include a single outlet point.

A Hydrologic Unit Code (HUC) identifies a hydrologic unit based on six levels of classification;

2-digit HUC	*first-level (region)*
4-digit HUC	*second-level (subregion)*
6-digit HUC	*third-level (accounting unit)*
8-digit HUC	*fourth-level (cataloguing unit)*
10-digit HUC	*fifth-level (watershed)*
12-digit HUC	*sixth-level (subwatershed)*

Each HUC is unique, and the more digits within a HUC the smaller the area that is being defined. The 6, 8, 10, and 12 digit HUCs for the NY Lake Champlain watershed can be seen in Map 3-1.

Reference: Unites States Department of Agriculture

3.1. *Identification of Parameters*

Several factors were taken into consideration when determining what parameters would be utilized to rank the subwatersheds based on their potential phosphorus loading and effects. The first was the availability of the necessary GIS layers that were standard across the watershed. This led to several applicable datasets that were not included based on incompleteness; streambank erosion sites, active timbering sites, and total outfalls/direct discharges to surface waters (as an aside note, recommendations for completion of these datasets can be found in the Regional Priorities in Chapter 6). An additional consideration was made to ensure that none of the parameters used represented potential non-point source pollution generators more frequently than others. Lastly, each subwatershed was normalized to ensure that the sizes of the subwatersheds didn't skew their finalized ranking.

Ultimately, 15 of 16 parameters (sans Parameter 8 – see discussion below) associated with potential phosphorus loading and impacts were utilized in the matrix. They can be broken out into five categories: (1) Water Quality, (2) Geology, (3) Human Impact, (4) Phosphorus Pollution Vectors, and (5) Land Use and Land Cover. Varying scoring ranges from 1 – 10 were assigned to each parameter, with a few being provided with multipliers. The higher the scores given for each parameter, the higher potential for phosphorus input indicated.

3.2. *Water Quality Parameters*

In New York State, the status of water quality in any given waterbody is compiled into the NYS DEC's Priority Waterbodies List (PWL). This list is updated on a statewide, 5-year rotating schedule, utilizing water chemistry sampling and macroinvertebrate identification information to identify water quality problems and their sources, as well as identify the waterbodies best uses. Each assessed waterbody has their own fact sheet with information including uses impacted, types of pollutants and sources of pollutants. This information is further broken down into categories including "known," "suspected," and "possible." Based on the information collected, the waterbody is provided within an overall rating that is defined in The New York State Consolidated Assessment and Listing Methodology: Section 305(b) Assessment Methodology document as;

Impaired Waters are waterbodies with well documented water quality problems that require restoration measures in order for uses to be supported. These waters are candidates for inclusion on the NYS Section 303(d) List of Impaired/TMDL Waters. Impaired Waters have Precluded or Impaired uses, where the confidence in that assessment is Known.

Waters with Minor Impacts are waterbodies where lesser water quality impacts are apparent, but where uses are still considered to be supported. Although water quality improvement is desired, protection – rather than restoration – strategies may be more appropriate for these waters. Generally these waters correspond to waters evaluated as having Stressed uses that are either Known or Suspected. Waters with uses that are Suspected of being Impaired are also considered to have Minor Impacts until the suspected impairment can be confirmed.

Threatened Waters are waterbodies for which uses are not restricted and no water quality problems currently exist, but where additional efforts to protect waters from potential future impacts would be appropriate, based on declining water quality trends, specific land use in the surrounding watershed, and/or the support of specific

uses makes the waterbody more susceptible to water quality threats (e.g., Class AA waters). Targeted, waterbody-specific protection strategies are appropriate for these waters. These waters have uses that are Known to be Threatened. Waters with Suspected Threats are considered to have No Known Impact.

Waters with Impacts that Need Verification are waterbodies that are thought to have water quality impact or impairment, but for which there is insufficient documentation to justify additional management actions. Such waterbodies require additional monitoring to determine whether uses are, in fact, impacted or impaired. These segments include waters with uses that are evaluated as being Stressed or Impaired, but where that evaluation remains Unconfirmed.

Waters with No Known Impact are waterbodies where monitoring data and information indicate that there are no use restrictions or other water quality impacts to uses. These waters correspond to waters where uses have been evaluated as being Fully Supported. Waters with No Known Impact also include waters with Threatened uses that have not been fully documented (ie, Suspected). This category is appropriate to use even when some, but not all, waterbody uses have been assessed.

UnAssessed Waters are waterbodies where adequate water quality information is not available to evaluate the support of any designated uses.

Parameter 1.PWL List: Pollutants *0 – 5 points*

The first parameter utilized in the ranking matrix is associated with the types of pollutants that are listed on the PWL sheets. Four of these pollutants; nutrients, sediment, pathogens and oxygen demand, all have a correlation to phosphorus pollution. Nutrients have the most direct correlation, as it is indicating that there were elevated levels of phosphorus and/or nitrogen in the water. Silt and sediment are also associated with phosphorus loading because phosphorus particles adhere to sediment, so sedimentation in surface waters can also increases phosphorus content. The indication of pathogens in a waterbody is explained by the presence of human and/or animal waste, which also contains nutrients such as phosphorus. Decreased dissolved oxygen has more of an indirect relationship to phosphorus inputs, but is still an important indicator of nutrient loading. Dissolved oxygen refers to the amount of oxygen found within the water. This is oxygen that fish and other aquatic organisms utilize for survival. When there is an increase in the amount of plant and algal growth within a waterbody, it is an indication of increased inputs of nutrients. Those plants and algae eventually die, sinking to the bottom, where they are broken down and utilized as food for microorganisms. In this process, these microorganisms use up dissolved oxygen. The greater amount of dead plant matter at the bottom of a waterbody, the more oxygen is used up to break it down. This is why decreases in dissolved oxygen is utilized as an indicator of phosphorus loading.

If a waterbody has any of the four types of pollutants listed on the PWL sheet, then the waterbody was provided with a range of points. As a way of emphasizing the difference between a known source and a suspected or possible pollutant, a point system was created; "known" pollutants are worth 3 points, "suspected" pollutants are worth 2 points, and "possible" pollutants are worth 1 point. The maximum score that any one waterbody could get is 12 points. Those points were then put into a point scale that is consistent with the point system throughout all the parameters.

10 – 12 points = 5 points	3 – 4 points = 2 points
7 – 9 points = 4 points	1 – 2 points = 1 point
5 – 6 points = 3 points	0 points = 0 points

Once a waterbody received its final scoring for this parameter, each HUC-12 subwatershed where a part of the waterbody is located was assigned the points.

Fivemile Run and tribs (1005-0021) MinorImpacts

Waterbody Location Information

Revised: 03/01/2009

Water Index No: C-100
Hydro Unit Code: 02010001/210 **Str Class:** C(T)*
Waterbody Type: River
Waterbody Size: 18.1 Miles
Seg Description: entire stream and tribs

Drain Basin: Lake Champlain
Champlain-Lk.George
Reg/County: 5/Essex Co. (16)
Quad Map: CROWN POINT (F-27-1)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity
Aquatic Life	Stressed
Recreation	Stressed

Problem Documentation
Known
Possible

Type of Pollutant(s)
Known: - - -
Suspected: NUTRIENTS, Silt/Sediment
Possible: Pathogens

Source(s) of Pollutant(s)
Known: - - -
Suspected: AGRICULTURE, STREAMBANK EROSION
Possible: - - -

Suspected:	Nutrients:	2 points
	Silt/Sediment:	2 points
Possible:	Pathogens:	1 point
		5 points total

CONVERTED INTO FINAL RANKING SCALE: 3 POINTS

Parameter 2. PWL List: Impairments *0 – 5 points*

The second parameter also utilized information obtained from the NYS DEC PWL. The NYS DEC categorizes the severity of uses impacted by determining if the use is impaired, stressed, or threatened. If one of the major four pollutants from the category above is listed as a pollutant, then points were given based on a 0 to 5 point scale.

Impaired = 5 points	Threatened = 1 point
Stressed = 2.5 points	Other = 0 points

As shown in the example below, recreation and aesthetics for Ticonderoga Creek are shown to be "stressed," and two of our four types of pollutants, nutrients and pathogens are listed, so Ticonderoga Creek was given a score of 2.5. The scores for each HUC-12 subwatershed were then totaled and the HUC-12 subwatershed was provided with a score.

Ticonderoga Creek (1006-0017) **MinorImpacts**

Waterbody Location Information Revised: 06/01/2009

Water Index No: C-101
Hydro Unit Code: 02010001/200 **Str Class:** D
Waterbody Type: River
Waterbody Size: 3.2 Miles
Seg Description: entire stream

Drain Basin: Lake Champlain
Champlain-Lk.George
Reg/County: 5/Essex Co. (16)
Quad Map: TICONDEROGA (F-27-4)

Water Quality Problem/Issue Information (CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Recreation	Stressed	Suspected
Aesthetics	Stressed	Known

Type of Pollutant(s)
Known: AESTHETICS (trash, debris)
Suspected: - - -
Possible: Nutrients, Pathogens

Source(s) of Pollutant(s)
Known: - - -
Suspected: URBAN/STORM RUNOFF, Private/Comm/Inst
Possible: - - -

Parameter 3.
Lake Segment Target Reduction Goals *1 – 10 points*

As discussed in Chapter 2, each lake segment was provided with a target phosphorus reduction goal in the TMDL Document. Through work completed by the Lake Champlain Research Institute at SUNY Plattsburgh, testing data for phosphorus levels in each of the lake segments is completed each year, which aids in identifying which lake segments are and are not meeting their goals, and by how much. Table 2-5 shows the target phosphorus reduction goals for each major tributary system, and this was utilized to provide additional points to those subwatersheds that intersect any part of a lake segment that is not reaching its reduction goals. The point system, based on total reduction required in mt/yr, is as following,

37 – 40 = 10 points	17 – 20 = 5 points
33 – 36 = 9 points	13 – 16 = 4 points
29 – 32 = 8 points	9 – 12 = 3 points
25 – 28 = 7 points	5 – 8 = 2 points
21 – 24 = 6 points	0 – 4 = 1 point

A greater scoring range was provided to this parameter because it is not only based on scientific monitoring information, but it is incredibly important to take into consideration the TMDL reduction goals when identifying areas that need the most phosphorus reduction on a smaller scale.

3.3. *Geology Parameters*

Parameter 4. Mean Slope *1 – 5 points*

The slope of an area is the measure of steepness or the degree of inclination from the earth's surface. The greater the slope of an area, the more potential for erosion and sediment movement, which can result in the movement of phosphorus adhered to sediment particles into receiving waterbodies. The mean slope of each HUC-12 subwatershed was calculated and a scoring range was determined based on the highest and lowest average slope value in the watershed. This was done within this parameter, and several to follow, to ensure that a gradient of scores was reached to discern the subwatersheds values to the maximum extent practicable.

2.55 – 2.95 = 5 points	1.73 – 2.09 = 2 points
2.35 – 2.54 = 4 points	1.18 – 1.72 = 1 point
2.10 – 2.34 = 3 points	

Parameter 5. Soil Type *1 – 5 points*

Soil is very important when dealing with management of runoff. Different types of soils allow water to infiltrate faster than others, creating scenarios where less runoff occurs when the underlying soil promotes infiltration and more runoff occurs when the underlying soil inhibits infiltration. Because the Lake Champlain watershed has a plethora of different soil types with varying degrees of sand, silt and clay, it was important to include this parameter as a measure of infiltration potential within each HUC-12 subwatershed.

Soil types are classified by the United States Department of Agriculture Natural Resource Conservation Service into four Hydrologic Soil Groups;

Table 3-1. Hydrolic Soil Group definitions. Information adapted from SUNY ESF.

Hydrolic Soil Groups	Definition	Infiltration Rate (inches/hr)	Relative Runoff Potential
A	Sand, loamy sand or sandy loam. High infiltration rates even when wet. Well drained. Course textured.	> 0.30	Low
B	Silt loam or loam. Moderate infiltration rate when wet. Moderately well drained. Moderately course texture.	0.15 – 0.30	Moderate
C	Sandy clay loam. Low infiltration rate when wet. Impede draining. Moderately fine to fine textured.	0.05 – 0.15	High
D	Clay loam, silty clay loam, sand clay, silty clay or clay. Very low infiltration when wet. High swelling potential. Fine textured.	0 – 0.05	Very High

Points were provided based on the predominate soil type in each HUC-12 subwatershed. Subwatersheds with D soils were given the most points, as these types of soil promote runoff and pollutant movement into surface waters.

D Soils = 5 points	B Soils = 2 points
C/D Soils = 4 points	A Soils = 1 point
C Soils = 3 points	

3.4. *Human Use Parameters*

Parameter 6. Waterbody Classifications *1 – 5 points*

The NYS DEC classifies waterbodies based on their existing or expected best usage. According to the NYS DEC Title 6 regulations, these classifications are defined as,

AA-Special: The best usage of these waters are as a source for drinking, culinary or food processing purposes, primary and secondary contact recreation and fishing (including propagation and survival). These waters meet NYS Department of Health (DOH) drinking water standards without additional treatment.

AA and A: The best usage of these waters are as a source for drinking, culinary or food processing purposes, primary and secondary contact recreation and fishing (including propagation and survival). With additional treatment, these waters can meet NYS DOH drinking water standards.

A-Special: The best usage of these waters are as a source for drinking, culinary or food processing purposes, primary and secondary contact recreation and fishing (including propagation and survival). This classification relates to international boundary waters that with additional treatment, can meet NYS DOH drinking water standards.

B: The best usage of these waters are primary and secondary contact recreation and fishing (including propagation and survival).

C: The best usage of these waters in for fishing (including propagation and survival).

D: The best usage of these water is for fishing (including survival).

Class A, B and C water may also have a (T) designation, which means that they are suitable for the propagation and survival of trout. Many waters within the Lake Champlain watershed have (T) designations.

Points were awarded to each waterbody based on their classification, with the purpose of identifying HUC-12 subwatersheds with high quality waters within them and placing them as higher priorities to maintain that water quality. The classifications were grouped based on the method utilized by the NYS DEC.

AAspcl, AA(T), AA = 5 points	C = 2
Aspcl, A(T), A = 4 points	D = 1
B(T), B, C(T) = 3 points	

Once all of the waterbodies were provided with points, the values within a HUC-12 subwatershed were added together and a 1 – 5 point scale was created based on the minimum and maximum value of points possible.

521 – 869 = 5 points	113 – 223 = 2 points
340 – 520 = 4 points	8 – 112 = 1 point
224 – 339 = 3 points	

Parameter 7. Public Water Supply *0 or 5*

Public surface water drinking supplies are plentiful throughout the Lake Champlain watershed (Map 2-9), and maintaining those waters suitable for drinking is a priority among stakeholders. Points were awarded if the HUC-12 subwatershed had at least one public drinking surface water source within it.

Yes = 5 points	No = 0 points

Parameter 8. Public Beaches *Not Used*

Originally, it was thought that providing higher scores to subwatersheds that have public beaches would be a good way to

incorporate additional human health necessities into the matrix. However, it was found, through compiling the information, that this wouldn't be a useful parameter in determining priorities due to the abundance of public beaches throughout the watershed, and therefore was not utilized in the final ranking matrix.

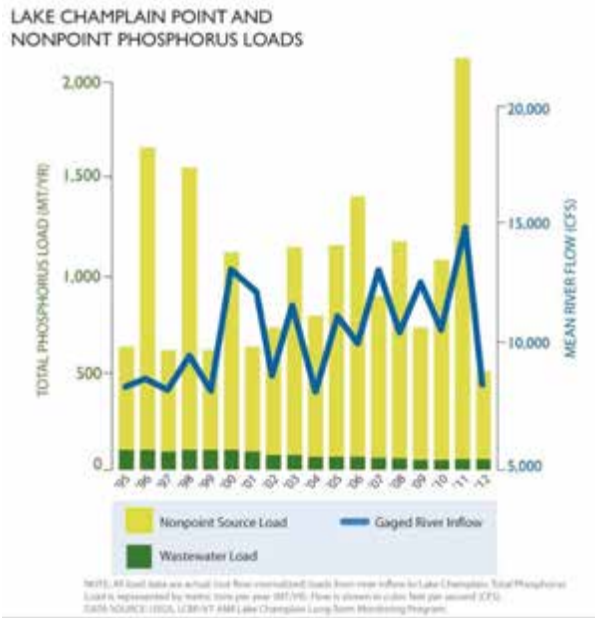
3.5. *Phosphorus Pollution Vector Parameters*

Parameter 9. Miles of Tributaries *1 – 5 points*

Large and small tributaries are extremely abundant throughout the Lake Champlain watershed, and act as vectors for movement of water from within the watershed, downstream to Lake Champlain. It is because of tributaries nature to act as pollutant receptacles within the watershed that the total miles of tributaries within a HUC-12 subwatershed was deemed as an important factor to incorporate. This idea was based on LCBP data taken from the several stream gauges present around the Lake Champlain watershed, which show that with an increase in flow from tributaries, there is increased phosphorus loading to the lake (Figure 3-1). The more miles of tributaries present within a HUC-12 subwatershed, the higher point value the subwatershed was given. The scoring ranges were created based on the minimum and maximum values calculated within all the HUC-12 subwatersheds.

96.10 – 135.71 = 5 points
69.13 – 96.09 = 4 points
49.51 – 69.12 = 3 points
28.39 – 49.50 = 2 points
2.51 – 28.38 = 1 point

Figure 3-1. Point and non-point source phosphorus loading sampling data coupled with gauged mean river flow. Figured taken from LCBP 2015 State of the Lake Report.



Parameter 10. Percent of Septic Systems within 100 feet of a Surface Water *1 – 5 points*

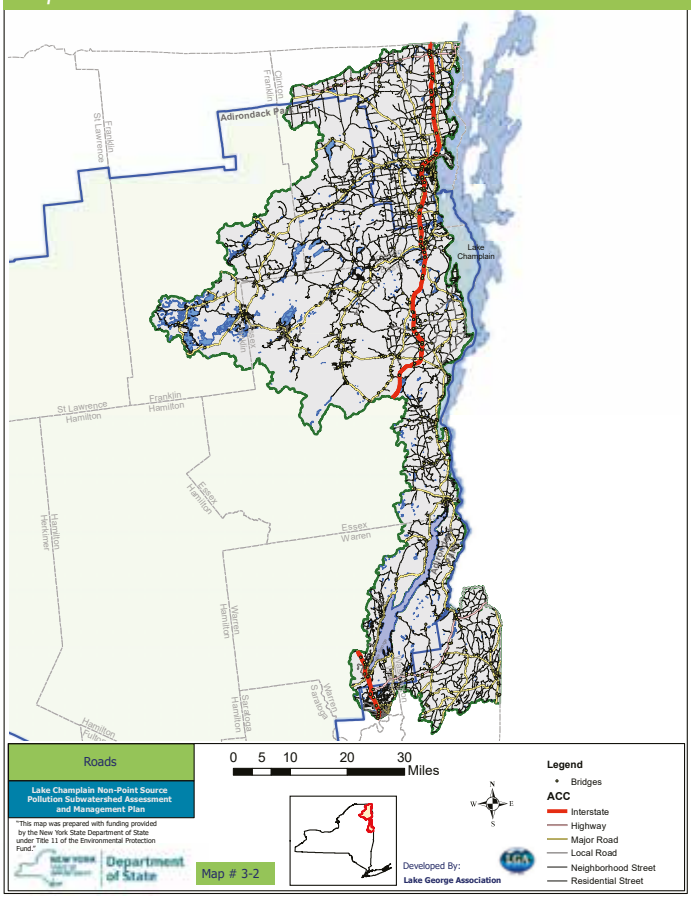
Although this was one of the most difficult parameters to utilize, it was determined by the Advisory Committee that it was an important one to add. Many of the homes along waterbodies in the Lake Champlain watershed are older camps and secondary homes with outdated septic systems that tend to not get properly cared for. Leaching septic system have the potential to contribute abundant amounts of pathogens and phosphorus to surface waters that may not be easily detected. Utilizing parcel data and public sewer data, parcels within 100 feet of a surface water and under 2 acres of land, were identified. The HUC-12 subwatersheds were then provided with points based on the percentage of those parcels.

81 – 100% = 5 points
61 – 80% = 4 points
41 – 60% = 3 points
21 – 40% = 2 points
0 – 20% = 1 point

Parameter 11. Total Lane Miles *1 – 5 points*

As shown in several pieces of work within the Lake Champlain watershed, most notably the LCBP's Technical Report entitled "Assessing the Effected of Unpaved Roads on Lake Champlain Water Quality," roadside ditches act as pollutant vectors from areas far away from surface waters directly into the surface waters (Wemple, 2013). Roads, bridges and their associated drainage systems (Map 3-2) are a vast network of channels that convey water and any pollutants that are picked up along the way, most notably sediment, directly into receiving waters, and are therefore a good indicator of potential phosphorus loading.

Map #3-2



A lane miles is defined as one side of road, so a typical two lane highway will have 2 lane miles within a mile of road distance. Each lane mile has an associated ditch, so calculating the amount of lane miles within each subwatershed provided information on the miles of roadside ditches within each subwatershed. The scoring gradient was based on the minimum and maximum value of total lane miles throughout the HUC-12 subwatersheds, with a greater number of points given to those subwatersheds with more lane miles.

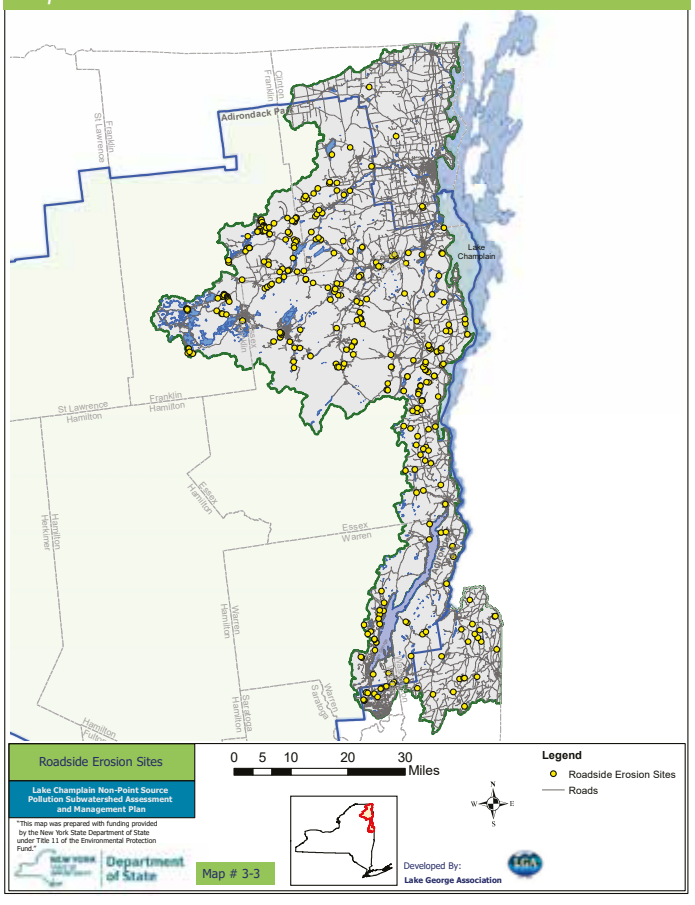
360.27 – 642.27 = 5 points
215.82 – 360.26 = 4 points
136.72 – 215.81 = 3 points
71.30 – 136.71 = 2 points
16.86 – 71.29 = 1 point

Parameter 12. Roadside Erosion Sites *1 – 5 points*

In 2012, the Lake Champlain – Lake George Regional Planning Board published their "Lake Champlain Roadside Erosion Assessment and Inventory" report. This report identifies a total of 319 actively eroding sites on state, county, public and private roads throughout the Lake Champlain watershed, and the location of the sites can be seen on Map 3-3. Each site was evaluated based on the severity of erosion and ranked high, medium or low priority for remediation. Within this Subwatershed Assessment, each site identified was given a point value based on their priority,

High priority sites = 3 points
Medium priority sites = 2 points
Low priority sites = 1 point

Map #3-3



Within each HUC-12 subwatershed the number of sites and their priority scores were added together to identify a total number. Those numbers where then broken into a 5 point scoring range for the HUC-12 subwatersheds, based on the minimum and maximum values calculated.

25.1 – 42 = 5 points
15.1 – 25 = 4 points
8.1 – 15 = 3 points
4.1 – 8 = 2 points
1 – 4 = 1 point

3.6. *Land Use and Land Cover Parameters*

Three land use categories were utilized in this parameter that are consistent with the land use types utilized by the LCBP; Developed, Agriculture, and Forested. Based on research findings discussed below, developed and agricultural lands were shown to create the greatest amount of phosphorus loading, and therefore additional parameters were created to emphasize their importance. Forested land cover was not additionally assessed because there isn't enough available data to determine if different land uses within forested areas are increasing or decreasing phosphorus inputs.

Additionally, three of the four land use and land cover parameters utilized were ranked on a points scale from 2 – 10, to emphasize the importance that land type and use has on phosphorus loading within a watershed.

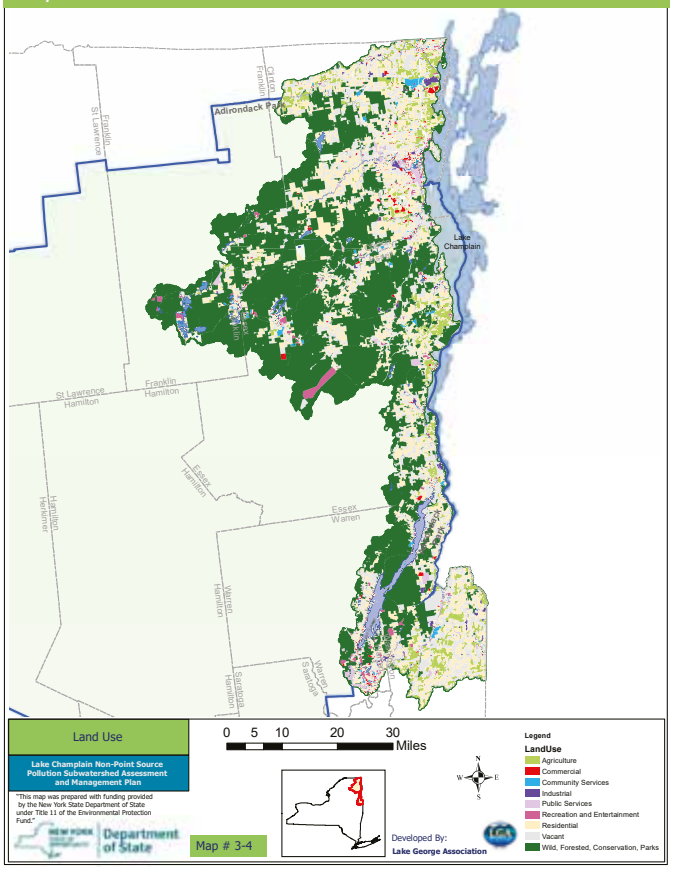
Parameter 13. Current Land Use – Phosphorus Loading per Land Use Type *2 – 10 points*

For this parameter, land use within each subwatershed was determined (Map 3-4), and the total acreage of that land use type was multiplied by a phosphorus loading coefficient provided by staff at the NYS DEC. NYS DEC staff determined these loading coefficients by completing an in-depth comparative analysis of two approved TMDLs (Lake Champlain and Onondaga Lake) and loading based on the 2011 National Land Cover Dataset (NLCD) using the simple method for determining stormwater loads. NYS DEC generally uses the best fit of these two TMDLs, however since this analysis was in the Lake Champlain Basin, NYS DEC staff provided the loading coefficients that matched the Lake Champlain TMDL for use.

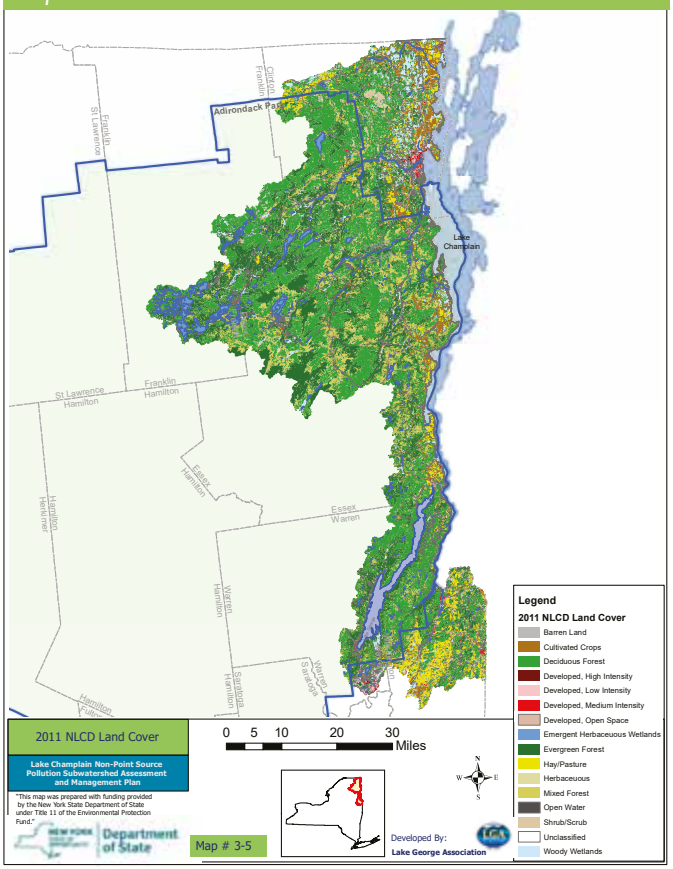
Land use, which was simplified into Developed, Agriculture and Forested categories, within each HUC-12 subwatershed was determined based on their associated land cover types (Map 3-5). Once each of the individual land use types had its score within each HUC-12 subwatershed, they were all added together to give each subwatershed a final score. A point range from 2 – 10 was derived by utilizing the minimum and maximum scores calculated for the subwatersheds.

11280.28 – 22798.65 = 10 points
7454.58 – 11280.27 = 8 points
4767.70 – 7454.57 = 6 points
2585.24 – 4767.69 = 4 points
433.60 – 2585.23 = 2 points

Map #3-4



Map #3-5



Parameter 14. Current Land Use – Phosphorus Loading Per Lake Segment — *0 or 5 points*

In 2007, the LCBP released a technical report, "Updating the Lake Champlain Basin Land Use Data to Improve Prediction of Phosphorus Loading," outlining the major contributors of phosphorus within each lake segment based on land use data analysis (Troy, Wang & Capen, 2007). For New York, the conclusions are as following,

Lake Segment	Developed (%)	Agriculture (%)	Forestry (%)
South Lake B	50	44	6.1
South Lake A	66.2	18.8	14.9
Port Henry	63.5	24.7	11.8
Otter Creek	57.4	10.2	32.5
Main Lake	63.6	19.5	16.9
Cumberland Bay	67.1	17.8	15.1
Isle La Motte	44.3	48.1	7.7

Based on the results of this study, it shows that developed lands contribute the most phosphorus per lake segment in all but one of the segments. In an effort to incorporate these findings into the model, the predominate land use in each of the subwatersheds was determined and the subwatershed was awarded points if the predominate land use was the same type as the land use determined to be the biggest contributor of phosphorus in this study.

Yes = 5 points No = 0 points

Parameter 15. Current Land Cover – Percent Impervious — *2 – 10 points*

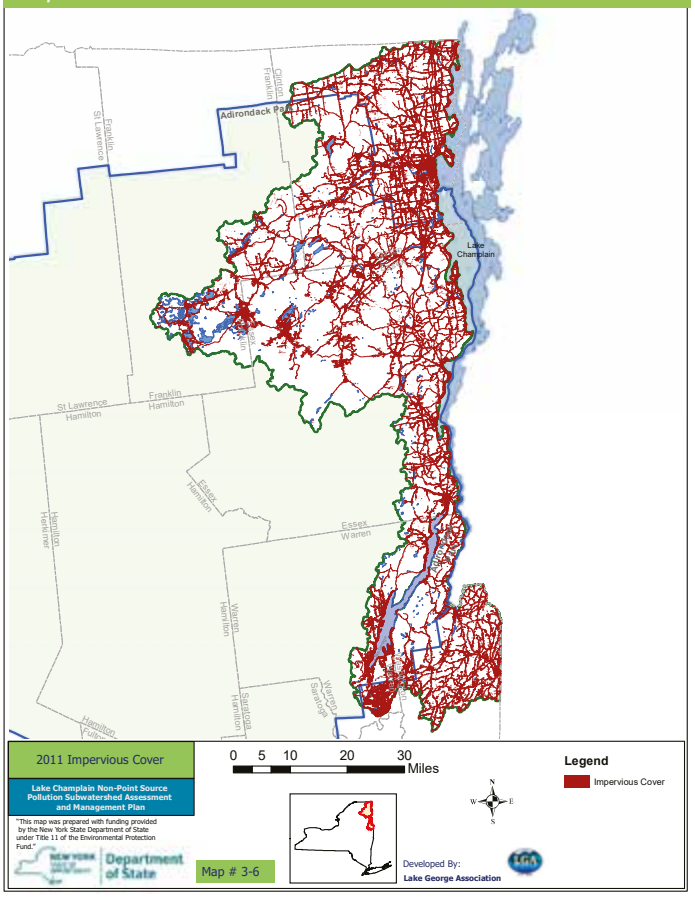
Impervious surfaces are those that water cannot penetrate through, therefore promoting runoff. The most common impervious surfaces are roofs, driveways and streets. When this water runs off it picks up pollution from the landscape and discharges it into the nearest surface water, creating non-point source pollution. It is because of this that the amount of impervious surface within the watershed is an important factor in not only determining loading, but determining appropriate remediation practices.

To address the importance of knowing how much of a watershed is impervious, the LCBP completed a GIS layer of all the impervious cover within the Lake Champlain watershed in 2013 (Map 3-6). This layer was created by using 1-meter resolution multispectral imagery, as well as object-based image analysis techniques. Anthropogenic impervious surfaces were mapped as two classes; Roads/Railroads and Other impervious surfaces including driveways, sidewalks, parking lots, buildings, and quarries (O'Neil-Dunne, 2013).

Utilizing the completed data layer, the percentage of each HUC-12 subwatershed that is impervious was determined and a scoring range was created based on percent. Those subwatersheds with more impervious surface were given higher point values.

81 – 100% = 5 points
61 – 80% = 8 points
41 – 60% = 6 points
21 – 40% = 4points
0 – 20% = 2 points

Map #3-6



Parameter 16. Current Land Cover – Percent Row Crop *2 – 10 points*

Fields that produce row crops, which are the agricultural equivalent to impervious surfaces, contribute a greater amount of phosphorus loading than those that are pastured, especially if they are on clay soils. The majority of the phosphorus movement off of row cropped fields is through erosion of sediment particles that have phosphorus from fertilizers adhered to them. In contrast, the lower rate of erosion from pastured lands, coupled with a lack of fertilization on those lands, produces less phosphorus leaching (National Research Council, 1993).

To take this into consideration, the "agricultural" land cover category was further broken down into "row crop" and "pasture." Then the percentage of row crop land cover was determined for each subwatershed and a point scale was created, giving higher points to subwatersheds with a greater percentage of row crops.

81 – 100% = 10 points
61 – 80% = 8 points
41 – 60% = 6 points
21 – 40% = 4 points
0 – 20% = 2 points

3.7. *Basic Characteristics of High Priority HUC-12 Subwatersheds*

Overall, utilizing these parameters, high priority subwatersheds have these basic characteristics:

- High percentage of surface waters listed on the PWL for pollutants associated with phosphorus and that are displaying noticeable use impairments because of those pollutants,
- Are within lake segments that need the greatest phosphorus reductions based on TMDL Allocations,
- Steep slopes and impermeable soils,
- Special use classifications and public surface water drinking supplies,
- High quantity of septic systems near waterbodies, streams, roads and actively eroding road banks, and
- High percentage of developed and/or agricultural land that is predominately impervious and/or row crops.

04.

Methodology & Results

The information utilized for the creation of the matrix was driven by the availability of data that was standard throughout the five-county watershed, in addition to the completeness of the corresponding metadata. Methodology consisted of the creation of a matrix that manipulated metadata to assign values to each HUC-12 subwatershed within each parameter. These values were utilized to determine where the greatest likelihood of phosphorus loading occurs within the watershed. These high priority areas can be seen in red within the figures in this chapter, which showcase the results from each parameter.

4.1. *Data Acquisition*

Data were collected on 15 of 16 potential phosphorus loading parameters that were included in the creation of the scoring matrix. While many of the datasets previously existed, none were in a format that could be readily utilized within the matrix. All of the data had to be processed in some way, including, adding fields of data via a relational database or look up table, clipping, joining and merging data, assigning a score, or splitting up the data into the individual HUC-12 datasets. All of the datasets were clipped to the Lake Champlain watershed either as a whole, Vermont and New York, or just New York. A watershed shapefile was obtained from the Lake Champlain Basin Program to complete this process, as were many other utilized files. All GIS work was completed using ESRI ArcGIS Desktop 10.2.2 thru 10.5. Additional maps were created utilizing ArcGIS Pro.

The scores for each one of the parameters are broken out into five categories from High to Low using a Natural Break (Jenks) method to better visualize the individual results. The Jenks method uses a manual data classification that partitions the data into classes based on natural groups in the data distribution using the low points in the histogram. Also considered was the Equal-Interval classification, which divides a set of attribute values into groups that contain an equal range of values, but it was determined that this classification system didn't adequately represent the data and wasn't used in this report or in the results.

4.2. *Matrix Results and Discussion*

Parameter 1. PWL List: Pollutants *0 – 5 points*

The original Waterbody Inventory/Priority Waterbodies List (PWL) dataset is maintained by the NYS DEC. The PWL dataset contains a statewide list of all PWL waterbodies with additional database information including a breakdown of pollutants, sources and uses that are all linked to the original file by a PWL ID. Using the metadata included with the dataset, look up tables were created to expand codes or abbreviations contained in the table, and were assigned to the corresponding PWL streams in the watershed. Tables were also used to assign points based on whether a pollutant was known or unknown. An example of the created table can be seen in Table 4-1.

Table 4-1. Metadata table for Parameter

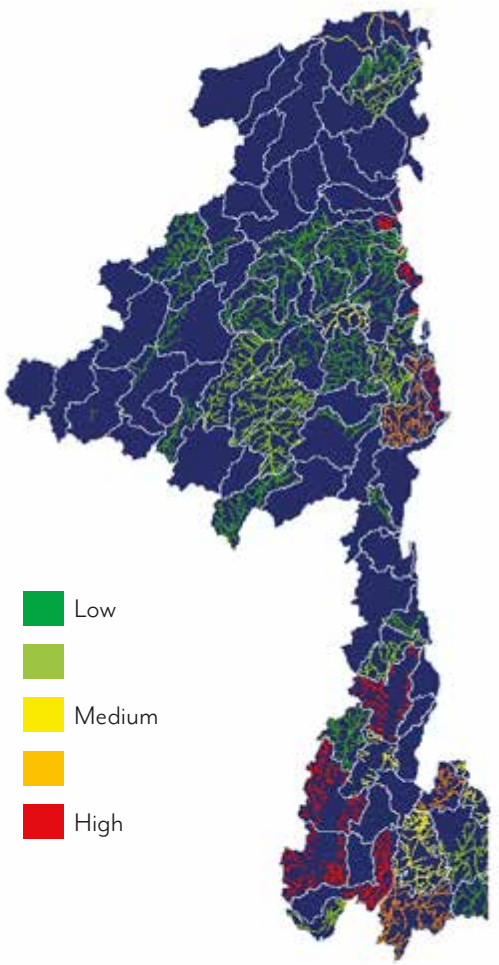
LUTDOC	SCOREDOC
K	3
S	2
P	1
--	0

If one or more pollutants were listed in the stream a corresponding score would be given based on the breakdown in Table 4-1. If the pollutant was "known" (K), "suspected "(S), "possible" (P) or "blank" (-) it was given the appropriate score. The final stream score was placed into a point scale of 1 to 5 based on the following range;

10 – 12 points = 5 points	3 – 4 points = 2 points
7 – 9 points = 4 points	1 – 2 points = 1 point
5 – 6 points = 3 points	0 points = 0 points

Each stream was then matched or grouped into a corresponding HUC-12 subwatershed and the final scoring was placed into a point scale of 1 (Low) to 5 (High). As can be seen in Figure 4-1, the majority of the high scoring subwatersheds are within the South Lake A subwatershed, which surrounds Lake George, as well as some direct drainage areas in Essex County. Several medium scoring HUC-12 subwatersheds are within the South Lake B subwatershed, based on the NYS DEC's assessment of the Champlain Canal and its tributaries. The majority of low and blank scores are found within the high peaks and less populated areas, indicating that urbanization and shoreline development are impacting surface waters.

Figure 4-1. Final matrix output results for Parameter 1: PWL List: Pollutants. Areas shown in red indicate a high quantity of pollutants detected within surface waters associated with phosphorus loading.



Parameter 2. PWL List: Impairments *0 – 5 points*

The second parameter also utilized information obtained from the PWL dataset that is maintained by NYS DEC. Impairments, or the severity of impacts on the waterbody use, is evaluated as Precluded, Impaired, Stressed, or Threatened. Since none of the waterbodies were 'Precluded', no point value was assigned to this category. If a designated use was listed with a severity of impairment, it was given a score from 0 to 5, as noted in Table 4-2 below. Again, the streams were grouped by HUC-12 subwatersheds and then totaled.

Table 4-2. Metadata table for Parameter 2: PWL List: Impairments.

OBJECTID	SEV	SEV_LIST
1	P	Precluded
2	I	Impaired
3	S	Stressed
4	T	Threatened
5	-	-

Figure 4-2. Final matrix output for Parameter 2 PWL List: Impairments. Red areas indicate those that have a higher severity of impacts associated with phosphorus pollution in surface waters.

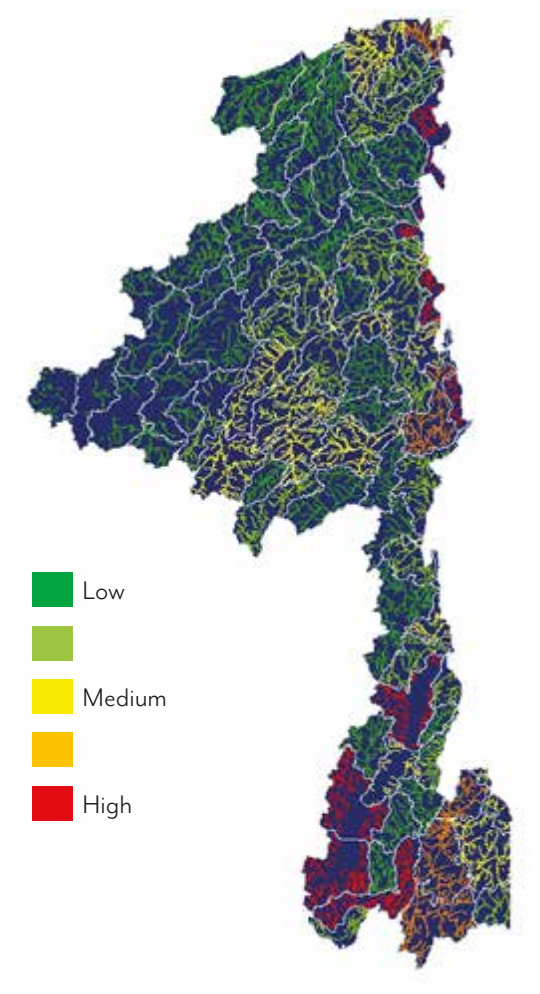


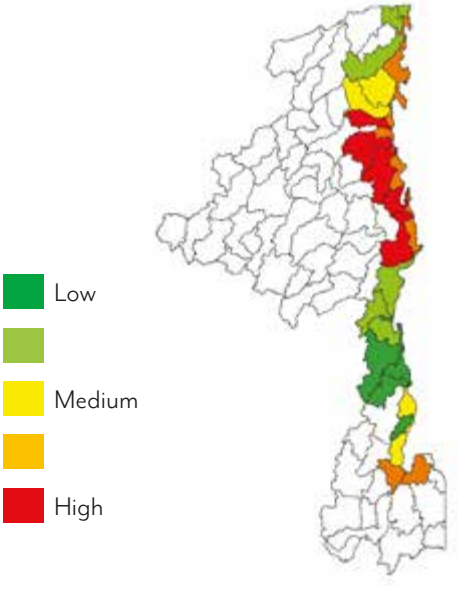
Figure 4-2 shows that the highest scoring streams are located near the shoreline of Lake Champlain and Lake George, and within the areas with the greatest population concentrations. The streams that scored within the medium category are located in the heavily farmed areas of Washington and Clinton County, as well as in the headwaters of the Ausable and Boquet River watersheds. Areas in the High Peaks and sparsely populated areas of the watershed have no confirmed impairments.

Parameter 3. Lake Segment Target Reduction Goals *1 – 10 points*

The target phosphorus reduction goal data were supplied by the Lake Champlain Research Institute at SUNY Plattsburgh. For the purposes of using this information in the matrix, if a HUC-12 subwatershed intersected any part of a lake segment, it was assigned a reduction score. The higher the reduction value the greater the score. Unfortunately, the lake segments do not match up to the HUC-12 subwatershed boundaries as some of the HUC-12 subwatersheds are spread up and down the shoreline or are even split into different segments rather than a contiguous watershed. When this occurred the points assigned were based on the percentage of the HUC-12 in that lake segment. For example, the Lake Champlain HUC-12 subwatershed boundary intersects with three (3) different lake segments of 38.7, 5.4 and 10.6 mt/yr. Based on the percentage of each area intersecting the specific corresponding segment; a final score of 25.4 was estimated. If a HUC did not intersect with a lake segment, it did not receive a score.

The final matrix output for this parameter can be seen in Figure 4-3. High scoring HUC-12 subwatersheds are those that are within the Main Lake watershed, which has the highest target phosphorus reduction goal on the New York side of the basin, followed by South Lake B and Cumberland Head. The lower scores (green) shown at the nearshore area found in southern Essex County include the Otter Creek and Port Henry subwatersheds, which have the lowest calculated phosphorus reduction goals (Table 2-5).

Figure 4-3. Final matrix output for Parameter 3: Lake Segment Target Reduction Goals. HUC-12 subwatersheds shown in red intersect the lake segment with the highest phosphorus reduction needs.

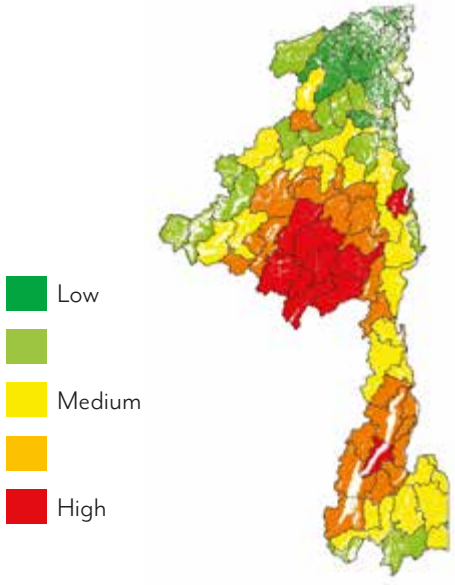


Parameter 4. Mean Slope *1 – 5 points*

The slope data were derived from the 7.5-minute DEMs (Digital Elevation Models) created and maintained by the U.S. Geological Survey (USGS) and NYS DEC. The DEMs have a 10-m by 10-m data spacing, elevation in decimeters. Coverage is provided in 7.5-minute by 7.5-minute blocks or a standard USGS 7.5-minute quadrangle. Blocks covering the watershed were mosaicked together and then clipped to the New York side of the watershed boundary and slopes were calculated using the Slope function in the ArcToolbox. The mean slope of each HUC-12 subwatershed was calculated when the slope data were grouped into HUC-12 subwatersheds.

The steepest slopes in the watershed can be found in the High Peaks region of the Adirondacks, located within Essex County. Other high mean slopes areas are located around Lake George. The rest of the watershed has relatively low slopes, which is where the agriculture in the watershed is located (Figure 4-4).

Figure 4-4. Final matrix output for Parameter 4: Slope. The outputs show the HUC-12 subwatersheds with steepest slopes from High (red) to Low (green).



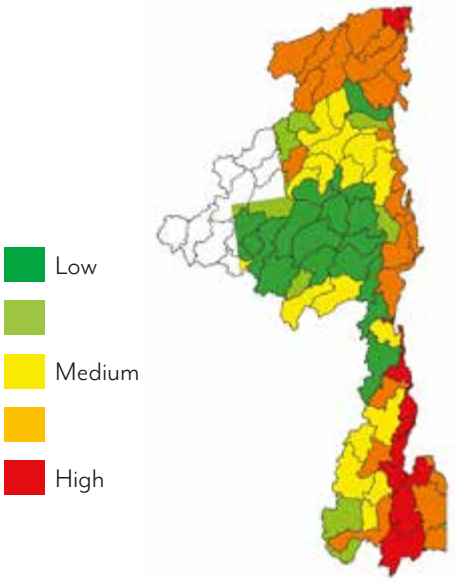
Parameter 5. Soil Type *1 – 5 points*

The soil database (Soil Survey Geographic or SSURGO) utilized for the model are created and maintained by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). The dataset is a digital soil survey (Web Soil Survey) and is generally the most detailed level of soil geographic data developed by the National Cooperative Soil Survey. The GIS map unit polygons were linked to data culled from the MS Access SSURGO database. The Hydrologic Soil Groups were selected from the database and scored utilizing the information shown in Table 4-3. The soil types that don't infiltrate well or provide the greater chance of generating runoff (C & D soils) received the higher scores, as those would be the soils most likely to produce runoff.

Table 4-3. Metadata table for Parameter 5. Soil Type.

LINK	RANK
A	1
A/D	3
B	2
B/D	4
C	3
C/D	4
D	5
Null	0

Figure 4-5. Final matrix output for Parameter 5: Soils. The output shows the results of the Hydrologic Soil Group data for each HUC-12 subwatershed, with high scores indicating impermeable (Type D) soils.



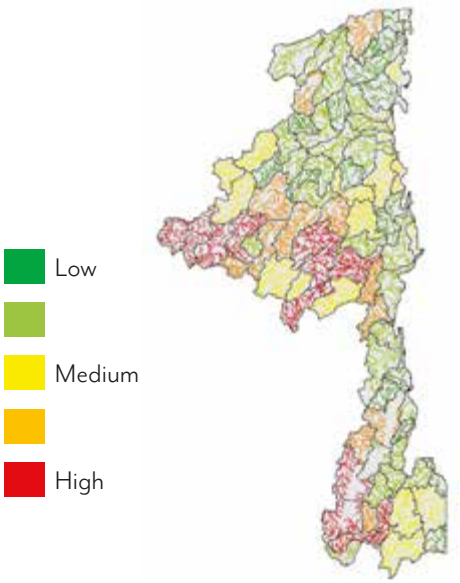
Unfortunately, no soils data for Franklin County were available, so those HUC-12 subwatersheds were not provided with a score. However, generally speaking, soils within Franklin County are sandy and well drained (A soils), so a comfort level with continuing with this parameter without Franklin County was established, as they would have received a low score. The undrained soils, which are the soils of concern, can be found mostly in Washington and Clinton Counties. These areas have the fertile clay soils where the majority of agricultural production in the watershed can be found. Higher permeability soils can be found in the High Peaks region in Essex County and lower Warren County (Figure 4-5).

Parameter 6. Waterbody Classifications *1 – 5 points*

This data set provides the water quality classifications of New York State's lakes, rivers, streams and ponds, collectively referred to as waterbodies. All waterbodies in the state are provided a water

quality classification based on existing, or expected, best usage of each waterbody or waterbody segment. Under New York State's Environmental Conservation Law (ECL), Title 5 of Article 15, certain waters of the state are protected on the basis of their classification. Streams and small waterbodies located in the course of a stream that are designated as C (T) or higher (i.e., C (TS), B, or A) are collectively referred to as "protected streams" (source - NYS DEC 'LC_wclineStreams.shp' Metadata).

Figure 4-6. Final matrix output for Parameter 6: Waterbody Classification. Subwatersheds shown in red indicate those HUC-12 subwatersheds that have a higher class of waterbody for human uses, as determined by the NYS DEC.



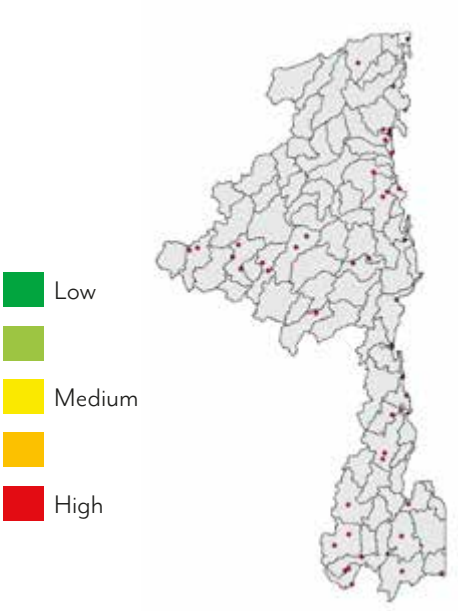
All of the waterbodies were assigned points based on their classification. The waterbodies were then divided into their respective HUC-12 subwatershed and the points were tallied. Using the Jenks method, the HUC-12 subwatersheds were classified into 5 different groups, with the watersheds having the greatest number of high quality waterbodies getting the highest number.

The majority of the portions of the watershed that have higher waterbody classifications are for those surface waters that are utilized or at least classified for drinking water. These include Lake George and Upper Saranac Lake. Higher classifications are also given to those that support trout reproduction, as discussed in Chapter 3, which include many of the tributaries in the High Peaks (Figure 4-6).

Parameter 7. Public Water Supply *0 or 5 points*

The Public Water Supply data are distributed and maintained by the NYS DEC. The data are from any facility that has the capacity to withdraw 100,000 gallons or more per day of surface or groundwater for any purpose. The data on these facilities are collected in accordance with NYS DEC Permit ECL 15-1501 and also require annual usage reporting. Only surface water data were used in the matrix, and points were assigned and totaled for any HUC-12 subwatershed that had at least one public surface water supply located within it. Only 28 facility locations were tallied and each of the applicable HUC-12 subwatersheds was given a score of 5, while all other HUC-12 subwatersheds were given a score of zero (0) (Figure 4-7).

Figure 4-7. Final matrix output for Parameter 7: Public Water Supply. Dots indicated HUC-12 subwatersheds with a Public Water Supply of 'Surface Water'.



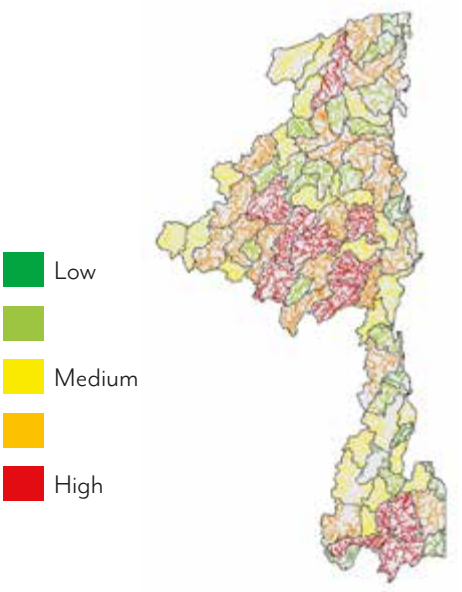
Parameter 8. Public Beaches *Not Used*

Originally part of the matrix, it was determined it wouldn't be a useful parameter and was not utilized in the final ranking matrix. However, because it had already been built into the matrix as a Parameter slot and therefore could not be removed without major reconstruction of the matrix, all fields for this parameter were left blank.

Parameter 9. Miles of Tributaries *1 – 5 points*

This dataset was created utilizing the same data provided by the NYS DEC for Parameter 6: Waterbody Classifications. The miles of

Figure 4-8. Final matrix output for Parameter 9: Miles of Tributaries. HUC-12 subwatersheds shown in red indicate those that have the greatest mileage of tributaries within the subwatershed.



tributaries were summed for each of the HUC-12 subwatersheds, and it was determined that the greatest number of miles of tributaries within one HUC-12 subwatershed was 135.71 miles, while the lowest was 28.38 miles. The more miles of tributaries present within a subwatershed, the higher point value the HUC-12 subwatershed was given.

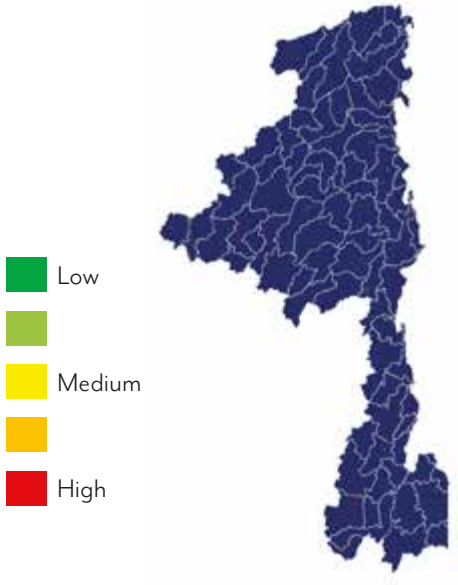
The distribution of HUC-12 subwatersheds with the greatest miles of tributaries is scattered throughout the watershed as seen in Figure 4-8, with the greatest mileage found in the High Peak region of Essex County. This is because many of the large river systems in the watershed begin from the array of higher elevation lakes, ponds, and springs originating in the mountains. South Lake B also has a high number of tributaries that feed the Champlain Canal.

Parameter 10. Percent of Septic Systems within 100 feet of a Surface Water *1 – 5 points*

For this parameter, parcel data from each county were utilized in conjunction with the NYS DEC data from the waterbody classification dataset to select parcels that are 2-acres or less and within a 100-foot buffer area of a surface water. GIS sewer district data were then removed from the resulting parcels to identify those parcels not on municipal sewer. In addition, State Pollutant Discharge Elimination System (SPDES) program point data from the NYS DEC were given a buffer of 100 ft and removed from the parcel data.

The acreage of the remaining parcels was summed by HUC-12 subwatershed. The percentage of parcel acreage within the 100-foot buffer of a waterbody was then compared to the total parcel acreage and ranked.

Figure 4-9. Final matrix output for Parameter 10: Percent of Septic Systems within 100 feet of a surface water. Areas in red indicate higher percentages of septic systems within 100 feet of a surface water.



The data displayed in Figure 4-9 are hard to distinguish, however over 12,300 acres fit the above criteria. A percentage of 1.28% to 2.29% constituted a HUC-12 subwatershed with a high ranking, and can be seen in red. The areas with the highest percentage include the Lake George watershed, Lake Placid area and the Town of Plattsburgh directly surrounding the City of Plattsburgh.

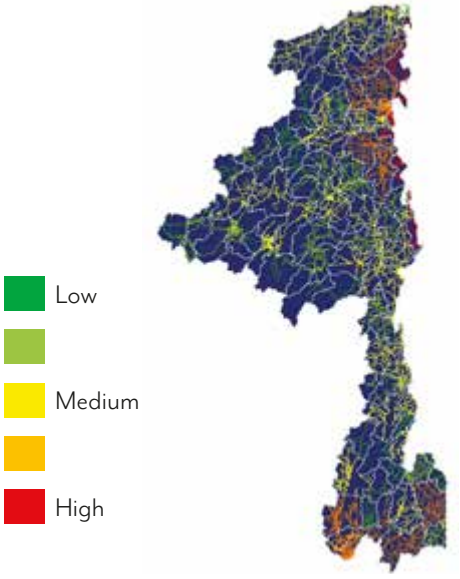
Parameter 11. Total Lane Miles *1 – 5 points*

The data used to derive the total lane miles were created from a clipped dataset from the New York State GIS Program Office's (NYS GPO) NYS Streets dataset. The vector file listed segment length as a single lane or one-way length. To determine lane miles from this information, the length was calculated for both directions of use as well as number of lanes (e.g. I-87). A look up table was used to determine number of lanes for each road segment based on the Feature Class Codes (FCC)(Table 4-5). The segment lengths were then summed for each HUC-12 subwatershed.

Table 4-5. Metadata table for Parameter 11. Total Lane Miles.

LUTFCC	LANESFCC
A15	4
A21	2
A25	2
A30	2
A35	2
A40	2
A41	2
A45	1

Figure 4-10. Final matrix output for Parameter 11. Total Lane Miles. Areas in red indicate those HUC-12 subwatersheds that have a greater number of road miles.



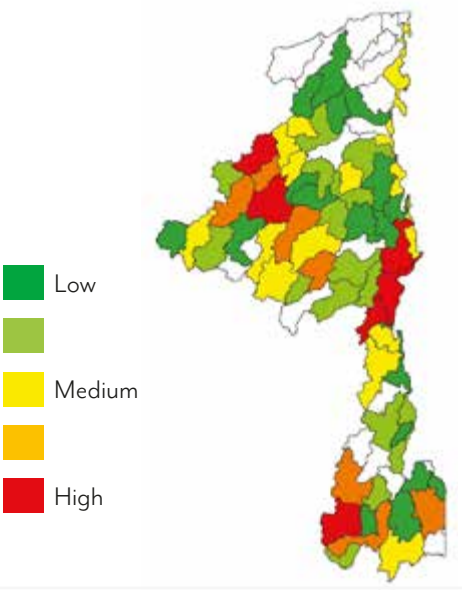
In general, the areas with the highest number of lanes miles are along the shoreline of Lake Champlain including and surrounding the City of Plattsburgh, the former Village of Keeseville, the more densely populated areas of southern Warren County, and portions of Washington County. The region with the smallest number of lane miles is the High Peak region in Essex County (Figure 4-10).

Parameter 12. Roadside Erosion Sites *1 – 5 points*

Point data collected from the Lake Champlain – Lake George Regional Planning Board's 2012 "Lake Champlain Roadside Erosion Assessment and Inventory" report was compiled and utilized to provide points to the HUC-12 subwatersheds with either a large number of sites or those with high priority actively eroding sites. The points for each HUC-12 subwatershed were then added together and ranked to determine a final point score for each.

As seen in Figure 4-11, the HUC-12 subwatershed that is indicated in red within Warren County includes an area of the county that has several high priority roadside erosion sites for remediation. The nearshore HUC-12 subwatersheds in lower Essex County are within the Towns of Crown Point and Moriah, which are areas that were hit particularly hard by Hurricane Irene in 2011 and have a significant number of high priority sites. The Franklin County portion of the watershed that is red is because of the number of roadside erosion sites identified within that area, which can be attributed to its sandy soils.

Figure 4-11. Final matrix output for Parameter 12. Roadside Erosion Sites. HUC-12 subwatersheds in red indicate those that have either a high number of sites or sites that are of high priority to remediate.



County	Number of Sites per Priority			Percentage of sites in Champlain Watershed	Total Restoration Costs per County
	High	Moderate	Low		
Clinton	22	6	6	11%	$91,150
Essex	50	39	42	40%	$1,443,650
Franklin	14	13	62	28%	$72,700
Warren	19	8	7	11%	$35,350
Washington	12	11	8	10%	$65,750

Graphic taken from the Lake Champlain – Lake George Regional Planning Board's 2012 Lake Champlain Roadside Erosion Assessment and Inventory report showing the number of sites identified within each county and their priority ranking.

Parameter 13. Current Land Use – Phosphorus Loading per Land Use Type *2 – 10 points*

For this parameter, the National Land Cover Dataset (NLCD) from 2011 was utilized, which is distributed by the U.S. Geological Survey. As stated in the metadata, the goal of the dataset is to provide the U.S. with complete, current and consistent public domain information on its land use and land cover.

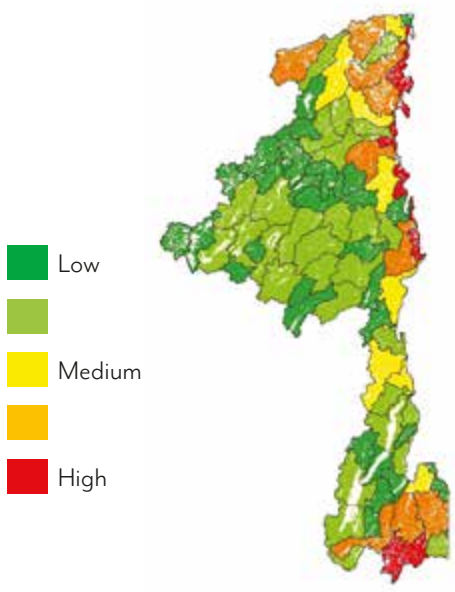
In order to determine phosphorus loading per the land use type of Developed, Agriculture and Forested lands, the following land cover types found in Table 4-6 were culled out from the NLCD 2011 data to coincide with each land use.

Table 4-6. Categories of current land use and cover types utilized for Parameter 13. Current Land Use – Phosphorus Loading per Land Use Type.

Land Use Type	Land Cover Type
Developed	Developed Low Intensity
	Developed Medium Intensity
	Developed High Intensity
	Developed Open Space
Agriculture	Cultivated Crop
	Hay/Pasture
Forested	Mixed Forest
	Evergreen Forest
	Deciduous Forest

The individual cover types were then combined into the coinciding land use category. All acreage and percent cover of each cover type was then summed together. The NYS DEC TMDL model, appropriately named 'TMDL Lite Champlain', was used to derive runoff coefficients and phosphorus loadings for each land use category. The phosphorus loads were then summed within each HUC-12 subwatershed. The Jenks method was used to create five (5) class ranges and points were assigned from 2 – 10 with 10 having highest phosphorus load range. The HUC-12 subwatersheds with a predominantly forested landscape ended up with lower phosphorus load scores than those with a predominantly developed and/or agricultural landscape (Figure 4-12).

Figure 4-12. Final matrix output for Parameter 13. Current Land Use – Phosphorus Loading per Land Use Type. HUC-12 subwatersheds in red indicate areas with greater amount of phosphorus loading potential based on current land use.



Parameter 14. Current Land Use – Phosphorus Loading Per Lake Segment *0 or 5 points*

To determine the phosphorus loading per lake segment, the data generated from Parameter 13 was utilized and the HUC-12 subwatersheds that directly intersected with the lake segments were selected, as was done in Parameter 3. It was determined which land use (Developed, Agriculture or Forested) was the predominant coverage for that lake segment. This was done by selecting the coverage with the highest percent cover in the dataset. A lookup table was used to fill in the land use type that has shown to be the biggest contributor of phosphorus for that lake segment based on the 2007 LCBP report (Table 4-7). If, for example, a HUC-12 subwatershed in South Bay intersects with South Lake B, then that watershed's biggest contributor of phosphorus would be assigned as Developed.

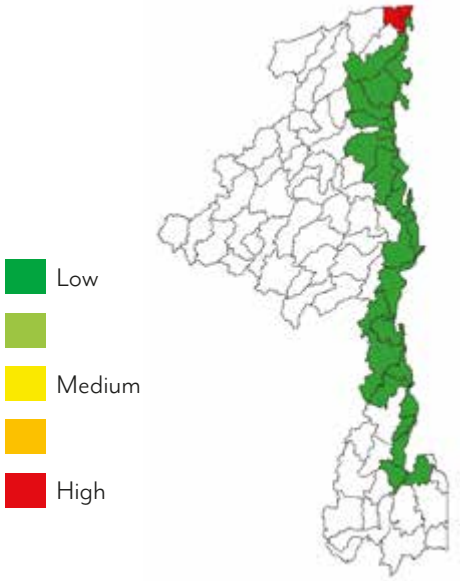
If the predominant land use from the HUC-12 subwatershed, based on the NLCD 2011 dataset, matched what was the assigned land use based on the lake segment and the land use with the biggest phosphorus load contribution, it was given a score of 5 points. If they did not match, no points were awarded.

Table 4-7. Table adapted from the 2007 LCBP report "Updating the Lake Champlain Basin Land Use Data to Improve Prediction of Phosphorus Loading" showing the percent of land cover contributing to phosphorus loading with each lake segment.

Lake Segment	Developed (%)	Agriculture (%)	Forestry (%)
South Lake A	66.2	18.8	14.9
South Lake B	50	44	6.1
Port Henry	63.5	24.7	11.8
Otter Creek	57.4	10.2	32.5
Main Lake	63.6	19.5	16.9
Cumberland Bay	67.1	17.8	15.1
Isle La Motte	44.3	48.1	7.7

As can be seen in Figure 4-13, only two of the HUC-12 subwatersheds met this criteria, which area both located in the Isle La Motte lake segment. This is because the LCBP's study indicated that agriculture is the greatest contributor of phosphorus in that lake segment, and those subwatersheds have a predominately agricultural land use.

Figure 4-13. Final matrix output for Parameter 14. Current Land Use – Phosphorus Loading Per Lake Segment.



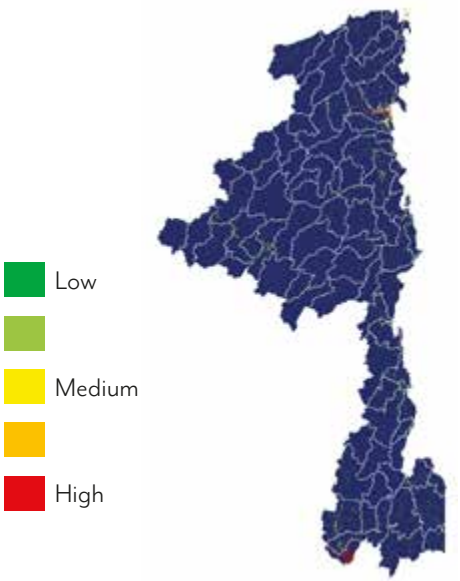
Parameter 15. Current Land Cover – Percent Impervious *2 – 10 points*

The University of Vermont Spatial Analysis Laboratory created a high-resolution impervious surfaces dataset for the Lake Champlain watershed (Troy, Wang & Capen, 2007). The dataset was created by using 1-meter resolution multispectral imagery, as well as object-based image analysis techniques. Anthropogenic impervious surfaces were mapped as two classes; Roads/Railroads and Other impervious surfaces including driveways, sidewalks, parking lots, buildings, and quarries.

For this matrix, the impervious surfaces were split into their respective HUC-12 subwatershed. Each HUC-12 subwatershed then had the

percent impervious cover calculated using ArcGIS 10.2 and the Jenks method was used to determine and separate out the five (5) natural breaks of classes in the data. The data ranges calculated for percent of impervious cover range from 0% in some HUC-12 subwatersheds to 19.94% in the HUC-12 subwatershed with the highest value. Those HUC-12 subwatersheds with more impervious surface were given higher point values, which include the Town of Queensbury in southern Warren County and the City of Plattsburgh in Clinton County. Moderately impervious areas can be found along the Lake Champlain's shoreline, which is a direct result of shoreline development. There are also moderately impervious areas found along the western shore of Lake George, also attributable to shoreline development (Figure 4-14)

Figure 4-14. Final matrix output for Parameter 15. Current Land Cover – Percent Impervious. Areas in red indicate portions of the watershed that have high amounts of impervious cover.

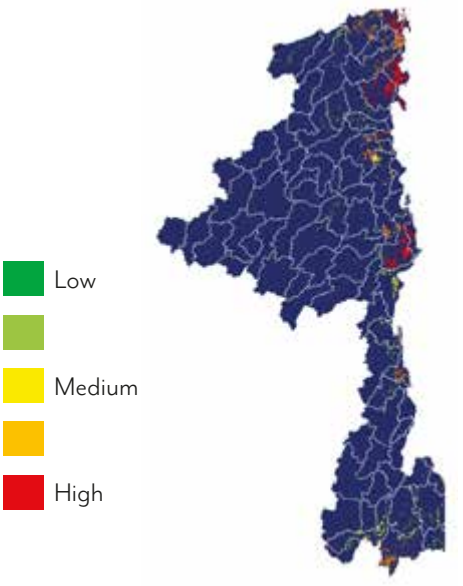


Parameter 16. Current Land Cover – Percent Row Crop *2 – 10 points*

To create the percent row crop dataset, the 2011 NLCD data obtained from the USGS was used and the cultivated crops class was culled from the data. The data were separated into their HUC-12 subwatersheds, and a field calculating the percent cover of the cultivated crops was also added.

The percent cover ranges assigning points were determined using the Jenks method. Higher points were assigned to subwatersheds with a greater percentage of row crops. The range of percent of row crops within the HUC-12 subwatersheds ranged from 27.5% at the highest to 0% at the lowest. The regions of the Lake Champlain watershed that have the greatest percent of row crops are along Lake Champlain in the valleys of Clinton and Essex Counties, which is a result of the presence of fertile valley soils. Additional areas of moderate to high amounts of row crops are within the agriculturally productive areas of Washington County (Figure 4-15).

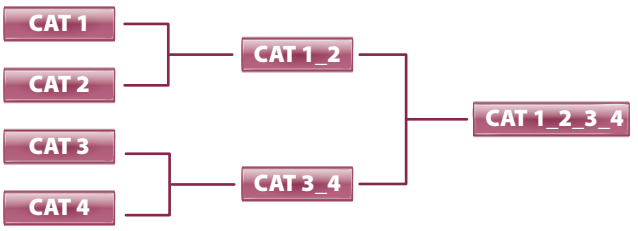
Figure 4-15. Final matrix output for Parameter 16. Current Land Cover – Percent Row Crops. Areas in red indicate portions of the watershed that have high amounts of row crops.



4.3. *Priority Subwatersheds*

In order to compile and rank the results for each HUC-12 subwatershed, the final results for each of the 16 parameters needed to be combined. To accomplish this, a field was added for each parameter that related to the parameter or category number the data represented. They were labeled CAT1, CAT2, CAT3... up to CAT16. The final score of each HUC-12 subwatershed populated the CAT# Field for the 16 parameters. Each result was then added together in pairs using a Join command, then the data were Dissolved based on each HUC-12 subwatershed. That was followed by a Merge to rename the fields. CAT1 was combined with CAT2 to create CAT1_2 and so on. See figure 4-16 for a subset example. The first step was to combine 8 pairs of 2 datasets that were combined into 4 pairs of 4 datasets, then 2 pair of 8 datasets that were combined in the last dataset that held all 16 categories.

Figure 4-16 – Example of the subset combination utilized in the creation of the ranking matrix.



The 16 CAT scores were then totaled and ranked highest to lowest. For most of the datasets, the final scores are broken out into 5 categories from High to Low using a Natural Break (Jenks) method, as discussed earlier in this chapter, and then assigned a point value.

The maximum score that one HUC-12 subwatershed could obtain was 95 points, while the minimum score was 15 points. None of the HUC-12 subwatersheds achieved the maximum number of points, which can be attributed to the dynamic nature of each subwatershed. The scores for each parameter, along with the final scores, for all of the 79 HUC-12 subwatersheds can be found in Appendix A. Map 4-1 shows the watershed as a whole with the 79 HUC-12 subwatersheds labeled with their identifying names and Map 4-2 shows the watershed as a whole with the 79 HUC-12 subwatersheds color coded and labeled from highest priority (1) to lowest priority (79).

Once each of the 79 HUC-12 subwatersheds was ranked from highest to lowest priority, it was determined that the top 19 HUC-12 subwatersheds (approximately 25% of the HUC-12 subwatersheds in the Champlain Basin) would be deemed the "Priority Subwatersheds." Following the method that was used to determine these priority areas, it can be inferred that a reduction in phosphorus loading within these 19 Priority Subwatersheds will result in achieving phosphorus loading reductions to the maximum extent practicable. HUC-12 subwatersheds that received a tied score were given a, b, c designations, with no bias toward any particular subwatershed. The 19 Priority Subwatersheds, along with their total points received are;

1. Lake Champlain Direct (74)
2. Lower Boquet River (68)
3. Halfway Creek (64)
4. Wood Creek – Champlain Canal (59)

5a. Ausable River (57)

5b. Little Ausable River (57)

7. Poultney River – Head of Lake Champlain (54)
8. Headwaters Lake George (53)

9a. Indian Brook – Lake George (50)

9b. Bullis Brook – Great Chazy River (50)

9c. Dead Creek (50)

12a. Lake Champlain Canal (49)

12b. Outlet Great Chazy River (49)

14a. Mettawee River (48)

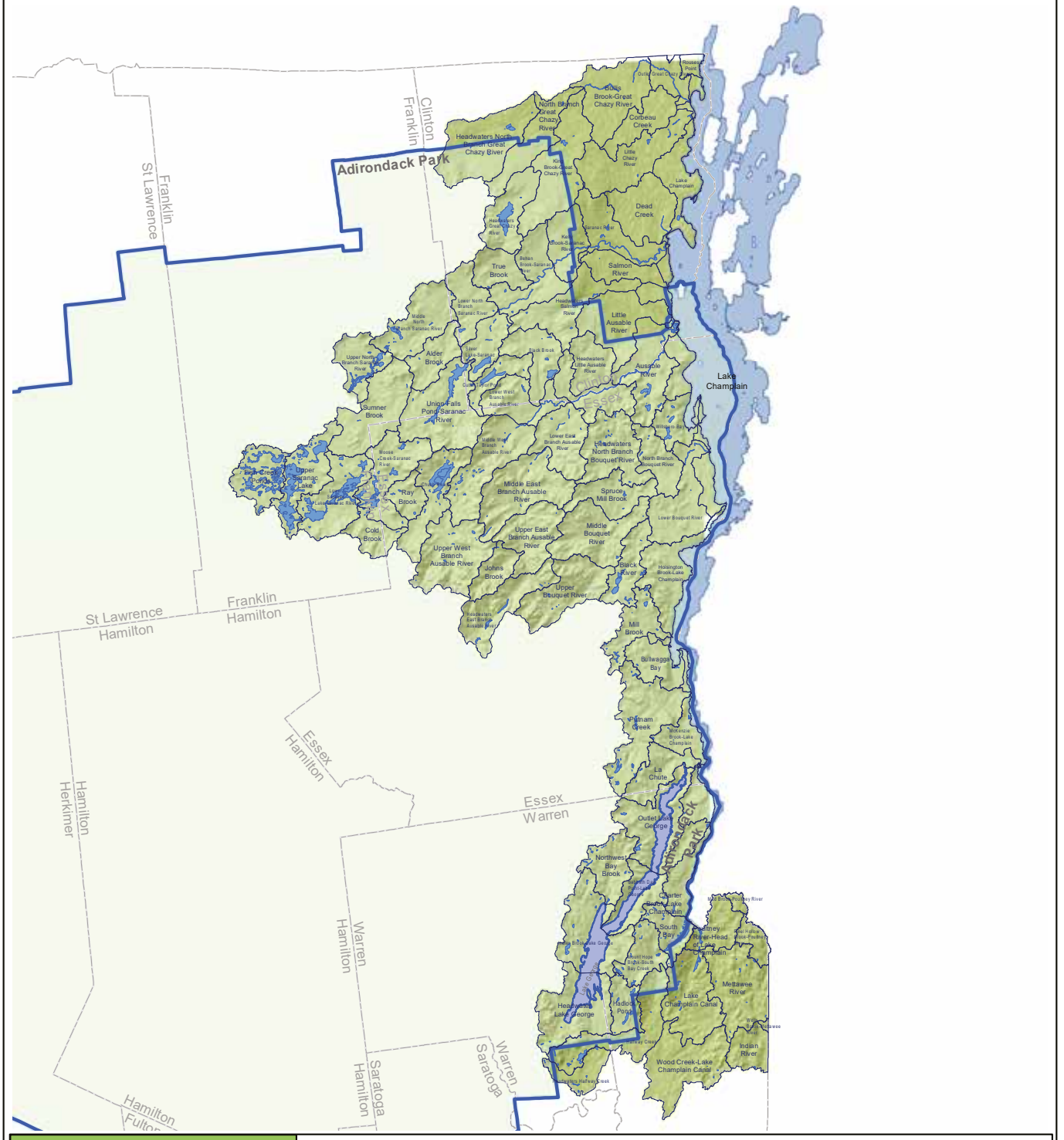
14b. Outlet Lake George (48)

16. McKenzie Brook – Lake Champlain (47)
17. Rouses Point (46)
18. Headwaters Halfway Creek (45)
19. Hoisington Brook – Lake Champlain (44)

The location of the Priority Subwatersheds are spread throughout the Basin, and include the southernmost portion of the watershed to the northernmost portion of the watershed. It was determined, through the matrix, that Priority Subwatersheds are found nearest to Lake Champlain itself, as the HUC-12 subwatersheds that are deeper in to the watershed are within the High Peaks and sparsely developed areas of the watershed. These HUC-12 subwatersheds that scored the lowest in the matrix also have a high percentage of state forest land (Map 2-18). As discussed in Chapter 2, the "Forever Wild" nature of the forestland in the Adirondack Park means that no development is allowed, and therefore the negative impacts from development are not seen in those areas.

The parameter scores for the 19 Priority Subwatersheds can be found in Table 4-8. In general, the HUC-12 subwatersheds that scored the highest almost all have public water supplies within them, are within areas with a high lake segment target reduction goal, have waterbodies within them that are listed on the NYS DEC's PWL, and scored high within the various land use categories. The highest Priority Subwatershed, Lake Champlain Direct, is located along the northern portion of the lakeshore within Essex and Clinton Counties. This subwatershed includes portions of the City of Plattsburgh and well as heavily farmed areas. Many of the other Priority Subwatersheds within Clinton County are those with large agricultural operations that account for the high phosphorus loading per land use scores. Priority Subwatersheds within Essex County ranked high based on an array of criteria, differing from one HUC-12 subwatershed to the next. Areas within Washington County that ranked within the Priority Subwatersheds are areas that are heavily farmed, as well as areas that have a large network of roads and public waters supplies. Priority Subwatersheds in Warren County include areas that have a large percentage of developed areas and impervious surfaces. Additional Priority Subwatersheds can also be found surrounding Lake George. These priority subwatersheds ranked high because of; a large number of tributaries to Lake George listed on the NYS DEC's PWL; the use of Lake George as a public drinking water supply by the Village of Lake George and many camps surrounding the lake; the presence of sandy soils; and abundant development around the lake, which has resulted in a high number of septic systems within 100 feet of a surface water. However, even with all of these phosphorus loading factors, South Lake A, the lake segment that Lake George is located within, is reaching its target phosphorus reduction goals. This is because Lake George is acting as a sink for phosphorus pollution, meaning that any loading of phosphorus from the watershed is remaining in Lake George, and not traveling out, through the LaChute River, into Lake Champlain. This dynamic leads to an interesting question: When will the aquatic system in Lake George become so saturated with phosphorus that it will begin spilling out in to Lake Champlain? The answer is – we don't know. As the only major tributary to Lake Champlain that is a lake system versus a riverine system, which by definition moves water from Point A to Point B (Lake Champlain), Lake George is absorbing the phosphorus from its watershed, and therefore the effects of the phosphorus pollution are being felt in Lake George. These findings have sparked the age old debate between remediation vs. prevention. It is just as important to prevent Lake George from becoming a phosphorus source to Lake Champlain as it is to remediate those areas that already have.

Map #4-1



Hydrologic Unit Code
HUC 12

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."

NEW YORK STATE OF OPPORTUNITY. Department of State

0 5 10 20 30 Miles

N W E S

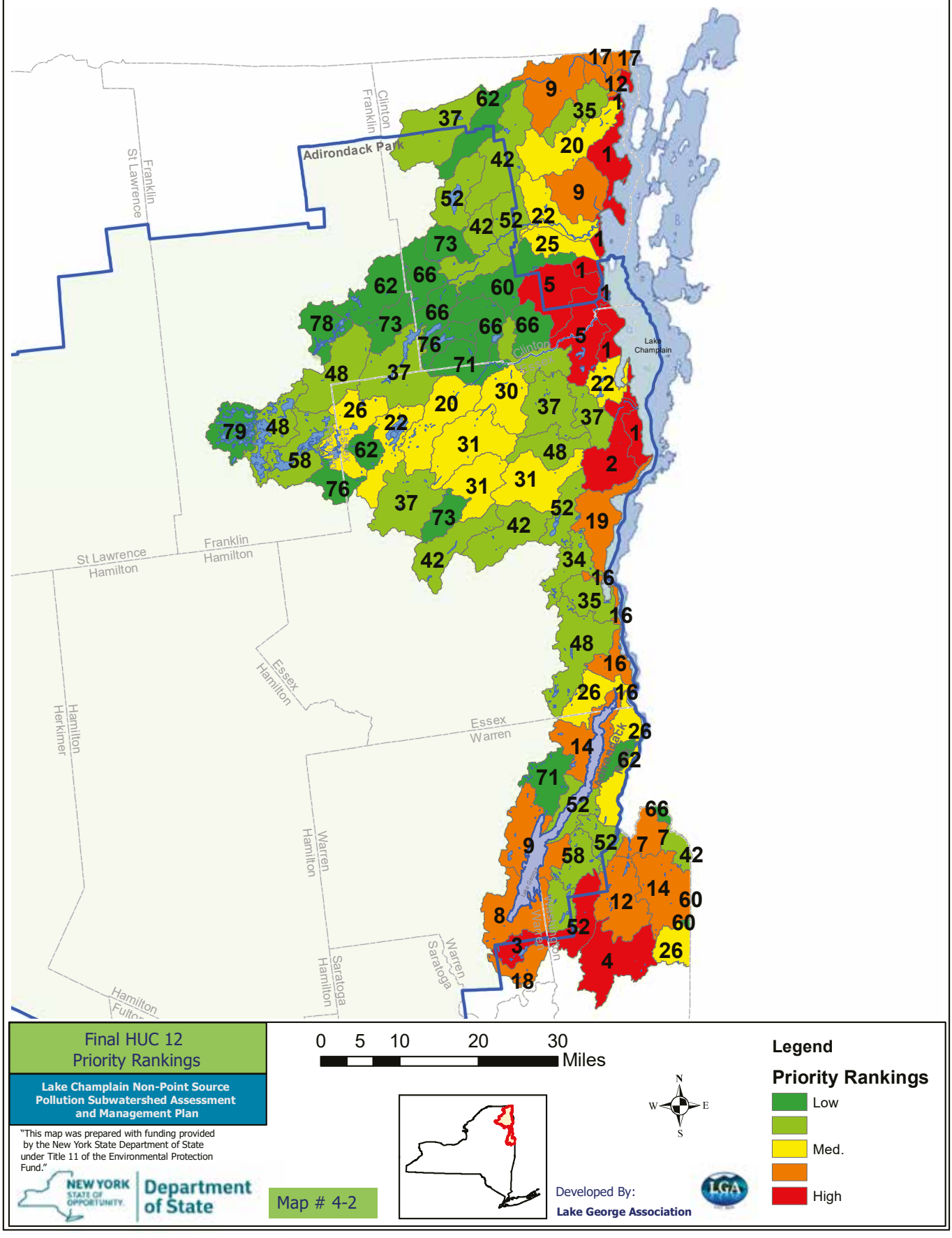
Legend

HUC 12

Map # 4-1

Developed By:
Lake George Association

Map #4-2


Adirondack Park
Lake Champlain
Clinton
Franklin
St Lawrence
Hamilton
Herkimer
Essex
Warren
Saratoga
Fulton
Final HUC 12
Priority Rankings
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
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Map # 4-2
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Lake George Association
Legend
Priority Rankings
Low
Med.
High

Table 4-8. Matrix output parameter scores for the 19 Priority Subwatersheds

HUC Rank	County(ies)	HUC Name	HUC Acrage	CAT1 PWL List: Pollutants	CAT2 PWL List: Impairements	CAT3 Lake Seg. Red. Goals	CAT4 Slope	CAT5 Soil Type	CAT6 Waterbody Classification	CAT7 Public Water Supply	CAT8 UNUSED	CAT9 Miles of Tribs	CAT10 Septic Systems	CAT11 Lane Miles	CAT12 ARRA Sites	CAT13 P Loading /Land Use	CAT14 P Loading / Lake Seg.	CAT15 % Impervious Surfaces	CAT16 % Row Crop	Total Score
			PTS	(1 - 5)	(0 - 5)	(1 - 10)	(1 - 5)	(1 - 5)	(1 - 5)	(0 or 5)		(1- 5)	(1- 5)	(1 - 5)	(1- 5)	(2 - 10)	(0 or 5)	(2 - 10)	(2 - 10)	(max 95)
1	Clinton/Essex	Lake Champlain	51061	5	5	7	2	4	3	5		4	5	5	3	10	0	6	10	74
2	Essex	Lower Boquet River	29627	4	4	10	3	4	2	5		4	3	2	5	8	0	4	10	68
3	Wrn/Wash	Halfway Creek	31955	5	5	0	3	4	5	5		5	4	4	4	8	0	6	6	64
4	Washington	Wood Creek/ Champlain Canal	37700	4	4	0	2	5	3	5		5	2	4	3	10	0	4	8	59
5a	Clinton/Essex	Ausable River	31615	1	2	10	3	3	3	5		4	3	4	1	6	0	6	6	57
5b	Clinton	Little Ausable River	31161	1	2	10	2	3	2	5		4	3	3	2	8	0	4	8	57
7	Washington	Poultney River/ Lake Champlain	15277	4	4	7	3	5	2	5		3	2	2	1	6	0	6	4	54
8	Wrn/Wash	Headwater Lake George	36923	5	5	0	4	2	5	5		4	5	1	5	4	0	6	2	53
9a	Wrn/Wash	Indian Brook/ Lake George	38291	5	5	0	4	3	5	5		3	5	1	4	4	0	4	2	50
9b	Clinton	Bullis Brook/ Great Chazy River	33644	3	3	0	1	4	4	5		4	3	3	0	8	0	4	8	50
9c	Clinton	Dead Creek	27552	0	1	3	1	4	1	5		2	5	4	0	8	0	6	10	50
12a	Washington	Lake Champlain Canal	33090	3	4	0	3	5	3	5		5	1	3	1	8	0	4	4	49
12b	Clinton	Outlet to Great Chazy River	10963	4	4	2	1	5	1	0		1	4	0	0	6	5	6	10	49
14a	Washington	Mettawee River	34766	2	3	0	3	4	3	0		4	3	4	4	8	0	4	6	48
14b	Wrn/Wash/Ex	Outlet Lake George	34725	5	5	0	4	3	4	5		3	5	2	2	4	0	4	2	48
16	Essex	McKenzie Brook/ Lake Champlain	15090	1	3	1	3	5	1	5		1	4	2	1	6	0	6	8	47
17	Clinton	Rouses Point	3731	0	2	2	1	5	1	5		1	3	1	0	2	5	8	10	46
18	Warren	Headwaters Halfway Creek	11790	2	2	0	2	2	2	5		1	5	4	2	4	0	10	4	45
19	Essex	Hoisington Brook/ Lake Champlain	26942	0	2	1	3	4	2	5		3	2	1	5	6	0	4	6	44

05.
Public Outreach

Public outreach is an important part of the development of any watershed management plan. Ensuring that the opinions of the residents and visitors that utilize the waterbodies are taken into consideration for management activities will secure future support of and participation in projects and programs. These outreach efforts also provide the opportunity to educate citizens on the local and regional issues, and inform them on the work being accomplished and the partnerships that have been formed to best address natural resource concerns within an area.

In the summer of 2014, the Lake Champlain—Lake George Regional Planning Board, along with the project partners, completed five planning charrettes throughout the Lake Champlain watershed in Lake George, Warren County; Whitehall, Washington County; Westport, Essex County; Plattsburgh, Clinton County; and Saranac Lake, Franklin County. Additional public outreach was conducted at local stakeholder meetings, including the New York Lake Champlain Citizens Advisory Committee meeting. During these public outreach events, over 60 professionals, residents and visitors to the Lake Champlain region were asked to answer a series of questions relating to the importance of their local waterbody to their community and their opinion of its water quality. Below are listed the waterbodies throughout the watershed that were chosen for comments. The remaining results of these public outreach efforts can be seen in the subsequent charts and tables.

Ausable River
Boquet River
Champlain Canal
Corbeau Creek
Dead Creek
East Branch Ausable River
Great Chazy River
Hadlock Pond
Halfway Brook (Warren Co.)
Halfway Creek Tribs (Washington Co.)
Hoisington Brook
La Chute River
Lake Champlain - Cumberland Bay
Lake Champlain- Isle La Motte
Lake Champlain- Main Lake
Lake Champlain-South Lake A
Lake Champlain- South Lake B
Lake Clear
Lake Colby
Lake George- East Shore
Lake George- North
Lake George- South
Lincoln Pond
Little Chazy River
Poultney/Mettawee Rivers
Putnam Creek
Salmon River
Saranac River (in Plattsburgh)
Trib to Cumberland Bay
Upper Saranac River
West Branch Ausable River

5.1 *Charrette Results*

The first question participants were asked is whether they perceive their local waterbody as an asset to their community. Of the total number of responses, 90% answered definitely, citing numerous reasons for their answers such as property values, economics based on the tourism industry, including marinas and hotels, and personal enjoyment. The 3% that answered "not at all" cited their reason based on the unavailability of that waterbody for much human use. These waterbodies included Hoisington Brook, Trib to Cumberland Bay and Dead Creek (Figure 5-1).

Participants were then asked how they utilized their local waterbody. They were given several answers to choose from, as shown in Table 5-1, as well as given the opportunity for write-ins, which included hunting, usage of trails such as the Saranac River Trail in the City of Plattsburgh, horseback riding, and for sewage treatment discharge. Overall, the majority of the waterbodies throughout the Lake Champlain region are utilized not only for physical enjoyment such as boating and fishing, but for visual enjoyment.

Figure 5-1. Percent of public that finds their local waterbody an asset to the community.

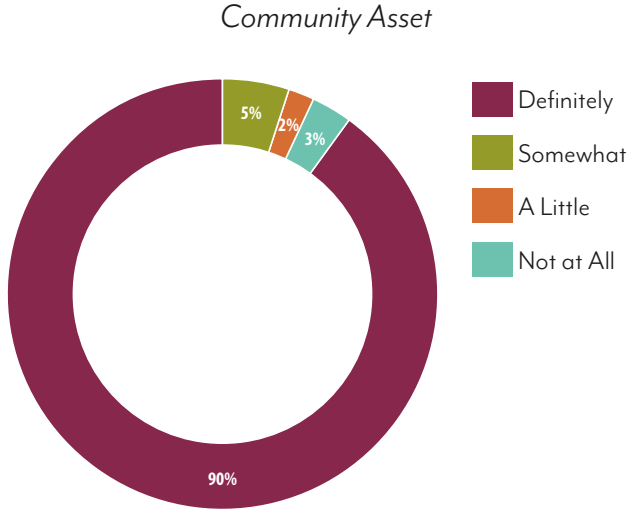


Table 5-1. Table showing how the public utilizes their local waterbody.

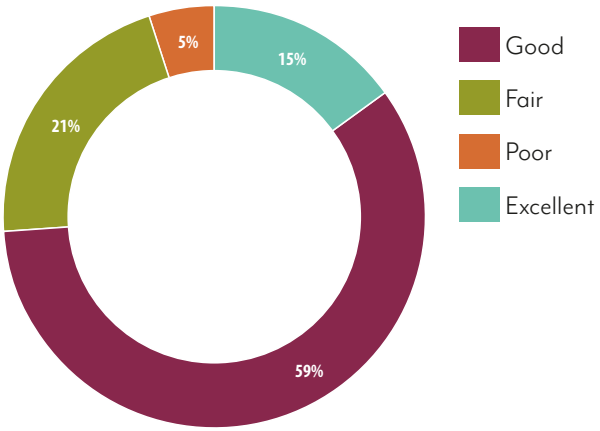
Waterbody	Aesthetic Enjoyment	Canoeing/ Kayaking	Drinking Water	Motor Boat/ Sailing	Fishing	Ice Fishing	Swimming	Wildlife Viewing
Ausable River	X	X		X	X		X	X
Boquet River	X	X		X	X		X	X
Champlain Canal	X	X		X	X	X		X
Corbeau Creek	X	X	X		X		X	
Dead Creek	X				X			
East Branch Ausable	X	X			X		X	
Great Chazy River	X	X		X	X	X	X	X
Hadlock Pond	X	X	X	X	X	X	X	X
Halfway Brook (Warren Co.)	X		X		X			X
Halfway Creek Tribs (Wash. Co.)	X							X
Hoisington Brook								
La Chute River	X				X			X
Lake Champlain- Cumberland Bay	X	X	X	X	X	X	X	X
Lake Champlain- Isle La Motte	X	X		X	X	X	X	X
Lake Champlain- Main lake	X	X		X	X			X
Lake Champlain- South Lake A	X				X			X
Lake Champlain- South Lake B	X				X			X
Lake Clear	X	X	X	X	X	X	X	X
Lake Colby	X	X	X	X	X	X	X	X
Lake George- East Shore	X	X	X	X	X	X	X	X
Lake George- South	X	X	X	X	X	X	X	X
Lake George- North	X	X		X			X	X
Lincoln Pond	X	X			X		X	X
Little Chazy River					X			X
Poultney/Mettawee River	X	X			X			X
Putnam Creek					X			
Salmon River		X			X			
Saranac River (Plattsburgh)	X	X	X		X			X
Trib to Cumberland Bay	X							X
Upper Saranac Lake	X	X	X	X	X	X	X	X
West Branch Ausable River	X	X	X		X		X	X

The next series of questions that were asked to the participants focused on water quality and pollutants, and the public's perception of the amount and types of pollutants that are present within the Lake Champlain Basin. Of the total number of participants asked to describe the water quality of their local waterbody, 59% answered "good" (Figure 5-2). These answers are based on the notion that the water is not potable, but clean enough to swim in. 15% answered "excellent," mostly within the Ausable River watershed, and answers that included "fair" and "poor" included notes that the waterbodies run through agricultural land which contributes pollutants, as well as a lack of presences of minnows, frogs, or healthy vegetation.

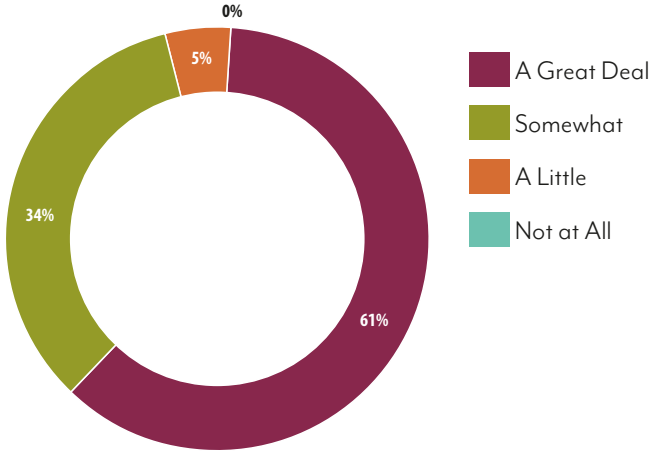
Non-point source pollution is defined as pollution that originates from several different sources and is carried over the landscape via stormwater and snow melt and eventually discharges into the nearest surface water. Participants were asked their opinion on how much non-point source pollution contributes to water quality impairments, and 61% answered "a great deal," while 34%

Figure 5-2. Public opinion results on the overall water quality in the watershed and their opinion on non-point source pollution as a contributor to water quality impairments in the watershed.

Overall Water Quality



How Much Non-Point Source Pollution Contributes to Water Quality Impairments



answered "somewhat" (Figure 5-2). In a follow-up discussion to their answers, those that chose "somewhat" cited point source pollutants such as waste water treatment plants and large camps and businesses with SPDES permits as contributors to water quality impairments on their waterbodies, so they did not consider non-point source pollution to be the greatest threat.

Participants were then asked to be more specific as to which non-point source pollutants they believe contribute most to the water quality impairments within the Lake Champlain Basin. Participants were allowed to choose as many answers as they would like and phosphorus was chosen the most times, followed by pathogens and bacteria, sediment, de-icing materials and nitrogen. Non-point source pollutants in the "others" category include pharmaceuticals, household hazardous wastes, and metals (Figure 5-3).

Once all of the potential non-point source pollutants were identified, participants were asked to choose which they believed was the number one non-point source pollutant. For this question, 37% chose phosphorus, followed by de-icing materials and pathogens/bacteria, and sediment (Figure 5-4).

This information is also being provided per lake segment in an effort to identify which pollutants are of concern in different parts of the watershed (Figure 5-5). Overall, phosphorus seems to be of the most concern in South Lake B, Cumberland Bay and Isle La Motte, which can be attributed to high amount of agriculture within those lake segments. The majority of participants within South Lake A, which includes the Lake George watersheds, are most concerned with de-icing materials, as a recent report published by the Darrin Freshwater Institute states chloride levels have increased within Lake George over the past 30 years as a result of the state, county and local government road de-icing programs (Boylen et al, 2014). Those within the Main Lake segment of the watershed are also mostly concerned with de-icing materials.

Figure 5-3. Public opinion results on the pollutants that are the biggest threat to water quality in the watershed.

Pollutants that are the Biggest Threat to Water Quality within the Lake Champlain Watershed

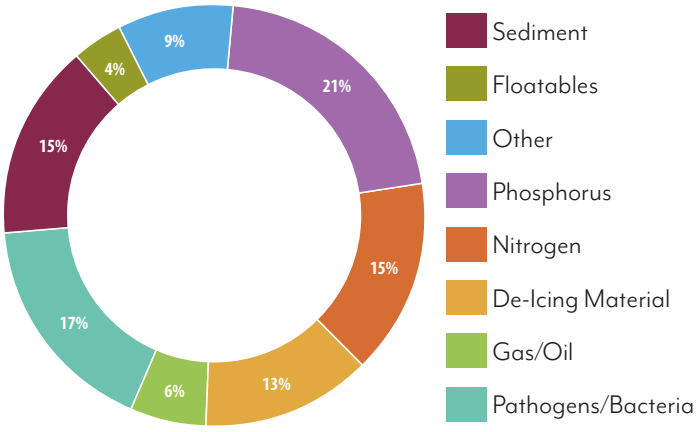


Figure 5-4. Public opinion results on the major non-point source pollutants in the watershed.

Major Non-Point Source Pollutants in the Lake Champlain Watershed

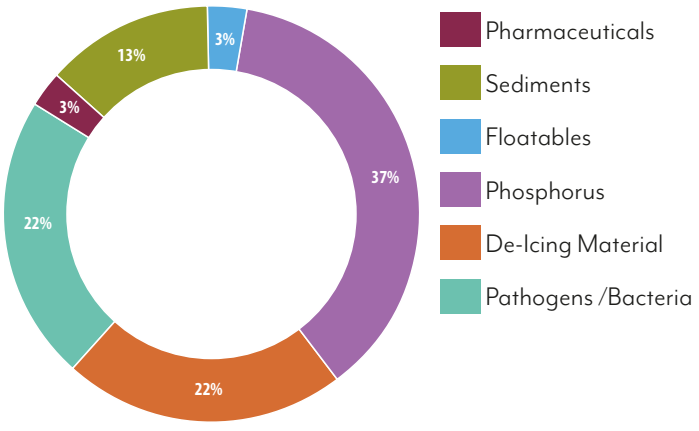
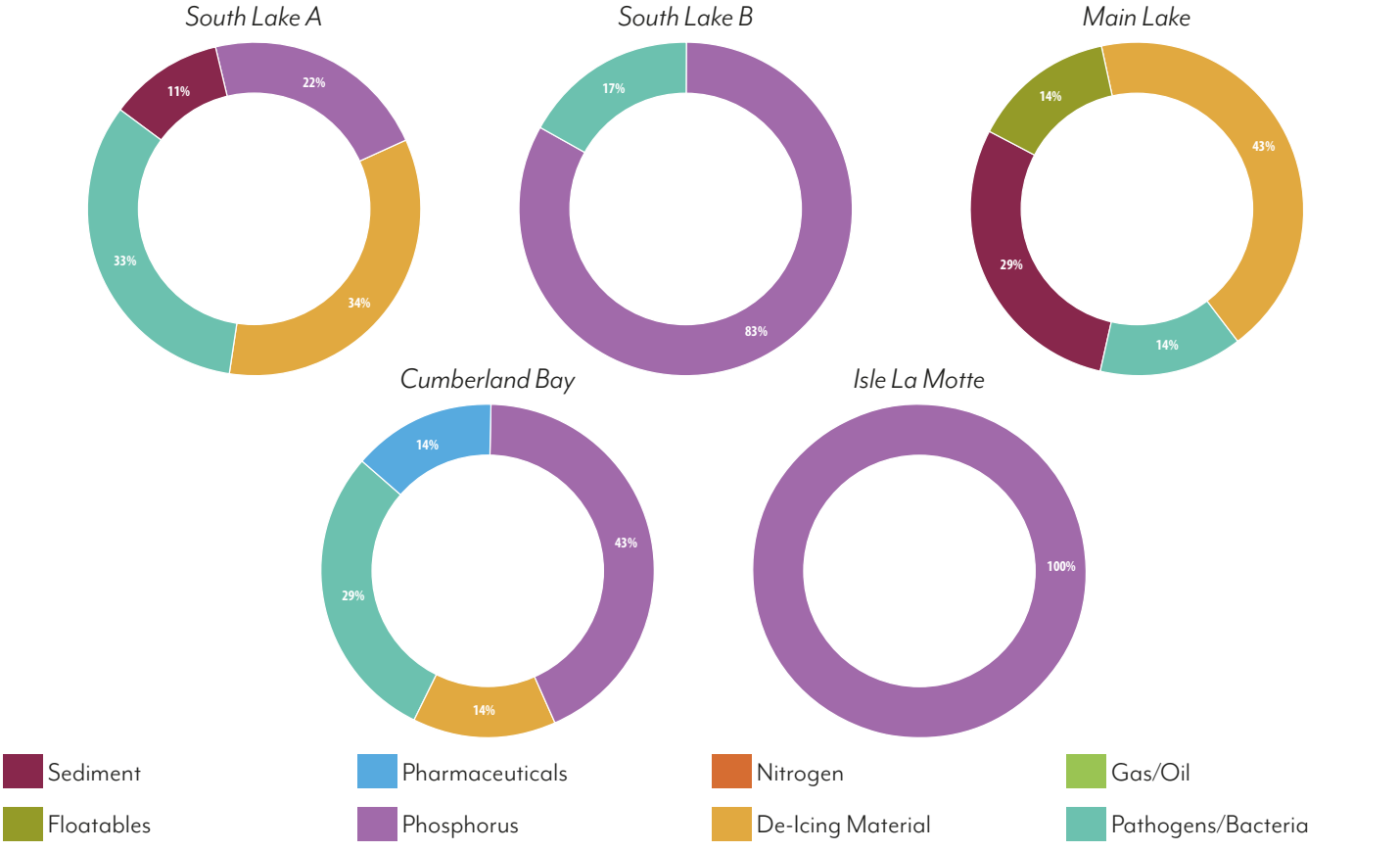


Figure 5-5. Public opinion results on the major types of non-point source pollution per lake segment.

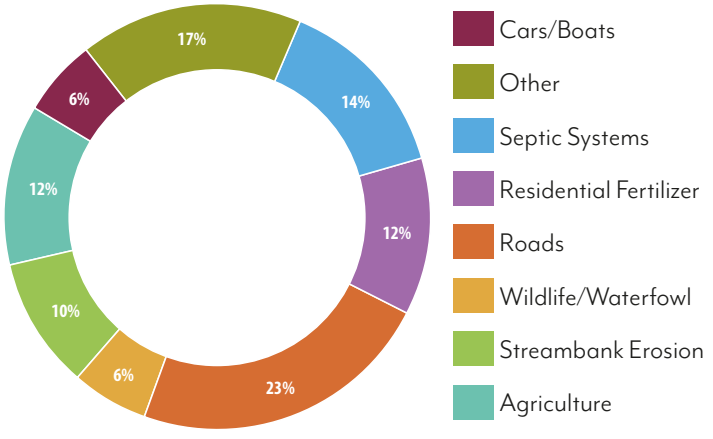


Once participants identified the types of non-point source pollutants within their watersheds, they were asked to identify the sources of those pollutants. Those identified include septic systems, fertilizers and pesticides from lawn care, cars/boats/trains, roads, water fowl and wildlife, streambank erosion, floatables, agriculture, pets, construction and forest clearing. Many also identified Wastewater Treatment Plants effluent and operations with SPDES permits as sources of pollutants, however, as noted before, those are considered point source pollutants.

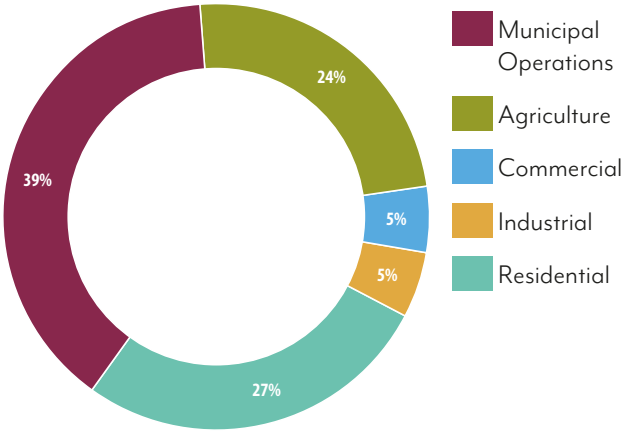
Overall, roads were identified as the major source of non-point source pollution. This includes roadside erosion as well as floatables. The next highest singular category is septic systems, followed by residential fertilizers. This information coincides with the major non-point source pollutants identified in previous questions, including the concern over de-icing materials and sediments from roads and phosphorus from fertilizing on private shoreline property. The "Other" category includes floatables, pets, trail erosion, construction and fish hatchery effluent (Figure 5-6).

Figure 5-6. Public opinion results on the major sources and land-use contributors of non-point source pollution in the watershed.

Major Sources of Non-Point Source Pollution in the Lake Champlain Watershed



Major Land Use Contributions to Non-Point Source Pollution in the Lake Champlain Watershed



Aside from specific sources of non-point source pollution, participants were asked to rank five types of land use from 1 - 5 (1 being the largest contributor and 5 being the least) based on their contributions to non-point source pollution. These land uses include agriculture, commercial (restaurants, gas stations, hotels, etc.), industrial, residential and municipal operations (including roads and DPW garages). Results showed that 39% of participants view municipal operations as the largest contributor to non-point source pollution based mostly on roadside erosion and de-icing operations. Residential was the second highest land use contributor with 27% as a result of fertilizers and leaking septic systems, followed by agriculture (Figure 5-6).

Land use contributors were also identified on a lake segment basis, as shown below in Figure 5-7. South Lake A and Main Lake participants identified municipal operations and residential land use as the greatest contributors, while South Lake B participants identified residential and agriculture. Cumberland Bay has the greatest mixed results, stemming from the inclusion of the City of Plattsburgh in that lake segment, which has an array of land uses from dense residential areas to the commercialized downtown and City Pier to the industry along the eastern border of the City. The Isle La Motte lake segment, which includes the Great and Little Chazy Rivers, is the most heavily farmed area of the NY watershed, and participants from that lake segment identified agriculture as the number one land use contributor.

Figure 5-7. Public opinion results on the major land use contributors to non-point source pollution in the watershed.

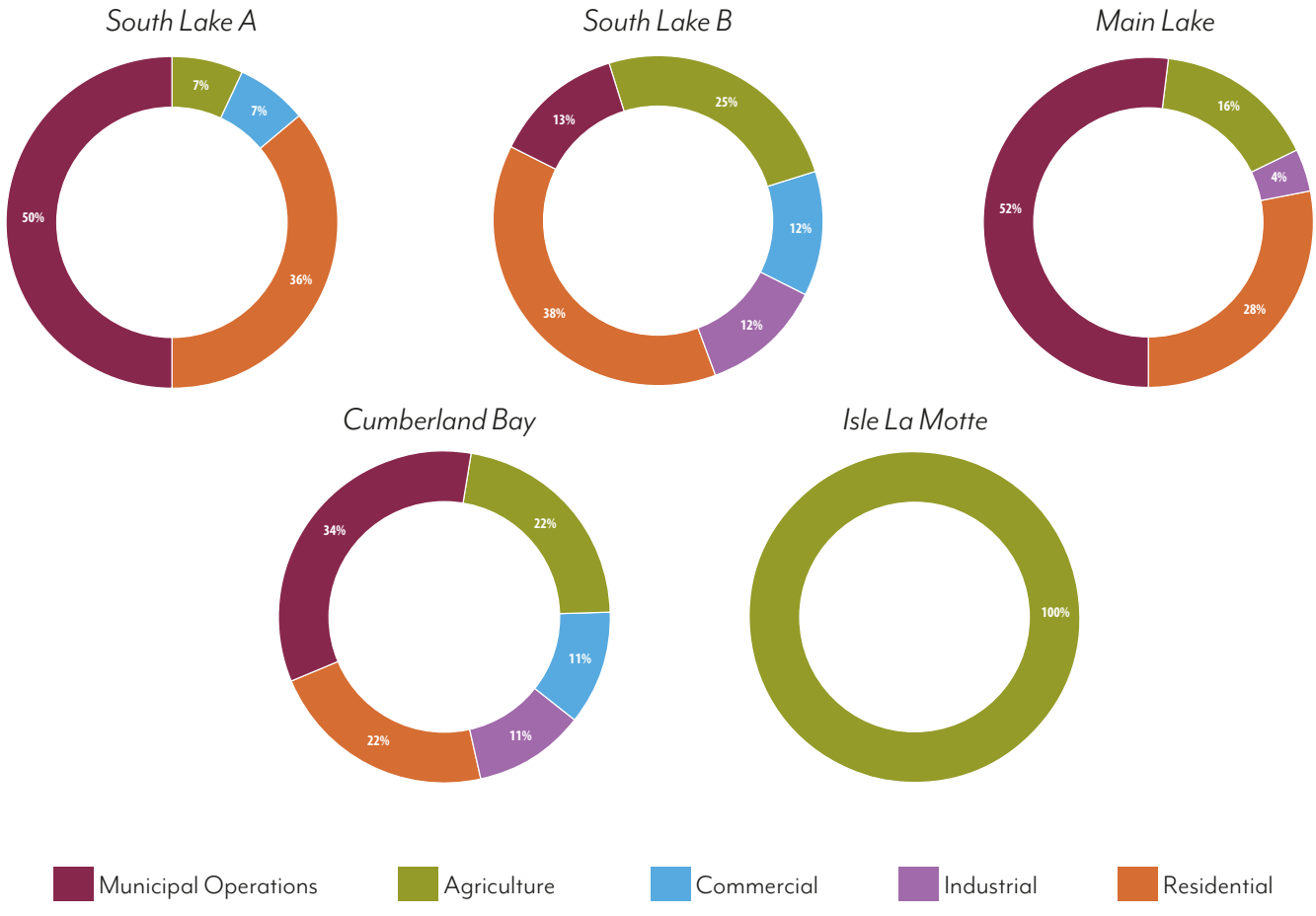
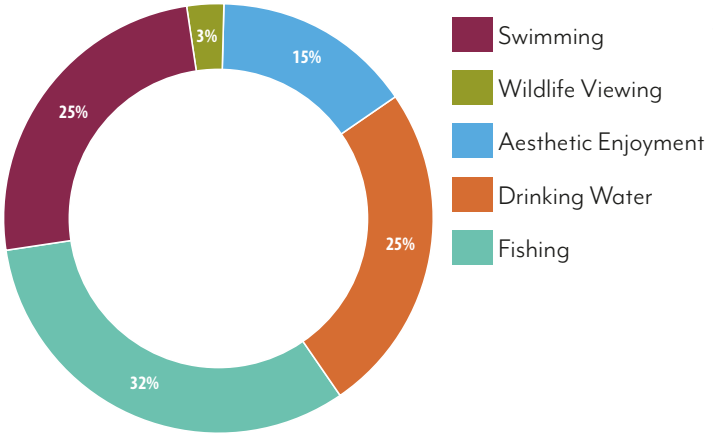


Figure 5-8. Public opinion results on the surface water uses that are affected from non-point source pollution.

Water Quality Uses that are Impaired from Non-Point Source Pollution in the Lake Champlain Watershed



Once the discussion about non-point source pollutants and their sources was concluded, participants were asked to identify which, if any, waterbody uses are impaired from these pollutants and sources. Results indicate that fishing is the most perceived impaired waterbody use throughout the watershed, followed by drinking water and swimming. Aesthetic enjoyment and wildlife viewing go hand-in-hand as the final impaired uses identified.

In conclusion, the public opinion, based on the sampling, is as followed;

- Phosphorus is the number one non-point source pollutant in the watershed, followed by a tie between road salt and pathogens/bacteria, and sediment.
- Roads are the greatest contributors of non-point source pollution in the watershed, followed by septic system, residential fertilizers and agriculture.
- Municipal Operations are the major land use contributor for non-point source pollution in the watershed, followed by residential, agriculture and industrial/commercial.
- Fishing is the most perceived impaired use of waterbodies within the watershed, followed by swimming and drinking water, and aesthetic enjoyment.

Photo courtesy of John Eldridge

Courtesy of the John Eldridge

06.

Priority Subwatersheds

Implementation & Recommendations

The overarching goal of identifying Priority Subwatersheds was to be able to identify projects and make recommendations for remediation efforts within those subwatersheds. This will assist stakeholders on the New York side of basin in achieving the phosphorus loading allocations as presented in the TMDL document. To achieve this goal, members of the Advisory Committee met and spoke with local elected officials, highway superintendents, code enforcement officers, county planning departments, lake and river associations, County Water Quality Coordinating Committees and the NY Citizens Advisory Committee to identify programs and on-the-ground projects. In total, 263 projects and programs costing almost $187,000,000 were identified. This effort shows the continual need for investment and funding within the Lake Champlain watershed to achieve water quality goals.

6.1 *Description of Recommendation Tables*

This chapter presents each of the 19 Priority Subwatersheds, discusses them in more detail, and provides maps and project recommendation tables. Each recommendation table has an array of information associated with it, including,

1. Project number, which is utilized to identify on-the-ground projects within each Priority Map,
2. Brief project narrative,
3. County(ies) the project can be found in,
4. Latitude and longitude of the on-the-ground projects,
5. Jurisdiction, which identifies if the project is located or associated with public or private land, or both,
6. Phosphorus loading concern(s), which have been broken into four (4) categories; Stormwater, Agriculture, Erosion, and Wastewater,
7. Projected cost of implementation,
8. Potential funding sources,
9. Involved parties (including lead agency), and
10. Time frame, broken into three (3) categories; short term (less than 2 years), medium term (3 – 5 years) and long term (6+ years).

Table 6-1 provides information on each of the Priority Subwatersheds and the number of projects within each, broken out by phosphorus loading concern. Please note that within the recommendation table there are several projects that are associated with more than one phosphorus loading concern. In total, these phosphorus reduction projects and programs will require an investment of $63,830,500 for those associated with stormwater runoff reduction, $22,415,000 in agricultural project implementation, $13,195,000 in sediment and erosion control projects, and $87,260,000 in wastewater planning and implementation funding. More detailed information on specific projects and programs can be found within each recommendation table.

Table 6-1. Total number and cost of projects for each Priority Subwatershed broken down by phosphorus loading concern.

Priority Subwatershed Number	*Priority Subwatershed Name*	*Stormwater*	*Agriculture*	*Erosion*	*Wastewater*	*Total Number of Projects*	*Total Cost of Projects*
1	Lake Champlain Direct	13	2	4	5	24	$20,935,000
2	Lower Boquet River	7	1	4	3	15	$9,775,000
3	Halfway Creek	7	0	1	3	11	$1,405,500
4	Wood Creek - Lake Champlain Canal	5	2	3	2	12	$7,025,000
5a	Ausable River	3	1	1	1	6	$2,430,000
5b	Little Ausable River	1	4	1	1	7	$4,590,000
7	Poultney River – Head of Lake Champlain	4	1	6	3	14	$28,110,000
8	Headwaters Lake George	37	0	5	9	51	$56,050,000
9a	Indian Brook – Lake George	11	0	4	2	17	$9,940,000
9b	Bullis Brook – Great Chazy River	1	3	2	0	6	$1,960,000
9c	Dead Creek	4	2	0	1	7	$4,250,000
12a	Lake Champlain Canal	2	1	1	0	4	$2,855,000
12b	Outlet Great Chazy River	2	2	2	0	6	$2,635,000
14a	Mettawee River	3	1	2	0	6	$2,815,000
14b	Outlet Lake George	13	1	6	2	22	$2,657,000
16	McKenzie Brook – Lake Champlain	7	1	1	1	10	$2,745,000
17	Rouses Point	3	1	0	0	4	$1,790,000
18	Headwaters Halfway Creek	10	0	3	3	16	$9,518,000
19	Hoisington Brook – Lake Champlain	5	0	3	1	9	$1,400,000
Regional	Entire Watershed	9	1	5	1	16	$13,815,000
	TOTAL	147	24	54	38	263	$186,700,500

6.2 *Phosphorus Loading Concerns*

The projects and programs that were identified in this Plan are related to four main Phosphorus Loading Concerns; (1) Stormwater, (2) Agriculture, (3) Erosion and (4) Wastewater.

Stormwater

Stormwater projects are those that are related to pollutants carried within stormwater runoff. Stormwater runoff is created by rain or melting snow that does not soak into the ground, and instead runs over the landscape. During this time, stormwater can pick up any pollutants that are on the ground. Pollutants high in phosphorus such as sediment, residential and commercial fertilizers, grass clippings and leaf litter, residential and commercial wash water, pet waste, and runoff from municipal facilities are of greatest concern in the Lake Champlain watershed. Stormwater runoff is most common within urbanized area, where there are large amounts of impervious surfaces is present, coupled with a higher population of people creating pollutants. Some of the projects identified to reduce the amount of polluted stormwater runoff within the Priority Subwatersheds include;

- Installation of gray infrastructure practices including dry wells, stormwater infiltrators and hydrodynamic separators, which are concrete, metal or plastic units that capture and infiltrate stormwater runoff;
- Installation of green infrastructure practices including street trees, bioretention basins, porous pavement, vegetative swales and creation of green space, which also capture and infiltrate stormwater runoff, but includes the use of plants and vegetation to mimic the natural world and reduce impervious surface, as well as create infiltration and evaporation capacity;
- Upgrade of stormwater conveyance system to capture and retain stormwater; and
- Implementation of Municipal Separate Storm Sewer System (MS4) Programs in the City of Glens Falls, Town of Queensbury, Town of Lake George and Village of Lake George. This mandatory state program requires certain municipalities to reduce the amount of pollutants in stormwater through public education and outreach, adoption of local laws, and improvement of municipal operations.

Agriculture

Several agricultural activities can create pollutants that can make their way into surface waters. Improperly managed fields and farmsteads have the potential to leach an enormous of amount of phosphorus and other nutrients, either through over-fertilizing, leaking of leachate into ditches, and/or improperly managed animal waste. Farmsteads and fields located directly on surface waters are of greatest concern, only because of their close proximity to surface waters. However, this is not to say that farmsteads and fields not directly positioned on a waterbody create any less phosphorus loading. To deal with these issues, project partners identified several types of projects that relate to improved management of farmsteads and fields;

- Completion of comprehensive nutrient management plans (CNMPs), which are plans created for agricultural animal operations that outlines the management of activities as they relate to improved conservation techniques;
- Installation of ag waste storage and treatment facilities and implementation of waste management practices to reduce the amount of animal waste that can potentially runoff or be leached from a farmstead and/or field;
- Installation of riparian buffers to reduce erosion, keep animals out of surface waters, and to capture and infiltrate nutrients;
- Installation of livestock exclusion fencing and alternative water systems to keep animals out of surface waters;
- Promotion and implementation of critical area seeding/cover crops, which are planted on fields between seasons to reduce the amount of exposed soil and reduce erosion potential from fields, as well as tie up excessive nutrients to prevent loss to the environment;
- Installation of heavy use area protection for movement of animals; and
- Installation of silage leachate treatment systems to eliminate runoff into nearby ditches.

Erosion

Erosion, which in this case refers to the movement of sediment through some form of conveyance system into a surface water, can itself be broken into three categories; (1) Streambank/Shoreline; (2) Roadside and (3) Forestry Operations. Streambank and shoreline erosion can be caused by many things, including excessive stormwater runoff, flooding, changes in stream channel, or wave action. When erosion along a surface water occurs, portions of the bank are swept away, exposing the vegetative root systems that are holding the bank together. Eventually, if enough sediment is lost from the bank, trees and other large debris will begin falling into the surface water, resulting in loss of riparian areas and land.

Roadside erosion refers to the movement of sediment from and via roadside ditches. The sediment that makes up the ditch can be eroded away either through high water flow and/or velocity, and can be exacerbated by a lack of vegetation. Roadside ditches can also act as a conveyance system for sediment that was eroded from somewhere else, and is being transported through the ditch via stormwater runoff.

Forestry operations can have a huge effect on the amount of sediment that is lost from an actively timbered site, most notably through the loss of vegetation and live root systems as a result of the transportation of equipment throughout the site, which in many cases involved driving through streams. Both of these hazards of timbering can result in increased erosion from a forest, however, due to a lack of regulations and required permitting, it is difficult to determine what forested areas within the watershed are being actively harvested.

As it relates to phosphorus loading, phosphorus particles have an affinity for sediment particles, and therefore readily attached to sediment particles and travel with them. Therefore, any excess sediment within a surface water can be directly related to excess phosphorus inputs. To combat this issue, several projects that reduce erosion have been identified and include;

- Stabilization of eroding streambanks and lakeshore utilizing natural stream design, however in many cases hard armoring with rip rap may be necessary;

- Installing in-stream sediment basins at the mouth of streams to reduce water velocity and promote the settling out of solids that are carried by the stream before they are discharged to a lake;
- Cleaning out roadside ditches of debris and relining with stone, installing check dams and/or sediment basins, and hydroseeding to reduce water velocity and capture sediment and floatables;
- Retrofitting culverts to fit more naturally within the stream channel and installing culverts that are properly sized to reduce erosion around the inlet and outlet of the structure, as well as reduce scouring of the stream channel;
- Dredging of deltas that have been created by upland erosion and pose a threat to the natural riparian areas of a lake; and
- Implementing the RC&D Skidder Bridge Loan Program, which loans skidder bridges to active forestry operations for use in crossing streams.

Wastewater

Wastewater issues within the Lake Champlain watershed stem mainly from outdated and underperforming municipal infrastructure that in many cases is cracked and crumbling, as well as old and improperly managed septic systems. Human waste contains a large amount of nutrients, and once in the environment without the proper treatment, it can cause environmental and human health risks. Wastewater infrastructure is one of the greatest concerns for stakeholders within the watershed, and one of the mostly costly. It includes an array of fixes depending on where the project is located within the watershed, and the projects identified with this Subwatershed Assessment relate to;

- Combined Sewer Overflow (CSO) reduction through implementation of municipal CSO Long-Term Control Plans, which reduces the amount of flow within combined sewer systems to eliminate overflows at outfalls;
- Upgrades to Wastewater Treatment Plants (WWTP). Although WWTP effluent is considered a point source, an overloaded and/or degraded plant can cause leaching from its infrastructure into the surrounding areas and surface waters and cause sewage to back up in the pipes, creating sanitary sewer overflow (SSO) and CSO events;
- Upgrades to wastewater conveyance systems to reduce inflow and infiltration (I&I) to reduce leaching of waste from sanitary pipes;
- Extension of wastewater sewer lines to eliminate septic systems and afford additional properties better waste management;
- Slip-lining sanitary pipes to rehabilitate existing pipes and eliminate I&I without having to remove them. This includes installing a smaller pipe into the existing pipe and grouting the space between the two pipes; and
- Creation of septic disposal districts and installation of community systems to more efficiently and effectively handle sanitary waste in areas without municipal sanitary sewer systems.

Planning Efforts

As can also be seen in the recommendation tables, there is a large amount of planning that still needs to be addressed, specifically on a subwatershed level. There are many subwatersheds that have active management plans, including Lake George, Boquet River, and Ausable River, but many of the larger tributaries, including the Champlain Canal, Great and Little Chazy Rivers, Saranac River and Poultney/Mettawee Rivers, need more intense evaluations to direct additional remediation efforts.

6.3 *Potential Funding Sources*

There are several federal, state and local funding sources that can be utilized to implement the many recommendations made in this Subwatershed Assessment, and each of the projects and programs within the recommendation tables includes potential funding sources for that project based on the requirements of the available programs. Table 6-2 summarizes the main funding sources and programs that could be used to implement the recommendations.

Table 6-2. List of federal, state, and local funding programs that can be utilized to implement the projects and programs outlined in the recommendation tables.

Funding Source	Funding Program	Program Overview
FEDERAL		
Environmental Protection Agency (EPA)	Wetland Program Development Grant	Competitive grants funds for projects that promote research, investigations, experiments, training, demonstrations, surveys and studies related to the cause, effects, extent, prevention, reduction and elimination of water pollution in wetlands.
Federal Emergency Management Agency (FEMA)	Pre-Disaster Mitigation Program	This program provides funding to states and local governments to plan for and implement flood mitigation projects.
Lake Champlain Basin Program (LCBP)	Local Implementation Grants	Local Implementation Grants support local community involvement in the implementation of projects and programs throughout the Champlain Watershed. Competitive grant funds are provided through agreements with the Great Lakes Fishery Commission and Environmental Protection Agency in four categories: (A) Pollution Prevention & Wildlife Habitat Conservation, (B) Aquatic Invasive Species Spread Prevention, (C) Education and Outreach, and (D) Organizational Support.

Funding Source	Funding Program	Program Overview
Northern Borders Regional Commission (NBRC)	Economic and Infrastructure Development Investment Program	Competitive grant program that provides funds to projects within specific counties in New York, Maine, Vermont and New Hampshire for economic development and infrastructure improvements. Projects must fall under one of five categories; Transportation Infrastructure, Basic Public Infrastructure, Telecommunications Infrastructure, Business and Workforce Development, and Renewable and Alternative Energy. All projects must relate to economic development. In New York, the Program is run through NYS Department of State, and only projects in Clinton, Essex and Franklin Counties are eligible.
US Department of Agriculture, Farm Service Agency (FSA)	Conservation Reserve Enhancement Program	CREP is a rental program where farmers and ranchers are paid a yearly rental rate to take environmentally sensitive land out of production and return it to a natural state. This program can also include funds for fencing projects and riparian habitat projects. This program is voluntary and contracts generally last 10 – 15 years.
US Department of Agriculture, Natural Resource Conservation Service (USDA NRCS)	Environmental Quality Improvement Program Wetland Reserve Program Wildlife Habitat Incentive Program	All of these voluntary programs provides financial and technical assistance to producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland. Each program is different, however, producers are paid a flat rate, as determined by NRCS, for the conservation practices that are implemented on their property.
	Resource Conservation Partnership Program	Competitive grant program that encourages producers to increase the restoration and sustainable use of soil, water, wildlife and related natural resources on regional or watershed scales. Through the program, NRCS and its partners help producers install and maintain conservation activities in selected project areas. Partners leverage RCPP funding in project areas and report on the benefits achieved.
US Department of Agriculture, Rural Development (USDA RD)	Rural Utilities Service Water and Waste Disposal Program	Grants and loans provided to low-income municipalities to develop storage, treatment, purification or distribution of potable water or for the collection, treatment, or disposal of waste. Loans are the preferred method of funding, however grants can be given if there is a need to reduce the average annual user charges to a reasonable level.
US Department of Housing and Urban Development (USHUD)	Community Development Block Grants	Competitive grant program that provides funding to municipalities to assist with creating decent housing in a suitable living environment, of which wastewater is a part. Program policy states that at least 70% of the funding benefits low-moderate income persons.
US Fish & Wildlife Service (USFWS)	Partners for Fish and Wildlife Program	This program aims to protect, enhance and restore important fish and wildlife habitats on private lands through partnerships. The voluntary cost-share program focuses on restoring the habitat of federal trust species on private lands, including tribal, county and municipal lands; restoring wetlands, riparian, in-stream and native upland habitats; and removing barriers to fish passage.
STATE		
NYS Department of Agriculture and Markets (NYSDAM)	Agricultural Non-Point Source Abatement and Control Program	Competitive grant program that provides funding to farmers through County Soil and Water Conservation Districts for implementation projects that reduce, abate, control, or prevent non-point source pollution caused by agricultural activities.
	Agricultural Environmental Management	Non-Competitive funds offered to each County Soil and Water Conservation District to assist agricultural operators/operations on environmental issues on their farm. Includes inventories, environmental evaluations, planning, implementation and analysis and updates.
	Climate Resilient Farming	Competitive grant program that provides funding to farmers through County Soil and Water Conservation Districts for implementation projects that reduce greenhouse gas emissions, improve flood resiliency and or improve soil health.

Funding Source	Funding Program	Program Overview
NYS Department of Environmental Conservation (NYSDEC)	Water Quality Improvement Project Program	Competitive grant program that funds implementation of water quality improvement projects under non-agricultural non-point source abatement and control, municipal wastewater treatment, aquatic habitat restoration, municipal separate sewer systems, and additional projects that address regional water quality issues.
	Urban and Community Forestry Grant Program	Competitive grant program that funds urban forestry projects to enhance landscapes, provide green space, and address water quality and quantity issues in urban landscapes. This program promotes the use of street trees to improve communities and intercept/infiltrate stormwater runoff.
	Trees for Tribs	This state program's goal is to reforest New York's tributaries that flow into and feed larger rivers and lakes by planting young trees and shrubs along stream corridors, also known as riparian areas, in order to prevent erosion, increase flood water retention, improve wildlife and stream habitat, and protect water quality.
NYS Environmental Facilities Corp (NYSEFC)	Green Innovative Grant Program	Competitive grant funding is available for projects that advance the use of green infrastructure for stormwater retention and infiltration. The goals of the program are to protect and improve water quality, spur innovation in stormwater management, and utilize local success as a building block for use of green infrastructure throughout the state.
NYS DEC/NYS EFC	Clean Water State Revolving Fund	This program provides low-interest rate financing to municipalities for the construction of sewers and wastewater treatment facilities that will result in improved water quality. Eligible projects include point source projects such as wastewater treatment facilities and nonpoint source projects such as stormwater management projects and landfill closures, as well as certain habitat restoration and protection projects in national estuary program areas.
	Engineering and Planning Grants	Competitive grant program available for planning associated with publicly owned wastewater infrastructure projects. Funding can be used by municipalities for the preparation of an engineering report and planning activities to determine the scope of water quality issues, evaluate alternatives, and propose a capital improvement project.
NYS Department of State (NYSDOS)	Local Waterfront Revitalization Program	Competitive grant program available to municipalities along designated inland waterways to prepare and implement local waterfront revitalization plans; redevelop hamlets, downtowns and urban waterfronts; plan and construct land and water-based trails; prepare and implement a lake-wide or watershed management plan; or prepare and implement a community resiliency strategy.
NYS Department of Transportation (NYSDOT)	Transportation Alternatives Program	Competitive grant program that focuses on improvements for non-drivers, but includes funds for streetscape improvements and stormwater management activities associated with improving safety for pedestrians and cyclists.
LOCAL		
Counties and Municipalities (munis)	General Budgets	This can include either funds from the municipal budget to assist in paying for projects, or in-kind services provided in the form of staff time and equipment usage for the implementation of projects and programs.
Lake George Association (LGA)	N/A	The Lake George Association is a local non-profit agency whose mission, since 1885, is to protect Lake George and its watershed through education and project implementation. The LGA has private funds available for projects throughout the Lake George watershed that address stormwater, wastewater, erosion, and invasive species.

6.4 *Priority Projects*

Also within each Priority Subwatershed, Priority Projects were chosen by a majority vote of the Advisory Committee. Priority Projects are those that are at the forefront of the phosphorus reduction efforts, and are of great importance for implementation by local stakeholders. These projects differ within each Priority Subwatershed, based on the needs of the communities within them, and include subwatershed management plans, stormwater retrofits and runoff reduction from municipal Department of Public Works sites, subwatershed-wide agricultural pollution prevention and buffer programs, wastewater infrastructure and treatment plant upgrades, and creation and implementation of septic disposal districts. These include a total investment of $95,690,000 in 55 projects, plus another $400,000 annually for three regional initiatives, as can be seen in Table 6-3. Priority projects can also be seen in bold in all of the recommendation tables.

Table 6-3. Priority projects, including phosphorus loading concern(s) and cost, within each Priority Subwatershed.

Priority Subwatershed	Priority Project Summary	Phosphorus Loading Concern				Project Cost
		Stormwater	Agriculture	Erosion	Wastewater	
#1 – Lake Champlain Direct	Stormwater reduction at the City of Plattsburgh US Oval municipal parking lot	X		X		$600,000
	Wastewater sewer line extension in the Town of Essex hamlet				X	$400,000
	Cumberland Head phosphorus loading/ bacterial assessment and monitoring				X	$45,000
	Implementation of watershed-wide shoreline outfall recon and stabilization	X		X		$250,000
#2 – Lower Boquet River	Upgrade Hamlet of Wadhams WWTP				X	$250,000
	Upgrade of Town of Willsboro WWTP				X	$2,000,000
	Implementation of agricultural pollution prevention projects for farms on waterbodies throughout subwatershed		X			$2,500,000
#3 – Halfway Creek	Town of Fort Ann DPW site stormwater containment and infiltration	X				$100,000
	Creation of a septic disposal district around Glen Lake in Town of Queensbury				X	$30,000
	Implementation of Glen Lake septic disposal district in Town of Queensbury				X	$500,000
#4 – Wood Creek/ Lake Champlain Canal	Stream buffer program for agricultural operations in Town of Kingsbury		X			$200,000
	Planning for upgrades to Village of Fort Ann WWTP				X	$100,000
	Retrofit of Village of Fort Ann WWTP				X	$5,000,000
#5a – Ausable River	Implementation of agricultural pollution prevention projects on farms on waterbodies		X			$200,000
	Upgrade of stormwater management system in the former Village of Keeseville	X				$100,000
#5b – Little Ausable River	Livestock exclusion fencing and vegetative buffers on agricultural lands in Town of Peru		X			$50,000
	Sanitary sewer main and municipal pump station reconstruction in Town of Peru				X	$4,000,000
#7 – Poultney River/ Head of Lake Champlain	Implementation of improved ag practices in Town of Whitehall		X			$2,500,000
	Village of Whitehall WWTP upgrades				X	$20,000,000
	Village of Whitehall wastewater conveyance system upgrades and I&I reduction				X	$2,000,000
#8 – Headwaters Lake George	Sanitary sewer extension up Route 9N to the Tahoe Resort in Town of Lake George				X	$10,000,000
	Removal of West Brook delta in Town of Lake George			X		$1,500,000
	Community septic system assessment for Assembly Point and Cleverdale/Rockhurst in Town of Queensbury				X	$200,000
	Implementation of community septic system on Assembly Point and Cleverdale/ Rockhurst in Town of Queensbury				X	$2,000,000
	Reconstruction of the Village of Lake George WWTP				X	$18,000,000
	Creation of a subwatershed assessment for Headwaters Lake George	X	X	X	X	$50,000

Priority Subwatershed	Priority Project Summary	Phosphorus Loading Concern				Project Cost
		Stormwater	Agriculture	Erosion	Wastewater	
#9a – Indian Brook/ Lake George	Town of Bolton hamlet stormwater reduction program	X				$125,000
	Slip-line wastewater conveyance system and upgrade manholes in the Town of Bolton				X	$250,000
	Town of Bolton WWTP upgrades				X	$3,500,000
	Upgrade of 9N stormwater conveyance system by NYSDOT	X				$5,000,000
#9b – Bullis Brook/ Great Chazy River	Livestock exclusion fencing and riparian buffer program		X			$150,000
	Creation of a Great Chazy River watershed management plan	X	X	X	X	$50,000
#9c – Dead Creek	Implement a residential green infrastructure program in the City of Plattsburgh	X				$50,000
	Improved planning and implementation to reduce ag runoff in Town of Plattsburgh		X			$1,500,000
#12a – Lake Champlain Canal	Reduce nutrient runoff from agricultural operations		X			$2,500,000
#12b – Outlet Great Chazy River	Promote and implement ag waste storage systems in the Town of Champlain		X			$260,000
	Implement agricultural riparian buffer program in the Town of Champlain		X	X		$225,000
#14a – Mettawee River	Implement manure storage management practices in Town of Granville		X			$200,000
	Mettawee River streambank restoration and buffer installation program	X	X	X		$350,000
#14b – Outlet Lake George	Route 8/9N intersection stormwater reduction engineering report in Town of Hague	X				$50,000
	Crow Point wastewater system assessment and community system installation in Town of Putnam				X	$200,000
	Implementation of stormwater runoff controls on Baldwin Road/Black Point Road in Town of Ticonderoga	X				$250,000
	Wastewater system assessment of Outlet Drive subwatershed in Town of Ticonderoga				X	$20,000
#16 – McKenzie Brook/ Lake Champlain	Construction of a new WWTP in Town of Crown Point				X	$1,000,000
	Complete a hamlet stormwater assessment and management plan in Town of Moriah	X				$20,000
	Implementation of ag pollution prevention projects on farms directly on waterbodies throughout subwatershed		X			$200,000
#17 – Rouses Point	Complete comprehensive stormwater management plan for Village of Rouses Point	X				$75,000
#18 – Headwaters Halfway Creek	Stormwater reduction and separate sewer system clay pipe elimination in City of Glens Falls	X				$1,000,000
	Continued implementation of City of Glens Falls CSO Long Term Control Plan				X	$5,000,000
	Improved implementation of City of Glens Falls MS4 Program	X				$100,000
	Creation of a septic disposal district around Lake Sunnyside in Town of Queensbury				X	$20,000

Priority Subwatershed	Priority Project Summary	Phosphorus Loading Concern				Project Cost
		Stormwater	Agriculture	Erosion	Wastewater	
#19 – Hoisington Brook/ Lake Champlain	Complete a Town of Westport stormwater assessment and management plan	X				$20,000
	Implement projects identified in Town of Westport stormwater assessment	X				$250,000
	Upgrade Town of Westport WWTP				X	$500,000
Regional Initiatives	Promote and implement a regional cover cropping program to reduce erosion from row crop fields		X			$250,000
	Establish and maintain regular funding pool for CWICNY's Rural Roads Active Management Program (RRAMP)			X		$100,000 annually
	Continued funding of County hydroseeding programs that address roadside erosion stabilization and are provided to municipalities at no/low cost			X		$50,000 annually
	Establish a line item in the NYS Environmental Protection Fund for Lake Champlain Watershed efforts funneled through CWICNY	X	X	X	X	$250,000 annually

6.5 *Ongoing Implementation, Long-Term Monitoring and Evaluation*

The projects outlined within the recommendation tables are part of the first round of implementation in New York's effort to reach the phosphorus reduction goals stated in the Lake Champlain TMDL. As these projects are implemented, and new ones are discovered, project partners will adapt the strategies and priorities outlined in this Plan to ensure that efforts continue. It is the intent for this Plan to be a "living document," that is updated as needed to reflect priorities and actions within the watershed. In addition, project partners realize that the overall phosphorus reduction goals cannot be reached by working in only a few subwatersheds, and therefore remain open to work in any of the 79 HUC-12 subwatersheds within the watershed.

Organizations within the Lake Champlain watershed are lucky in the sense that there is already a mechanism for long-term monitoring and evaluation through the Lake Champlain Research Institute. Their consistent water quality monitoring of the lake and its tributaries, along with the stream gauge monitoring systems, will assist the project partners in identifying, in the long-term, whether the implementation of the projects outlined in this plan are effective, and where future efforts for phosphorus reduction should be focused.

PRIORITY SUBWATERSHED 1.

Lake Champlain

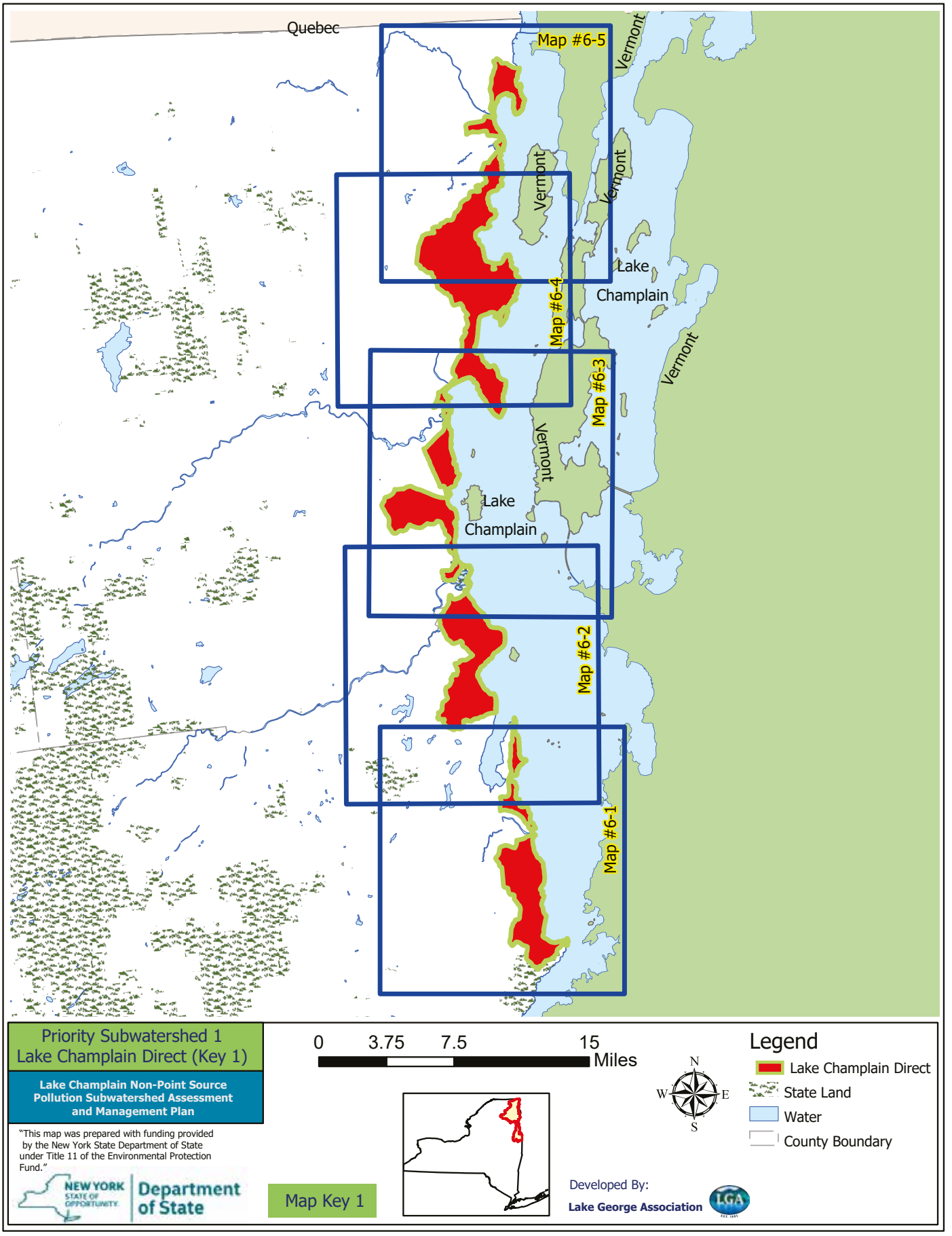
Courtesy of the City of Plattsburgh

The Lake Champlain subwatershed includes almost 80 square miles of land along the Lake Champlain shoreline stretching from the Town of Willsboro in Essex County to the southern border of the Village of Rouses Point in Clinton County. Places of concern for phosphorus loading within this subwatershed include Willsboro Point, Cumberland Head and the City of Plattsburgh, due to their current level of development along the shoreline. This Priority Subwatershed also includes the many small hamlets within the Essex and Clinton County shoreline towns, which have increased phosphorus loading potential. Outside of the developed areas include an array of agricultural fields, many directly along the Lake, that provide their own level of phosphorus loading. Within the matrix, this subwatershed received 74 out of 95 points, and notable results for this subwatershed include;

- Maximum points within both NYS DEC PWL categories, which can be attributed to the impaired PWL listing for Lake Champlain itself;
- High score in the target phosphorus reduction goal parameter because of its inclusion of lands along Main Lake, Cumberland Bay and Isle La Motte lake segments;
- High score in soils because the majority of the land is Champlain Valley clay;
- Maximum score for the presence of a surface water drinking source;
- High number of road miles, and
- Maximum score for both phosphorus loading per land use and percent row crops, which can be attributed to the density of agriculture in the Champlain Valley and along the shoreline; and
- Moderately high score for percent imperviousness due to the City, Villages, and hamlets within the subwatershed.

Priority Projects

1. Stormwater Reduction/Infiltration work at the City of Plattsburgh's 600-car parking lot at the US Oval – Planning for and implementation of green infrastructure retrofits to reduce stormwater loading directly to Lake Champlain.
2. Cumberland Head phosphorus loading/ bacterial system assessment and water quality monitoring – Continued monitoring of the water quality in Cumberland Head to determine sources of loading for creation of an action plan.
3. Sanitary sewer line extension throughout the hamlet in the Town of Essex - Extension of sewer line to eliminate on-site systems.
4. Implementation of a watershed-wide shoreline outfall reconnaissance and stabilization program – Mapping of all shoreline outfalls and implementation of stabilization needs.


Quebec
Map #6-5
Vermont
Vermont
Vermont
Lake
Champlain
Map #6-4
Map #6-3
Vermont
Vermont
Lake
Champlain
Map #6-2
Map #6-1
Priority Subwatershed 1
Lake Champlain Direct (Key 1)
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
Map Key 1
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Miles
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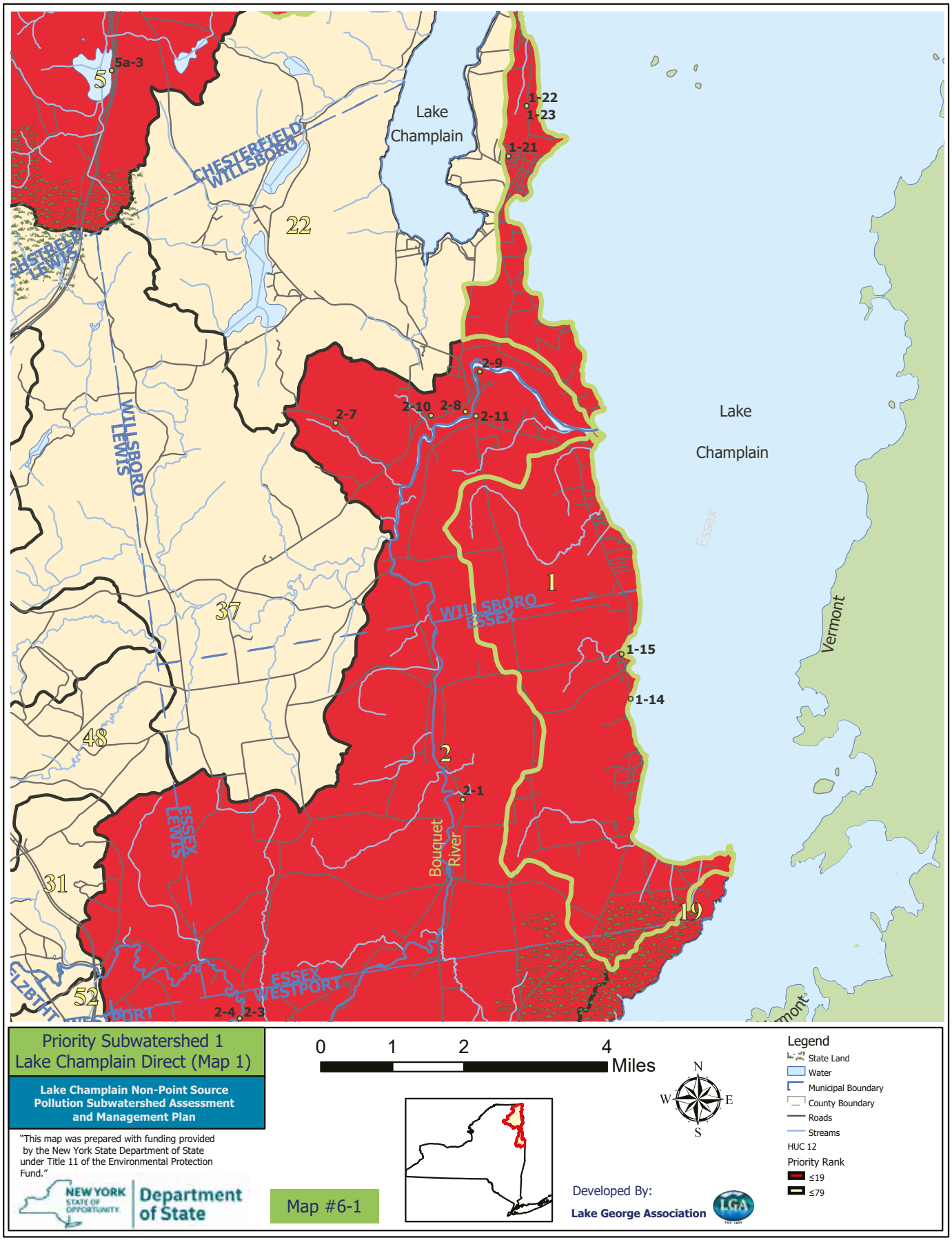
Legend
Lake Champlain Direct
State Land
Water
County Boundary
Developed By:
Lake George Association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5
Lake
Champlain
1-22
1-23
1-21
CHESTERFIELD
WILLSBORO
22
WILLSBORO
LEWIS
2-9
2-7
2-10
2-8
2-11
Lake
Champlain
Essex
WILLSBORO
ESSEX
1
37
1-15
1-14
Vermont
48
2
2-1
ESSEX
LEWIS
Bouquet
River
31
19
52
ESSEX
WESTPORT
2-4
2-3
Priority Subwatershed 1
Lake Champlain Direct (Map 1)
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
Map #6-1
0 1 2 4 Miles
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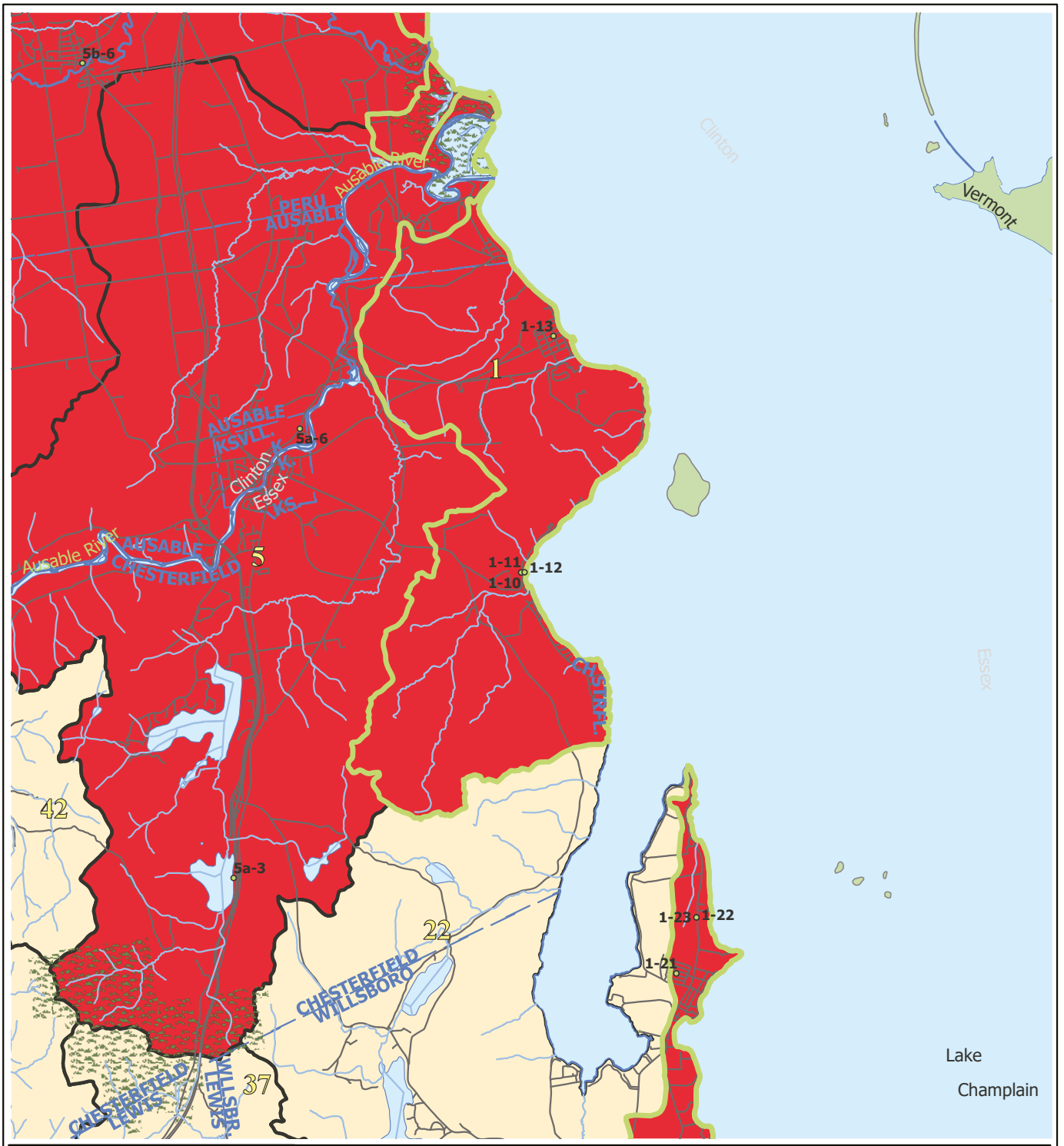
Developed By:
Lake George Association
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79



Priority Subwatershed 1
Lake Champlain Direct (Map 2)

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."

NEW YORK STATE OF OPPORTUNITY. Department of State

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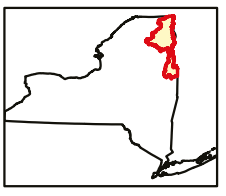


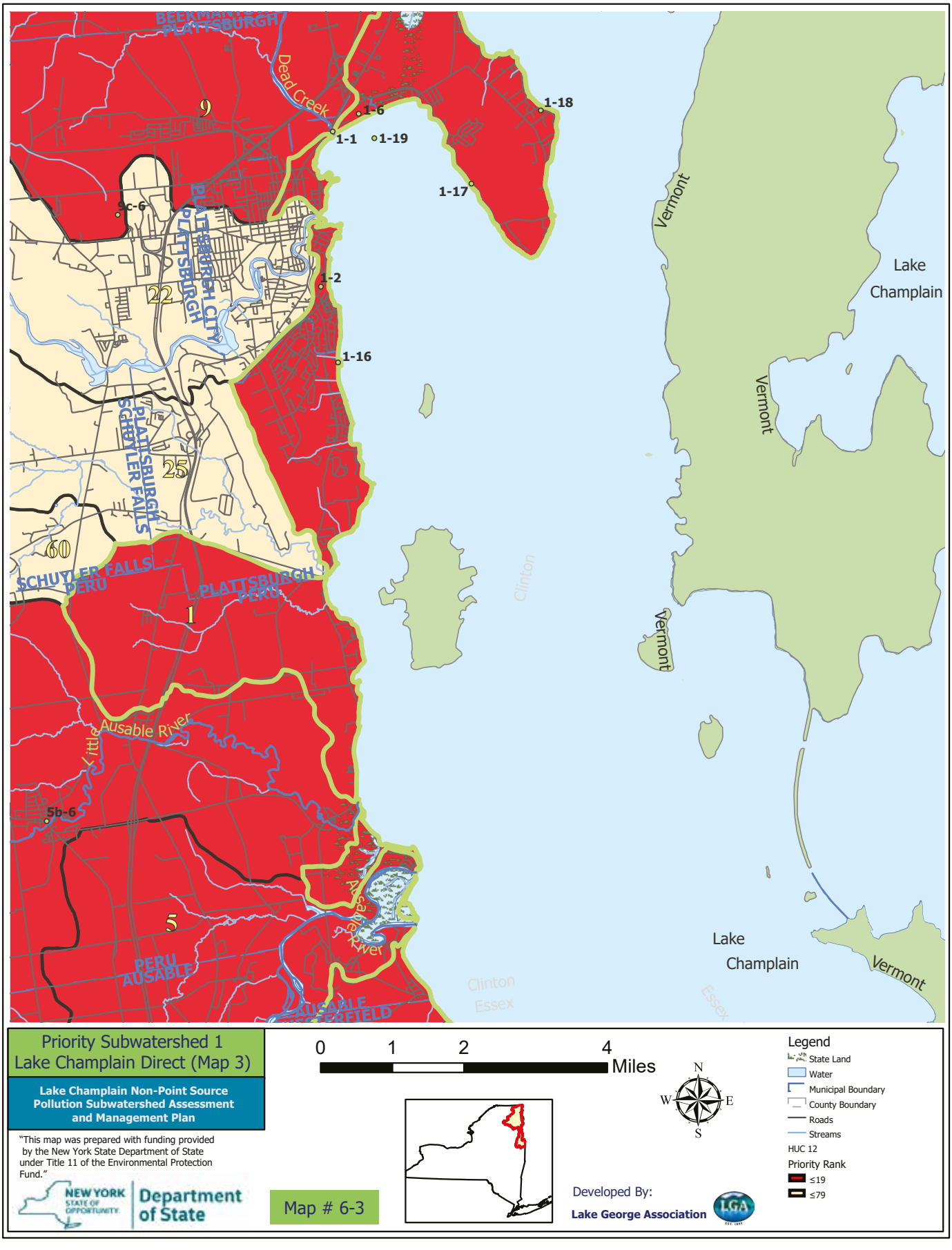
Map # 6-2

Developed By:
Lake George Association LGA

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79



Priority Subwatershed 1
Lake Champlain Direct (Map 3)

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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Map # 6-3

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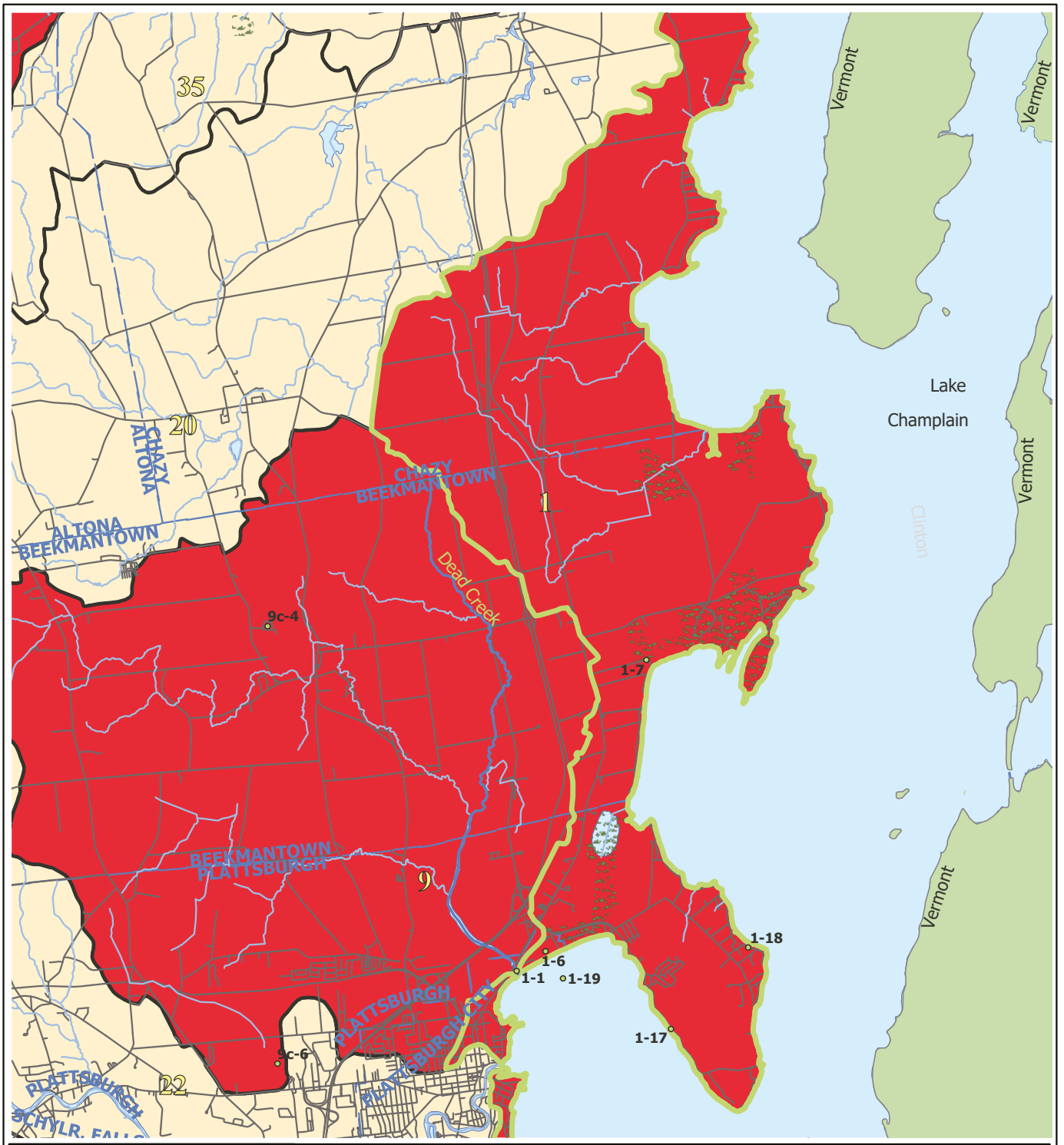
Lake George Association



Priority Subwatershed 1
Lake Champlain Direct (Map 4)

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

Map # 6-4

0 1 2 4 Miles

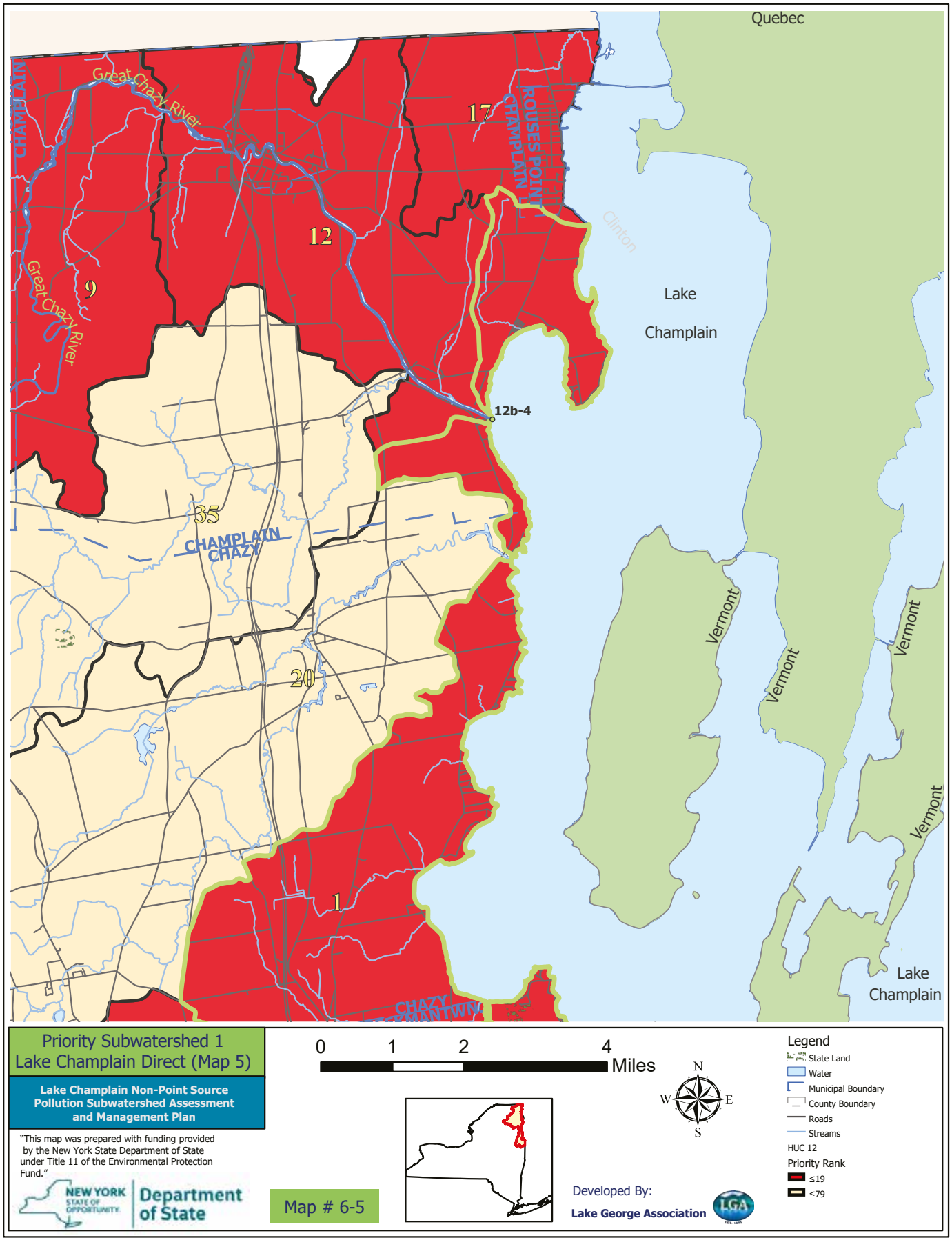
N W E S

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Developed By:
Lake George Association


Quebec
Great Chazy River
CHAMPLAIN
ROUSES POINT CHAMPLAIN
17
12
9
Great Chazy River
Clinton
Lake
Champlain
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CHAMPLAIN CHAZY
20
1
CHAZY CHANTWY
Vermont
Vermont
Vermont
Vermont
Lake
Champlain
Priority Subwatershed 1
Lake Champlain Direct (Map 5)
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
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NEW YORK STATE OF OPPORTUNITY. Department of State
Map # 6-5
0 1 2 4 Miles
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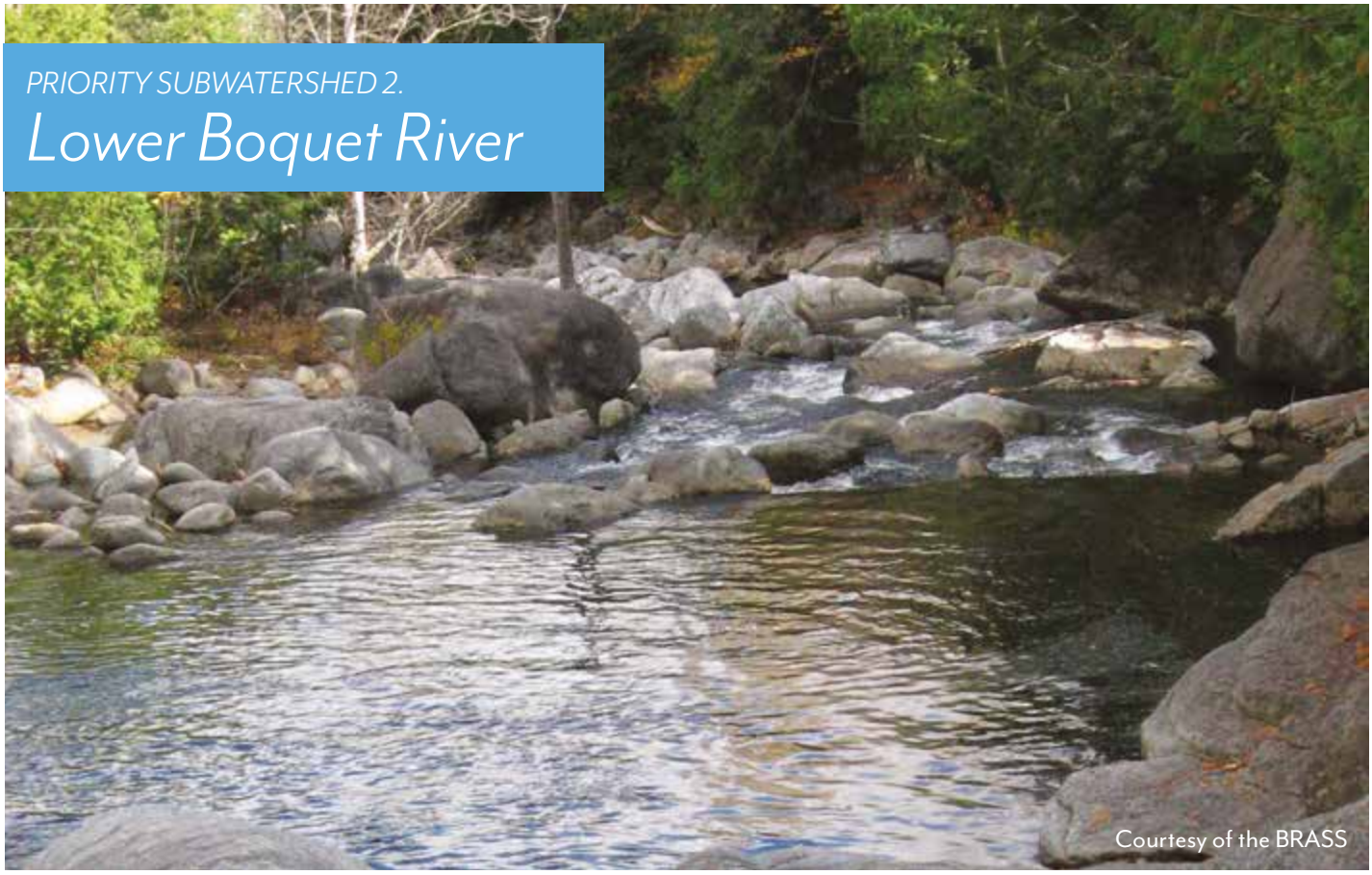
Developed By:
Lake George Association
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79

Priority Subwatershed #1 - Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
City of Plattsburgh									
1-1	Stabilize eroding stream- bank at Sailor's Beach	Clinton	44°43'00.60"N 73°26'32.78"W	Public	Stormwater Erosion	$50,000	NYSDOS NYSDEC LCBP	*City*	Short Term
1-2	Stormwater reduction/ GI infiltration work at the US Oval municipal parking lot and road-way. Implementation & education	Clinton	44°41'07.89"N 73°26'47.88"W	Public	Stormwater	$600,000	NYSDOS NYSDEC LCBP	*City,* LCLGRPB	Short Term Medium Term
1-3	Implementation of CSO Long- Term Control Plan	Clinton	Various	Public	Wastewater	$10 M	NYSDEC	*City*	Long Term
1-4	Implementation of Green Infrastructure Plan	Clinton	Various	Public	Stormwater	$1.0 M	NYSDOS NYSDEC NYSEFC LCBP	*City,* LCLGRPB	Medium Term
1-5	Promote and implement City's Urban Forestry Program	Clinton	Various	Public	Stormwater	$45,000	NYSDOS NYSDEC LCBP	*City,* LCLGRPB	Short Term
1-6	Creation and implementation of a comprehensive pollution reduction study for Cumberland Bay area	Clinton	44°43'13.12"N 73°26'05.99"W	Public	Stormwater Wastewater	$1.0 M	NYSDOS NYSDEC NYSDAM USDA NRCS LCBP	*City,* County Health Dept., LCLGRPB	Short Term Medium Term
Town of Beekmantown									
1-7	Reduce roadside erosion and stabilize ditch	Clinton	44°46'22.35"N 73°24'28.31"W	Public	Erosion	$10,000	NYSDOS NYSDEC LCBP	*Clinton Co. SWCD,* Town DPW & Parks	Short Term
1-8	Implement manure management practices on farms	Clinton	Various	Private	Agriculture	$2.0 M	NYSDAM USDA NRCS LCBP	*Clinton Co. SWCD* Landowners	Medium Term
Town of Chazy									
1-9	Livestock exclusion fencing and riparian buffers along Riley Brook	Clinton	Various	Private	Agriculture Erosion	$30,000	USDA NRCS FSA NYSDAM LCBP	*Clinton Co. SWCD,* Landowner	Medium Term

Priority Subwatershed #1 - Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (*Lead agency in Italics*)	Time Frame
Town of Chesterfield									
1-10	Culvert retrofit and grade control structure placement to address undercutting in Port Douglass	Essex	44°29'04.56"N 73°25'05.34"W	Public	Erosion	$150,000	NYSDOS NYSDEC USFWS LCBP	*Essex Co SWCD*, Town, USFWS, TU	Medium Term
1-11	Implementation of grey and green infrastructure stormwater reduction projects in the Hamlet of Port Douglass	Essex	44°29'04.56"N 73°25'05.34"W	Public	Stormwater	$150,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD,* Town, CWICNY	Medium Term
1-12	Installation of stormwater management controls at DEC Boat Launch parking lot	Essex	44°29'04.67"N 73°25'02.23"W	Public	Stormwater	$30,000	NYSDEC	*NYSDEC,* Essex Co. SWCD, Town	Short Term
1-13	Implementation of grey and green stormwater reduction projects in the Hamlet of Port Kent of Essex	Essex	44°31'38.63"N 73°24'31.69"W	Public	Stormwater	$150,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD*, Town, CWICNY	Medium Term
Town of Essex									
1-14	Re-stabilization of Lakeshore Road by either road relocation or lakeshore stabilization	Essex	44°18'03.72"N 73°20'58.06"W	Public	Stormwater Erosion	$200,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD,* Essex Co., Town, CWICNY	Long Term
1-15	**Wastewater sewer line extension throughout the Hamlet**	**Essex**	**44°18'36.48"N 73°21'06.29"W**	**Public**	**Wastewater**	**$400,000**	**NYSDEC LCBP NBRC**	*Town*	**Medium Term**
Town of Plattsburgh									
1-16	Shoreline stabilization along Lake Champlain and abandoned jetties	Clinton	44°40'12.50"N 73°26'31.86"W	Private	Erosion	$150,000	NYSDOS NYSDEC USFWS	*Town*	Medium Term
1-17	Cumberland Head Road green space creation	Clinton	44°42'20.69"N 73°24'12.36"W	Public	Stormwater	$350,000	NYSDOS NYSDEC LCBP	*Town,* LCLGRPB, Clinton Co. SWCD	Long Term
1-18	Cumberland Head road way ditching and outfall assessment	Clinton	44°43'12.98"N 73°23'00.16"W	Public	Stormwater Erosion	$30,000	NYSDOS NYSDEC LCBP	*Clinton Co. SWCD,* Town	Short Term

Priority Subwatershed #1 - Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
1-19	Cumberland Head phosphorus loading/ bacterial system assess ment and water quality monitoring	Clinton	44°42'55.14"N 73°25'50.47"W	Public	Wastewater	$45,000	NYSDOS NYSDEC LCBP	*Clinton Co. Health Dept.*	Short Term
1-20	Rte. 3 corridor impervious surface reduction and stormwater retrofits	Clinton	Various	Public Private	Stormwater	$2.0 M	NYSDOS NYSDEC NYSEFC LCBP	*Town, Landowners*	Long Term
Town of Willsboro									
1-21	Installation of green and gray stormwater infrastructure at Buena Vista Mobile Estates	Essex	44°24'40.64"N 73°22'51.02"W	Public Private	Stormwater	$175,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD,* Town	Long Term
1-22	Willsboro Point sanitary sewer assessment	Essex	44°25'16.99"N 73°22'31.70"W	Public	Wastewater	$120,000	NYSDOS NYSDEC	*Town,* County Planning	Medium Term
1-23	Implement recommendations in Willsboro Point sanitary sewer assessment	Essex	44°25'16.99"N 73°22'31.70"W	Public	Wastewater	$2.0 M	NYSDEC NYSEFC LCBP	*Town*	Long Term
All Municipalities									
1-24	Implementation of a watershed-wide shoreline outfall reconnaissance & stabilization program	Clinton Essex	Various	Public Private	Erosion Stormwater	$250,000	NYSDEC LCBP	*County SWCDs,* Towns, County	Medium Term



PRIORITY SUBWATERSHED 2.

Lower Boquet River

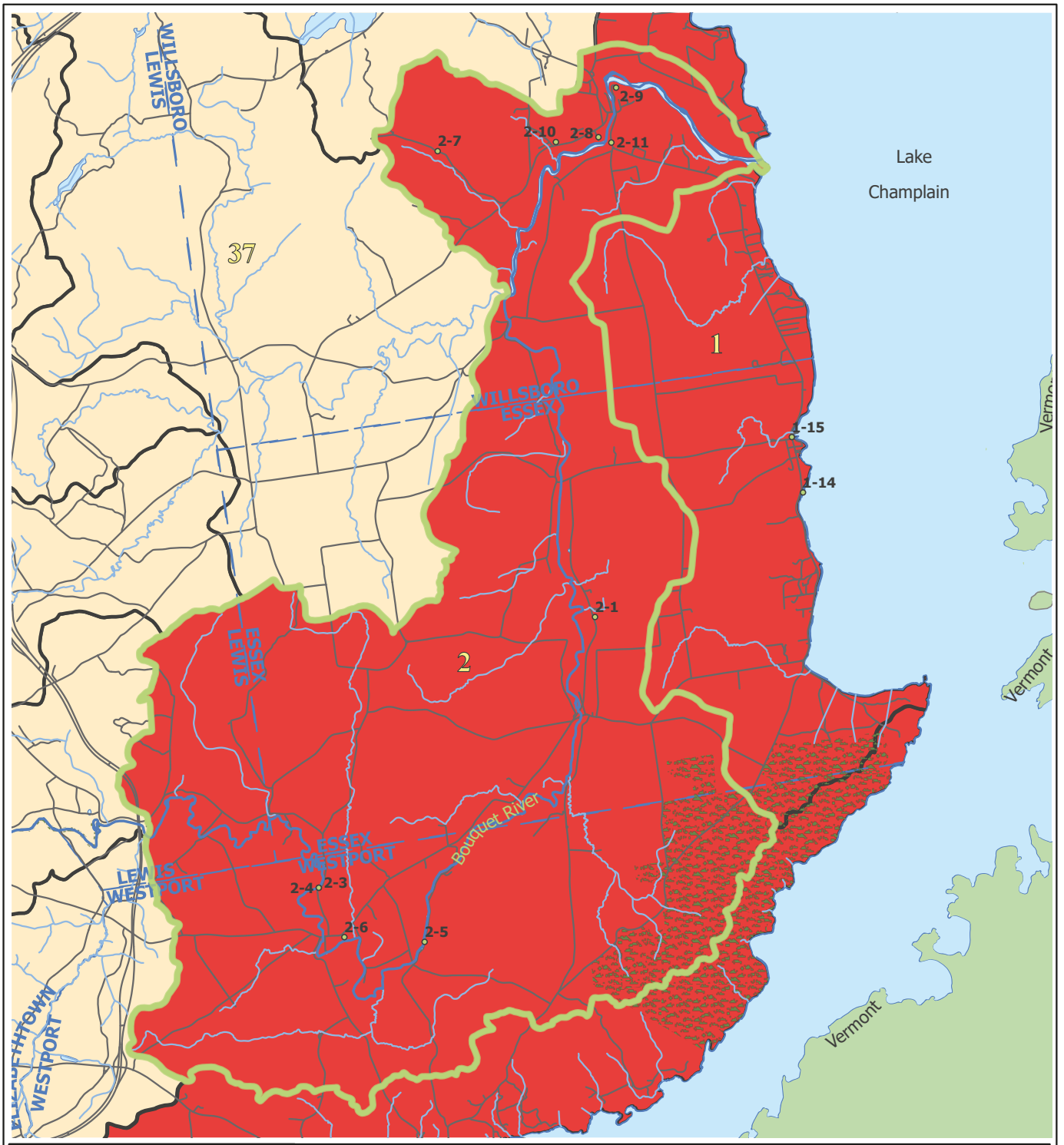
Courtesy of the BRASS

The Lower Boquet River Priority Subwatershed includes just over 46 square miles in the Towns of Essex, Lewis, Westport and Willsboro in Essex County that lead up to the mouth of the Boquet River. This subwatershed includes several developed hamlets that are surrounded by an array of agricultural fields, creating the potential for phosphorus loading from many different sources. Within the matrix, this subwatershed received 68 out of 95 points, and notable results for this subwatershed include;

- High scores in both NYS DEC PWL categories;
- Maximum score for target phosphorus reduction goal as it is within the Main Lake lake segment;
- High score for soil because it's within the Champlain Valley clay;
- Maximum score because there is the presence of a surface water drinking source; and
- High scores for both phosphorus loading per land use type and a maximum score for percent row crops as a result of the many agricultural fields in the subwatershed.

Priority Projects

1. Upgrade Hamlet of Wadhams Wastewater Treatment Plant – Funding to upgrade the out-of-date plant that services the Hamlet.
2. Upgrade Town of Willsboro Wastewater Treatment Plant – Funding to upgrade the out-of-date plant that services the Town of Willsboro.
3. Implementation of agricultural pollution prevention projects on farms directly on waterbodies – Implementation of an array of practices to reduce agricultural runoff into surface waters.



Priority Subwatershed 2
Lower Bouquet River

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

Map # 6-6

Developed By:
Lake George Association

Priority Subwatershed #2 - Lower Boquet River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Essex									
2-1	Improvements to Town DPW site for stormwater pollutant control	Essex	44°16'52.86"N 73°23'50.43"W	Public	Stormwater	$150,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD,* Town	Medium Term
Town of Lewis									
2-2	Implement roadside erosion control program	Essex	Various	Public	Erosion	$150,000	NYSDOC NYSDEC LCBP	*Town,* Essex Co. SWCD	Short Term
Town of Westport									
2-3	Complete study to address flooding and stormwater issues on Lewis-Wadhams Road	Essex	44°14'16.61"N 73°27'40.78"W	Public	Stormwater	$60,000	NYSDOS NYSDEC LCBP	*County Planning, County DPW,* Town, TU, BRASS	Medium Term
2-4	Implement recommendations in Lewis-Wadhams Road Study	Essex	44°14'16.61N 73°27'40.78"W	Public	Stormwater	$250,000	NYSDOC NYSDEC LCPBP	*County Planning, County DPW,* Town, Essex Co. SWCD	Long Term
2-5	Stabilize road erosion on Mirriam Forge Road along Boquet River bank	Essex	44°13'43.59"N 73°27'15.03"W	Public	Erosion	$30,000	NYSDOS NYSDEC LCBP	*Town,* Essex Co. SWCD	Short Term
2-6	**Upgrade Hamlet of Wadhams WWTP**	**Essex**	**44°13'47.27"N 73°27'20.61"W**	**Public**	**Wastewater**	**$250,000**	**NYDEC NYSEFC LCBP NBRC**	***Town***	**Medium Term**
Town of Willsboro									
2-7	Joe Rivers Road roadside bank stabilization project	Essex	44°21'28.81"N 73°27'20.61"W	Public	Erosion	$20,000	NYSDOC NYSDEC LCBP	*Essex Co. SWCD,* Town, BRASS	Short Term
2-8	Improvements to Town DPW site for stormwater pollutant control	Essex	44°21'35.22"N 73°23'39.90"W	Public	Stormwater	$150,000	NYSDOC NYSDEC LCBP	*Essex Co. SWCD,* Town	Medium Term
2-9	**Upgrade of Town WWTP**	**Essex**	**44°22'04.16"N 73°23'24.63"W**	**Public**	**Wastewater**	**$2.0M**	**NYSDEC NYSSEFC LCBBP**	***Town, County Planning***	**Long Term**

Priority Subwatershed #2 - Lower Boquet River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
2-10	Improvement of tertiary wastewater treatment system	Essex	44°21'32.82"N 73°24'14.88"W	Public	Wastewater	$50,000	NYSDEC NYSEFC LCBP	*Town*	Long Term
2-11	Upgrade Town stormwater system	Essex	44°21'31.87"N 73°23'29.42"W	Public	Stormwater	$50,000	NYSDOC NYSDEC LCBP	*Town,* Essex Co. DPW, Essex Co. SWCD	Short Term
All Municipalities									
2-12	**Implementation of agricultural pollution prevention projects on farms directly on waterbodies**	**Essex**	**Various**	**Private**	**Agriculture**	**$2.5 M**	**NYSDAM USDA NRCS LCBP**	***Essex Co. SWCD,*** **BRASS, TU, USF&WS**	**Long Term**
2-13	Implementation of a roadside erosion reduction program	Essex	Various	Public	Erosion	$100,000	NYSDOC NYSDEC LCBP	*Essex Co. SWCD,* Town, Essex Co. NYSDOT	Medium Term
2-14	Boquet River tributary assessment	Essex	Various	Public Private	Stormwater Erosion	$15,000	NYSDOC NYSDEC LCBP	*Essex Co. SWCD,* BRASS	Short Term
2-15	Implementation of recommendations made in Boquet River Watershed Management Plan	Essex	Various	Public Private	Stormwater Erosion Wastewater	$4.0 M	NYSDOS NYSDEC NYSEFC USDA NRCS LCBP	*BRASS,* Essex Co. SWCD, munis, County	Short - Long Term

PRIORITY SUBWATERSHED 3.

Halfway Creek

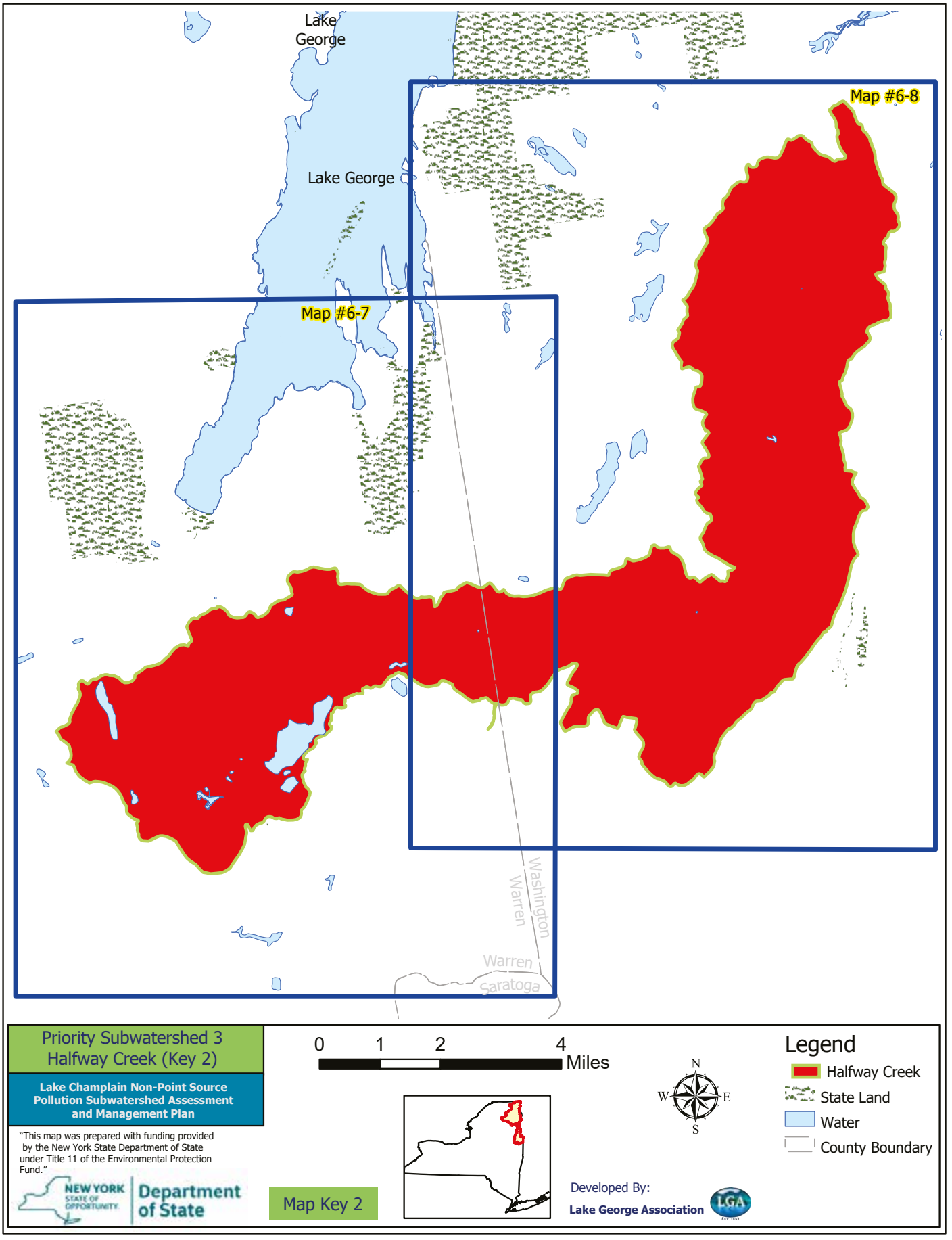
Courtesy of Jim Lieberum

The Halfway Creek watershed is within Warren and Washington Counties in the southern portion of the Lake Champlain Basin. It encompasses 50 square miles of land in the Towns of Queensbury, Kingsbury, and Fort Ann, and includes a very small portion of southern part of the Town of Lake George and the majority of the Village of Fort Ann. Halfway Creek flows through the highly developed commercial corridors within the Town of Queensbury and the heavily farmed areas of the Town of Fort Ann, making urbanized stormwater runoff and agricultural runoff equally of concern for phosphorus loading. Additional phosphorus concerns include a large amount of camps and secondary homes built along the lakes within the watershed, making leaching from septic tanks a potential phosphorus input. This Priority Subwatershed scored a 64 out of 95 points within the matrix, and notable results include;

- Maximum scores in both NYS DEC PWL categories, which can be attributed to the inclusion of many sources of pollutants that are having an effect on Halfway Creek itself;
- High score in soil type, due to the presence of clay soils within Washington County;
- Maximum score for water body classification because of the many B, A(T), and AA(T) waterbodies within the HUC-12;
- Maximum score for the presence of a surface water drinking source;
- Maximum score for miles of tributaries;
- High numbers for septic systems within 100 feet of a surface water, lane miles, and erosion sites; and
- High number for phosphorus loading per land use and moderately high numbers for percent impervious surface and percent row crops, due to the difference in land use between urbanized Warren County and agricultural Washington County.

Priority Projects

1. Town of Fort Ann DPW site stormwater containment and infiltration – Installation of several stormwater control and best management practices at the Town DPW site to reduce stormwater runoff.
2. Creation of a septic disposal district around Glen Lake – The Town of Queensbury and Glen Lake Protective Association will work together to create a Septic Disposal District, which will create a mandatory program for septic inspections and pump-outs.
3. Implementation of a septic disposal district around Glen Lake – Implementation of the program, which will include an inventory of septic systems surrounding the lake and create a regular inspection and pump-out schedule for all properties.


Lake George
Lake George
Map #6-8
Map #6-7
Washington
Warren
Warren
Saratoga
Priority Subwatershed 3
Halfway Creek (Key 2)
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY Department of State
0 1 2 4 Miles
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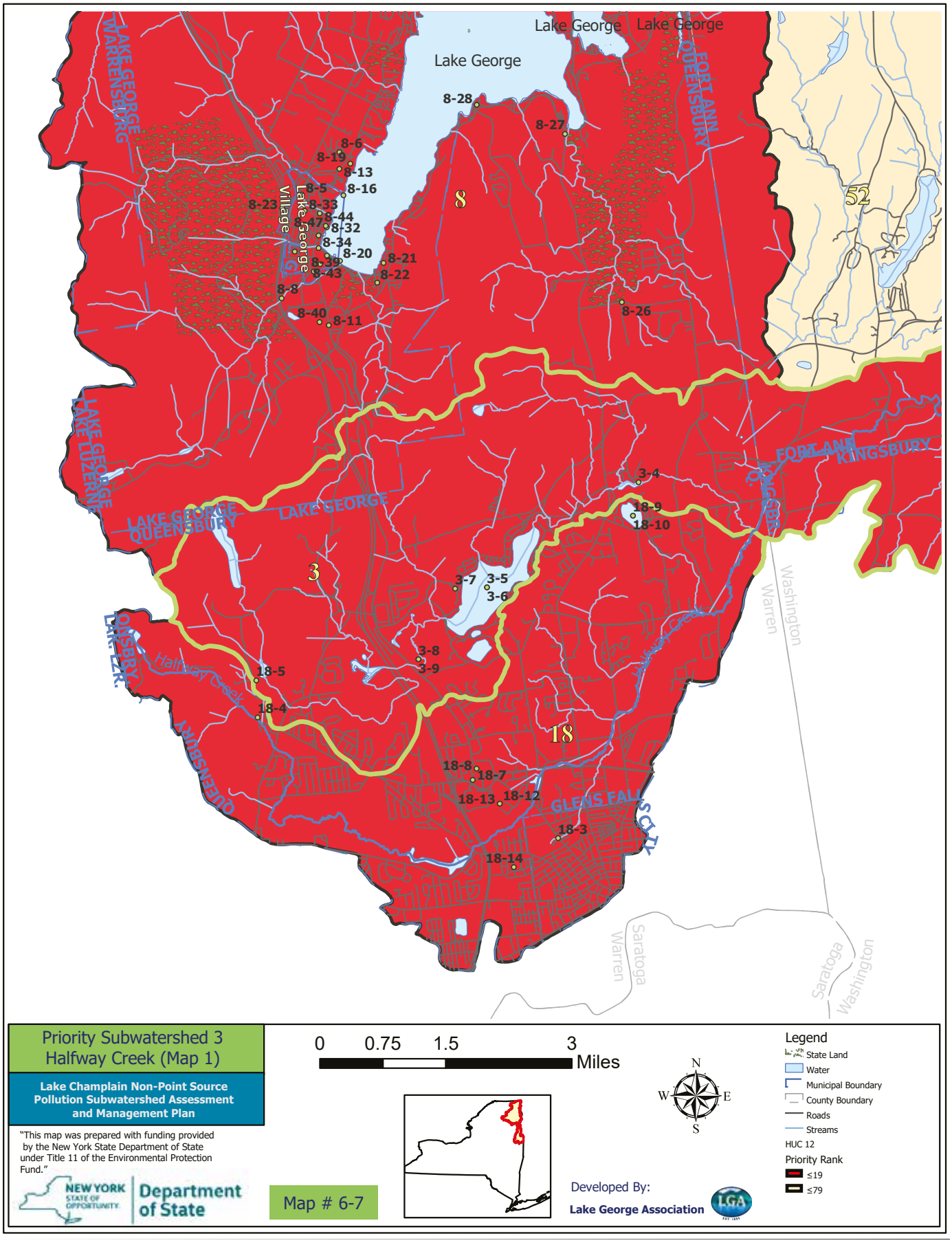
Map Key 2
Developed By:
Lake George Association
Legend
Halfway Creek
State Land
Water
County Boundary



Priority Subwatershed 3
Halfway Creek (Map 1)

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

Map # 6-7

0 0.75 1.5 3 Miles

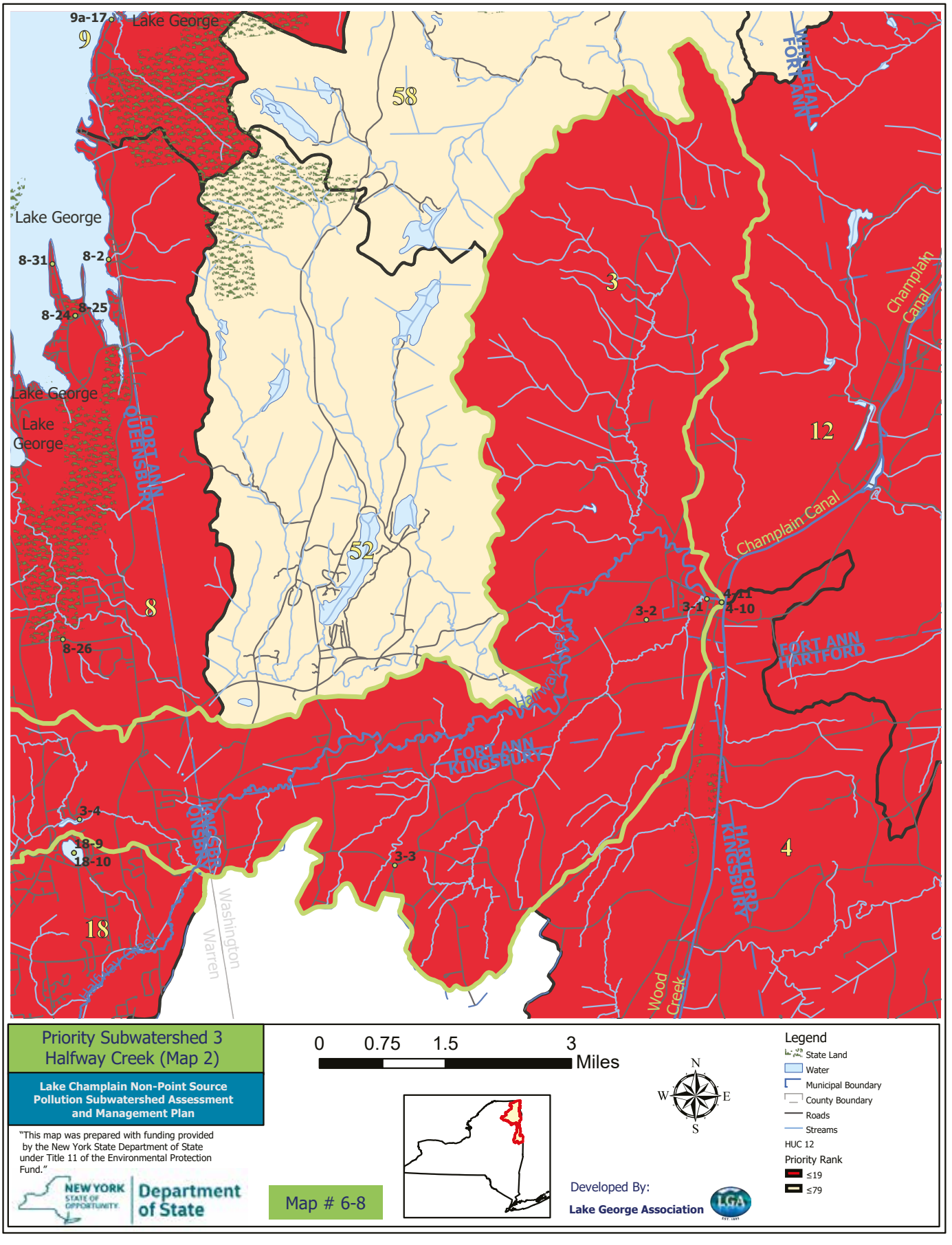
N W E S

Developed By:
Lake George Association

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79


9a-17
Lake George
9
58
Lake George
8-31
8-2
8-24
8-25
Lake George
Lake George
FORT ANN
QUEENSBURY
8
8-26
52
3
12
Champlain Canal
Champlain Canal
WHITEHALL
FORT ANN
3-2
3-1
4-11
4-10
FORT ANN
HARTFORD
Halfway Creek
FORT ANN
KINGSBURY
3-4
18-9
18-10
QUEENSBURY
KINGSBURY
3-3
18
Washington
Warren
Wood Creek
HARTFORD
KINGSBURY
4
Priority Subwatershed 3
Halfway Creek (Map 2)
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
Map # 6-8
0 0.75 1.5 3 Miles
N
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S
Developed By:
Lake George Association
LGA
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79

Priority Subwatershed #3 - Halway Creek									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (*Lead agency in Italics*)	Time Frame
Town of Fort Ann									
3-1	Stormwater runoff assessment for County Route 16 Halfway Brook culvert	Washington	43°25'02.04"N 73°29'19.79"W	Public	Stormwater	$5,000	NYSDOS NYSDEC LCBP	*County DPW,* Washington Co. SWCD	Short Term
3-2	Town DPW site storm- water containment and infiltration	Washington	43°24'49.79"N 73°30'11.67"W	Public	Stormwater	$100,000	NYSDOS NYSDEC LCBP	*Town,* County, Wash. Co. SWCD	Medium Term
Town of Kingsbury									
3-3	Vaughn Road road bank stabilization	Washington	43°22'19.97"N 73°33'49.56"W	Public	Erosion	$45,000	NYSDOS NYSDEC LCBP	*County*	Short Term
Town of Queensbury									
3-4	Dream Lake wastewater assessment and priority action plan for remediation	Warren	43°22'51.74"N 73°38'17.34"W	Public Private	Wastewater	$15,000	NYSDOS NYSDEC LCBP	*Town,* LCLGRPB	Short Term
3-5	Creation of a septic disposal district around Glen Lake	Warren	43°21'48.01"N 73°40'27.85"W	Private	Wastewater	$30,000	NYSDOS NYSDEC NYSEFC	*Glen Lake Association,* Town	Short Term
3-6	Implementation of Glen Lake septic disposal district, including replacement of out dated systems	Warren	43°21'48.01"N 73°40'27.85"W	Private	Wastewater	$500,000	NYSDOS NYSDEC NYSEFC LCBP Land-owner	*Glen Lake Association, Landowners,* Town	Long Term
3-7	Drywell installation on Birch Rd/ Chestnut Rd	Warren	43°21'47.54"N 73°40'54.97"W	Public	Stormwater	$5,000	NYSDOS NYSDEC LCBP	*Warren Co. SWCD,* Town	Short Term
3-8	Assessment of stormwater runoff from Six Flags Great Escape Property	Warren	43°21'04.01"N 73°41'27.15"W	Private	Stormwater	$3,000	LCBP Land-owner	*Warren Co. SWCD,* Town, Landowner	Medium Term

Priority Subwatershed #3 - Halway Creek									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
3-9	Implementation of recommendations in Six Flag Great Escape assessment	Warren	43°21'04.01"N 73°41'27.15"W	Private	Stormwater	$300,000	LCBP Land-owner	*Warren Co. SWCD,* Town, Landowner	Long Term
3-10	Increase in educational campaign focused on Town-wide phosphorus free fertilizer law	Warren	Various	Public	Stormwater	$2,500	NYSDOS NYSDEC LCBP	*Town,* LCLGRPB	Short Term
3-11	Implementation of Town's MS4 Stormwater Management Program Plan	Warren	Various	Public	Stormwater	$400,000	NYSDEC LCBP	*Town,* LCLGRPB, Warren Co. SWCD	Medium Term

Courtesy of Nick Rowell

PRIORITY SUBWATERSHED 4.

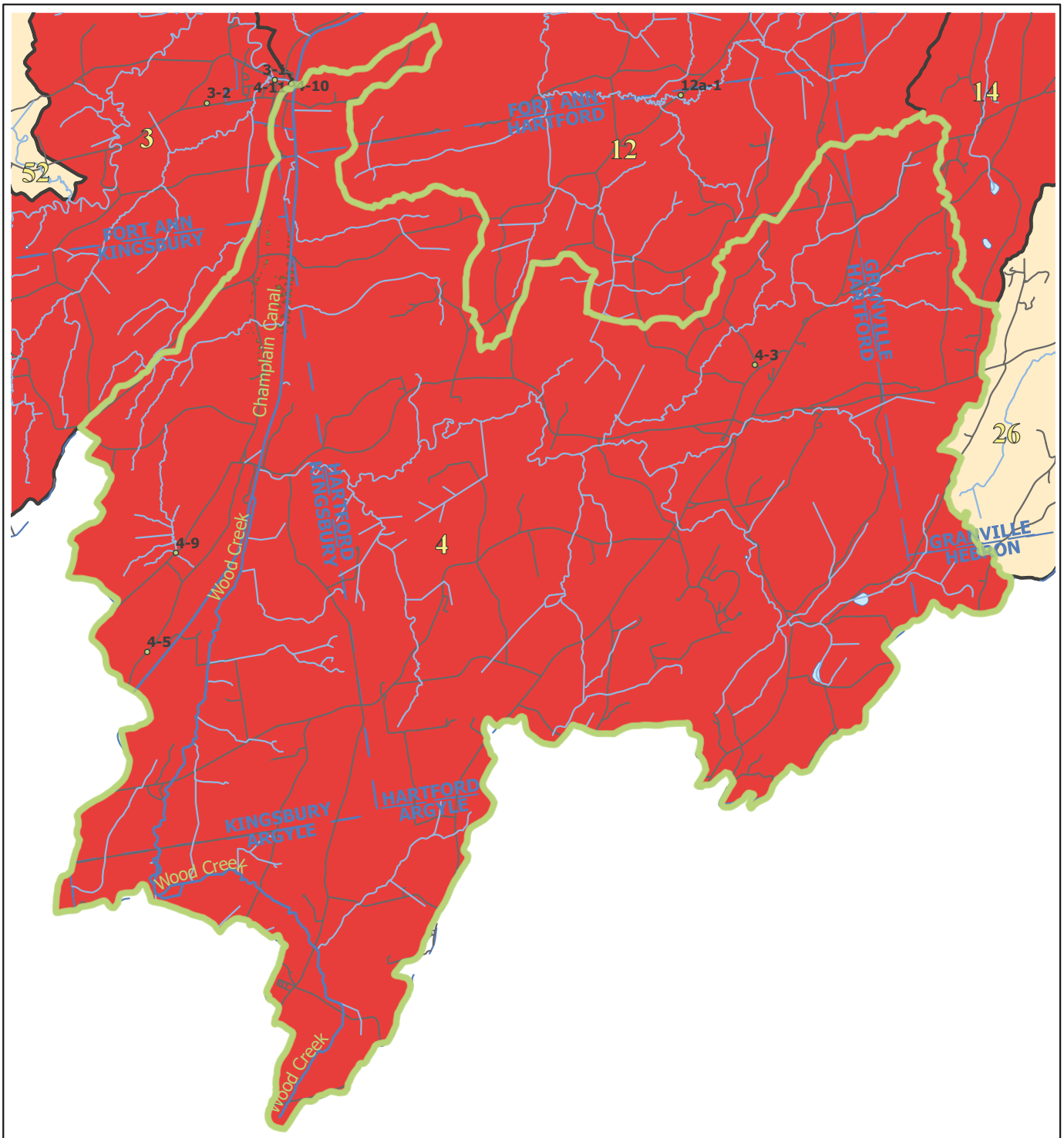
Wood Creek/ Lake Champlain Canal

The Wood Creek/Lake Champlain Canal subwatershed includes 59 square miles of land within the Towns of Kingsbury, Hartford, Fort Ann and Granville. The many tributaries within the subwatershed flow through small hamlets with outdated and failing infrastructure, as well as heavy agricultural operations in the areas surrounding the hamlets. Phosphorus loading concerns come from both land uses within the subwatershed. Within the matrix, this subwatershed received 59 out of 95 points, and notable results include;

- High scores within both NYS DEC PWL categories, which can be attributed to the listing of the Champlain Canal and its tributaries on the NYS DEC 303(d) List for an array of pollutant sources;
- Maximum score for soil type because of the clay soils within Washington County;
- Maximum score for the presence of a surface water drinking source;
- Maximum score for miles of tributaries;
- Maximum score for phosphorus loading per land use type; and
- High score for percent row crops due to the agricultural nature of the subwatershed.

Priority Projects

1. Stream buffer program for agricultural operations in the Town of Kingsbury – Implement stream buffers along agricultural fields to reduce nutrient loading into surface waters.
2. Planning for upgrades of the Village of Fort Ann WWTP – Providing funding for planning and engineering efforts so the Village can become listed on the NYS Intended Use Plan.
3. Retrofit of the Village of Fort Ann WWTP – Once all the engineering is complete, retrofit the plant to perform as necessary.



Priority Subwatershed 4
Wood Creek- Champlain Canal

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

Map # 6-9

0 0.75 1.5 3 Miles

N W E S

Developed By:
Lake George Association

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #4 - Wood Creek/Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Argyle									
4-1	Implement stormwater management needs on State Route 40	Washington	Various	Public	Stormwater	$400,000	NYSDOT	*NYSDOT*	Medium Term
Town of Granville									
4-2	Promote forestry management plans and best management practices	Washington	Various	Private	Erosion	$60,000	LCBP	*RC&D*	Short Term
Town of Hartford									
4-3	Town DPW stormwater management	Washington	43°22'19.28"N 73°23'19.33"W	Public	Stormwater	$220,000	NYSDOS NYSDEC LCBP	*Town,* Washington Co. SWCD	Medium Term
4-4	Updated assessment of Town roads to identify roadside erosion needs	Washington	Various	Public	Erosion	$10,000	NYSDOS NYSDEC LCBP	*Washington Co. SWCD*	Short Term
Town of Kingsbury									
4-5	Stormwater management assessment and implementation along Towpath Road	Washington	43°19'46.55"N 73°31'04.41"W	Public	Stormwater	$50,000	NYSDOS NYSDEC LCBP	*Town,* Washington Co. SWCD	Short Term
4-6	Streambank stabilization on Bond Creek	Washington	Various	Private	Erosion	$60,000	LCBP USFWS	*Washington Co. SWCD*	Medium Term
4-7	**Stream buffer program for agricultural operations**	**Washington**	**Various**	**Private**	**Stormwater Erosion**	**$200,000**	**LCBP NYSDAM USFWS USDA NRCS**	***Washington Co. SWCD***	**Medium Term**
4-8	Manure management and barnyard runoff mitigation program	Washington	Various	Private	Agriculture	$750,000	LCBP NYSDAM USDA NRCS	*Washington Co. SWCD*	Medium Term

Priority Subwatershed #4 - Wood Creek/Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
4-9	Installation of new culvert and stabilization of road slide on Co. Rte 41	Washington	43°20'41.16"N 73°30'41.31"W	Public	Stormwater	$75,000	NYSDOS NYSDEC LCBP	*County DPW*	Short Term
Village of Fort Ann									
4-10	Planning for upgrades of wastewater treatment plant	Washington	43°24'59.77"N 73°29'07.28"W	Public	Wastewater	$100,000	NYSDOS NYSDEC NYSEFC USDA RD	*Village,* LCLGRPB	Short Term
4-11	Retrofit of wastewater treatment plant	Washington	43°24'59.77"N 73°29'07.28"W	Public	Wastewater	$5.0 M	NYSDOS NYSDEC NYSEFC USDA RD	*Village*	Short Term
All Municipalities									
4-12	Heightened implementation of regional cover cropping program	Washington	Various	Private	Agriculture	$100,000	NYSDAM USDA NRCS LCBP Landowner	*Washington Co. SWCD, Landowner*	Short Term

PRIORITY SUBWATERSHED 5(a).

Ausable River

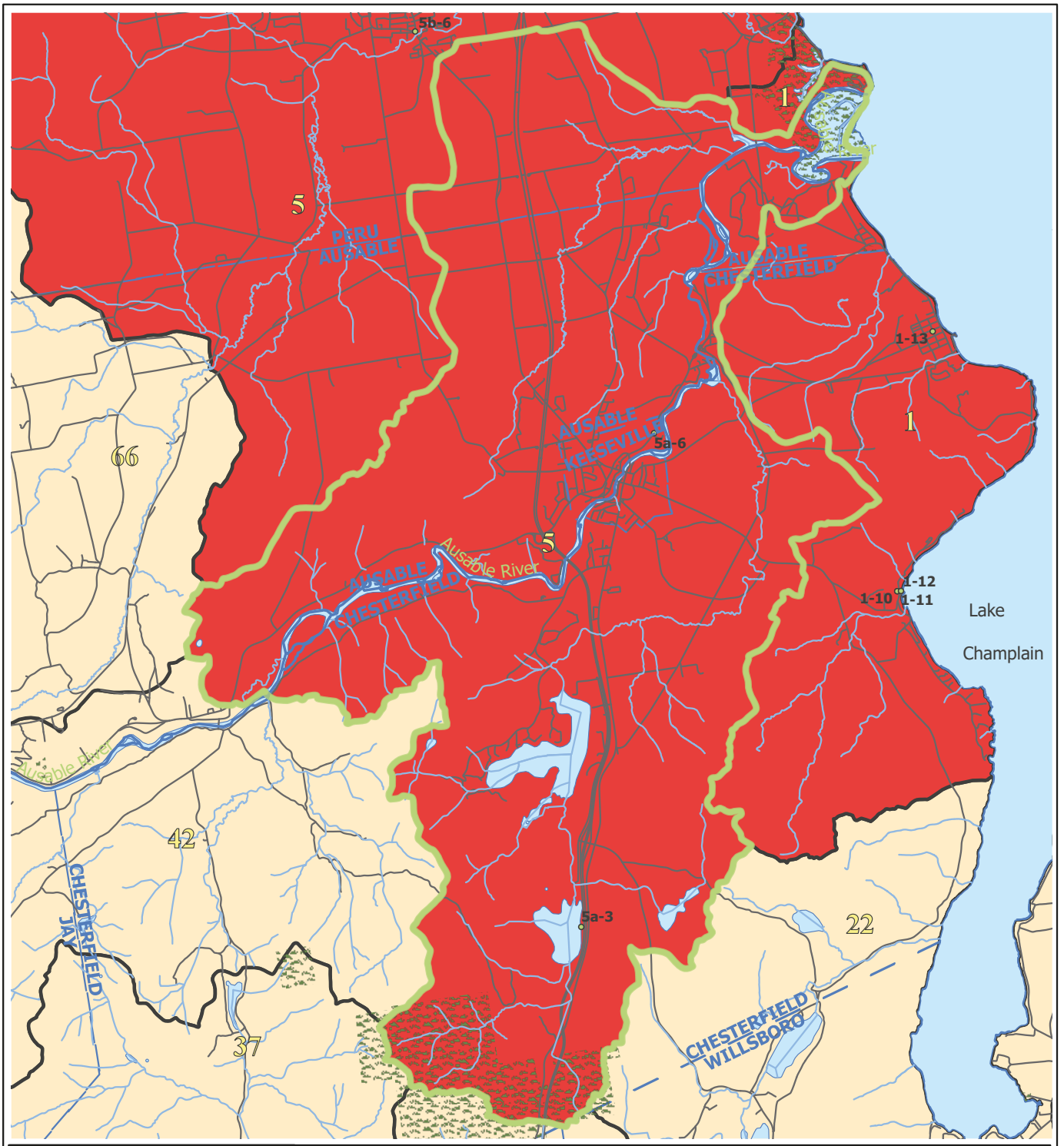
The outlet of the Ausable River subwatershed is located within Clinton and Essex Counties in the Towns of Ausable, Peru, and Chesterfield, and the former Village of Keeseville. This subwatershed is just over 49 square miles in size. Areas of concern include the former Village of Keeseville, due to its developed nature built directly on the river. Outside of the Village, the remaining portion of the subwatershed is heavily farmed with much of it including row crops used for animal feed. This subwatershed received 57 out of 95 points within the matrix, and notable results include;

- Maximum score for lake segment target reduction goal because it is part of the Main Lake lake segment;
- Maximum score for the presence of a surface water drinking source;
- High scores for miles of tributaries due to the convergence of several tributaries into the river before it discharges into the lake and lane miles because of the more developed nature of the lake's nearshore area; and
- Moderately high scores for phosphorus loading per land use, percent impervious and percent row crops, which is directly related to the dynamic land uses within the watershed, all of which create their own phosphorus inputs.

Priority Projects

1. Implementation of agricultural pollution prevention programs on farms directly on waterbodies – Installation of an array of agricultural BMPs to reduce runoff from farmsteads and fields. These include, but are not limited to, shoreline buffers, exclusion fencing, heavy use area protection, and manure storages.

2. Upgrade of the stormwater management system in the former Village of Keeseville – Installation of both gray and green urban stormwater BMPs to capture and infiltrate stormwater runoff created by the impervious surfaces of the former Village.



Priority Subwatershed 5a
Ausable River

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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Map # 6-10

0 0.75 1.5 3 Miles

N W E S

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Developed By:
Lake George Association LGA

Priority Subwatershed #5(a) - Ausable River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Ausable									
5a-1	Perform water quality assessments of tributaries to the Ausable River	Essex	Various	Public Private	Stormwater Erosion Agriculture	$25,000	NYSDOS NYSDEC LCBP	*AsRA*	Short Term
Town of Chesterfield									
5a-2	Implementation of agricultural pollution prevention projects on farms directly on waterbodies	Essex	Various	Private	Agriculture	$200,000	NYSDAM USDA NRCS	*Essex Co. SWCD,* AsRA, TU, USF&WS	Long Term
5a-3	Installation of sediment basins and infiltration pond to collect road ditch runoff from Interstate 87 and Rte 9 into Butternut Pond	Essex	44°25'48.52"N 73°29'32.84"W	Public Private	Erosion	$80,000	LCBP	*Essex Co. SWCD*	Medium Term
Town of Peru									
5a-4	Perform water quality assessments of tributaries to the Ausable River	Clinton	Various	Public Private	Stormwater Erosion Agriculture	$25,000	NYSDOS NYSDEC LCBP	*AsRA*	Short Term
(former) Village of Keeseville									
5a-5	Upgrade of stormwater management system within the Hamlet	Essex	Various	Public	Stormwater	$100,000	NYSDOS NYSDEC LCBP	*Town,* Essex Co. SWCD	Short Term
5a-6	Upgrade of wastewater treatment plant in Keeseville	Essex	44°30'41.25"N 73°28'24.82"W	Public	Wastewater	$2.0 M	NYSDOS NYSDEC NYSEFC USHUD USDA RD NBRC	*Town*	Medium Term

PRIORITY SUBWATERSHED 5(b).

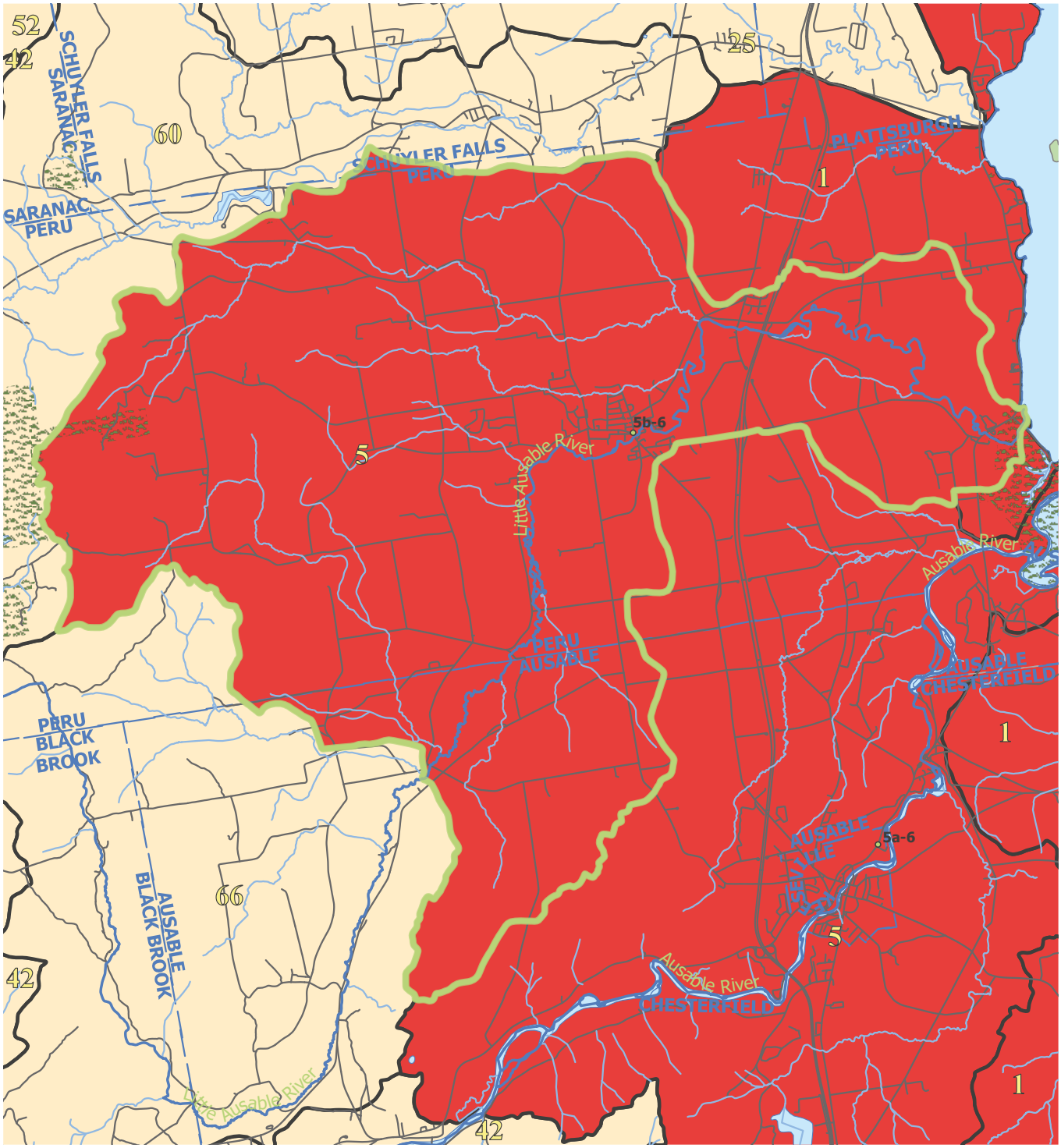
Little Ausable River

The Little Ausable River subwatershed is located just north of the Ausable River, and includes over 48 square miles in the Towns of Peru and Ausable, as well as slivers of the Towns of Schuyler Falls and Plattsburgh. The major land use, and therefore the main phosphorus loading concern, within the subwatershed is agriculture. There is also a small hamlet within the Town of Peru in the subwatershed, which is also a concern for urban runoff and sanitary sewer leaching. Within the matrix, this subwatershed received 57 out of 95 points, and notable findings include;

- Maximum points for lake segment target reduction goals because it's part of the Main Lake lake segment;
- Maximum score for the presence of a surface water drinking source;
- High score for miles of tributaries because of the numerous springs that feed the Little Ausable River; and
- High score for phosphorus loading per land use and percent row crops, due to the abundance of agricultural in the subwatershed.

Priority Projects

1. Livestock exclusion fencing and vegetative buffers on agricultural land – Installation of fences and buffers to keep livestock out of surface waters while also capturing nutrients from field runoff.
2. Sanitary sewer main and municipal pump station reconstruction on the Town of Peru – Replacement of the sewer main and pump station to ensure proper functionality and reduce I&I potential.



Priority Subwatershed 5b
Little Ausable River

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

Map # 6-11

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Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Developed By:
Lake George Association

Priority Subwatershed #5(b) - Little Ausable River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Peru									
5b-1	Heavy use protection and critical area seeding on ag land	Clinton	Various	Private	Agriculture Erosion	$20,000	NYSDAM USDA NRCS	*Clinton Co. SWCD, Landowner*	Short Term
5b-2	**Livestock exclusion fencing and vegetative buffer on ag land**	**Clinton**	**Various**	**Private**	**Agriculture Erosion**	**$50,000**	**NYSDAM FSA USDA NRCS**	***Clinton Co. SWCD, Landowner***	**Short Term**
5b-3	Silage leachate treatment systems on ag lands	Clinton	Various	Private	Agriculture	$30,000	NYSDAM USDA NRCS	*Clinton Co. SWCD, Landowner*	Short Term
5b-4	Ag waste system upgrades	Clinton	Various	Private	Agriculture	$400,000	NYSDAM USDA NRCS	*Clinton Co. SWCD, Landowner*	Medium Term
5b-5	Implement Trees for Tribs Program along Little Ausable River	Clinton	Various	Public Private	Erosion	$50,000	NYSDEC	*Clinton Co. SWCD, AsRA, Landowner*	Short Term
5b-6	**Sanitary sewer main and municipal pump station reconstruction**	**Clinton**	**44°34'42.71"N 73°31'37.24"W**	**Public**	**Wastewater**	**$4.0 M**	**NYSEFC NYDOS NYSDEC NBRC**	***Town***	**Medium Term**
All Municipalities									
5b-7	Perform water quality assessments of tributaries to the Ausable River	Clinton Essex	Various	Public Private	Stormwater Erosion Agriculture	$40,000	NYSDOS NYSDEC LCBP	*AsRA*	Short Term

PRIORITY SUBWATERSHED 7.

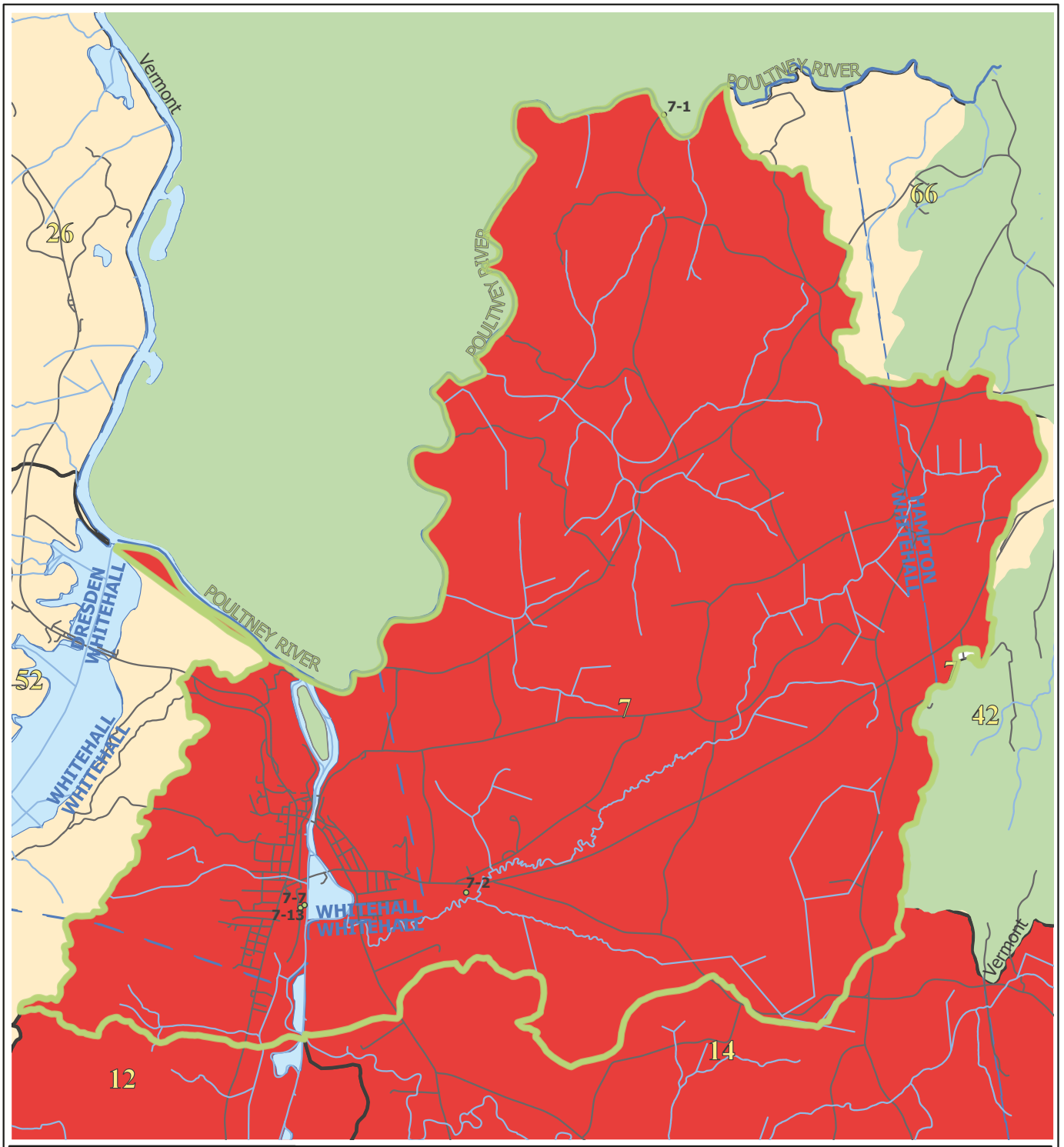
Poultney River/ Head of Champlain

The Poultney River/Head of Lake Champlain subwatershed encompasses almost 24 square miles in Washington County in the Town and Village of Whitehall, and also includes a sliver of the Town of Hampton. The portion of the subwatershed in Town of Whitehall is heavily farmed, especially along the shorelines of the river. This makes phosphorus loading from agricultural operations, as well as streambank erosion, a concern. The portion of the subwatershed within the Village of Whitehall makes urban stormwater runoff a concern, in addition to the outdated and failing municipal wastewater infrastructure throughout the Village. Within the matrix, this subwatershed received 54 out of 95 points, and notable results include;

- High scores for both NYS PWL categories, which can be attributed to the various listings of the Poultney River and its tributaries on the NYS DEC PWL;
- High score for lake segment target reduction goal, as the subwatershed is within the South Lake B watershed;
- Maximum score for soil type due to the clay soils along the river valley;
- Maximum score for the presence of a surface water drinking source; and
- Moderately high scores for phosphorus loading per land use and percent impervious, due to the Village of Whitehall.

Priority Projects

1. Implementation of improved agricultural practices – Installation of an array of agricultural Best Management Practices.
2. Village of Whitehall WWTP Upgrades – Funding for the complete overhaul of the Village WWTP.
3. Village of Whitehall wastewater system upgrades and I&I reduction – Slip lining/ replacement of the Village's wastewater conveyance system to reduce leaching and SSO's.



Priority Subwatershed 7
Poultney River
Head of Lake Champlain

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."

NEW YORK STATE OF OPPORTUNITY. Department of State

Map # 6-12

0 0.5 1 2 Miles

N W E S

Developed By:
Lake George Association

Legend
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #7 - Poultney River/Head of Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Whitehall									
7-1	Stabilization of County Rte 10 roadway slides	Washington	43°37'25.01"N 73°21'07.49"W	Public	Erosion	$200,000	NYSDOS NYSDEC LCBP	*County,* Washington Co. SWCD	Medium Term
7-2	Town DPW site stormwater retention and erosion reduction	Washington	43°32'52.18"N 73°22'50.79"W	Public	Stormwater Erosion	$150,000	NYSDOS NYSDEC LCBP	*Town,* Washington Co. SWCD	Medium Term
7-3	Poultney River streambank restoration and buffer installation program	Washington	Various	Private	Erosion	$100,000	USFWS LCBP	*Washington Co. SWCD, Landowner*	Medium Term
7-4	Implement erosion reduction projects on Mud Brook	Washington	Various	Private	Erosion	$75,000	USFWS LCBP	*Washington Co. SWCD, Landowner*	Medium Term
7-5	Implementation of improved ag practices	Washington	Various	Private	Agriculture	$2.5 M	NYSDAM USDA NRCS LCBP	*Washington Co. SWCD, Landowner*	Medium Term
7-6	Promote forestry Best Management Practices and expand RC&D Skidder Bridge Program	Washington	Various	Private	Erosion	$65,000	NYSDEC LCBP USDA NRCS	*Washington Co. SWCD, Landowner*	Short Term
Village of Whitehall									
7-7	Village WWTP upgrades	Washington	43°32'47.92"N 73°24'11.21"W	Public	Wastewater	$20 M	NYSDOS NYSDEC NYSEFC USHUD USDA RD	*Village,* NYSDEC	Long Term
7-8	Village wastewater system upgrades and I&I reduction	Washington	Various	Public	Wastewater	$2.0 M	NYSDOS NYSDEC NYSEFC USHUD USDA RD	*Village,* NYSDEC	Medium Term

Priority Subwatershed #7 - Poultney River/Head of Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
7-9	Village separate stormwater system upgrades and installation of green infrastructure technologies	Washington	Various	Public	Stormwater	$1.5 M	NYSDOS NYSDEC LCBP	*Village*, Washington Co. SWCD	Medium Term
7-10	Develop a floodplain management plan for the Village	Washington	Various	Public Private	Stormwater	$70,000	NYSDOS NYSDEC LCBP	*Village*	Short Term
7-11	Facilitate the sale of wetlands around Cooke's Island and/or purchase conservation easements	Washington	Various	Private	Stormwater	$1.0 M	Nature Conser-vancy	*Village, Nature Conservancy, Landowner*	Medium Term
7-12	Reduce bank erosion on Wood Creek	Washington	Various	Private	Erosion	$100,000	USFWS LCBP	*Washington Co. SWCD, Landowner*	Medium Term
7-13	Establish marina pumpout station at Village WWTP	Washington	43°32'48.86"N 73°24'09.23"W	Public	Wastewater	$100,000	NYSDOS NYSDEC NYSEFC LCBP	*Village*	Short Term
All Municipalities									
7-14	Poultney River streambank restoration and buffer installation program	Washington	Various	Private	Erosion	$250,000	USFWS LCBP	*Washington Co. SWCD, Landowner*	Medium Term

PRIORITY SUBWATERSHED 8.

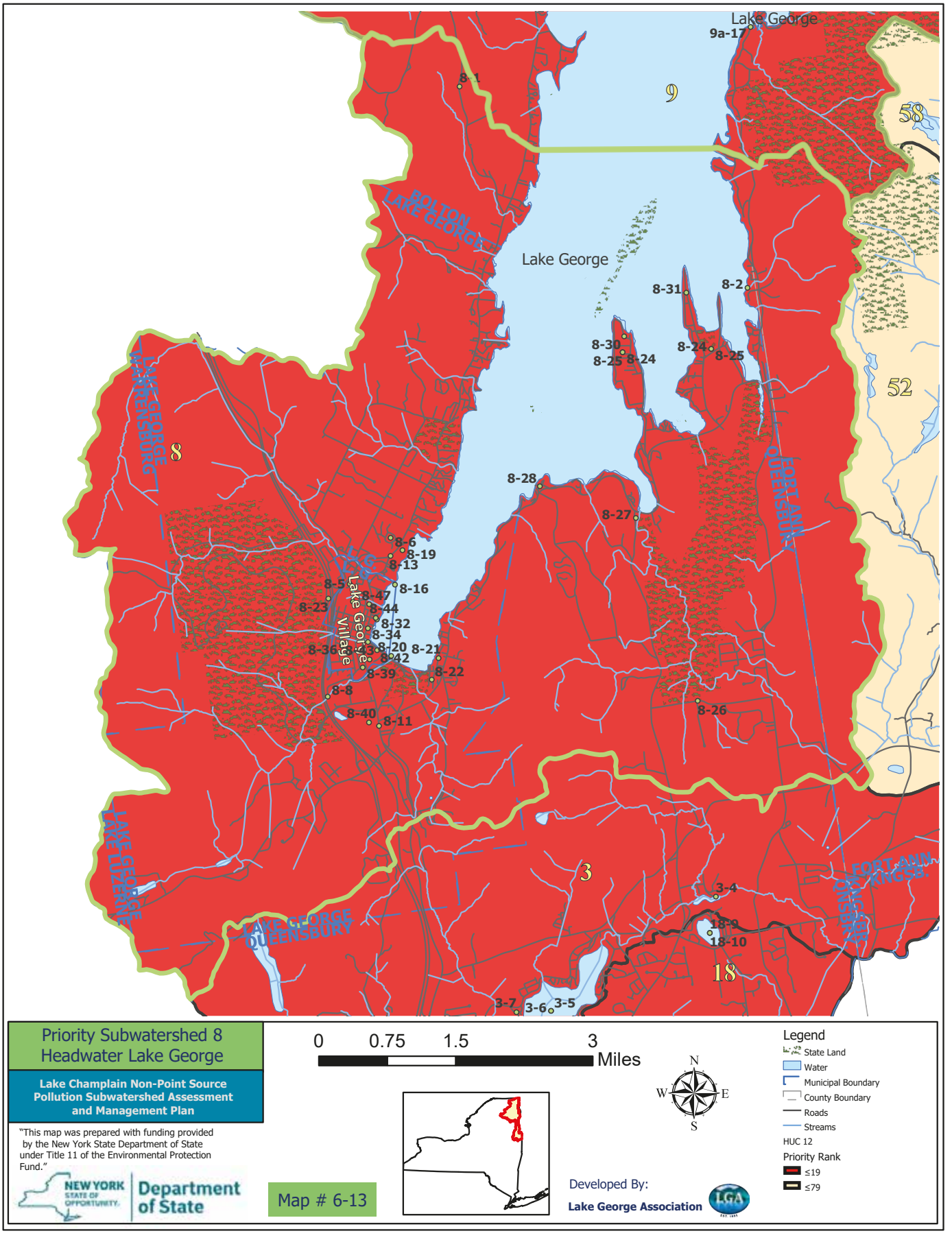
Headwaters Lake George

Lake George, located in the southern portion of the Lake Champlain watershed, is the only lake that serves as a major tributary to Lake Champlain. The headwaters subwatershed consists of almost 58 square miles within the Towns of Lake George, Queensbury, Fort Ann and Bolton and the Village of Lake George. This area has a large amount of development around Lake George, from the Village which is mostly impervious to the lakeshore homes that extend almost the entire shoreline. Within the matrix, this subwatershed received 53 out of 95 points, and notable results for this subwatershed include;

- Maximum points within both NYS DEC PWL categories, which can be attributed to Lake George and its tributaries listed as impaired on the PWL;
- High score for slope;
- Maximum score for waterbody classification because Lake George is a AA-special waterbody;
- Maximum score for the presence of a surface water drinking source;
- High score for miles of tributaries, and maximum scores for percent of septic systems within 100 feet of a surface water, due to the development around the lake, and erosion sites, due to the subwatershed' s highly erodible sandy soils;
- Moderately high score for percent impervious surface because of the Village of Lake George.

Priority Projects

1. Town of Lake George wastewater infrastructure and I&I reduction – Funding for slip lining of the Town's wastewater conveyance system pipes.
2. Sanitary sewer extension in the Town of Lake George up Route 9N to the Tahoe Resort – Extension of the sewer line throughout a heavily developed shoreline area to eliminate private wastewater systems.
3. Removal of the West Brook delta – Excavating the delta formed at the mouth of West Brook as a result of upland erosion.
4. Community septic system assessments on Cleverdale/ Rockhurst and Assembly Point in the Town of Queensbury - Funding for planning/engineering design of community septic systems on the two points.
5. Implementation of the community septic systems engineering design on Cleverdale/Rockhurst and Assembly Point - Funding for installation of community systems to eliminate old private systems.
6. Reconstruction of the Village of Lake George WWTP – Funds for replacement of the Village's failing WWTP.
7. Development of a subwatershed assessment for the Head of Lake George Subwatershed – Creation of a more specific watershed assessment including water quality testing.


Lake George
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LAKE GEORGE
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QUEENSBURY
FORT ANN
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LAKE GEORGE
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FORT ANN
KINGSBURY
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18
3-7
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3-5
Priority Subwatershed 8
Headwater Lake George
Lake Champlain Non-Point Source
Pollution Subwatershed Assessment
and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK
STATE OF OPPORTUNITY.
Department of State
Map # 6-13
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Developed By:
Lake George Association
LGA
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79

Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Bolton									
8-1	Coolidge Hill Road stormwater remediation	Warren	43°30'36.90"N 73°41'28.11"W	Public	Stormwater	$20,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. DPW,* Warren Co. SWCD	Medium Term
Town of Fort Ann									
8-2	Trout Pavilion Road in-stream sediment basin	Washington	43°28'39.26"N 73°37'44.74"W	Private	Erosion	$30,000	LCBP LGA	*LGA,* Warren Co. SWCD	Medium Term
8-3	Perform feasibility analysis for establishment of an RME for onsite septic operations on Pilot Knob	Washington	Various	Private	Wastewater	$30,000	NYSDOS NYSDEC NYSEFC	*Town, Landowners*	Short Term
8-4	Creation of onsite septic district on Pilot Knob	Washington	Various	Private	Wastewater	$700,000	NYSDOS NYSDEC NYSEFC	*Town, Landowners*	Medium Term
Town of Lake George									
8-5	Installation of porous pavement at the Town/ Village Municipal Center	Warren	43°25'53.72"N 73°43'00.35"W	Public	Stormwater	$500,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*LGA,* Warren Co. SWCD, Town, Village	Long Term
8-6	Lakeview Circle Dr. stormwater infiltration and sediment retention project implementation	Warren	43°26'19.70"N 73°42'27.73"W	Private	Stormwater	$125,000	NYSDEC LCBP LGA	*Town,* LCLGRPB, LGA	Short Term
8-7	Creation and adoption of Town redevelopment/ retrofit code requirements	Warren	Various	Public	Stormwater	$15,000	NYSDOS	*Town,* LCLGRPB, LGA	Short Term

Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
8-8	Installation of check dams and live stakes on Interstate 87 stormwater swales discharging to West Brook	Warren	43°24'49.51"N 73°43'18.92"W	Public	Stormwater Erosion	$20,000	NYSDOT	*NYSDOT,* Warren Co. SWCD, LGA	Medium Term
8-9	Implementation of Town's MS4 Stormwater Management Program Plan	Warren	Various	Public	Stormwater	$250,000	NYSDEC LCBP LGA	*Town,* LCLGRPB, LGA	Medium Term
8-10	**Wastewater infrastructure I&I reduction - slip lining town pipes**	**Warren**	**Various**	**Public**	**Wastewater**	**$150,000**	**NYSDOS NYSDEC LCBP LGA**	*Town*	**Short Term**
8-11	Implementation of additional stormwater controls along Rte. 9 corridor	Warren	43°24'32.33"N 73°42'39.09"W	Private	Stormwater	$300,000	LGA LCBP	*Town,* LGA, Warren Co. SWCD	Medium Term
8-12	Town-wide stormwater reduction implementation program	Warren	Various	Public	Stormwater	$250,000	NYSDOS NYSDEC LCBP LGA	*Town,* LGA, Warren Co. SWCD	Medium Term
8-13	**Sanitary sewer extension up Rte. 9N to the Tahoe Resort**	**Warren**	**43°26'09.35"N 73°42'28.00"W**	**Public**	**Wastewater**	**$10 M**	**NYSDEC NYSEFC USDA RD**	*Town*	**Medium Term**
8-14	Implementation of the Town septic initiative	Warren	Various	Private	Wastewater	$500,000	LCBP LGA	*Town*	Medium Term
8-15	English Brook streambank stabilization	Warren	Various	Public Private	Stormwater Erosion	$200,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*Town,* NYSDOT, LGA, Warren Co. SWCD	Medium Term
8-16	Removal of English Brook delta	Warren	43°25'52.90"N 73°42'24.87"W	Public	Erosion	$1.5 M	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* LGA, Town, Village	Medium Term

Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
8-17	West Brook watershed assessment for natural stream design and erosion control	Warren	Various	Private	Erosion	$15,000	LCBP LGA	*Warren Co. SWCD,* LGA, Town, Village of LG	Short Term
8-18	Implementation of West Brook watershed assessment	Warren	Various	Private	Erosion	$100,000	LCBP LGA	*Warren Co. SWCD,* LGA, Town, Village of LG	Medium Term
8-19	Installation of stormwater controls west of Tahoe Resort	Warren	43°26'12.51"N 73°42'18.56"W	Private	Stormwater	$200,000	LCBP LGA	*LGA,* Warren Co. SWCD	Short Term
8-20	**Removal of West Brook delta**	**Warren**	**43°25'12.21"N 73°42'28.66"W**	**Public**	**Erosion**	**$1.5 M**	**NYSDOS NYSDEC LCBP LGA**	***LGA,* Town, Village**	**Medium Term**
8-21	Front St. homeowner green infrastructure education and implementation program	Warren	43°25'10.51"N 73°41'51.61"W	Private	Stormwater	$200,000	LCBP LGA	*LGA,* Town, LCLGRPB	Medium Term
8-22	Stormwater infiltration on Cedar Ln/ Beatty Rd	Warren	43°24'58.32"N 73°41'57.21"W	Public	Stormwater	$60,000	NYSDOS NYSDEC LCBP LGA	*Town,* LGA, Warren Co. SWCD	Short Term
8-23	Removal of paved drainage ditches and installation of vegetated swales with check dams at I-87 Exit 22 south bound off ramp	Warren	43°25'45.56"N 73°43'17.24"W	Public	Stormwater	$50,000	NYSDOT LGA	*NYSDOT,* LGA, Warren Co. SWCD	Medium Term

Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Queensbury									
8-24	Community septic system assessment for Assembly Point and Cleverdale/ Rockhurst	Warren	43°28'03.62"N 73°39'23.53"W 43°28'04.72"N 73°38'13.97"W	Private	Wastewater	$200,000	NYSDOS NYSDEC NYSEFC	*Town,* LGA	Medium Term
8-25	Implementation of community septic system assessment on Assembly Point and Cleverdale/ Rockhurst	Warren	43°28'03.62"N 73°39'23.53"W 43°28'04.72"N 73°38'13.97"W	Private	Wastewater	$2.0 M	NYDOS NYSDEC NYSEFC LCBP Landowner	*Town,* LGA	Long Term
8-26	Installation of vegetated swales and 2 drywells on Pickle Hill Rd.	Warren	43°24'43.78"N 73°38'29.09"W	Private	Stormwater	$25,000	LGA LCBP	*Warren Co. SWCD,* LGA, Town	Short Term
8-27	Installation of improved buffers and porous pavers at Dunham's Bay Marina Bay Rd. parking lot	Warren	43°26'28.82"N 73°39'15.20"W	Private	Stormwater	$95,000	LCBP LGA Landowner	*Warren Co. SWCD,* LGA, Landowner	Medium Term
8-28	Installation of drywells on Lock-hart Loop	Warren	43°26'47.81"N 73°40'30.05"W	Public	Stormwater	$10,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* Town, LGA	Short Term
8-29	Assembly Pt., Cleverdale, Rockhurst and Pilot Knob homeowner green infrastructure education and implementation program	Warren	Various	Private	Stormwater	$50,000	LCBP LGA	*LGA,* Town, LCLGRPB	Medium Term
8-30	Assembly Point stormwater reduction and infiltration	Warren	43°28'12.67"N 73°39'22.08"W	Public	Stormwater	$20,000	NYSDOS NYSDEC LCBP LGA	*Warren Co . SWCD,* Town, LGA	Short Term

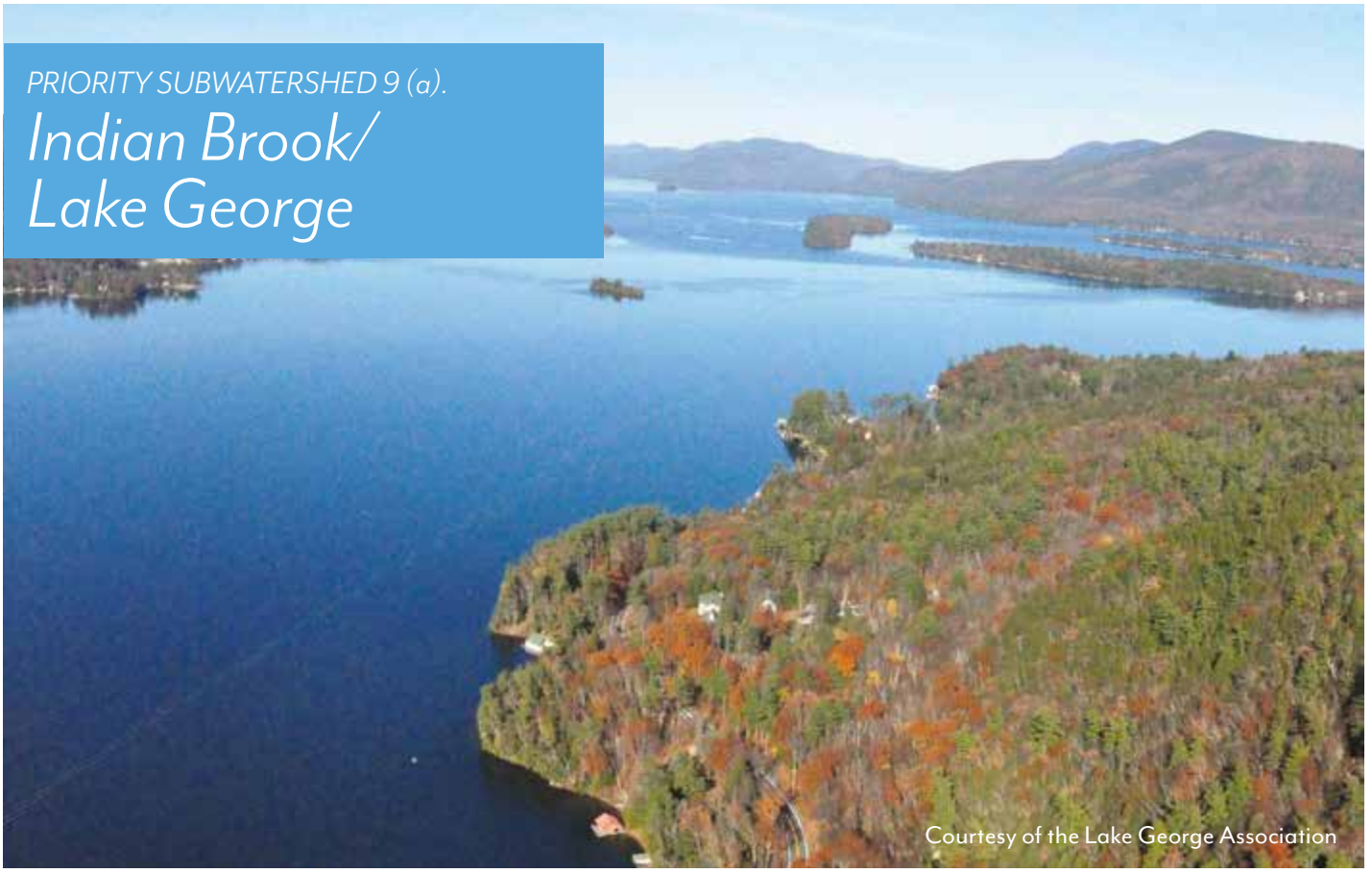
Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
8-31	Cleverdale/ Rockhurst stormwater reduction and infiltration	Warren	43°28'37.08"N 73°38'32.78"W	Public Private	Stormwater	$10,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* Town, LGA	Short Term
Village of Lake George									
8-32	Installation of a hydrodynamic separator at the bottom of Lower Amherst St. and bioretention area at Shepard's Park Beach	Warren	43°25'33.17"N 73°42'39.51"W	Public	Stormwater	$120,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Village, LCLGRPB	Short Term
8-33	Installation of a hydrodynamic separator on Joques Farm Rd.	Warren	43°25'43.62"N 73°42'58.04"W	Public	Stormwater	$75,000	NYSDOS NYSDEC LCBP LGA	*Village*	Short Term
8-34	Installation of a hydrodynamic separator near/in Shepard's Park	Warren	43°25'28.19"N 73°42'46.64"W	Public	Stormwater	$75,000	NYSDOS NYSDEC LCBP LGA	*Village*	Medium Term
8-35	Installation of a hydrodynamic separator to capture stormwater flowing to Beach Road	Warren	43°25'20.39"N 73°42'46.74"W	Private	Stormwater	$90,000	LCBP LGA	*Village, Landowner*	Short Term
8-36	Retrofit of Village DPW for increased stormwater protection	Warren	43°25'18.42"N 73°43'07.12"W	Public	Stormwater	$250,000	NYSDOS NYSDEC LCBP	*Village,* LGA, Warren Co. SWCD	Short Term
8-37	Engineering assessment of Prospect Mountain Brook watershed for runoff velocity reduction and flood attenuation	Warren	Various	Private	Stormwater	$30,000	LCBP LGA	*LGA, Warren Co. SWCD,* Village, LCLGRPB	Short Term

Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
8-38	Implementation of recommendations in the Prospect Mountain Brook watershed assessment	Warren	Various	Private	Stormwater	$1.0 M	FEMA LCBP LGA	*LGA, Warren Co. SWCD,* Village	Medium Term
8-39	Wastewater infrastructure repairs on Sewell St.	Warren	43°25'05.88"N 73°42'51.16"W	Public	Wastewater	$40,000	NYSDOS NYSDEC LCBP LGA	*Village*	Short Term
8-40	**Reconstruction of the wastewater treatment plant**	**Warren**	**43°24'34.40"N 73°42'46.91"W**	**Public**	**Wastewater**	**$18 M**	**NYSDOS NYSDEC NYSEFC**	***Village***	**Medium Term**
8-41	Installation of 15 drywells within the Village	Warren	Various	Public	Stormwater	$90,000	NYSDOS NYSDEC LCBP LGA	*Village,* Warren Co. SWCD, LGA	Short Term
8-42	Installation of pervious pavement at the Beach Road parking lot	Warren	43°25'15.62"N 73°42'39.70"W	Public	Stormwater	$500,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*Village, Warren Co.,* LGA	Medium Term
8-43	Installation of pervious pavement at the Fort William Henry Resort	Warren	43°25'10.39"N 73°42'45.68"W	Private	Stormwater	$600,000	NYSEFC LCBP LGA Landowner	*Village, Landowner,* LGA LCLGRPB	Long Term
8-44	Installation of pervious pavement at the Boardwalk Restaurant parking lot	Warren	43°25'34.08"N 73°42'40.35"W	Private	Stormwater	$400,000	NYSEFC LCBP LGA Landowner	*Village, Landowner,* LGA, LCLGRPB	Long Term
8-45	Creation and implementation of a program within the Village and Town of Lake George that mirrors Onondaga County's Save the Rain Program	Warren	Various	Public Private	Stormwater	$5.0 M	NYSDOS NYSDEC NYSEFC LCBP	*Village, Town,* LCLGRPB, LGA	Medium Term

Priority Subwatershed #8 - Headwaters Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
8-46	Creation and adoption of Village redevelopment/ retrofit code requirements	Warren	Various	Public	Stormwater	$15,000	NYSDOS	*Village,* LCLGRPB, LGA	Medium Term
8-47	Green infrastructure retrofits at Lake George High School - green roof, cisterns, rain gardens, pervious pavers, etc.	Warren	43°25'41.94"N 73°42'45.31"W	Public	Stormwater	$300,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*LGA,* Warren Co. SWCD, School District, Village	Long Term
8-48	Implementation of Village's MS4 Stormwater Management Program Plan	Warren	Various	Public	Stormwater	$250,000	NYSDEC LCBP LGA	*Village,* LCLGRPB	Medium Term
All Municipalities									
8-49	**Development of a subwatershed assessment for the Headwaters of Lake George**	**Warren Washington**	**Various**	**Public Private**	**Stormwater Wastewater Erosion Agriculture**	**$50,000**	**NYSDOS NYSDEC LGA LCBP**	***LCLGRPB,*** **LGA, Warren Co. SWCD, munis**	**Short Term**
8-50	Complete a comprehensive analysis of the effects of alternative de-icing products as they pertain to phosphorus inputs	Warren Washington	Various	Public	Stormwater	$40,000	NYSDOS NYSDEC LGA LCBP	*LGA,* LCLGRPB	Short Term
8-51	Implementation of recreation in Lake George Management Plan	Warren Washington	Various	Public Private	Stormwater Wastewater Erosion Agriculture	$10 M	NYSDOS NYSDEC LCBP LGA Counties Munis	*Munis* LCLGRPB, LGA, Warren Co. SWCD	Long Term

PRIORITY SUBWATERSHED 9 (a).

Indian Brook/ Lake George



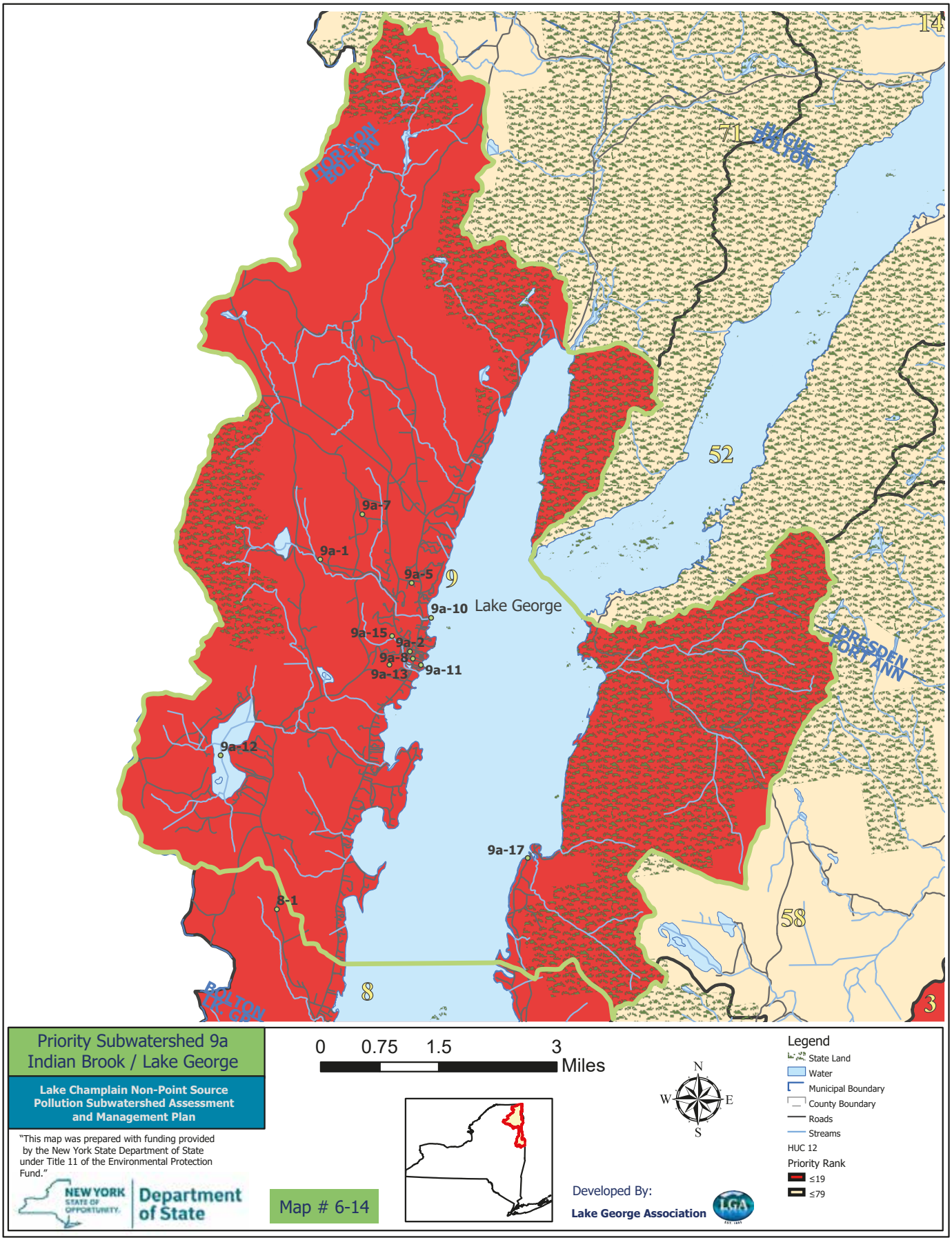
Courtesy of the Lake George Association

The Indian Brook/Lake George subwatershed covers almost 60 acres in the Towns of Bolton and Fort Ann, and includes small slivers of the Towns of Dresden and Horicon. The portion of this subwatershed within the Towns of Fort Ann, Dresden and Horicon are majority state forestland, which limits the amount of implementation that can be done for non-point source pollution reduction. The land within the Town of Bolton includes the hamlet, making urbanized stormwater runoff a priority for phosphorus reduction. Within the matrix, this subwatershed scored 50 out 95 points, and notable results for this subwatershed include;

- Maximum points within both NYS DEC PWL categories, which can be attributed to the impaired PWL listings for Lake George and its tributaries;
- High score for slope;
- Maximum score for waterbody classification as Lake George is a AA-special listed waterbody;
- Maximum score for the presence of a surface water drinking source; and
- Maximum score for number of septics within 100 feet of a surface water due to all the development surrounding Lake George and high score for erosion sites because of the subwatershed' s erodible sandy soils.

Priority Projects

1. Town of Bolton hamlet stormwater reduction program – funding for the installation of various stormwater runoff BMP's throughout the hamlet.
2. Slip lining of the Town of Bolton's wastewater conveyance system and upgrade of manholes – Take steps to reduce I&I in the Town's sanitary system.
3. Upgrade of the Town of Bolton's WWTP – Funds for upgrades to the plant to improve function.
4. Upgrade Route 9N stormwater conveyance system – Funds for NYS DOT to improve stormwater conveyance and promote infiltration to reduce water issues on the road and improve infrastructure.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9a-5
9
9a-10
Lake George
9a-15
9a-2
9a-8
9a-11
9a-13
DRESDEN
FORT ANN
9a-12
9a-17
8-1
58
8
BOLTON
3
Priority Subwatershed 9a
Indian Brook / Lake George
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
Map # 6-14
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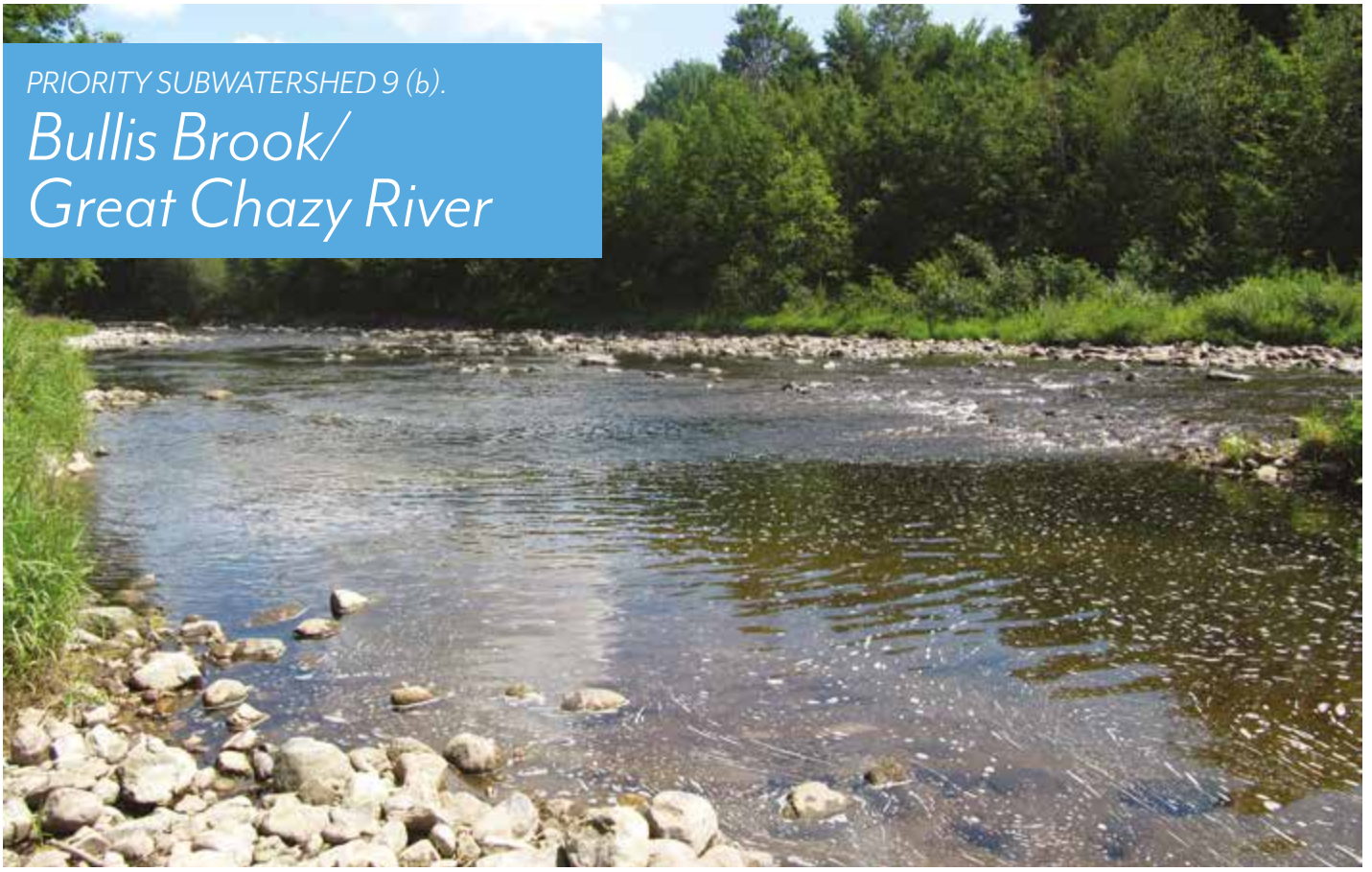
Developed By:
Lake George Association
LGA
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79

Priority Subwatershed #9a - Indian Brook/Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Bolton									
9a-1	Installation of a hydrodynamic separator and double stack drywell at the Town DPW site	Warren	43°34'28.35"N 73°40'43.55"W	Public	Stormwater	$100,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* Town, LGA	Short Term
9a-2	Install tree boxes and curb cut median at Municipal Parking Lot behind Town Hall	Warren	43°33'26.33"N 73°39'23.17"W	Public	Stormwater	$100,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*LGA,* Town, LCLGRPB, Warren Co. SWCD	Medium Term
9a-3	**Bolton hamlet stormwater reduction program**	**Warren**	**Various**	**Public**	**Stormwater**	**$125,000**	**NYSDOS NYSDEC LCBP LGA**	***Warren Co. SWCD,* Town, LGA**	**Long Term**
9a-4	Stewart Brook stream bank stabilization, stormwater infiltration, and education	Warren	Various	Public Private	Erosion	$100,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Warren Co. SWCD, Landowners, Town	Long Term
9a-5	Installation of vegetated swales on Valley Woods Road	Warren	43°34'11.78"N 73°39'20.63"W	Public	Stormwater	$60,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* Town, NYSDOT, LGA	Medium Term
9a-6	**Slip-line wastewater conveyance system and upgrade manholes**	**Warren**	**Various**	**Public**	**Wastewater**	**$250,000**	**NYSDOS NYSDEC LCBP LGA**	***Town***	**Short Term**
9a-7	Install check dams and live stakes in new stone lined ditches on Frank Cameron Rd.	Warren	43°34'57.79"N 73°40'04.59"W	Public	Stormwater	$10,000	NYSDOS NYSDEC LCBP LGA	*Town,* Warren Co. SWCD, LGA	Short Term
9a-8	Installation of porous asphalt on Dula Street parking lot	Warren	43°33'21.59"N 73°39'20.63"W	Public	Stormwater	$125,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*LGA,* Warren Co. SWCD, Town	Long Term

Priority Subwatershed #9a - Indian Brook/Lake George									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (*Lead agency in Italics*)	Time Frame
9a-9	Finkle Brook Watershed Assessment	Warren	Various	Public	Erosion	$10,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* LGA, Town	Short Term
9a-10	Removal of Finkle Brook delta	Warren	43°33'48.42"N 73°39'03.40"W	Public	Erosion	$400,000	NYSDOS NYSDEC LGA	*LGA,* Town	Medium Term
9a-11	Installation of porous asphalt at Rogers Park Lot	Warren	43°33'17.27"N 73°39'13.42"W	Public	Stormwater	$100,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*LGA,* Town	Medium Term
9a-12	Trout Lake and Trout Brook watershed assessment	Warren	43°32'19.55"N 73°42'17.14"W	Public Private	Stormwater Erosion	$15,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* LGA	Short Term
9a-13	**Upgrade of Town wastewater treatment plant**	**Warren**	**43°33'17.84"N 73°39'42.04"W**	**Public**	**Wastewater**	**$3.5 M**	**NYSDEC**	*Town*	**Long Term**
9a-14	**Upgrade 9N stormwater conveyance system**	**Warren**	**Various**	**Public**	**Stormwater**	**$5.0 M**	**NYSDOT**	*NYSDOT*	**Long Term**
9a-15	Streambank erosion reduction in Dula Pond headwaters	Warren	43°33'36.83"N 73°39'39.24"W	Private	Erosion	$20,000	LCBP LGA	*LGA,* Warren Co. SWCD, Town, Landowner	Short Term
Town of Fort Ann									
9a-16	Perform watershed assessment of Fort Ann portion of LG watershed	Washington	Various	Public	Stormwater Erosion	$10,000	NYSDOS NYSDEC LCBP LGA	*LCLGRPB,* Wash. Co. SWCD, Town	Short Term
9a-17	Install trench drain and stormwater infiltration units along road next to Fort Ann Beach	Washington	43°31'08.26"N 73°37'38.98"W	Public	Stormwater	$15,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Wash. Co. SWCD, Town	Medium Term



PRIORITY SUBWATERSHED 9 (b).

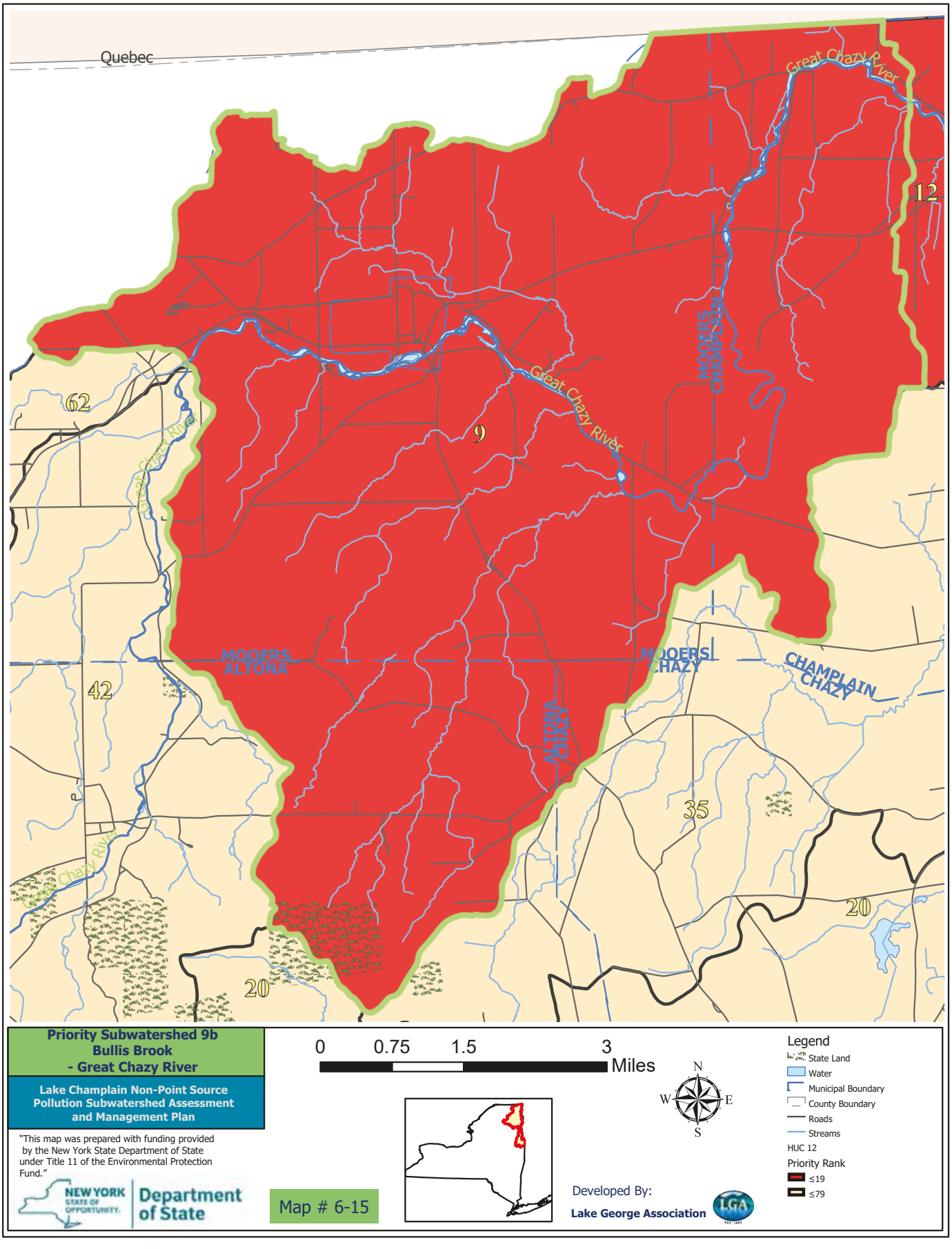
Bullis Brook/ Great Chazy River

The Bullis Brook/Great Chazy River subwatershed is one of the northernmost subwatersheds in the Basin, spanning 52.5 square miles of Clinton County in the Towns of Mooers, Champlain and Altona, as well as a small part of the Town of Chazy. The majority of this subwatershed is agricultural land, but it also includes a small hamlet area within the Town of Mooers. Phosphorus loading concerns within this subwatershed include agricultural operations and streambank erosion. Within the matrix, this subwatershed received 50 out of 95 points, and notable results include;

- High score for soil type due to the clay soils that cover Clinton County;
- High scores for waterbody classification, mainly because this portion of the Great Chazy River is classified as an A waterbody, although it is important to note that many of the surrounding waterbodies, including other portions of the Great Chazy River, are classified as C or C(T);
- Maximum score for the presence of a surface water drinking source;
- High tributary mileage; and
- A high score for both phosphorus loading per land use and percent row crops, which can be attributed to the density of agriculture in Clinton County, particularly in the Chazy River watershed.

Priority Projects

1. Livestock exclusion fencing and riparian buffer program throughout the subwatershed – Installation of fencing to keep livestock out of surface waters and planting of buffers along shorelines to uptake nutrients. Both of these practices will also reduce the potential for streambank erosion within the subwatershed.
2. Creation of a Great Chazy River Watershed Management Plan – This watershed is one of the only watersheds in the basin that does not have a dedicated watershed management plan. Creation of a plan will assist local landowners and resource managers with identifying more localized issues, and assist with creating solutions to improve water quality in the Great Chazy River.


Quebec
Great Chazy River
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CHAMPLAIN
Great Chazy River
MOOERS
ALTONA
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CHAZY
CHAMPLAIN
CHAZY
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Chazy River
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Priority Subwatershed 9b
Bullis Brook
- Great Chazy River
Lake Champlain Non-Point Source
Pollution Subwatershed Assessment
and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
Map # 6-15
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Developed By:
Lake George Association
LGA
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79

Priority Subwatershed #9b - Bullis Brook/Great Chazy River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (*Lead agency in Italics*)	Time Frame
All Municipalities									
9b-1	Livestock exclusion fencing and riparian buffer program	Clinton	Various	Private	Agriculture Erosion	$150,000	NYSDAM FSA USDA NRCS LCBP	*Clinton Co. SWCD,* *Landowner*	Short Term
9b-2	Great Chazy River watershed management plan	Clinton	Various	Public Private	Erosion Agriculture Stormwater Wastewater	$50,000	NYSDOS NYSDEC LCBP	*Munis,* LCLGRPB	Short Term
9b-3	Implementation of Trees for Tribs on Great Chazy River	Clinton	Various	Public Private	Erosion	$50,000	NYSDEC LCBP	*Clinton Co. SWCD*	Short Term
9b-4	Comprehensive water quality assessment of tributaries to Great Chazy River	Clinton	Various	Public Private	Stormwater Erosion Agriculture	$110,000	NYSDOS NYSDEC LCBP	*Clinton Co. SWCD,* *LCLGRPB*	Medium Term
9b-5	Completion of comprehensive nutrient management plans	Clinton	Various	Private	Agriculture	$100,000	NYSDAM USDA NRCS LCBP	*Clinton Co. SWCD,* *Landowner*	Short Term
9b-6	Implementation of manure management systems	Clinton	Various	Private	Agriculture	$1.5 M	NYSDAM USDA NRCS	*Clinton Co. SWCD,* *Landowner*	Medium Term

PRIORITY SUBWATERSHED 9 (c).

Dead Creek

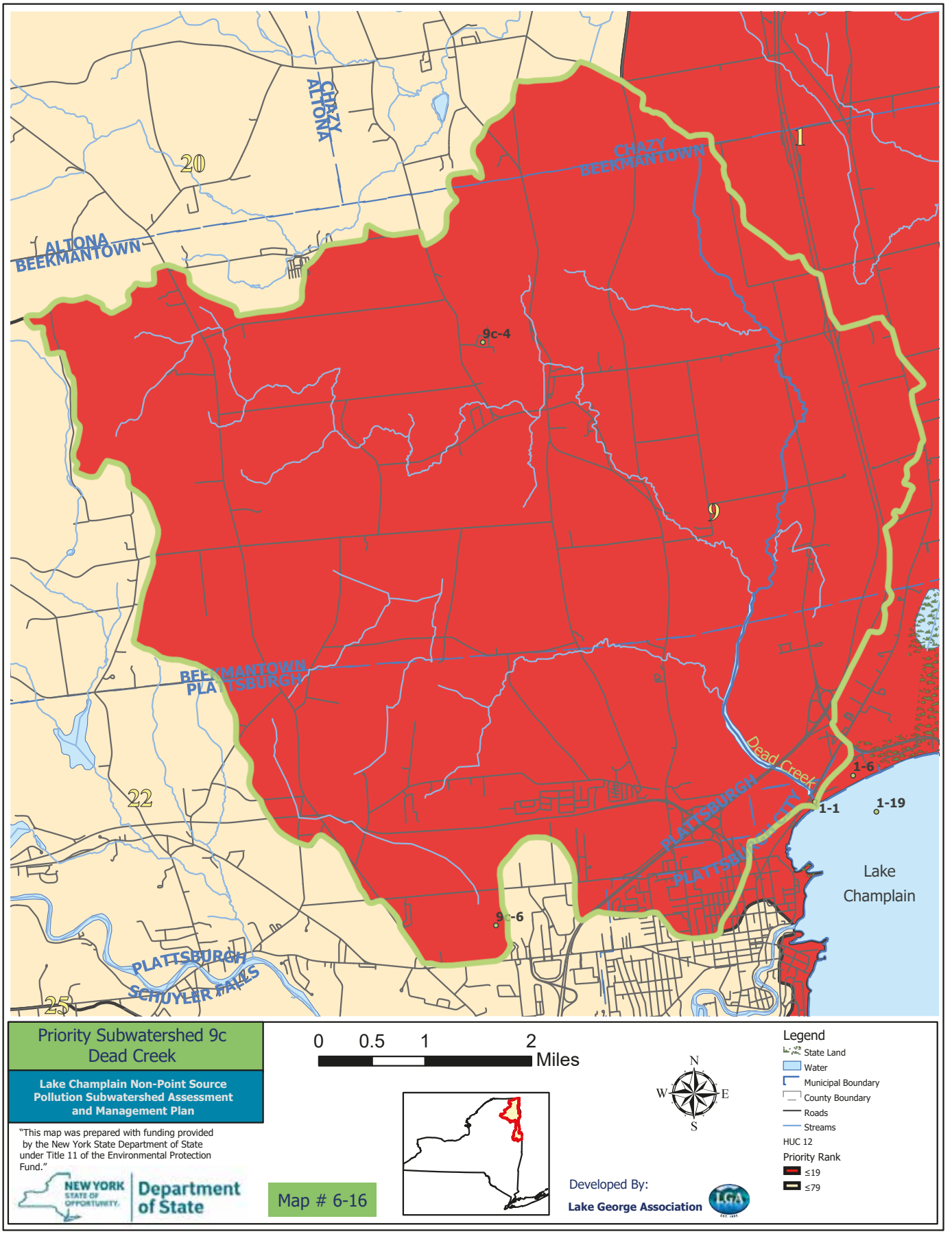
The Dead Creek subwatershed is located just north of the Saranac River outlet and includes 43 square miles of drainage area within the Towns of Beekmantown, Plattsburgh, and Chazy, as well as the northern portion of the City of Plattsburgh. Major tributaries to the small creek include Ray Brook and Kennon Creek. This subwatershed begins in the heavily farmed areas of Clinton County, and flows towards Lake Champlain where the land use turns urbanized and includes densely residential portions of the City. This creates an array of phosphorus loading concerns, from agricultural runoff to streambank erosion to urban stormwater pollution. This subwatershed received 50 out of 95 points within the matrix, and notable results for this subwatershed include;

- High score in soils because of the clay soils that cover Clinton County;
- Maximum score for the presence of a surface water drinking source;
- Maximum score for septic systems along waterbodies, which can be attributed to the urban sprawl neighborhoods of the Town suburbs that are not serviced by sanitary sewer;
- High score for number of lane miles;
- High scores for phosphorus loading per land use, moderately high score for impervious cover, and a maximum score for percent row crops. This is attributed to the diversity of land use within this subwatershed, ranging from heavily agricultural in the headwaters to density urbanized around the outlet to Lake Champlain.

Priority Projects

1. Implement residential green infrastructure program in the City of Plattsburgh – This work will incorporate the City's already completed green infrastructure plan with additional ideas to reduce stormwater runoff from residential neighborhoods by utilizing ran barrels, rain gardens, porous pavers, right-of-way bioretention facilities, and tree pits.

2. Improved planning and implementation to reduce agricultural runoff in the Town of Plattsburgh – Increase participation in the Clinton County SWCD's AEM Program and increased effort in creating and maintaining Comprehensive Nutrient Management Plans.



Priority Subwatershed 9c
Dead Creek

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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Map # 6-16

Developed By:
Lake George Association

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #9c - Dead Creek									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
City of Plattsburgh									
9c-1	Implement residential green infrastructure program	Clinton	Various	Private	Stormwater	$50,000	*LCBP*	*City,* LCLGRPB	Short Term
9c-2	Promote and implement City's Urban Forestry Program	Clinton	Various	Public	Stormwater	$75,000	NYSDOS NYSDEC LCBP	*City,* LCLGRPB	Short Term
Town of Beekmantown									
9c-3	Comprehensive water quality assessment of Dead Creek and its tributaries	Clinton	Various	Public Private	Stormwater Erosion Agriculture	$35,000	NYSDOS NYSDEC LCBP	*Clinton Co. SWCD, LCLGRPB*	Medium Term
9c-4	Perform on-site wastewater assessments at Stony Acres Mobile Home Park	Clinton	44°46'49.04"N 73°30'15.26"W	Private	Wastewater	$40,000	NYSDOS NYSDEC LCBP	*Town*	Short Term
9c-5	Implement manure storage and silage leachate projects	Clinton	Various	Private	Agriculture	$2.5 M	NYSDAM USDA NRCS LCBP	*Clinton Co. SWCD, Landowner*	Medium Term
Town of Plattsburgh									
9c-6	Stormwater drainage study for water quality impacts - Tom Miller Rd./Newell Ave. subwatershed	Clinton	44°42'02.91"N 73°30'13.61"W	Public Private	Stormwater	$50,000	NYSDOS NYSDEC LCBP	*Town,* LCLGRPB	Short Term
9c-7	Improved planning and implementation to reduce ag runoff	Clinton	Various	Private	Agriculture	$1.5 M	NYSDAM USDA NRCS LCBP	*Clinton Co. SWCD,* Landowner	Medium Term

PRIORITY SUBWATERSHED 12 (a).

Lake Champlain Canal

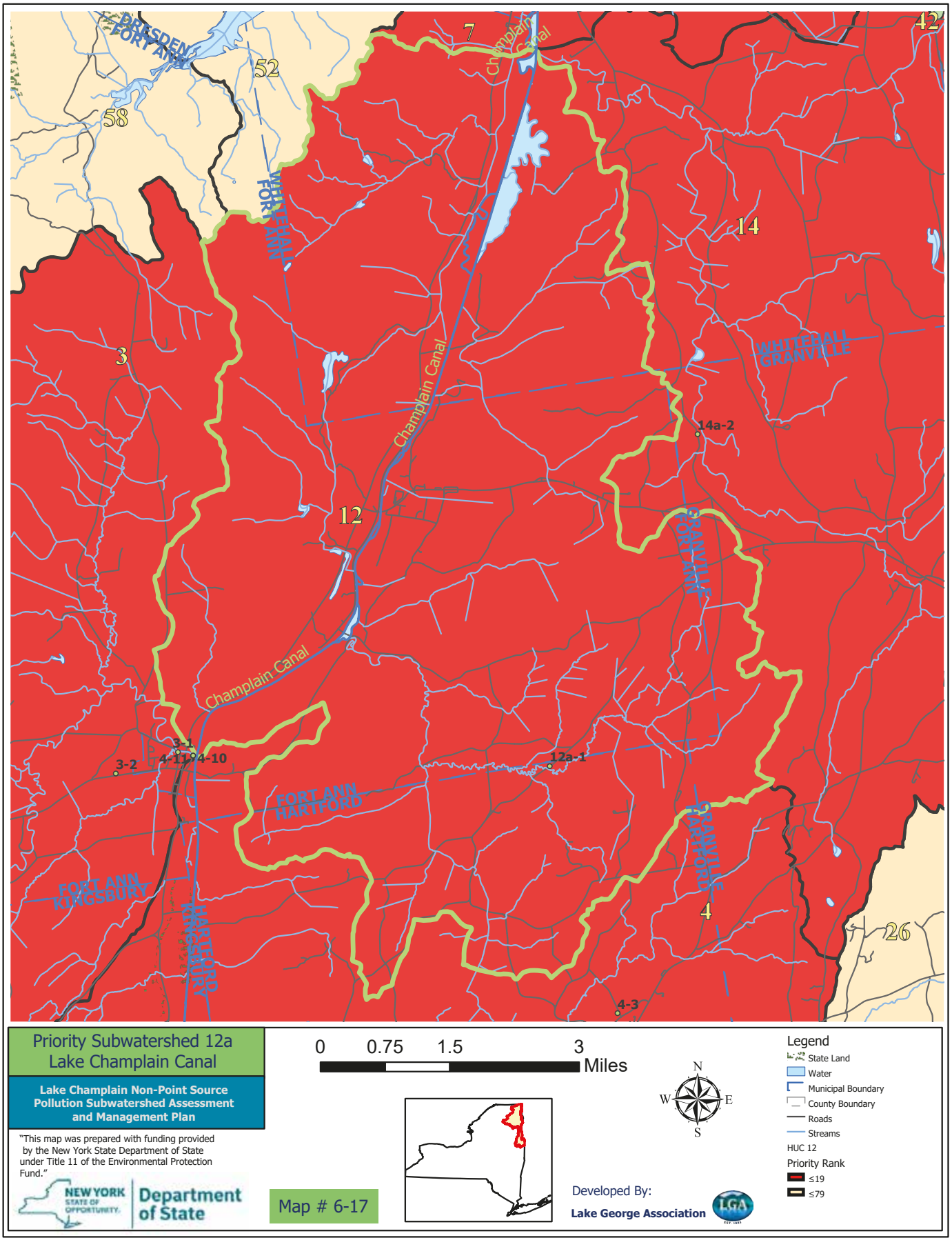
Courtesy of the tug44.org

The Lake Champlain Canal subwatershed consists of almost 52 square miles covering the Towns of Whitehall, Fort Ann, Hartford and Granville in Washington County. This subwatershed includes the Route 4 corridor, which is lined with farms, rock quarries and wetlands. The land use within the subwatershed is predominately agricultural, making runoff from these operations the greatest phosphorus loading concern. Within the matrix, this subwatershed received 49 out of 95 points, with notable results including;

- High score for PWL impairment listings due to the presence of the Champlain Canal and its tributaries on the NYS DEC 303(d) list for an array of sources and impairments;
- Maximum score in soils because Washington County is comprised of Champlain Valley clay;
- Maximum score for the presence of a surface water drinking source;
- Maximum score for miles of tributaries, due to the abundance of wetlands and streams; and
- A high score for phosphorus loading per land use because of all the agricultural lands in the subwatershed.

Priority Projects

1. Reduce nutrient runoff from agricultural operations – Improved planning and implementation of agricultural BMPs to reduce runoff into surface waters.


PRESIDENT
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WHITEHALL
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HARTFORD
FORT ANN
KINGSBURY
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KINGSBURY
GRANVILLE
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Priority Subwatershed 12a
Lake Champlain Canal
Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
Map # 6-17
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Developed By:
Lake George Association
Legend
State Land
Water
Municipal Boundary
County Boundary
Roads
Streams
HUC 12
Priority Rank
≤19
≤79

Priority Subwatershed #12a - Lake Champlain Canal									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (Lead agency in Italics)	Time Frame
Town of Fort Ann									
12a-1	County Route 17 roadside slide stabilization	Washington	43°24'49.35"N 73°24'11.65"W	Public	Erosion	$100,000	NYSDOS NYSDEC	*County*	Medium Term
All Municipalities									
12a-2	Reduce nutrient runoff from agricultural operations	Washington	Various	Private	Agriculture	$2.5 M	NYSDAM FSA USDA NRCS LCBP	*Washington Co. SWCD, Landowners*	Medium Term
12a-3	Comprehensive stormwater runoff assessment for the Canal	Washington	Various	Public Private	Stormwater	$200,000	NYSDOS NYSDEC LCBP	*LCLGRPB, Towns*	Short Term
12a-4	Comprehensive water quality assessment for tributaries	Washington	Various	Public Private	Stormwater Erosion Agriculture	$55,000	NYSDOS NYSDEC LCBP	*Washington Co. SWCD, LCLGRPB*	Medium Term

PRIORITY SUBWATERSHED 12 (b).

Outlet Great Chazy River

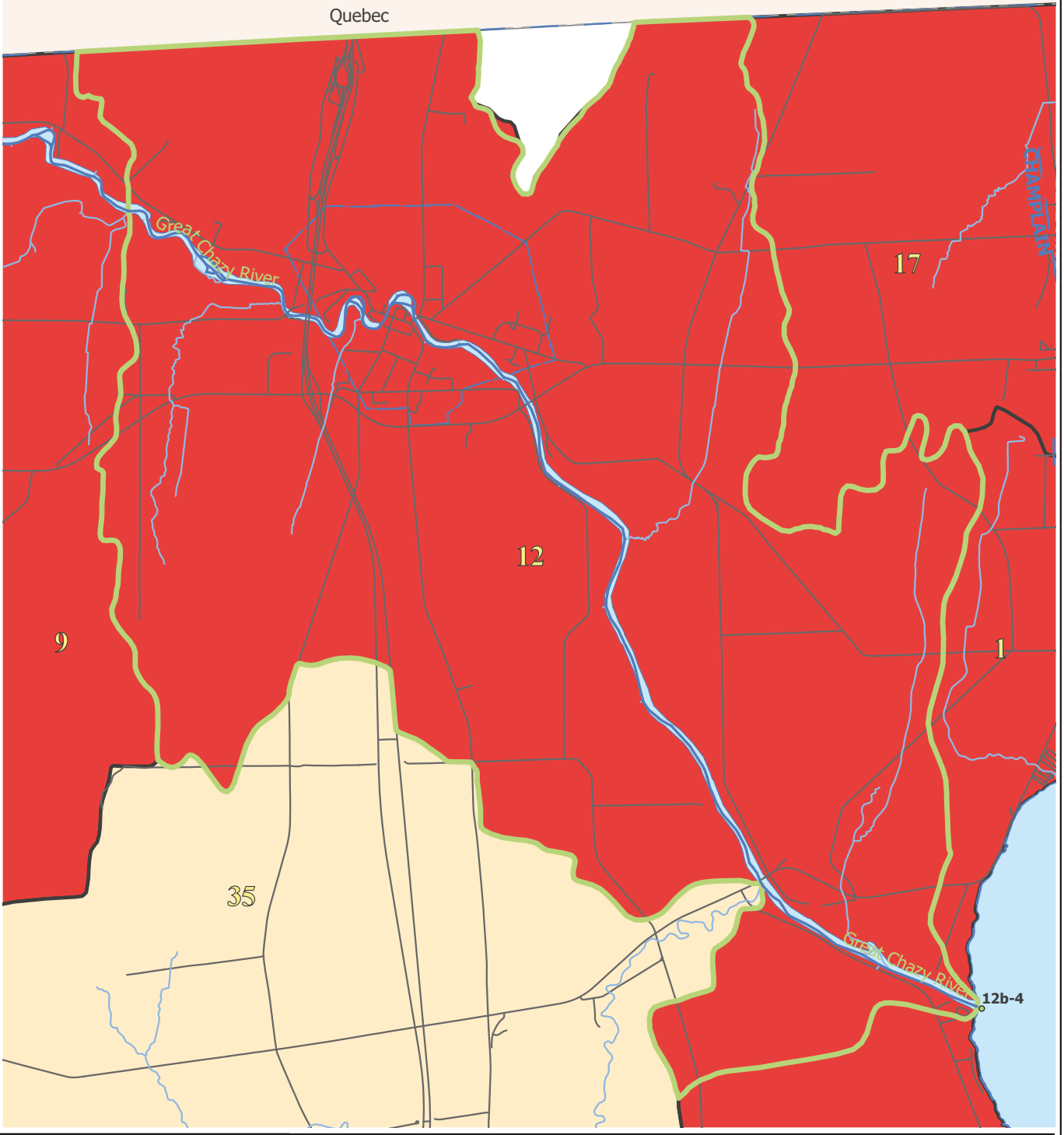
Courtesy of Peter Hagar

The Outlet Great Chazy River subwatershed encompasses 17 square miles within a large portion of the Town of Champlain, and includes the entirety of the Village of Champlain. As previously noted, the Great Chazy River watershed is one of the most heavily farmed areas within New York State, making agricultural runoff reduction a priority for achieving water quality goals. This is coupled with urban runoff concerns within the Village of Champlain and streambank erosion issues along the entire Great Chazy River. Within the matrix, this subwatershed received 49 out of 95 points, where notable results include;

- High scores within both NYS DEC PWL categories, which can be attributed to the impaired PWL listing for northern Lake Champlain;
- Maximum points in soils because the majority of the land is Champlain Valley clay;
- High score for number of septic systems along waterbodies because of the suburbs of the Village that are not serviced by sanitary sewer;
- Maximum score for phosphorus loading per lake segment, as the major land use in the subwatershed is agriculture, which was found to be the main phosphorus loading land use in the Isle La Motte lake segment according to Troy, Wang, and Capen (2007); and
- A moderately high score for both phosphorus loading per land use and percent impervious, and a maximum score for percent row crops, which can be attributed to the density of agriculture in this subwatershed, coupled with the impervious nature of the Village.

Priority Projects

1. Promote and implement ag waste storage systems in the Town of Champlain – Implement waste storage facilities to reduce nutrient rich runoff from agricultural operations.
2. Implement agricultural riparian buffer programs in the Town of Champlain – Assist farmers with installation of riparian buffers on surface water for nutrient uptake and reduction of streambank erosion.



Priority Subwatershed 12b
Outlet Great Chazy River

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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Map # 6-18

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Developed By:
Lake George Association LGA

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #12b - Outlet Great Chazy River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Champlain									
12b-1	Promote and implement ag waste storage systems	Clinton	Various	Private	Agriculture	$260,000	USDA NRCS NYSDAM LCBP	*Clinton Co. SWCD,* USDA NRCS	Medium Term
12b-2	Implement agricultural riparian buffer program	Clinton	Various	Private	Agriculture Erosion	$225,000	FSA USDA NRCS NYSDAM LCBP	*Clinton Co. SWCD,* USDA NRCS	Short Term
12b-3	Implement streambank restoration program on Great Chazy	Clinton	Various	Private	Erosion	$500,000	NYSDEC NYSDAM USFWS LCBP	*Clinton Co. SWCD*	Medium Term
12b-4	Dredging of delta at mouth of Great Chazy River	Clinton	44°55'55.41"N 73°23'05.67"W	Public	Erosion	$1.5 M	NYSDOS NYSDEC LCBP	*Town, Landowners*	Short Term
Village of Champlain									
12b-5	Comprehensive stormwater management assessment	Clinton	Various	Public	Stormwater	$50,000	NYSDOS NYSDEC LCBP	*Village*	Short Term
12b-6	Implement residential stormwater reduction program	Clinton	Various	Private	Stormwater	$100,000	LCBP	*Clinton Co. SWCD*	Medium Term

PRIORITY SUBWATERSHED 14 (a).

Mettawee River

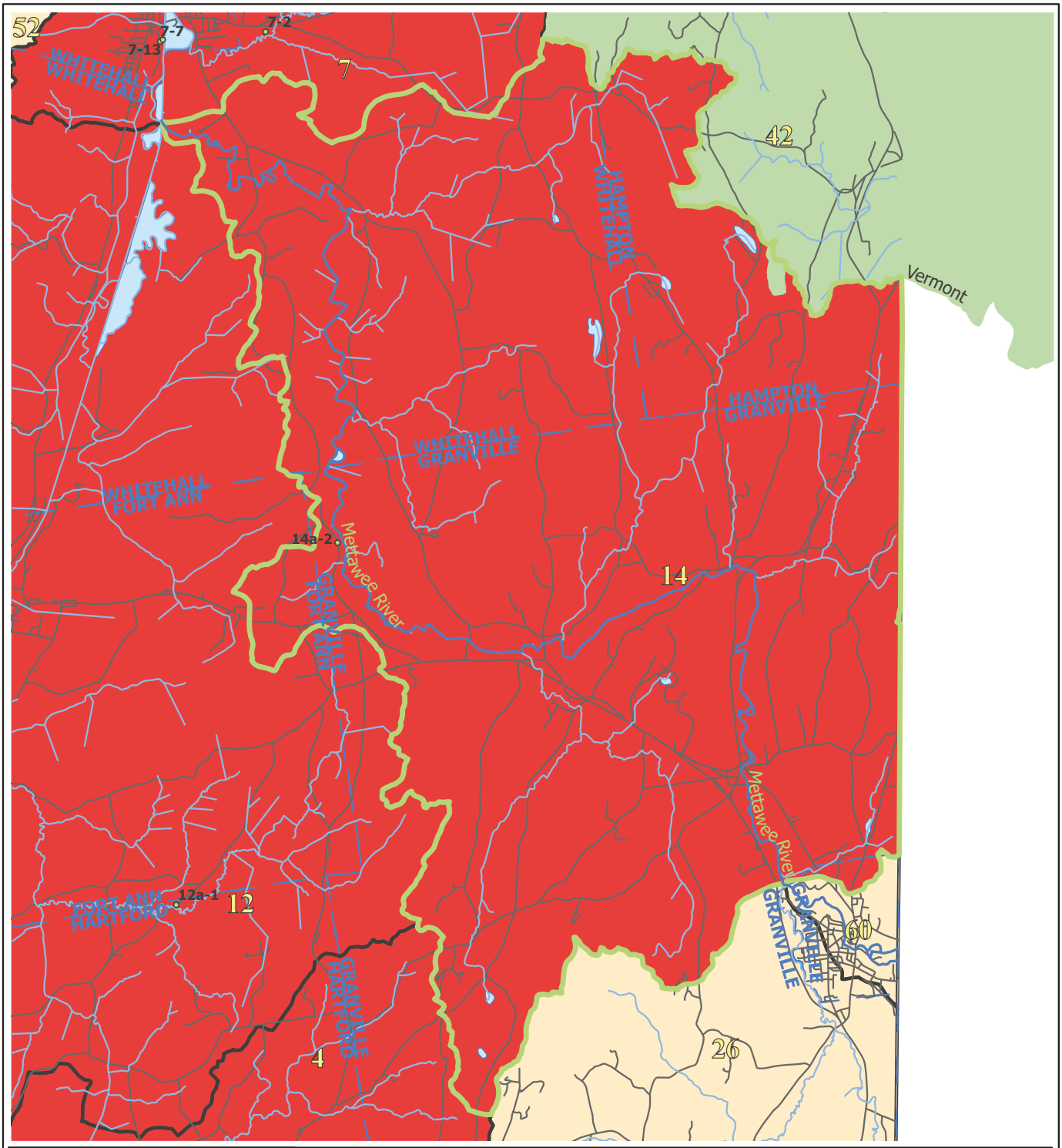
The Mettawee River subwatershed is just over 54 square miles and includes area within the Towns of Hampton, Whitehall and Granville, and includes small portions of the Town of Fort Ann and the Village of Granville. All of the subwatershed is located within Washington County. The Mettawee River enters into New York State in the Village of Granville and flows northwest to Lake Champlain. The predominate land use within the subwatershed is agricultural. Phosphorus loading concerns within this subwatershed include runoff from agricultural fields and farmsteads and streambank erosion. Within the matrix, this subwatershed received 48 out of 95 points, and notable results for this subwatershed include;

- High score for soil types because of the clay soils within Washington County;
- High score for miles of tributaries based on the large amount of wetlands within the river's watershed;
- High score for lane miles and erosion sites; and
- High score for phosphorus loading per land use and moderately high score for percent row crops, which can be attributed to the density of agriculture in this portion of the Basin.

Priority Projects

1. Implement manure storage management practices in the Town of Granville – Improved infrastructure to manage and store agricultural manure to reduce leaching of phosphorus rich waste into surface waters.

2. Mettawee River streambank restoration and buffer installation program – Installation of buffers on agricultural and non-agricultural land to reduce phosphorus loading, while also implementing streambank restoration project for improved riparian habitat and erosion reduction.



Priority Subwatershed 14a
Mettawee River

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

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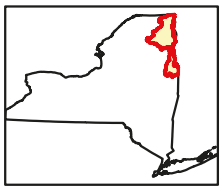


Map # 6-19

Developed By:
Lake George Association

Legend
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

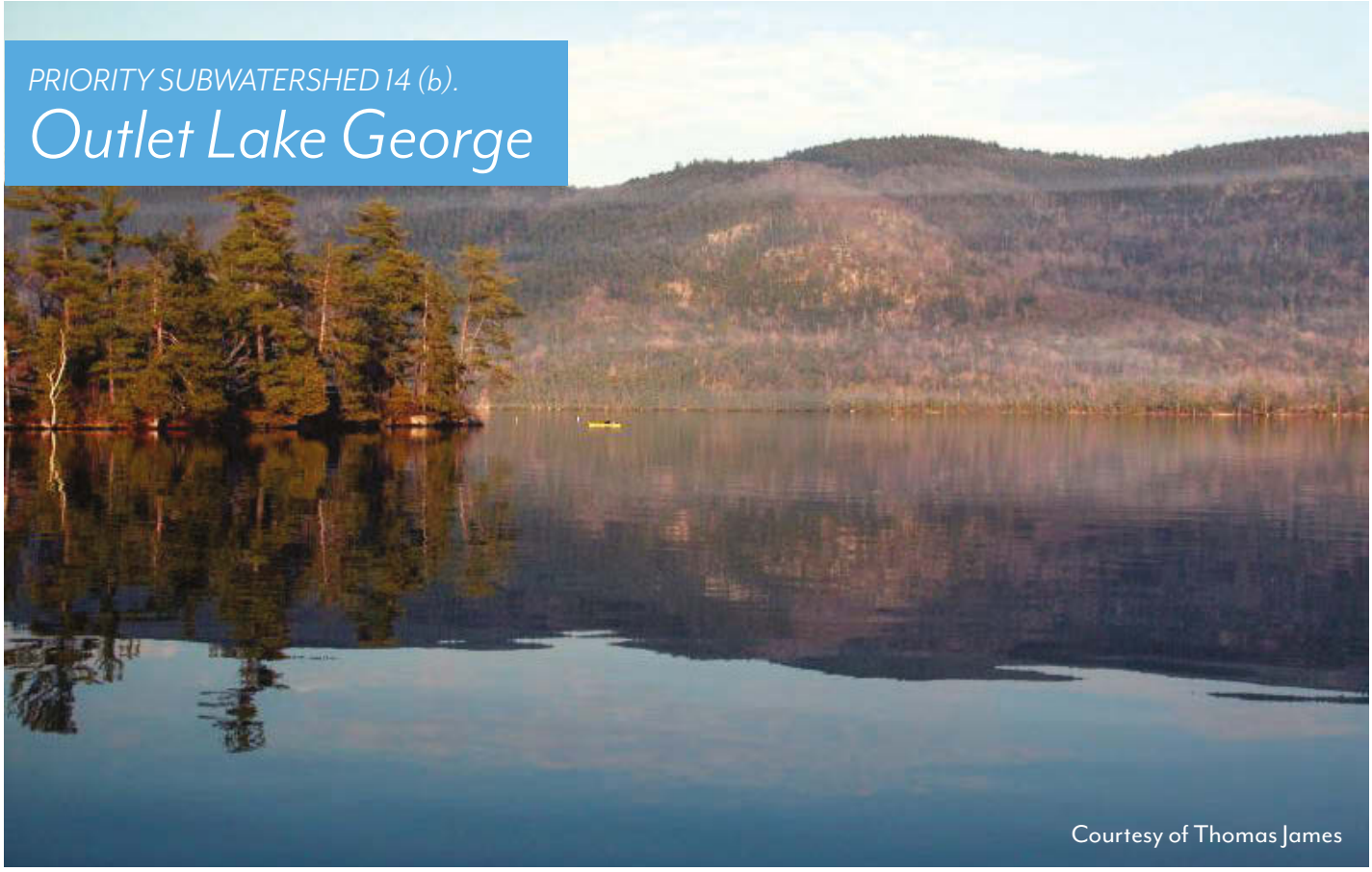
HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #14a - Mettawee River									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Granville									
14a-1	Outreach and assistance to quarries for proper management of pumped groundwater	Washington	Various	Private	Stormwater Erosion	$200,000	LCBP Landowner	*Washington Co. SWCD, Landowner*	Medium Term
14a-2	Stabilization of streambank on Upper Turnpike Road	Washington	43°28'08.29"N 73°22'03.58"W	Public	Erosion	$1.5 M	NYSEG LCBP	*NYSEG,* Washington Co. SWCD, Town	Medium Term
14a-3	Implement manure storage management practices	Washington	Various	Private	Agriculture	$400,000	NYSDAM USDA NRCS LCBP	*Washington Co. SWCD, Landowner*	Short Term
Town of Whitehall									
14a-4	Assessment of culverts within the town, especially those connecting wetlands	Washington	Various	Public	Stormwater	$15,000	NYSDOS NYSDEC LCBP	*Washington Co. SWCD,* Town, County	Short Term
14a-5	Remediation of failing culverts identified in assessment	Washington	Various	Public	Stormwater	$350,000	NYSDOS NYSDEC LCBP Counties Munis	*Washington Co. SWCD, Town, County*	Medium Term
All Municipalities									
14a-6	Mettawee River streambank restoration and buffer installation program	Washington	Various	Private	Erosion Agriculture Stormwater	$350,000	NYSDAM FSA USFWS LCBP	*Washington Co. SWCD, Landowners*	Medium Term

PRIORITY SUBWATERSHED 14 (b).

Outlet Lake George



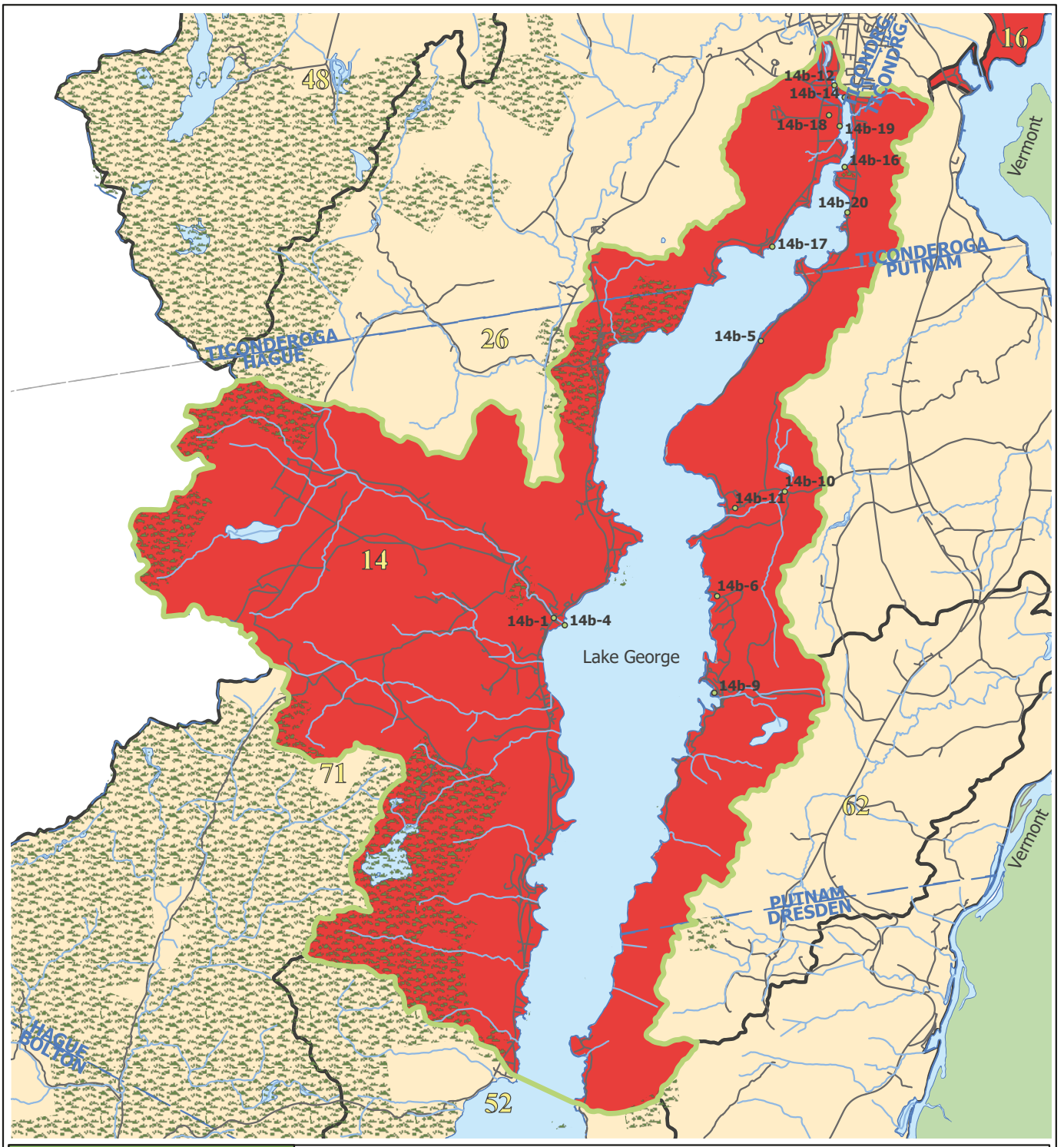
Courtesy of Thomas James

The Outlet Lake George subwatershed is 54 square miles and includes area within Warren, Washington and Essex Counties in the Towns of Hague, Dresden, Putnam and Ticonderoga. A small portion of the Hamlet of Ticonderoga is also within the watershed. Much of the subwatershed is forested, however, the heavily developed shoreline of Lake George is an area of concern for phosphorus loading. Many older secondary camps and homes are built on shallow bedrock, making septic systems a potential source for phophorus loading. There are also concerns of stormwater runoff and streambank and roadside erosion. Within the matrix, this subwatershed received 48 out of 95 points, and notable results include;

- Maximum points within both NYS DEC PWL categories, which can be attributed to the impaired listing of Lake George and its tributaries;
- High score for slope, based on the mountainous topography of the subwatershed;
- High score for waterbody classification as Lake George is AA-special waterbody;
- Maximum score for the presence of a surface water drinking source; and
- Maximum score for number of septic systems 100 feet from a surface water, which is due to the high shoreline development on Lake George.

Priority Projects

1. Route 8/Route 9N Intersection stormwater reduction engineering report in the Town of Hague – The intersection of these two state routes is directly on Lake George and creates a large area of impervious surface where stormwater readily flows into the lake. The engineering report would identify ways to reduce stormwater runoff from the intersection.
2. Crow Point, Town of Putnam wastewater system assessment and community system installation – The creation of an assessment and plan to remove individual wastewater systems on the point and install a community system to better handle waste in an area with shallow bedrock.
3. Implementation of stormwater runoff controls on Baldwin and Black Roads and surrounding areas in the Town of Ticonderoga – Reduction of stormwater runoff directly into Lake George by installing a series of stormwater infiltration/ green infrastructure practices.
4. Wastewater system assessment of Outlet Drive subwatershed in the Town of Ticonderoga – Completion of an assessment to identify if individual systems are functioning properly and assess the feasibility of a community system.



Priority Subwatershed 14b
Outlet Lake George

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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Map # 6-20

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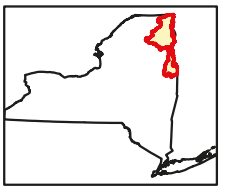


N W E S

Developed By:
Lake George Association LGA

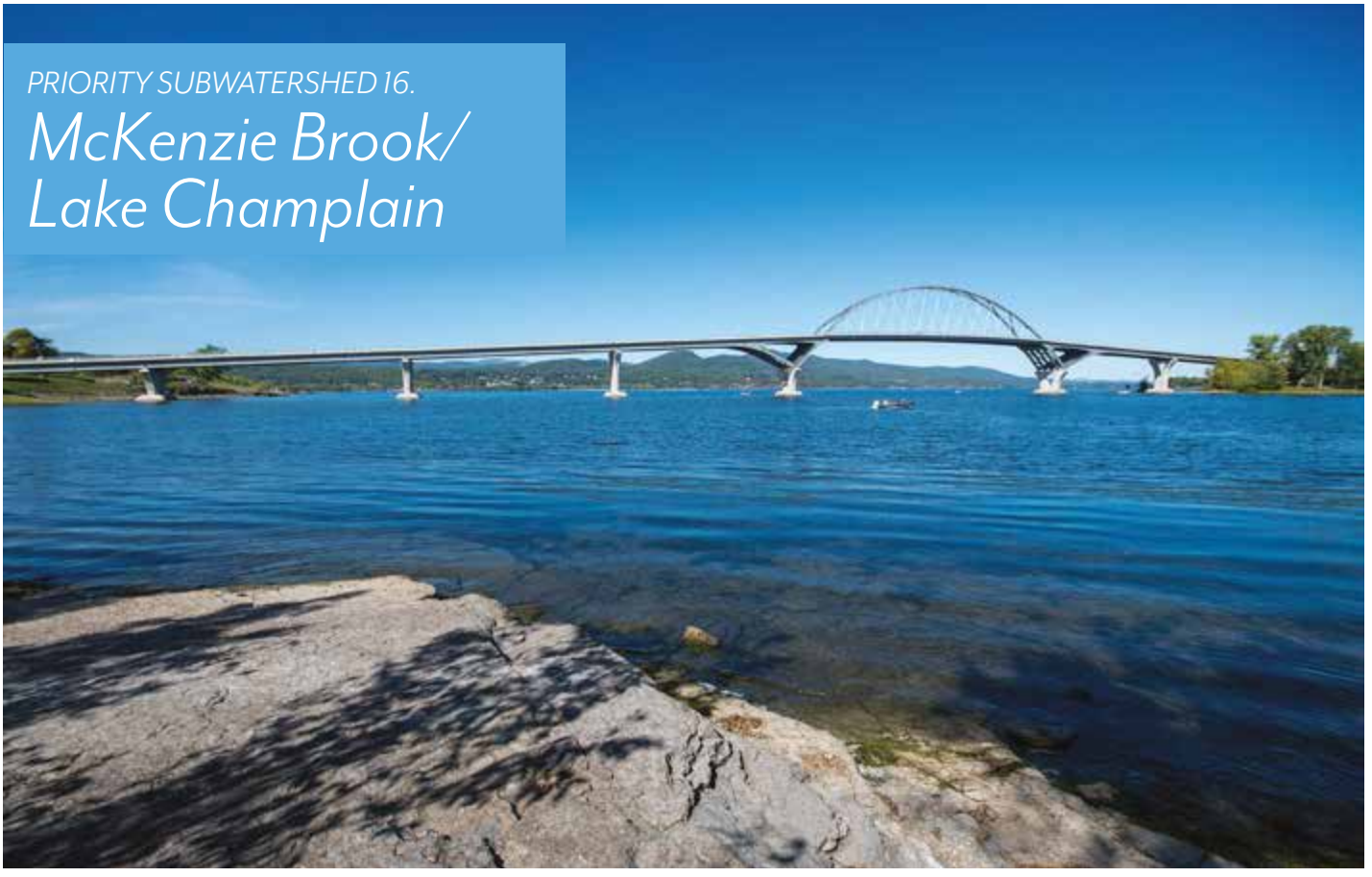
Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12
Priority Rank
- ≤19
- ≤79

Priority Subwatershed #14b - Outlet Lake Geroge									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Hague									
14b-1	Route 8/ Route 9N intersections stormwater reduction engineering report	Warren	43°44'43.04"N 73°29'54.82"W	Public	Stormwater	$50,000	NYSDOT LCBP LGA	*Town, NYSDOT,* Warren Co. SWCD, LGA	Medium Term
14b-2	Conduct four culvert replacements for erosion reduction	Warren	Various	Public	Erosion	$75,000	NYSDOS NYSDEC LCBP LGA	*Warren Co. SWCD,* LGA, Town	Medium Term
14b-3	Comprehensive Hague Brook watershed study	Warren	Various	Public Private	Erosion	$15,000	NYSDOS LCBP LGA	*LGA*	Short Term
14b-4	Removal of Hague Brook delta	Warren	43°44'38.38"N 73°29'45.53"W	Public Private	Erosion	$800,000	NYSDOS NYSDEC LGA	*LGA,* Town	Medium Term
Town of Putnam									
14b-5	Black Point Road/ Anthony's Nose stormwater assessment	Washington	43°47'32.68"N 73°26'52.93"W	Private	Stormwater	$15,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Washington Co. SWCD	Short Term
14b-6	Reconstruction of Royal Anchorage Way to reduce erosion and stormwater velocity	Washington	43°44'54.71"N 73°27'34.52"W	Private	Stormwater Erosion	$200,000	LCBP LGA	*LGA,* Town, Washington Co. SWCD	Long Term
14b-7	Completion of a Gull Bay upland stormwater assessment	Washington	Various	Public	Stormwater	$15,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Town, Washington Co. SWCD	Short Term
14b-8	Gull Bay stormwater reduction implementation project as identified in Army Corp of Engineers study	Washington	Various	Public	Stormwater	$50,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Town	Short Term

Priority Subwatershed #14b - Outlet Lake Geroge									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
14b-9	Crow Point wastewater system assessment and community system installation	Washington	43°43'54.66"N 73°27'38.44"W	Private	Wastewater	$200,000	LCBP LGA	*LGA,* Town, LCLGRPB	Short Term
14b-10	County Rte 1 sediment basin installation project	Washington	43°45'58.87"N 73°26'34.91"W	Public	Erosion	$25,000	NYSDOS NYSDEC LCBP LGA	*County,* LGA, LCLGRPB, Washington Co. SWCD	Short Term
14b-11	Implement projects identified in Army Corps of Engineers Plan for Glenburnie	Washington	43°45'49.20"N 73°27'17.73"W	Public Private	Stormwater Erosion	$45,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Town, Landowner	Short Term
Town of Ticonderoga									
14b-12	Implementation of stormwater runoff controls on Baldwin Rd./Black Point Rd. and surrounding area	Essex	43°50'10.57"N 73°25'45.77"W	Public	Stormwater	$250,000	NYSDOS NYSDEC LCBP LGA	*Essex Co. SWCD,* Town, LGA	Medium Term
14b-13	Address nutrient loading for agricultural practices on near shore farms	Essex	Various	Private	Agriculture	$100,000	NYSDAM USDA NRCS LCBP	*Essex Co. SWCD,* USDA NRCS, Private Landowners	Medium Term
14b-14	Engineering assessment of Tin Pan Alley for high volume stormwater treatment system	Essex	43°50'02.90"N 73°25'37.04"W	Public	Stormwater	$30,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Town	Short Term
14b-15	Implementation of Tin Pan Alley assessment	Essex	43°50'02.90"N 73°25'37.04"W	Public	Stormwater	$100,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Town	Medium Term

Priority Subwatershed #14b - Outlet Lake Geroge									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
14b-16	Install porous pavement at Mossy Point Boat Launch	Essex	43°49'19.72"N 73°25'38.32"W	Public	Stormwater	$150,000	NYSDOS NYSDEC NYSEFC LCBP LGA	*LGA,* Town	Long Term
14b-17	Installation of stormwater infiltration/ retention at Steamboat Landing	Essex	43°48'31.08"N 73°26'41.66"W	Public	Stormwater	$100,000	NYSDOS NYSDEC LCBP LGA	*LGA,* Town	Short Term
14b-18	**Wastewater system assessment in Outlet Drive subwatershed**	**Essex**	**43°49'52.10"N 73°25'50.90"W**	**Private**	**Wastewater**	**$20,000**	**LCBP LGA**	***LGA,* LCLGRPB, Essex Co. SWCD, Town**	**Short Term**
14b-19	Installation of green infrastructure practices for stormwater retention on Outlet Drive	Essex	43°49'45.20"N 73°25'41.92"W	Private	Stormwater	$7,000	LCBP LGA	*LGA,* Town, Essex Co. SWCD	Short Term
14b-20	Stabilization of 100 feet of shoreline on Black Point Road	Essex	43°48'51.48"N 73°25'36.70"W	Private	Erosion Stormwater	$50,000	LCBP LGA	*LGA,* Town, Essex Co. SWCD	Short Term
All Municipalities									
14b-21	Address roadside erosion issues throughout the Town on local, county and state roads	Essex Warren Washington	Various	Public	Erosion	$60,000	NYSDOS NYSDEC NYSDOT LCBP LGA	*Warren/ Essex/ Wash. Co. SWCDs,* LGA, Towns, Counties,	Short Term
14b-22	Purchase of a roadside sweeper/ vacuum to be shared by all municipalities	Essex Washington	Various	Public	Stormwater	$300,000	NYSDOS NYSDEC LCBP LGA	*LCLGRPB,* LGA, Towns	Short Term



PRIORITY SUBWATERSHED 16.

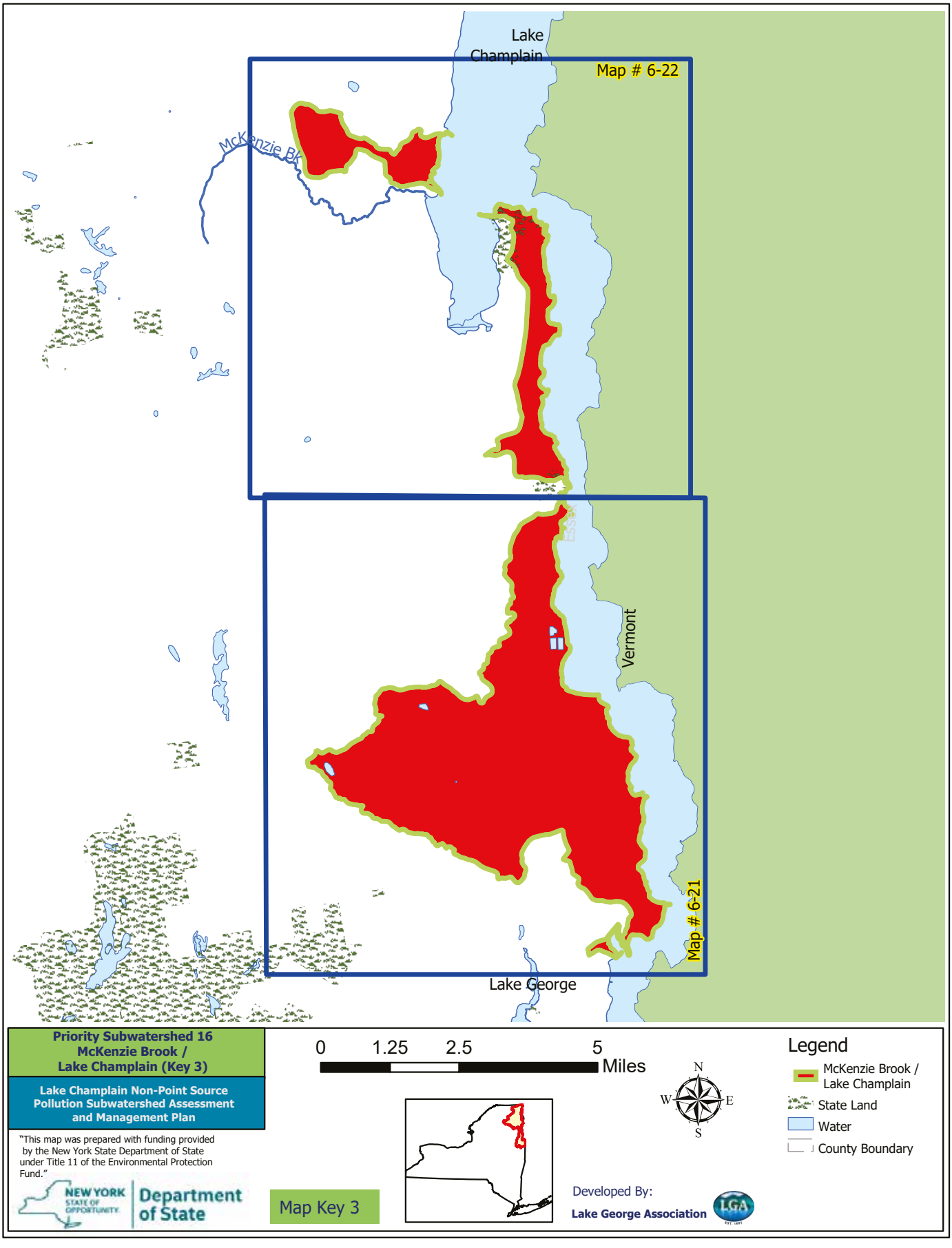
McKenzie Brook/ Lake Champlain

The McKenzie Brook/Lake Champlain subwatershed includes land within the Towns of Ticonderoga, Moriah, and Crown Point in Essex County. The subwatershed is located directly on the Lake Champlain shoreline and is 23.5 square miles. The more developed portions of the subwatershed are along Lake Champlain and include much of the former Village of Port Henry (now considered a hamlet in the Town of Moriah) and developed areas within the Town of Crown Point. The more inland areas of the subwatershed are dominated by agricultural productions. Because of the dynamic land use within the subwatershed, phosphorus loading concerns come from both urbanized areas and agriculture and their associated stormwater runoff. Within the matrix, this subwatershed received 47 out of 95 points, and notable results include;

- Maximum score in soils type due to the clay soils present in the subwatershed;
- Maximum score for the presence of a surface water drinking source;
- High score for the number of septic systems within 100 feet of a surface water, which can be attributed to the residential and secondary home development along Lake Champlain;
- Moderately high score for phosphorus loading per land use; and
- Moderately high score for percent impervious surface as a result of urbanized areas and shoreline development, and a high score for percent row crop as a result of the agricultural nature of the inland subwatershed.

Priority Projects

1. Construction of a new wastewater treatment plant in the Town of Crown Point – Replacement of the current wastewater treatment plant to ensure that all facets of the plant are at optimal function.
2. Complete a hamlet stormwater assessment and management plan in the Town of Moriah – Commission an assessment of stormwater runoff patterns and identify areas for improved management in the former Village of Port Henry.
3. Implementation of agricultural pollution prevention projects on farms directly on waterbodies - Implementation of agricultural best management practices throughout the watershed on fields and farmsteads that are in close proximity to surface waters to reduce phosphorus loading potential.


Lake
Champlain
Map # 6-22
McKenzie Bk
Vermont
Map # 6-21
Lake George
Priority Subwatershed 16
McKenzie Brook /
Lake Champlain (Key 3)
Lake Champlain Non-Point Source
Pollution Subwatershed Assessment
and Management Plan
"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."
NEW YORK STATE OF OPPORTUNITY. Department of State
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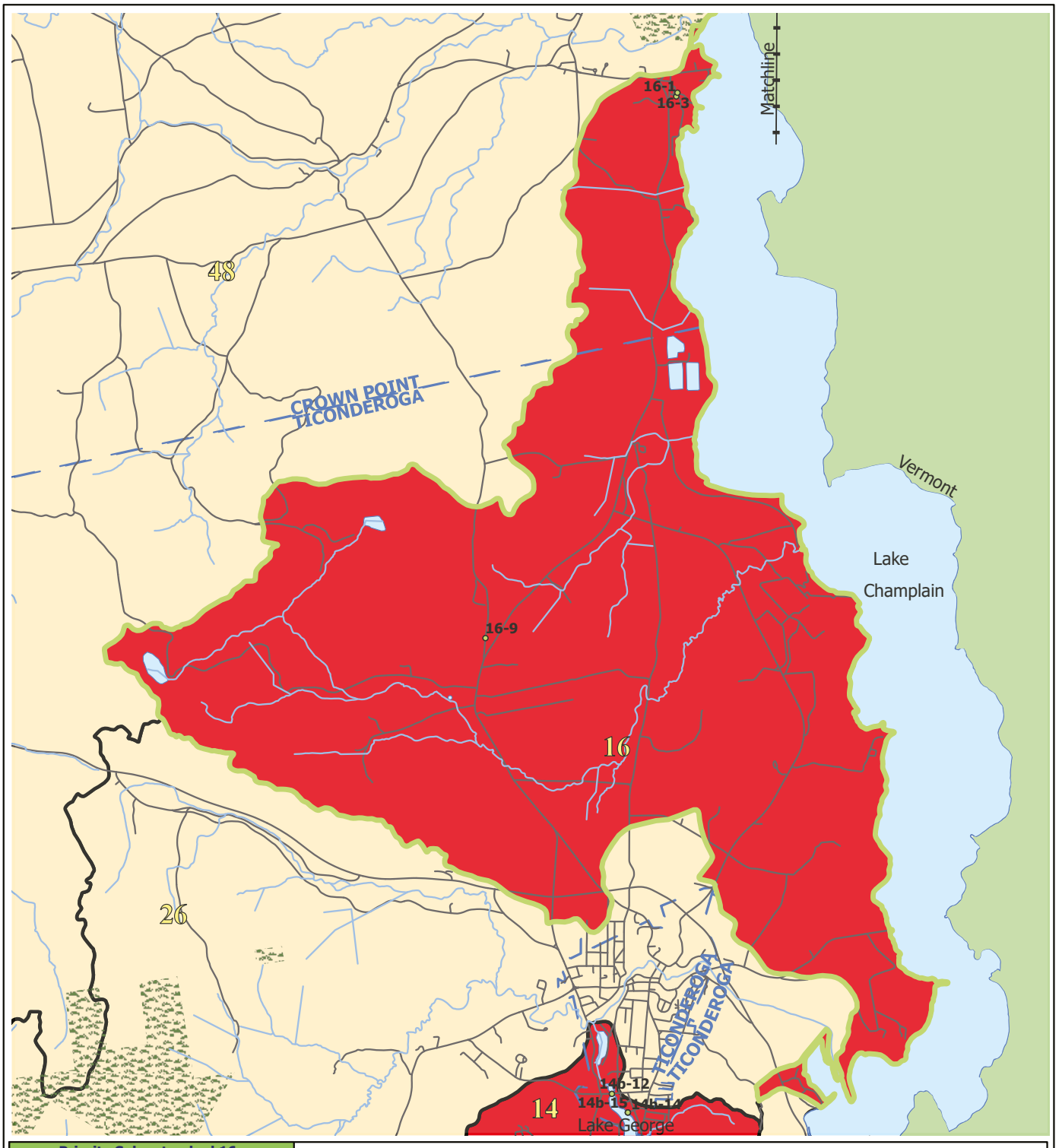
Map Key 3
Developed By:
Lake George Association
Legend
McKenzie Brook / Lake Champlain
State Land
Water
County Boundary



Priority Subwatershed 16
McKenzie Brook / Lake Champlain (Map 1)

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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0 0.5 1 2 Miles

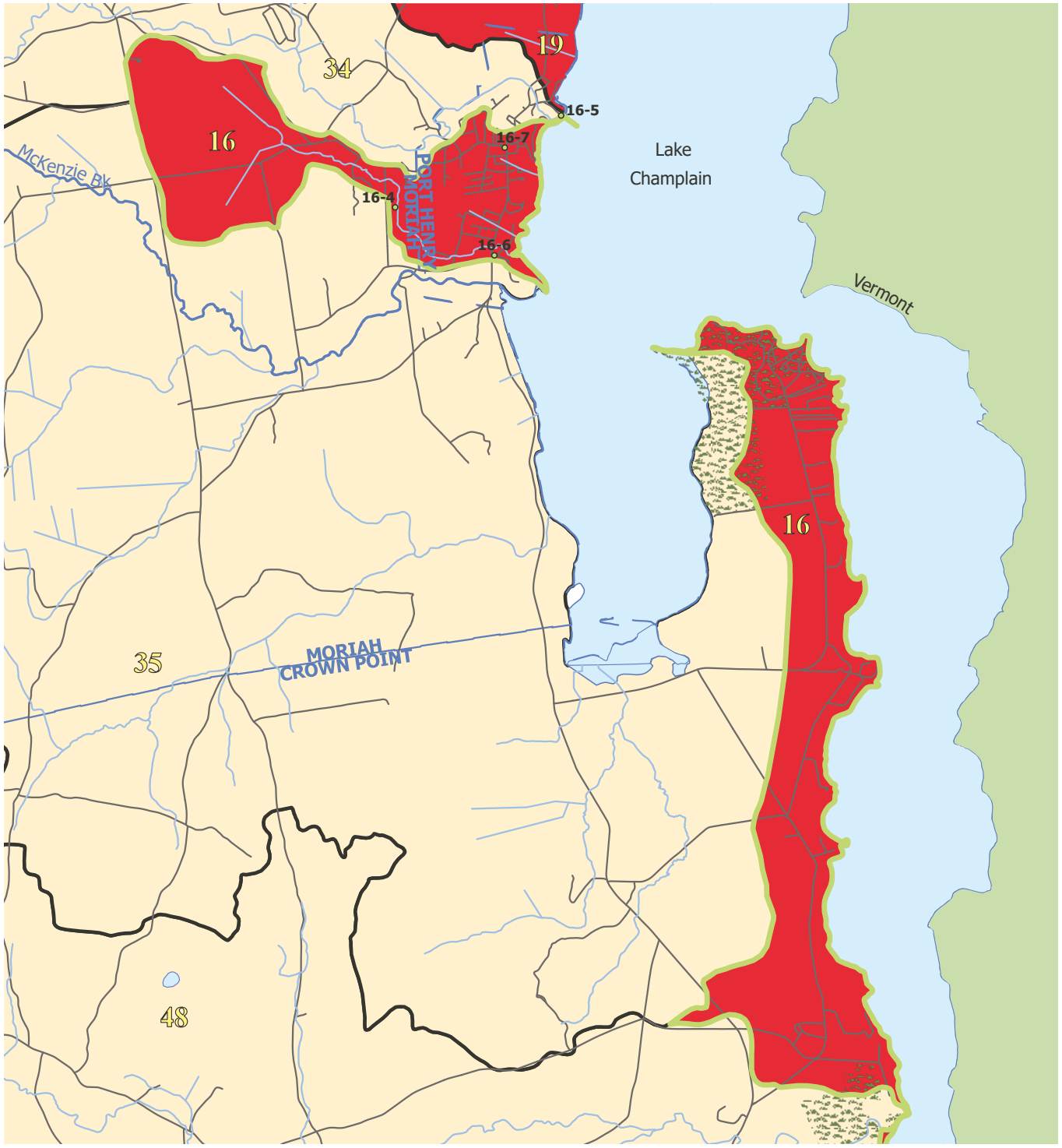
N W E S

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12
Priority Rank
- ≤19
- ≤79

Map # 6-21

Developed By:
Lake George Association



Priority Subwatershed 16
McKenzie Brook / Lake Champlain (Map 2)

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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0 0.5 1 2 Miles

N W E S

Map # 6-22

Developed By:
Lake George Association

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #16 - McKenzie Brook/Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (*Lead agency in Italics*)	Time Frame
Town of Crown Point									
16-1	Installation of green infrastructure practices to intercept stormwater around Monitor Bay	Essex	43°56'54.14"N 73°24'59.04"W	Public	Stormwater	$25,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD,* Essex Co. Planning Dept., Town	Short Term
16-2	Stormwater system improvements in the Hamlet of Crown Point	Essex	Various	Public	Stormwater	$250,000	NYSDOS NYSDEC LCBP	*Town,* NYSDOT, Essex Co. SWCD	Medium Term
16-3	**Construction of a new wastewater treatment plant**	**Essex**	**43°56'55.63"N 73°24'58.34"W**	**Public**	**Wastewater**	**$1.0 M**	**NYSDEC NYSEFC USDA RD**	***Town,* NYSDEC, NYSDOH, Essex Co. Planning**	**Medium Term**
Town of Moriah									
16-4	Channel stabilization and riparian buffer installation of Stony Brook at Moriah Country Club	Essex	44°02'35.03"N 73°28'26.96"W	Private	Erosion Stormwater	$30,000	LCBP USFWS	*Essex Co. SWCD,* Town, CWICNY	Short Term
16-5	Stormwater and flooding mitigation at the outlet of Mill Brook	Essex	44°03'04.78"N 73°27'09.01"W	Public	Stormwater	$120,000	NYSDOS NYSDEC LCBP FEMA	*Town, Essex Co. DPW,* Essex Co. SWCD	Medium Term
16-6	Install catch basin and remove debris around railroad bridge	Essex	44°02'18.31"N 73°27'41.25"W	Private	Stormwater Erosion	$50,000	USFWS LCBP FEMA	*Essex Co. SWCD,* Landowner	Medium Term
16-7	**Complete a hamlet stormwater assessment and management plan**	**Essex**	**44°02'54.37"N 73°27'35.48"W**	**Public**	**Stormwater**	**$20,000**	**NYSDOS**	***Town,* LCLGRPB**	**Short Term**
16-8	Implement recommendations in hamlet stormwater management plan	Essex	Various	Public	Stormwater	$1.0 M	NYSDOS NYSDEC LCBP	*Town,* Essex Co. SWCD	Long Term

Priority Subwatershed #16 - McKenzie Brook/Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Ticonderoga									
16-9	Installation of sediment basins and erosion control practices on Vineyard Road	Essex	43°53'16.18"N 73°26'51.74"W	Public	Stormwater	$50,000	NYSDOS NYSDEC LCBP	*Town,* Essex Co. SWCD	Medium Term
All Municipalities									
16-10	Implementation of agricultural pollution prevention projects on farms directly on waterbodies	Essex	Various	Private	Agriculture	$200,000	NYSDAM FSA USDA NRCS	*Essex Co. SWCD,* CWICNY, TU, USFWS	Long Term

PRIORITY SUBWATERSHED 17.

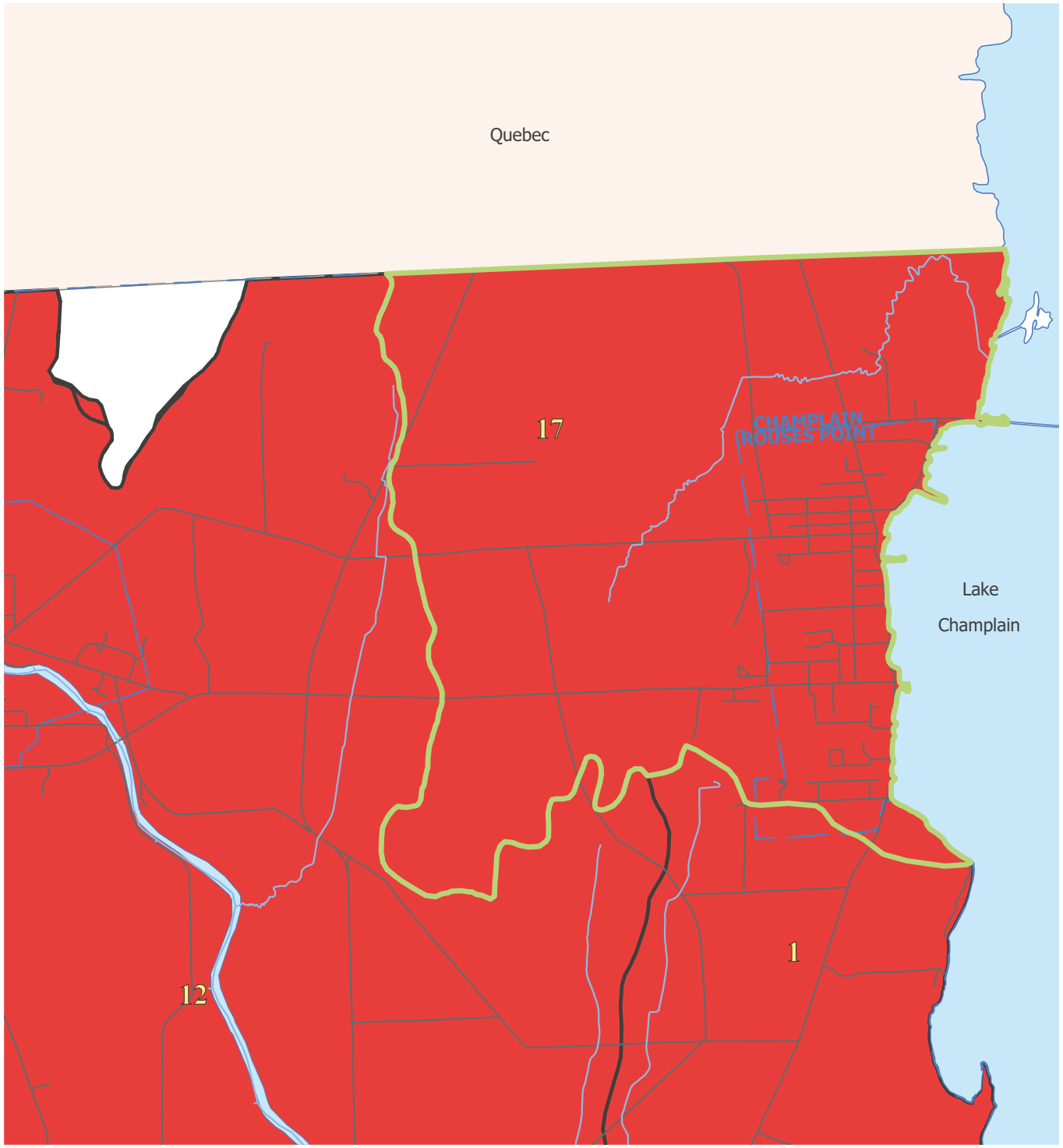
Rouses Point

The Rouses Point subwatershed is located in the northernmost point of the subwatershed in Clinton County along the Canadian border, and includes land within the Town of Champlain and the Village of Rouses Point covering almost 6 square miles. This subwatershed is a prime example of the differing land use within the watershed, where the developed and impervious Village is located directly on the shoreline of Lake Champlain, while the inland portion of the subwatershed is dominated by agricultural production. Because of this, phosphorus loading concerns include stormwater runoff from impervious surfaces as well as stormwater runoff from agricultural fields and farmsteads. Within the matrix, this subwatershed received 46 out of 95 points, and notable results include;

- Maximum score in soils type due to the clay soils within the Champlain valley;
- Maximum score for the presence of a surface water drinking source;
- Maximum score for phosphorus loading per lake segment, as the major land use in the subwatershed is agriculture, which was found to be the main phosphorus loading land use in the Isle La Motte lake segment according to Troy, Wang, and Capen (2007); and
- High score for percent impervious surface as a result of the Village of Rouses Point and maximum score for percent row crops as a result of the dense agricultural nature of the subwatershed outside of the Village.

Priority Projects

1. The completion of a comprehensive stormwater management plan for the Village of Rouses Point – Identification of stormwater runoff patterns and best management practices to be implemented to reduce stormwater runoff from the Village.



Priority Subwatershed 17
Rouses Point

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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NEW YORK STATE OF OPPORTUNITY. Department of State

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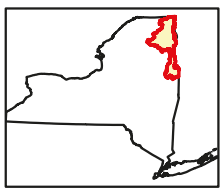


Map # 6-23

Developed By:
Lake George Association

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19

Priority Subwatershed #17 - Rouses Point									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
Town of Champlain									
17-1	Comprehensive water quality assessment of tributaries to Lake Champlain	Clinton	Various	Public Private	Stormwater Erosion Agriculture	$65,000	NYSDOS NYSDEC LCBP	*Clinton Co. SWCD, LCLGRPB*	Medium Term
17-2	Reduction of runoff from ag fields	Clinton	Various	Private	Agriculture	$150,000	NYSDAM USDA NRCS LCBP	*Clinton Co SWCD,* Landowners	Medium Term
Village of Rouses Point									
17-3	**Complete comprehensive stormwater management plan**	**Clinton**	**Various**	**Public**	**Stormwater**	**$75,000**	**NYSDOS NYSDEC LCBP**	***Village,* LCLGRPB**	**Short Term**
17-4	Implement recommendations in stormwater management plan	Clinton	Various	Public	Stormwater	$1.5 M	NYSDOS NYSDEC NYSEFC LCBP	*Village*	Medium Term

PRIORITY SUBWATERSHED 18.

Headwaters Halfway Creek

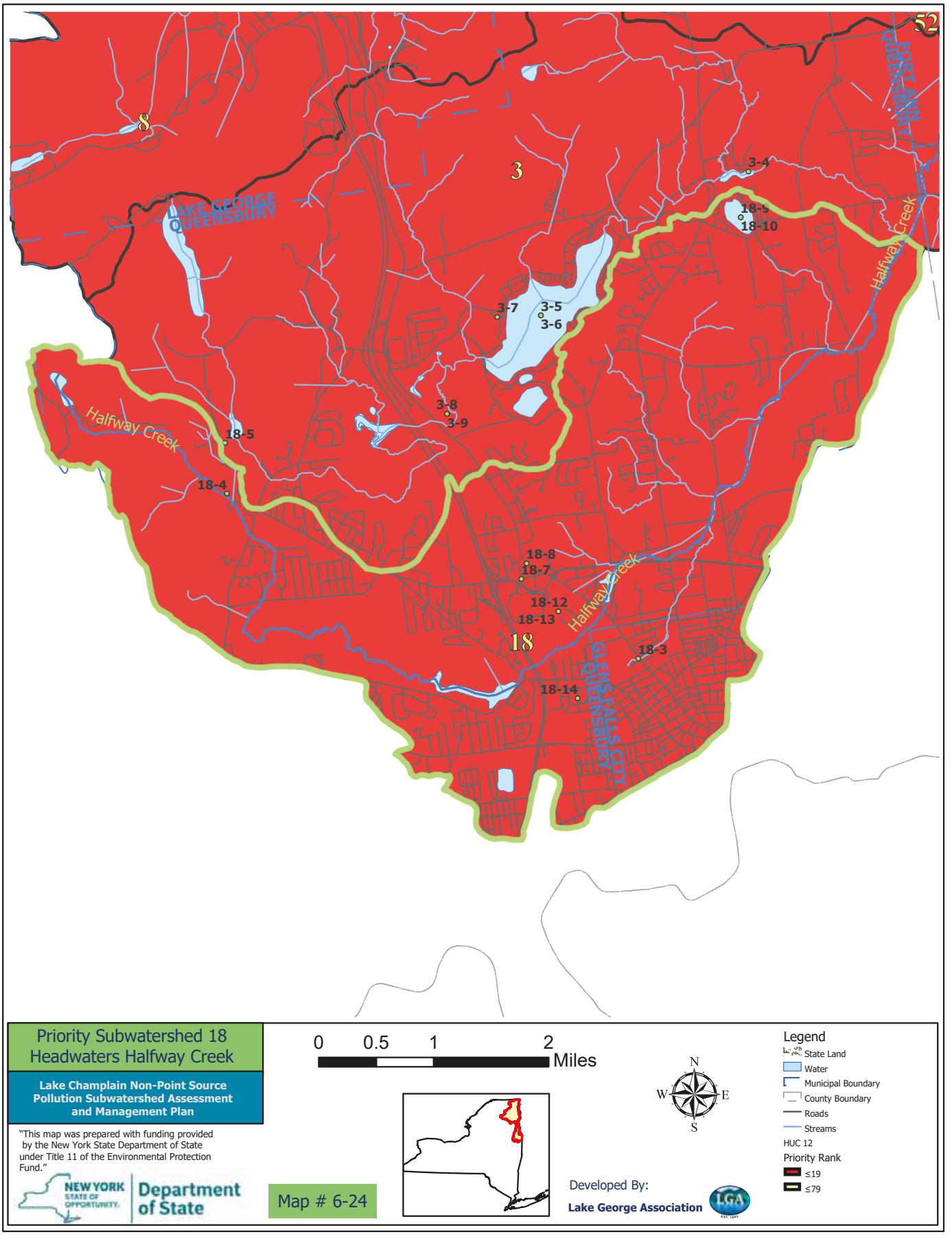
Courtesy of Jim Lieberum

The Headwaters Halfway Creek subwatershed is located at the southern portion of the Champlain watershed and is within the Town of Queensbury and City of Glens Falls in Warren County. This subwatershed, which is approximately 18.5 square miles, is one of the most developed portions of the Lake Champlain watershed, second only to the City of Plattsburgh. The high residential and commercial density within this area makes stormwater runoff from impervious surfaces the main concern for phosphorus loading into Halfway Creek. Best management practices for stormwater are especially important in this subwatershed as both municipalities are MS4 Communities. Within the matrix, this subwatershed received 45 out of 95 points, and notable results include;

- Maximum score for the presence of a surface water drinking source;
- Maximum score for percent of septic systems within 100 feet of a surface water due to the abundance of surface water in the watershed and a large amount of development within the Town that is not serviced by municipal sanitary sewer;
- High score for number of lane miles as a result of the developed nature of the subwatershed; and
- Maximum score for percent impervious surface as its one of the most developed portions of the watershed.

Priority Projects

1. Stormwater reduction and separate sewer system clay pipe reduction in the City of Glens Falls – Replacement and upgrade of outdated stormwater infrastructure within the City to better manage stormwater runoff.
2. Continued implementation of City of Glens Falls CSO Long Term Control Plan – Funding is necessary for the City to better manage their combined sewer system and decrease the frequency of CSO events.
3. Improved implementation of the City of Glens Falls' MS4 Program – Improved management and implementation of program to ensure the City is effectively reducing and managing stormwater runoff from impervious surfaces.
4. Creation of a septic disposal district around Lake Sunnyside - The Town of Queensbury and Protective Association for Lake Sunnyside (PALS) will work together to create a Septic Disposal District, which will create a mandatory program for septic inspections and pump-outs.



Priority Subwatershed 18
Headwaters Halfway Creek

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

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0 0.5 1 2 Miles

N W E S

Map # 6-24

Developed By:
Lake George Association

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Priority Subwatershed #18 - Headwaters Halfway Creek									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
City of Glens Falls									
18-1	Stormwater reduction and separate sewer system clay pipe elimination	Warren	Various	Public	Stormwater	$1.0 M	NYSDOS NYSDEC NYSEFC	*City,* Warren Co. SWCD	Medium Term
18-2	Continued implementation of City CSO Long Term Control Plan	Warren	Various	Public	Wastewater	$5.0 M	NYSDOS NYSDEC NYSEFC NYSESD USHUD USDA RD	*City*	Long Term
18-3	Crandall Pond Outlet reconstruction	Warren	43°19'11.56"N 73°39'30.74"W	Public	Erosion	$500,000	NYSDOS NYSDEC LCBP	*City*	Medium Term
18-4	Repair access road to Wilkie Reservoir	Warren	43°20'29.40"N 73°43'44.80"W	Public	Erosion	$20,000	NYSDOS NYSDEC LCBP	*City, Town of Queensbury*	Short Term
18-5	Repair access road to Butler Pond Reservoir	Warren	43°20'52.42"N 73°43'45.41"W	Public	Erosion	$20,000	NYSDOS NYSDEC LCBP	*City, Town of Queensbury*	Short Term
18-6	Improved implementation of City MS4 Program	Warren	Various	Public	Stormwater	$100,000	NYSDOS NYSDEC NYSEFC LCBP	*City*	Medium Term
Town of Queensbury									
18-7	Installation of 2 drywells on Greenway Circle	Warren	43°19'48.56"N 73°40'42.58"W	Public	Stormwater	$20,000	NYSDOS NYSDEC LCBP	*Warren Co. SWCD,* Town	Short Term
18-8	NYS Rte. 9 stormwater retrofits	Warren	43°19'55.56"N 73°40'39.16"W	Public	Stormwater	$350,000	NYSDOT NYSDOS NYSDEC LCBP	*NYSDOT* Warren Co. SWCD, Town	Medium Term
18-9	Creation of a septic disposal district around Lake Sunnyside	Warren	43°22'31.06"N 73°38'22.58"W	Private	Wastewater	$20,000	NYSDOS NYSDEC NYSEFC	*Protective Assoc. for Lake Sunnyside, Town*	Short Term

Priority Subwatershed #18 - Headwaters Halfway Creek									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties *(Lead agency in Italics)*	Time Frame
18-10	Implementation of Lake Sunnyside septic disposal district, including replacement of outdate systems	Warren	43°22'31.06"N 73°38'22.58"W	Private	Wastewater	$250,000	NYSDOS NYSDEC NYSEFC LCBP Landowner	*Protective Assoc. for Lake Sunnyside, Landowners, Town*	Long Term
18-11	Lake Sunnyside home- owner green infrastructure education and implementation program	Warren	Various	Private	Stormwater	$25,000	NYSDOS NYSDEC LCBP	*Protective Assoc. for Lake Sunnyside, Town*	Short Term
18-12	Perform stormwater runoff assessment in area west of Aviation Mall to Foster Ave.	Warren	43°19'33.54"N 73°40'19.90"W	Public Private	Stormwater	$3,000	NYSDOS NYSDEC LCBP	*Warren Co. SWCD,* Town	Short Term
18-13	Implementation of recommendations made in Aviation Mall/Foster Ave. assessment	Warren	43°19'33.54"N 73°40'19.90"W	Public Private	Stormwater	$100,000	NYSDOS NYSDEC LCBP Landowner	*Warren Co. SWCD,* Town, Landowners	Medium Term
18-14	Broadacres neighborhood stormwater infiltration project	Warren	43°18'53.99"N 73°40'08.78"W	Public	Stormwater	$110,000	NYSDOS NYSDEC LCBP	*Warren Co. SWCD,* Town	Medium Term
All Municipalities									
18-15	Address stream crossings on waterways	Warren	Various	Public Private	Stormwater Erosion	$1.75 M	NYSDEC USFWS LCBP	*Warren Co. SWCD,* City, Town	Medium Term
18-16	Implement curbside infiltration utilizing green infrastructure practices	Warren	Various	Public Private	Stormwater	$250,000	NYSDOS NYSDEC NYSEFC LCBP	*Warren Co. SWCD,* City, Town	Medium Term

PRIORITY SUBWATERSHED 19.

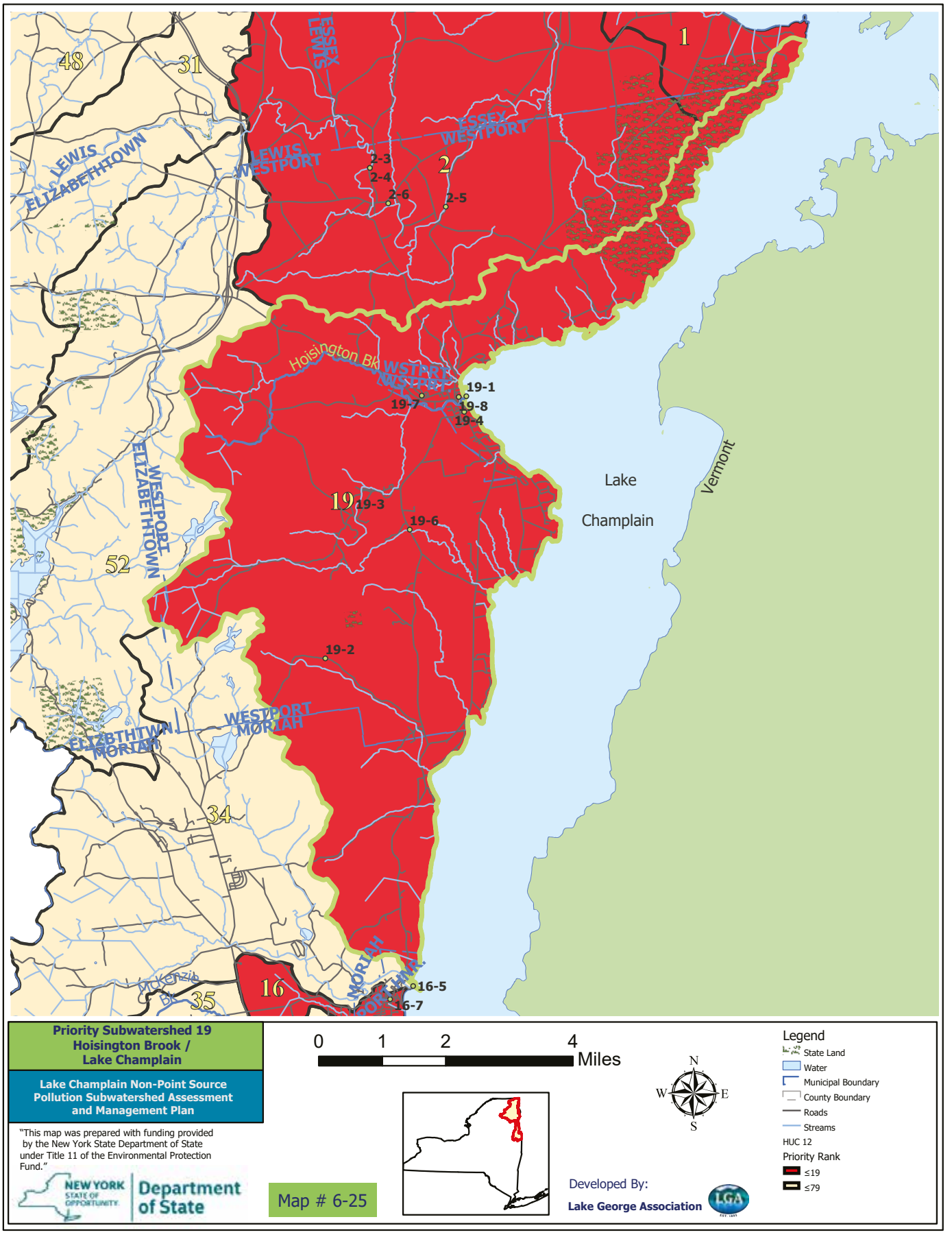
Hoisington Brook/ Lake Champlain

The Hoisington Brook/Lake Champlain subwatershed includes area within the Towns of Moriah, Westport and a small piece in the Town of Essex. The subwatershed is located directly on Lake Champlain and is 42 square miles. A small portion of the former Village of Port Henry is included in the subwatershed, as well as the Hamlet of Westport. There are also several smaller farms within the watershed, many of which are located directly on the Lake between the two hamlets, making phosphorus loading from both urbanized areas and agriculture a concern. Within the matrix, this subwatershed received 44 out of 95 points, and notable results include;

- High score for soil type due to the clay soils within the Champlain valley;
- Maximum score for the presence of a surface water drinking source;
- Maximum score for identified erosion sites as a result of Tropical Storm Irene; and
- Moderately high score for phosphorus loading per land use and percent row crops.

Priority Projects

1. Complete a stormwater assessment and management plan for the hamlet of Westport – Commission a plan to assess stormwater runoff and identify opportunities for runoff reduction.
2. Implement projects identified in the hamlet stormwater assessment in Westport – Funding for implementation to reduce stormwater runoff.
3. Upgrade of Town of Westport WWTP – Improvement of the WWTP facility to ensure that all waste is properly received and treated.



Priority Subwatershed 19
Hoisington Brook / Lake Champlain

Lake Champlain Non-Point Source Pollution Subwatershed Assessment and Management Plan

"This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund."

NEW YORK STATE OF OPPORTUNITY. Department of State

0 1 2 4 Miles

Map # 6-25

N W E S

Legend
- State Land
- Water
- Municipal Boundary
- County Boundary
- Roads
- Streams

HUC 12

Priority Rank
- ≤19
- ≤79

Developed By:
Lake George Association LGA

Priority Subwatershed #19 - Hoisington Brook/Lake Champlain									
Project ID	Project Narrative	County	Location (Lat/Long)	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	Involved Parties (*Lead agency in Italics*)	Time Frame
Town of Westport									
19-1	Removal of a sediment delta located at the mouth of Hoisington Brook	Essex	44°11'07.81"N 73°25'55.70"W	Public Private	Erosion	$80,000	NYSDOS NYSDEC	*Essex Co. SWCD,* Town, CWICNY, APA, private Landowners	Long Term
19-2	Installation of sediment basins and erosion control practices on McConley Road	Essex	44°07'34.94"N 73°28'42.02"W	Public	Stormwater Erosion	$10,000	NYSDOS NYSDEC LCBP	*Town,* Essex Co. SWCD	Short Term
19-3	Installation of sediment basins and erosion control practices on Mountain Spring Road	Essex	44°09'42.68"N 73°28'09.40"W	Public	Erosion	$40,000	NYSDOS NYSDEC LCBP	*Town,* Essex Co. SWCD	Short Term
19-4	Complete a Town stormwater assessment and management plan	Essex	44°10'55.05"N 73°25'58.43"W	Public	Stormwater	$20,000	NYSDOS NYSDEC LCBP	*Town,* LCLGRPB	Short Term
19-5	Implement projects identified in stormwater assessment	Essex	Various	Public	Stormwater	$250,000	NYSDOS NYSDEC LCBP	*Town*	Long Term
19-6	Installation of a properly sized culvert on Stevenson Road	Essex	44°09'19.28"N 73°27'03.08"W	Public	Stormwater Erosion	$100,000	NYSDOS NYSDEC LCBP	*County,* Essex Co. SWCD	Medium Term
19-7	Implementation of stormwater control measures at County Fair Grounds	Essex	44°11'09.02"N 73°26'46.50"W	Public	Stormwater	$300,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD*	Medium Term
19-8	Upgrade of wastewater treatment plant	Essex	44°11'07.33"N 73°26'04.38"W	Public	Wastewater	$500,000	NYSDOS NYSDEC NYSEFC USDA RD	*Town*	Medium Term
All Municipalities									
19-9	Implementation of a roadside erosion reduction program	Essex	Various	Public	Erosion	$100,000	NYSDOS NYSDEC LCBP	*Essex Co. SWCD,* Towns, Essex Co., NYSDOT	Medium Term

Regional Priorities

Along with the specific projects identified for each Priority Subwatershed, there are also several Regional Priorities for projects and programs to be implemented throughout the Lake Champlain watershed as a whole. CWICNY partners have been working diligently with municipalities, producers, and other resource managers to provide technical assistance and implementation funding for an array of issues throughout the basin that address phosphorus loading. Issues that have been identified as regional priorities include stormwater reduction from impervious surfaces, improvements of WWTPs and municipal infrastructure, replacements of undersized and failing culverts, implementation of agricultural BMPs, and reduction of erosion from streambanks and roadsides.

Priority Projects

1. Establish a line item in the New York State Environmental Protection Fund (NYS EPF) for Lake Champlain Watershed efforts funneled through CWICNY – One of the main purposes of forming CWICNY was to bring all the resource managers in the watershed together to create a comprehensive and coordinated approach to natural resource planning and implementation. Much of this work is done utilizing grant funds that CWICNY partners have applied for. The inclusion of CWICNY within the NYS EPF would allow CWICNY members and partners to spend less time applying for grants, and more time planning for and implementing improvement projects that will help New York achieve the phosphorus reduction goals set in the 2002 TMDL document.

2. Promote and implement a regional cover cropping program to reduce erosion from row crop fields – Funding for the creation and implementation of a regional cover cropping program to educate farmers on the benefits of cover crops for soil quality and erosion reduction, and implement yearly plantings.

3. Establish and maintain a regular funding pool for CWICNY's Rural Roads Active Management Program (RRAMP) – In 2014, CWICNY developed a program modeled after Vermont's Better Back Roads Program to provide funding for planning and implementation of improvements to roadside ditches along secondary road within the watershed. Funding for the Vermont Program is provided by Federal Highway to ensure a continuation of the program on a yearly basis. CWICNY would like to establish a similar funding stream to ensure that assistance is available to municipalities on a continual basis.

4. Continued funding of County hydroseeder programs that address roadside erosion stabilization and are provided to the county DPW and municipalities at no/low cost – The County SWCDs within the watershed provide hydroseeding services to highway departments and DPWs following roadside ditch cleaning efforts to ensure that soil is not left exposed and vulnerable to erosion. Continued funding of these efforts will ensure that roadside ditches throughout the watershed are properly maintained and do not act as sources of phosphorus loading.

Regional Priorities						
Project Narrative	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	*Involved Parties (Lead agency in Italics)*	Time Frame
Implement road reconstruction projects on local, county and state roads for improved stormwater management	Public	Stormwater	$10 M	NYSDOS NYSDEC NYSDOT LCBP	*CWICNY, Munis, Counties*	Short - Long Term
Remediation of remaining roadside erosion sites as identified in the LCLGRPB's Lake Champlain Watershed Roadside Erosion Assessment and Inventory	Public	Erosion	$1.0 M	NYSDOS NYSDEC LCBP	*CWICNY, Munis, Counties*	Short Term
Promote and implement a regional cover cropping program to reduce erosion from row crop fields	**Private**	**Agriculture**	**$250,000**	**NYSDAM USDA NRCS LCBP**	***CWICNY, Landowners***	**Short Term**
Implementation of a riparian buffer program on both non-agricultural and agricultural property to reduce streambank erosion	Public Private	Erosion Agriculture	$350,000	NYSDEC NYSDAM FSA USDA NRCS LCBP	*CWICNY, Landowners*	Short Term
Comprehensive county and town culvert assessment to identify road crossing that are creating streambank erosion and causing localized flooding	Public	Stormwater Erosion	$70,000	NYSDOS NYSDEC LCBP	*CWICNY*	Short Term
Comprehensive outfall assessment to identify all direct discharges to surface waters	Public Private	Stormwater	$110,000	NYSDOS NYSDEC LCBP	*CWICNY*	Medium Term
Comprehensive streambank assessment to identify and map areas within major and minor tributaries in need of stabilization	Public Private	Erosion	$200,000	NYSDOS NYSDEC USFWS LCBP	*CWICNY*	Medium Term
Creation and implementation of a wetland restoration program that will address the loss of wetlands within the watershed and work to restore and protect wetlands	Public Private	Stormwater	$750,000	NYSDEC USDA NRCS FEMA EPA	*CWICNY*	Long Term
Creation of a watershed-wide green infrastructure plan that addresses on-the-ground needs for open space protection	Public Private	Stormwater Erosion	$200,000	NYSDOS NYSDEC NYSEFC LCBP	*LCLGRPB*	Medium Term
Continued support and expansion of Greater Adk RC&Ds Skidder Bridge Program, including maintaining a database of active timbering sites	Private	Erosion	$100,000	NYSDEC LCBP	*RC&D, Landowners*	Medium Term
Establish and maintain regular funding pool for CWICNY's Rural Roads Active Management Program (RRAMP)	**Public Private**	**Stormwater Erosion**	**$100,000 annually**	**NYS DEC LCBP**	***CWICNY***	**Medium Term**

Regional Priorities						
Project Narrative	Jurisdiction	Phosphorus Loading Concern(s)	Projected Cost	Potential Funding Source	*Involved Parties (Lead agency in Italics)*	Time Frame
Continued funding of County hydroseeding programs that addresses roadside erosion stabilization and are provided to the county DPWs and municipalities at no/ low cost	Public	Erosion	$50,000 annually	NYSDOS NYSDEC LCBP	*CWICNY*	Short Term
Assist municipalities with completing all the necessary steps to become listed on the New York State Environmental Facilities Corporation Intended Use Plan for infrastructure upgrade funding	Public	Wastewater	$250,000 annually	NYSDEC	*LCLGRPB*	Short Term
Increased allocation of state and federal planning funds to address regional and local planning issues and needs, including sub-watershed level planning	Public	Stormwater Erosion	$100,000 annually	NYSDOS NYSDEC NYSEFC LCBP	*LCLGRPB*	Short Term
Provide County Water Quality Coordinating Committees with mini-grants to plan for and implement improvement projects	Public Private	Stormwater Erosion	$35,000 annually	NYSDEC LCBP	*CWICNY, County WQCCs*	Short Term
Establish a line item in the NYS Environmental Protection Fund for Lake Champlain Watershed efforts funneled through CWICNY	Public	Stormwater Erosion Agriculture Wastewater	$250,000 annually	NYSDOS NYSDEC LCBP	*CWICNY*	Medium Term

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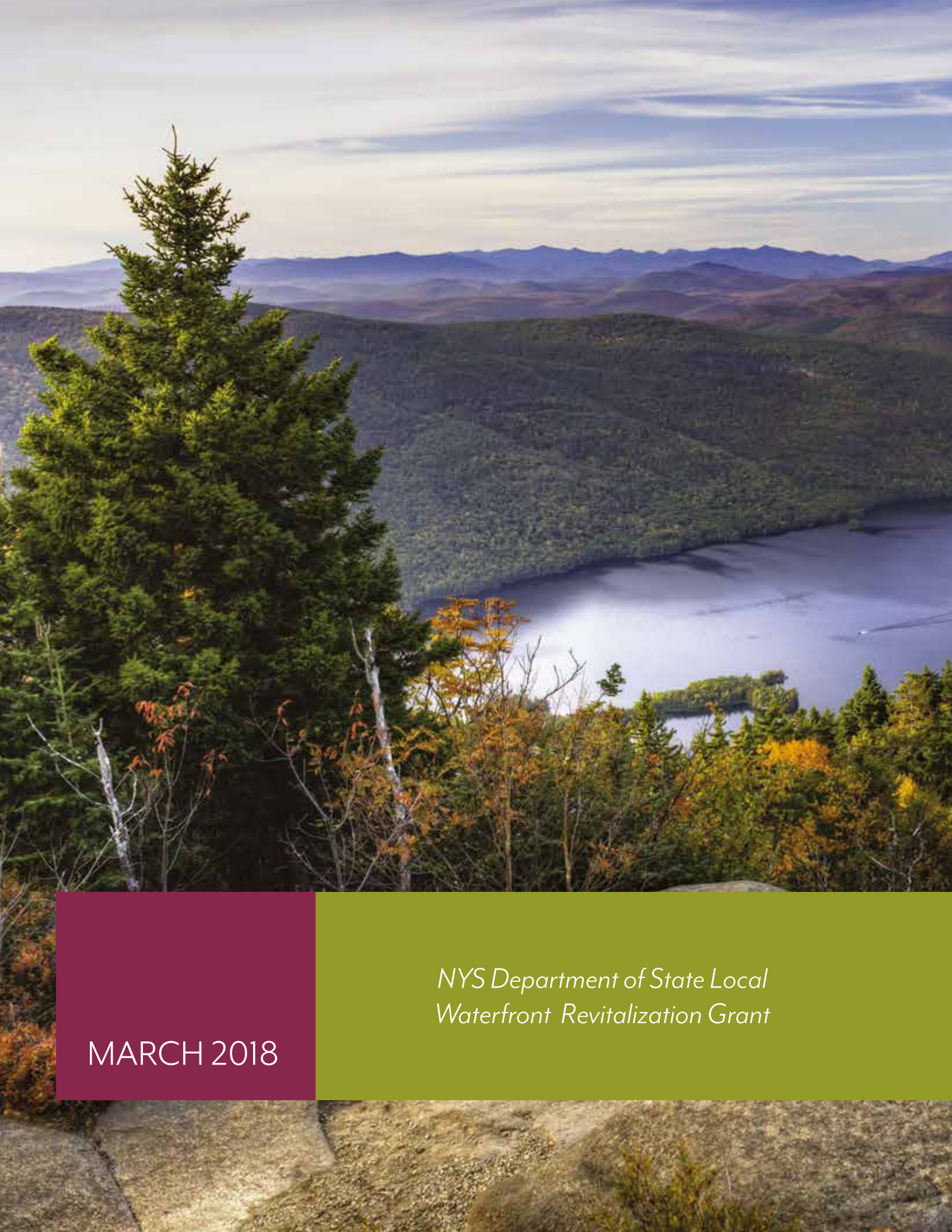
Appendix

HUC Rank	County(ies)	HUC Name	HUC Acrage	CAT1 PWL List: Pollutants	CAT2 PWL List: Impairements	CAT3 Lake Seg. Red. Goals	CAT4 Slope	CAT5 Soil Type	CAT6 Waterbody Classification	CAT7 Public Water Supply	CAT8 UNUSED	CAT9 Miles of Tribs	CAT10 Septic Systems	CAT11 Lane Miles	CAT12 ARRA Sites	CAT13 P Loading/ Land Use	CAT14 P Loading/ Lake Seg.	CAT15 % Impervious Surfaces	CAT16 % Row Crop	Total Score
			PTS	1 - 5	0 - 5	1 - 10	1 - 5	1 - 5	1 - 5	0 or 5		1 - 5	1 - 5	1 - 5	1 - 5	2 - 10	0 or 5	2 - 10	2 - 10	max 95
1	Clinton/Essex	Lake Champlain	51061	5	5	7	2	4	3	5		4	5	5	3	10	0	6	10	74
2	Essex	Lower Boquet River	29627	4	4	10	3	4	2	5		4	3	2	5	8	0	4	10	68
3	Wrn/Wash	Halfway Creek	31955	5	5	0	3	4	5	5		5	4	4	4	8	0	6	6	64
4	Washington	Wood Creek/Champlain Canal	37700	4	4	0	2	5	3	5		5	2	4	3	10	0	4	8	59
5a	Clinton/Essex	Ausable River	31615	1	2	10	3	3	3	5		4	3	4	1	6	0	6	6	57
5b	Clinton	Little Ausable River	31161	1	2	10	2	3	2	5		4	3	3	2	8	0	4	8	57
7	Washington	Poultney River/ Lake Champlain	15277	4	4	7	3	5	2	5		3	2	2	1	6	0	6	4	54
8	Wrn/Wash	Headwater Lake George	36923	5	5	0	4	2	5	5		4	5	1	5	4	0	6	2	53
9a	Wrn/Wash	Indian Brook/Lake George	38291	5	5	0	4	3	5	5		3	5	1	4	4	0	4	2	50
9b	Clinton	Bullis Brook/ Great Chazy River	33644	3	3	0	1	4	4	5		4	3	3	0	8	0	4	8	50
9c	Clinton	Dead Creek	27552	0	1	3	1	4	1	5		2	5	4	0	8	0	6	10	50
12a	Washington	Lake Champlain Canal	33090	3	4	0	3	5	3	5		5	1	3	1	8	0	4	4	49
12b	Clinton	Outlet to Great Chazy River	10963	4	4	2	1	5	1	0		1	4	0	0	6	5	6	10	49
14a	Washington	Mettawee River	34766	2	3	0	3	4	3	0		4	3	4	4	8	0	4	6	48
14b	Wrn/Wash/Ex	Outlet Lake George	34725	5	5	0	4	3	4	5		3	5	2	2	4	0	4	2	48
16	Essex	McKenzie Brook/ Lake Champlain	15090	1	3	1	3	5	1	5		1	4	2	1	6	0	6	8	47
17	Clinton	Rouses Point	3731	0	2	2	1	5	1	5		1	3	1	0	2	5	8	10	46
18	Warren	Headwaters Halfway Creek	11790	2	2	0	2	2	2	5		1	5	4	2	4	0	10	4	45
19	Essex	Hoisington Brook/ Lake Champlain	26942	0	2	1	3	4	2	5		3	2	1	5	6	0	4	6	44
20	Essex	Middle West Branch Ausable River	35457	2	3	0	5	1	4	5		5	3	3	4	4	0	2	2	43
20	Clinton	Little Chazy River	34629	2	2	2	1	4	1	0		4	3	4	0	8	0	4	8	43

HUC Rank	County(ies)	HUC Name	HUC Acrage	CAT1 PWL List: Pollutants	CAT2 PWL List: Impairements	CAT3 Lake Seg. Red. Goals	CAT4 Slope	CAT5 Soil Type	CAT6 Waterbody Classification	CAT7 Public Water Supply	CAT8 UNUSED	CAT9 Miles of Tribs	CAT10 Septic Systems	CAT11 Lane Miles	CAT12 ARRA Sites	CAT13 P Loading/ Land Use	CAT14 P Loading/ Lake Seg.	CAT15 % Impervious Surfaces	CAT16 % Row Crop	Total Score
			PTS	1 - 5	0 - 5	1 - 10	1 - 5	1 - 5	1 - 5	0 or 5		1- 5	1- 5	1 - 5	1- 5	2 - 10	0 or 5	2 - 10	2 - 10	max 95
22	Essex	Chubb River	26443	1	2	0	4	1	4	5		4	5	3	3	4	0	4	2	42
22	Clinton	Saranac River	24198	0	1	3	2	1	2	5		3	5	1	1	6	0	8	4	42
22	Essex	Willsboro Bay	13337	2	3	10	5	4	1	0		1	5	2	1	2	0	4	2	42
25	Clinton	Salmon River	14444	0	1	10	1	2	2	0		2	5	1	0	4	0	6	6	40
26	Washington	Indian River	13006	1	2	0	3	4	1	5		1	3	2	0	4	0	6	6	38
26	Franklin/Ex	Moose Creek-Saranac River	30056	1	1	0	3	2	5	5		4	5	1	1	4	0	4	2	38
26	Essex/Wash	Charter Brook-Lake Champlain	22765	0	2	4	4	5	2	0		3	2	4	2	4	0	4	2	38
26	Essex/Wrn	La Chute	17711	2	2	1	4	4	1	5		2	2	3	0	4	0	4	4	38
30	Essex	Lower East Branch Ausable River	24262	1	2	0	4	1	4	0		4	4	3	2	4	0	4	4	37
31	Essex	Upper East Branch Ausable River	25045	2	3	0	5	1	5	0		4	2	2	4	4	0	2	2	36
31	Essex	Middle East Branch Ausable River	37786	2	3	0	5	1	5	0		5	2	2	3	4	0	2	2	36
31	Essex	Middle Bouquet River	32699	1	3	0	5	1	5	0		5	2	2	2	4	0	2	4	36
34	Essex	Mill Brook	17882	1	1	1	4	1	4	0		3	3	3	5	2	0	4	2	34
35	Essex	Bullwagga Bay	16285	0	2	1	3	3	2	0		2	2	3	3	4	0	4	4	33
35	Clinton	Corbeau Creek	17828	1	2	0	1	4	1	0		2	3	3	0	4	0	4	8	33
37	Essex	Upper West Branch Ausable River	36230	2	3	0	5	1	3	0		5	1	1	3	4	0	2	2	32
37	Ex/Frnk/Clin	Union Falls Pond-Saranac River	42182	1	1	0	4	2	4	0		5	1	1	5	4	0	2	2	32
37	Essex	Headwaters North Branch Bouquet River	29230	1	1	0	4	1	3	5		5	1	2	1	4	0	2	2	32
37	Essex	North Branch Bouquet River	16506	2	2	0	3	2	1	0		3	1	3	1	4	0	2	8	32

HUC Rank	County(ies)	HUC Name	HUC Acrage	CAT1 PWL List: Pollutants	CAT2 PWL List: Impairements	CAT3 Lake Seg. Red. Goals	CAT4 Slope	CAT5 Soil Type	CAT6 Waterbody Classification	CAT7 Public Water Supply	CAT8 UNUSED	CAT9 Miles of Tribs	CAT10 Septic Systems	CAT11 Lane Miles	CAT12 ARRA Sites	CAT13 P Loading/ Land Use	CAT14 P Loading/ Lake Seg.	CAT15 % Impervious Surfaces	CAT16 % Row Crop	Total Score
			PTS	1 - 5	0 - 5	1 - 10	1 - 5	1 - 5	1 - 5	0 or 5		1- 5	1- 5	1 - 5	1- 5	2 - 10	0 or 5	2 - 10	2 - 10	max 95
37	Clinton	Headwaters North Branch Great Chazy River	40492	0	1	0	2	4	2	0		3	2	2	0	8	0	4	4	32
42	Washington	Finel Hollow Brook-Poultney River	7856	3	3	0	3	4	1	0		1	2	1	1	2	0	4	6	31
42	Essex	Headwaters East Branch Ausable River	27050	1	2	0	5	3	5	5		4	1	1	0	2	0	2	0	31
42	Ex/Clinton	Palmer Brook-Ausable River	20045	3	3	0	4	1	3	0		3	2	2	2	2	0	4	2	31
42	Clinton	Behan Brook-Saranac River	27349	1	1	0	2	3	2	0		4	2	2	2	4	0	4	4	31
42	Essex	Upper Bouquet River	30218	0	1	0	5	3	3	0		5	1	3	2	4	0	2	2	31
42	Clinton	King Brook-Great Chazy River	39245	0	1	0	1	4	2	0		5	2	3	1	6	0	2	4	31
48	Franklin	Upper Saranac Lake	26715	1	1	0	2	0	5	5		3	4	2	3	2	0	2	0	30
48	Franklin/Ex	Sumner Brook	35389	0	1	0	2	2	3	0		4	2	2	4	4	0	4	2	30
48	Essex	Putnam Creek	39498	0	1	1	3	1	2	0		4	1	2	3	6	0	2	4	30
48	Essex	Spruce Mill Brook	18952	0	1	0	4	1	2	5		3	3	3	0	2	0	4	2	30
52	Washington	Hadlock Pond	12377	0	1	0	3	3	4	0		3	5	1	1	2	0	4	2	29
52	Clinton	Kelly Brook-Saranac River	18804	0	1	0	2	3	1	0		2	3	4	1	4	0	4	4	29
52	Washington	South Bay	13182	0	1	7	4	5	2	0		2	1	1	0	2	0	2	2	29
52	Wrn/Wash	Sabbath Day Point-Lake George	19724	3	3	0	5	4	2	0		1	4	3	0	2	0	2	0	29
52	Essex	Black River	17567	0	1	0	4	1	4	0		4	2	3	2	2	0	4	2	29
52	Clinton	Headwaters Great Chazy River	22805	0	1	0	3	4	4	0		3	4	3	1	2	0	2	2	29
58	Franklin	Lower Saranac Lake-Saranac River	31638	1	1	0	3	1	5	0		4	2	1	2	4	0	2	2	28
58	Washington	Mount Hope Brook-South Bay Creek	15965	0	1	0	4	3	2	5		3	1	1	2	2	0	2	2	28

HUC Rank	County(ies)	HUC Name	HUC Acrage	CAT1 PWL List: Pollutants	CAT2 PWL List: Impairements	CAT3 Lake Seg. Red. Goals	CAT4 Slope	CAT5 Soil Type	CAT6 Waterbody Classification	CAT7 Public Water Supply	CAT8 UNUSED	CAT9 Miles of Tribs	CAT10 Septic Systems	CAT11 Lane Miles	CAT12 ARRA Sites	CAT13 P Loading/ Land Use	CAT14 P Loading/ Lake Seg.	CAT15 % Impervious Surfaces	CAT16 % Row Crop	Total Score
			PTS	1 - 5	0 - 5	1 - 10	1 - 5	1 - 5	1 - 5	0 or 5		1- 5	1- 5	1 - 5	1- 5	2 - 10	0 or 5	2 - 10	2 - 10	max 95
60	Washington	Wells Brook-Mettawee River	652	1	2	0	2	2	1	0		1	1	1	0	2	0	10	4	27
60	Clinton	Headwaters Salmon River	28694	1	1	0	3	3	2	0		4	2	3	0	4	0	2	2	27
62	Essex	Ray Brook	10091	0	1	0	4	1	2	5		2	2	3	0	2	0	4	0	26
62	Frank/Clinton	Middle North Branch Saranac River	28626	1	1	0	3	2	3	0		4	2	1	5	2	0	2	0	26
62	Washington	Mill Brook	7410	0	1	1	4	5	1	0		1	1	3	1	2	0	4	2	26
62	Clinton	North Branch Great Chazy River	23306	0	1	0	1	4	2	0		3	2	3	0	4	0	2	4	26
66	Washington	Mud Brook-Poultney River	2316	3	3	0	3	4	1	0		1	1	1	0	2	0	4	2	25
66	Clinton	Black Brook	20122	1	2	0	3	3	2	0		2	2	2	2	2	0	2	2	25
66	Clinton/Frank	Lower North Branch Saranac River	18715	1	1	0	2	2	2	0		3	2	3	3	2	0	2	2	25
66	Clinton	Silver Lake-Saranac River	15339	1	1	0	3	4	2	0		2	2	1	3	2	0	2	2	25
66	Clinton	Headwaters Little Ausable River	16408	1	1	0	3	3	1	0		2	1	4	3	2	0	2	2	25
71	Clinton/Ex	Lower West Branch Ausable River	20806	1	2	0	4	1	2	0		3	2	2	1	2	0	2	2	24
71	Warren	Northwest Bay Brook	19742	1	1	0	4	3	4	0		3	1	3	0	2	0	2	0	24
73	Essex	Johns Brook	12561	0	1	0	5	2	3	0		2	1	1	2	2	0	2	2	23
73	Franklin	Alder Brook	15780	1	1	0	3	4	1	0		2	1	2	4	2	0	2	0	23
73	Clinton	True Brook	14333	0	1	0	4	2	1	0		2	1	3	3	2	0	2	2	23
76	Clinton	Outlet Taylor Pond	11798	1	2	0	4	3	1	0		2	1	1	1	2	0	2	2	22
76	Franklin/Ex	Cold Brook	12575	0	1	0	4	3	4	0		3	1	2	0	2	0	2	0	22
78	Franklin	Upper North Branch Saranac River	18211	0	1	0	2	0	3	0		3	3	1	2	2	0	2	2	21
79	Franklin	Fish Creek Ponds	21681	0	1	0	2	0	5	0		3	3	1	1	2	0	2	0	20



NYS Department of State Local Waterfront Revitalization Grant

MARCH 2018