

FINAL



November 2020

Executive Summary

St. Lawrence River Watershed Revitalization Plan



EcoLogic



This plan 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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St. Lawrence River Watershed Revitalization Plan Executive Summary

Prepared for

Franklin County Soil & Water Conservation District
151 Finney Blvd.
Malone NY 12953

Prepared by

EcoLogic, LLC
9 Albany St., Suite 3J
Cazenovia, NY 13035

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ABBREVIATIONS

LWRP	Local Waterfront Revitalization Program
NYSDOS	New York State Department of State
PWL	Priority Waterbodies List
SLRWP	St Lawrence River Watershed Project
SPDES	State Pollution Discharge Elimination System
SWCD	Soil and Water Conservation District
WAC	Watershed Advisory Committee
WRP	Watershed Revitalization Plan

1 Purpose of the Plan

The St. Lawrence River Watershed Revitalization Plan was developed using the NYS Department of State's Local Waterfront Revitalization Program (LWRP) framework. This framework guides communities through a four-step process to (1) document current conditions and trends, (2) engage the community to articulate their vision and goals for the future, (3) identify challenges and opportunities in resource management and community development, and (4) define specific recommended actions to achieve the desired future.

The LWRP approach applies ecosystem-based management principles to implement smart and sustainable growth in communities, maintain agriculture and working landscapes, and prepare for impacts of changing climate. A Watershed Revitalization Plan (WRP) provides a roadmap for communities to make progress toward a desired future through **projects** (e.g., infrastructure improvements, lake restoration initiatives), **practices** (e.g., improved management of land and water resources) and **partnerships**

(e.g., citizen science, community outreach, and ongoing collaborations). Because most land use decisions are made at the local level, the WRP also provides a basis for municipalities to consider appropriate changes to laws addressing the interaction of development and resource management. WRP also provides a basis for municipalities to consider appropriate changes.



Aerial view of Potsdam, NY.
Source: UVM Blogs

1.1 Planning Process and Partners

The St. Lawrence River Watershed Project (SLRWP) was created through a partnership among the Soil & Water Conservation Districts of Franklin, St. Lawrence, Jefferson, Lewis, Herkimer, Hamilton, western Essex, and Clinton Counties to focus on protection and restoration of the north county region. Soil & Water Conservation District leaders have been joined by representatives of other organizations within the St. Lawrence Watershed to complete the Watershed Revitalization Plan. With completion of the Plan, the 5,600 square mile region of NY's north county joins other large drainage basins including the Mohawk, Upper Susquehanna, and Hudson River Basins, in having an organized coalition to guide resource management for the benefit of their communities.

The planning team was supported by members of the St. Lawrence River Watershed Advisory Committee (WAC) as they compiled data, surveyed residents about their vision of a desirable future, gathered ideas for projects, and developed a process to set priorities. Members of the WAC included representatives of state, county, tribal, and municipal government agencies, educational institutions, and non-governmental and community-based organizations serving the St. Lawrence River watershed area. The WAC met regularly to review work products and provide input and guidance on effective outreach efforts across the large study area.

Public participation efforts were guided by a *Community Outreach Plan* which identified key individuals, organizations, and entities with interests in the future of the St. Lawrence River watershed and its waterfront assets. Outreach efforts included public workshops, and meetings designed to elicit insights regarding community goals, seek stakeholder input about concerns and priorities, and engage residents in discussion of recommended actions and priorities. Other outreach methods included project fact sheets, online/paper surveys, and a project web site. Responses from the public survey can be found in **Appendix A: Survey and Responses**.

1.2 Vision & Goals

As a result of stakeholder input, the St. Lawrence River Watershed Revitalization Plan is guided by a vision for the future in which:

The St. Lawrence River watershed is a sustainable source of clean water, recreation, renewable energy, transportation, and timber and food production.

Based on community input, the planning team and WAC embraced the following goals to complement the vision:

- Protect and enhance habitats of native plants and animals
- Adapt to a changing climate
- Ensure that communities retain their essential character while providing economic opportunity
- Resolve issues of legacy contamination and atmospheric deposition

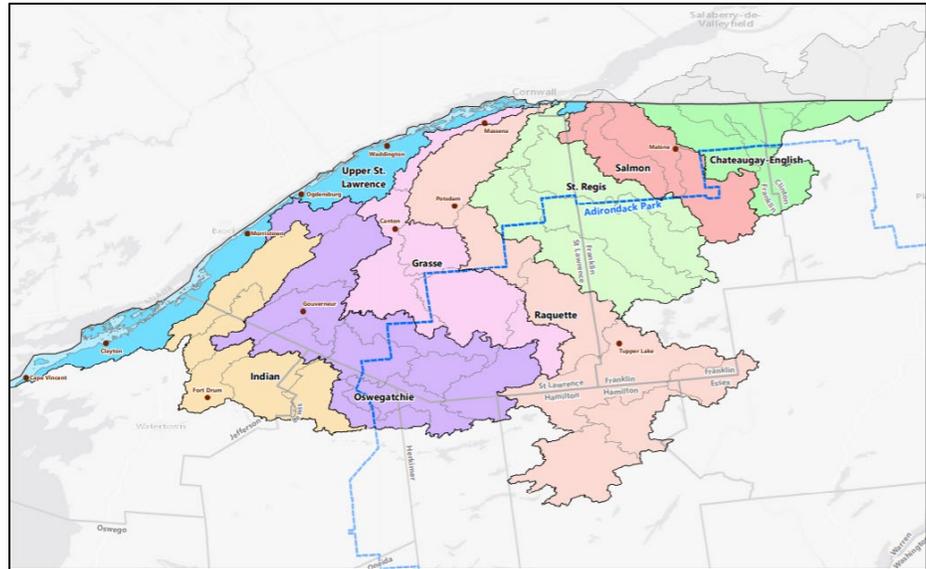


Aerial view of Clayton Harbor.
Photo source: marinas.com

- Increase awareness of how human actions affect the ecosystem
- Prepare for emerging issues and threats

2 Nature of the St. Lawrence River Watershed

A watershed includes the land area that channels rainfall and snowmelt through creeks, streams, and rivers to a defined outflow point. The St. Lawrence River watershed is one of the largest drainage basins within New York State and serves as the gateway between the North Atlantic and the Great Lakes. The WRP study area encompasses



The St. Lawrence River watershed in upstate NY. The eight HUC8 watersheds are highlighted in different colors.

5,600 square miles within northern New York which includes 12,030 miles of freshwater rivers and streams. As the first step in the planning process, the project team compiled a **St. Lawrence River Watershed Characterization Report** to describe current conditions of both the natural and built environment. Key findings related to the Plan development are summarized in this section.

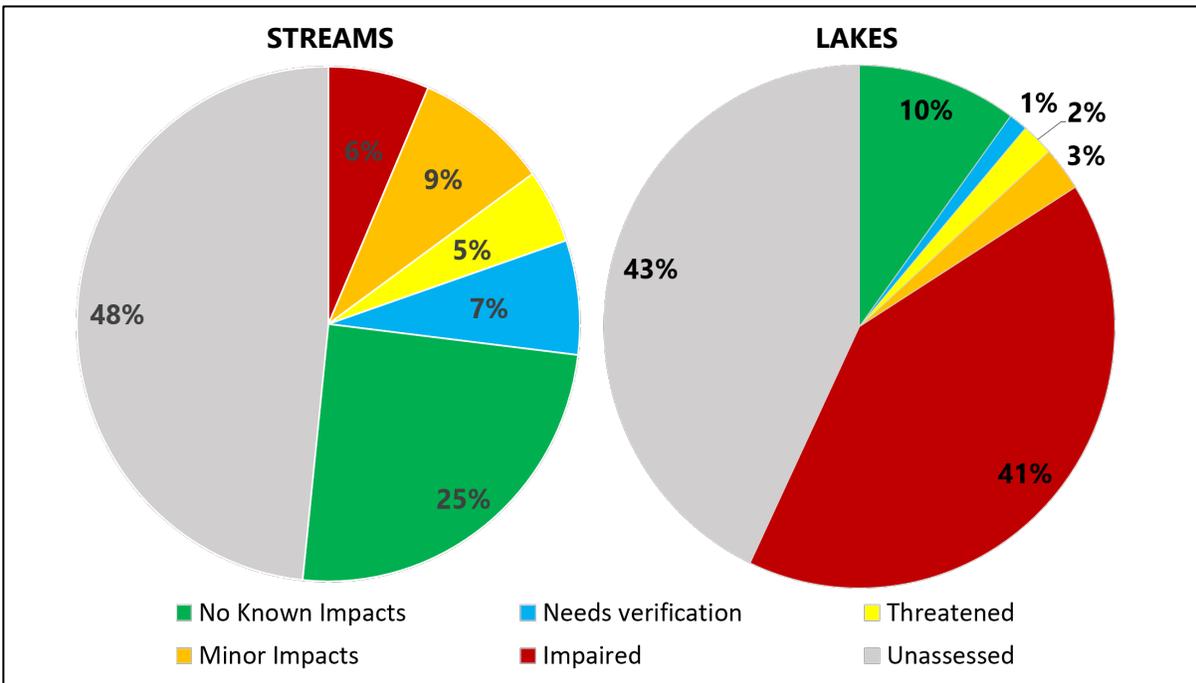
2.1 Environmental Setting

Land cover in the watershed is generally comprised of densely forested woodlands with large peatland complexes in the south along the slopes of the Adirondack Mountains; and more flat, agricultural plains along the St. Lawrence within the northern portion of the watershed. Much of the southern and eastern portion of the watershed (about 44%) falls within the boundaries of the state’s Adirondack Park.

The southern portion of the watershed is predominantly classified as Wild, Conservation, Forest, & Parks. Agriculture is a leading industry and land use in the northernmost region along the St. Lawrence River floodplain; the fertile soils and gentle topography are well-suited for farming. The watershed is one of the most sparsely populated watersheds within New York State with residential, commercial, and industrial development present around Massena, Malone, Ogdensburg, Canton, Gouverneur, Clayton, and Alexandria Bay.

2.2 Environmental Stresses

While most people associate the Adirondacks and northern New York as relatively undeveloped and pristine, the St. Lawrence River watershed still faces problems with water quality. The New York State Priority Waterbodies List (PWL) has assessed approximately half of the stream miles and lake acres within the watershed, with the other half unassessed. This is partly due to the great density of water resources in the region as well as the lack of sufficient data to properly provide an assessment.



PWL status of St. Lawrence River watershed waterbodies.
Source: NYSDEC WI/PWL 2016

Water quality and habitat within the St. Lawrence River watershed are primarily challenged by nonpoint sources of pollution (mercury and acid deposition, nutrients, sediment, road salt) and issues such as water level and floodplain management, adaptation to climate change, invasive species, and an emerging need to meet human demands for energy and recreation. Nonpoint source pollution is typically sourced from runoff which collects pollutants from the landscape as it flows downslope into lakes, rivers, wetlands, and groundwaters. The most frequently cited sources of stream impairment include agriculture, improper waste disposal and contaminated sediment, on-site septic systems, and stormwater. Lakes are primarily impaired by atmospheric deposition, contaminated sediment, on-site septic systems, and nearby agricultural activities. Road salt pollution is a growing concern in the watershed with evidence showing

Pollutant transport can be minimized by these sources through implementation of best management practices, which aims to increase infiltration, slow runoff, and capture pollutants such as sediment,

nutrients, and pathogens as they traverse the landscape. Stormwater runoff and snowmelt also carry deicing salts applied on roadways to nearby streams and potable groundwater sources, which poses a risk to human health and threatens habitats. Storage of deicing compounds is currently unregulated, and many municipalities in the north country have inadequate storage facilities; this allows deicing compounds to be exposed to the elements and transported off site.

Point sources are regulated under the State Pollution Discharge Elimination System (SPDES). Permitted discharges within the St. Lawrence River watershed include municipal and industrial wastewater treatment plants (95), combined sewer overflows (33), municipal and industrial storm sewer outfalls (10), and concentrated animal feeding operations (72). In addition to these current permitted discharges, certain areas of the watershed have been affected by legacy industrial operations that resulted in contamination of sediments and waterways.

Many shoreline communities have faced periodic flooding during spring and early summer where snowmelt and heavy rainfall events can quickly overwhelm hydrologic systems. In response to the extended pattern of flooding along the shores of Lake Ontario and the St. Lawrence River, Governor Andrew M. Cuomo created the Resiliency & Economic Development Initiative (REDI) to increase resilience of shoreline communities and bolster economic development

Invasive species challenge this area of the north country, due to the St. Lawrence Seaway as well as its high recreational value. Invasive species presence can quickly alter community dynamics, decrease biodiversity, and threaten native wildlife. Many regionally significant lakes are vulnerable to excessive growth of aquatic invasive species such as Eurasian watermilfoil, variable leaf milfoil, and curly-leaf pondweed. Proliferation of these nuisance invasive species affect fishing, swimming, and recreational access.

Water levels in the St. Lawrence River are primarily affected by Lake Ontario outflow through the Moses-Saunders and Long Sault Dams. Managing this water system and balancing the risks to human uses along with the natural and built environment is complex. Flooding affect local economies due to expensive remediation and infrastructure repairs, decreased tourism, and damage to residential and business properties. Rapid runoff resulting from increased precipitation is expected to affect sediment and contaminant transport, impairing waterways, and eroding shorelines. Alterations in flow patterns and consequential sedimentation of low-flow areas can decrease fish spawning and egg viability, biodiversity, and habitat.

Adapting to Climate Change. The 4th National Climate Assessment for the Northeast and Great Lakes Regions predicts a 20% increase in precipitation delivered in heavy rainfall events, an increase in drought events, reduced ice cover on the Great Lakes, and increased invasive species threats and vulnerability. Winters are seeing a shift in the proportion of precipitation falling as rain or snow, with fewer days without temperatures below freezing resulting in decreased snow depth, fewer days

without snow on the ground, and multiple snowmelt events each year. Warmer weather and more variable precipitation complicate efforts to manage both the natural and built environments. Heavy rains create hazardous runoff conditions and increase vulnerability to flooding. Higher temperatures, changing precipitation and wind patterns, and increased nutrient-rich runoff exacerbate the risk of eutrophication. Changing precipitation patterns and a warming climate also threaten fish populations by decreasing the levels of dissolved oxygen, increasing water temperature and turbidity, and altering water flow.

2.3 Regulatory Environment

Land use and resource management are governed by multiple levels of policies, procedures, and regulations. The regulatory environment varies widely across this large watershed due to significant variation in local approaches to resource protection. Population centers tend to have greater resources available including planning staff, education and outreach capacity, and enforcement tools. Remote areas may have limited resources to manage water quality challenges. However, the areas within the boundaries of the Adirondack Park are under the regulatory guidance of the Adirondack Park Agency. The APA is responsible for maintaining protection of the forest preserve and regulating development on privately-owned lands. This encompasses shoreline restrictions, tree removal, and protection of river systems and riparian corridors. As part of the Watershed Characterization Report, the planning team surveyed local and programs affecting water quality, see **Appendix B: Local Laws and Programs Affecting Water Quality**.

3 Recommendations

Recommendations have been developed to address a diversity of watershed issues and needs. The **Recommendations & Implementation Strategy** chapter has a detailed description of both general recommendations as well as a matrix of strategies and projects for watershed protection and restoration. The e matrix includes priority projects, actions, target/priority subwatersheds, related strategy/goal, approximate cost, and a timeframe for implementation.

3.1 Defining Priorities

To identify existing and potential water quality issues within the St. Lawrence River watershed, a methodology for scoring subwatersheds was developed to assist in identifying priority areas. The prioritization model includes fourteen indicators that have a direct influence on natural resources. The indicators were grouped into four indices: documented impairments, environmental setting, human impacts, and local capacity for restoration/protection. Each index was assigned a score that incorporated various quantitative indicators (metrics) of watershed health, and each indicator was weighted for overall significance. A cumulative score encompassing all indicators and their weighted significance, can be used to help define priority areas (subwatersheds with the lowest overall scores), while preserving important information regarding the underlying causes for concern. This

assessment was done at the HUC10 level. The indicators, weighting factors, and data sources can be found in the **Subwatershed Assessment** chapter.

3.2 Implementation Strategy for Watershed Revitalization

Recommended actions focus on measures to enhance water quality and the natural environment, while protecting quality of life for residents and aligning with the community's vision for a sustainable future. Recommendations to advance the watershed community's vision for the future were grouped into three broad strategies: (1) *restoration and protection actions* to minimize adverse impacts of human activities on lands and waters, protect and restore natural hydrology, reduce erosion and sedimentation, minimize pollution, and protect and restore habitats; (2) *collaborations, partnerships and outreach* to maximize effectiveness of actions and build local support; and (3) *municipal and programmatic actions* which outlines opportunities for local officials to strengthen communities and environmental protections. promote sustainability and reduce risk of flood damage through appropriate local land use policies.

At present, recommended projects focus on *restoration and protection strategies* to revitalize the watershed and are more subwatershed specific. Although all of these recommendations are intended to be implemented to improve conditions throughout the watershed, the reality is that implementation involves significant resources in terms of time, funding, staff, and support in order to be implemented. Therefore, subwatershed specific tables highlighting the most significant issues in the watershed are provided to suggest focus areas for each HUC10 to prioritize implementation of the general recommendations. General recommendations are grouped into eight broad categories to reflect the unique conditions influencing factors such as water quality, hydrology, flooding, and diverse uses of each watershed. Strategies for each category are listed below. Each of these strategies are addressed through a set of detailed recommendations for actions and practices that address current conditions and support goals of the watershed.

Agricultural Practices and Management

- Implement erosion control practices that reduce nutrient and sediment transport by increasing the soil's infiltration capacity, decreasing the volume of surface runoff, and slowing surface runoff
- Incorporate adequate manure storage and pasture management
- Increase voluntary engagement with the Agricultural Environmental Management program through local Soil and Water Conservation Districts
- Build rapport with community on farming practices, needs, and issues affecting the watershed

Floodplain and Stormwater Management

- Implement stormwater management techniques that slow, spread, and infiltrate runoff
- Protect existing buildings, facilities, and people in vulnerable areas and reduce future flooding risk
- Conserve land and discourage development in vulnerable areas

Forest Management

- Ensure continued viability of forestry and timber production
- Protect water quality by utilizing BMPs during timber production
- Minimize forest fragmentation

Invasive Species Management

- Prevent establishment through early detection and monitoring
- Manage established infestations
- Provide outreach opportunities to the public and visitors to the watershed on existing invasive species and their impact on the watershed
- Foster collaboration and provide support to organizations and stakeholders involved in invasive species management

Infrastructure and Development

- Implement best management practices to reduce impacts from stormwater and prevent erosion
- Work with municipalities to identify gaps in local laws and programs relevant to reducing nonpoint source pollution
- Reduce impacts of de-icing practices
- Prepare infrastructure and environment for a changing climate

Water and Wastewater Management

- Address combined sewer overflows
- Address on-site septic systems
- Prepare infrastructure to meet climate change needs and flooding
- Protect drinking water source waters

Water Quality Research & Monitoring

- Monitor trends in water quality
- Encourage citizen engagement and participation in citizen science programs
- Support research to inform future watershed management =

Watershed Planning, Management, & Outreach

- Identify effective collaborations and funding sources to implement recommendations
- Develop mechanisms to track and evaluate implementation efforts

- Engage stakeholders and the public to foster appreciation for watershed resources and support for the plan

New York State is a home-rule state, meaning that community growth, planning and development is vested within local cities, towns, and villages. Watershed boundaries and management do not follow political boundaries, and therefore it is difficult to align multiple local governments to implement recommendations and strategies to improve water quality. However, the role of local government and leadership in watershed protection cannot be overemphasized. Therefore, the remaining recommendations focus on providing the partnerships and local infrastructure to support, fund, and increase implementation of this Plan. Various agencies and organizations exist within the watershed with programs that address water quality, environmental education, habitat protection, and restoration activities, and it is important to provide the opportunity for these players to combine technical and financial resources to maximize effectiveness and implementation of this Plan. Partnerships and outreach should focus on networking amongst watershed stakeholders, providing technical expertise to communities and landowners in their planning and stewardship efforts, and educating relevant budget committees and local/elected officials on water quality issues. Municipalities should coordinate with each other, relevant agencies, and their regional planning organizations to implement projects to improve watershed conditions, incorporate effective water quality protection strategies into local regulatory structure, and support departments and staff responsible for implementing projects and leading collaboration and education efforts conducive to this Plan.

4 Ongoing Implementation

4.1 Implementation and Monitoring

Recommended projects were gathered with input from the Watershed Advisory Committee and watershed stakeholders; a full inventory of recommendations is provided in **Appendix D: Implementation Strategy and Project Matrix**. The projects are grouped by category (i.e., agricultural management, floodplain, and stormwater management, etc.). Each project identifies relevant HUC10 subwatershed(s), strategy/goal, potential partners, approximate cost, and implementation timeframe.



Adirondack Watershed Institute members conducting routine stream monitoring.

To manage ongoing implementation, the St. Lawrence River Watershed Project (SLRWP) will establish a Steering Team comprised of representatives of the watershed’s Soil and Water Conservation Districts, regional and county planning departments, NYSDOS and NYSDEC representatives, and state and local stakeholders as appropriate. The Steering Committee will be responsible for establishing key focus groups which will be used to prioritize issues within the watershed and harness local expertise. These groups will include local watershed experts on the respective issue at hand and be responsible for the development of annual work plans.

In addition to the identified projects outlined within **Recommendations and Implementation Strategy** chapter; other projects will certainly be added in the future as the Plan is implemented. Future actions should be prioritized and implemented in a way that carries out the vision for the future and supports the goals of the watershed. Therefore, the St. Lawrence River Watershed Revitalization Plan will remain a “living document”, adaptive to the conditions in the watershed.

4.2 Tracking Implementation

Tracking progress of implementation efforts and watershed conditions is essential to watershed management. Periodic reviews allow managers to document progress and adjust to changing water resource issues. The SLRWP Steering Committee will be responsible for tracking the ongoing implementation of watershed projects and other actions to restore and protect the watershed. Implementation activities will be tracked and monitored using a ‘Tracking Template’ that includes details such as action, project HUC10, goal, responsible party, funding sources, estimated cost, and project status/progress. When applicable, efforts should be made to incorporate in-water or land-based metrics that are quantifiable and directly related to the management goal. This effort should be made in coordination with other sampling and data collection efforts to build upon and enhance existing datasets.

5 Get Involved

All of us live, work, and play in a watershed. Everything we do on the land impacts the quality of water on which we rely for drinking, irrigation, and industry. Therefore, community involvement and public support is a vital component to successfully implementing this plan. So, get involved; attend public meetings, volunteer with local organizations on watershed projects, educate your kids and neighbors on water quality issues.

Local watershed residents should be on the lookout for progress reports and updates on the St. Lawrence River Watershed Project webpage. On the tenth anniversary of this Plan, SLRWP aims to provide an update on Plan implementation, current conditions, and future goals for the watershed.

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St. Lawrence River Watershed Characterization Report



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Sensitive Areas

ABBREVIATIONS

APA	Adirondack Park Agency
APIPP	Adirondack Park Invasive Plant Program
CAFO	Concentrated Animal Feeding Operation
CAIR	Clean Air Interstate Rule
CCE	Cornell Cooperative Extension
CEC	Contaminant of Emerging Concern
CSO	Combined sewer overflow
DANC	Development Authority of the North Country
FEMA	Federal Emergency Management Agency
FCSWCD	Franklin County Soil & Water Conservation District
GLAM	Great Lakes-St. Lawrence River Adaptive Management
HUC	Hydrologic Unit Code
IJC	International Joint Commission
LCLGRPB	Lake Champlain-Lake George Regional Planning Board
MGD	Million Gallons per Day
NASS	National Agricultural Statistics Service
NFHP	National Fish Habitat Partnership
NO _x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NYSDAM	New York State Department of Agriculture & Markets
NYSDEC	New York State Department of Environmental Conservation
NYNHP	New York Natural Heritage Program
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Labor
NYPA	New York Power Authority
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation
OPRHP	Office of Parks, Recreation, & Historic Preservation
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
POTW	Publicly Owned Treatment Works
PRISM	Partnership for Regional Invasive Species Management
PWL	Priority Waterbodies List
REDI	Resiliency & Economic Development Initiative
SLELO	St. Lawrence-Eastern Lake Ontario
SLRWP	St. Lawrence River Watershed Project, Inc.
SO ₂	Sulfur Dioxide
SRMT	St. Regis Mohawk Tribe
SPDES	State Pollution Discharge Elimination System
SUNY	State University of New York
SWCD	Soil and Water Conservation District

TMDL	Total Maximum Daily Load
USACOE	US Army Corp of Engineers
USDA	US Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	US Fish & Wildlife Service
USGS	US Geological Survey
VOCs	Volatile Organic Carbons
WAC	Watershed Advisory Committee
WI	Waterbody Inventory
WRP	Watershed Revitalization Plan
WWTP	Wastewater Treatment Plant

1 Introduction

The St. Lawrence River watershed is the largest drainage basin in New York State, encompassing 5,600 square miles in northern New York (**Map 1**). In 2018, the St. Lawrence River Watershed Project (SLRWP) Inc. and the Franklin County Soil & Water Conservation District (FCSWCD) launched a watershed planning effort with funds from the New York State Department of State (NYSDOS) Local Waterfront Revitalization Program. This Watershed Characterization Report has been developed as a component of the St. Lawrence River Watershed Revitalization Plan (WRP), scheduled for completion in 2020.

The St. Lawrence River Watershed Revitalization Plan will address a series of questions:

1. *Where are we now?* That is, what is the current status of the natural, cultural, and political environment within the watershed? What are the assets, existing problems, and emerging threats and opportunities?
2. *Where are we going?* What processes and programs are in place that will affect the future of the watershed?
3. *Where do we want to be?* What is the community's vision for the future of the watershed? What desirable conditions or attributes of the watershed should be enhanced, and what undesirable conditions should be minimized or eliminated?
4. *How do we get there?* What strategic actions will enable the community to achieve the goals and vision? What specific practices and projects will help restore and protect the watershed and how can funds be leveraged?
5. *When will we get there?* When will the recommended projects be advanced, and how will the priority actions be decided?
6. *How do we measure progress?* What is the plan for tracking improvement and deciding what else needs to be done?

This Watershed Characterization Report documents current conditions and trends in the watershed, providing data and information needed to address the first two questions above. Water quality is linked to conditions throughout the watershed, including its landscape (geography, soils, hydrology, habitat, and climate), land use (settlement patterns, impervious surfaces, industry and agriculture centers, and waste management practices), and conditions that alter the natural state of the land. This characterization of the environmental conditions and human activities that affect the St. Lawrence River watershed will provide a basis for recommending long-term protection and restoration strategies for the watershed.

2 Overview of the Watershed

A watershed is the land that drains, or sheds, its water to a defined receiving water, such as a wetland, river, lake, coastal embayment, or ocean. The St. Lawrence River serves as the natural outlet for the Great Lakes to the Atlantic Ocean via the St. Lawrence River and Seaway. The St. Lawrence River ultimately receives runoff that originated across nearly 300,000 square miles; the watershed encompasses all the lands draining to the Great Lakes and flowing from Lake Ontario as well as the northern and western Adirondack Mountains. The river is part of the international boundary between the United States and Canada, and its shoreline abuts the Canadian provinces of Ontario and Quebec as well as northern New York.

The focus of this report is the portion of the St. Lawrence River watershed that lies within northern New York State. This study area encompasses 5,600 square miles within the state's borders and spans eight counties, including all of St. Lawrence County, most of Franklin County, much of northern Jefferson, Lewis, Herkimer, and Hamilton counties, and small areas of western Essex and Clinton Counties. In addition to 185 miles of St. Lawrence River shoreline, New York's St. Lawrence River watershed includes 12,030 miles of freshwater rivers and streams.

Land cover in the basin is comprised of densely forested woodlands with large peatland complexes in the southern portion of the basin along the slopes of the Adirondack Mountains; and more flat, agricultural plains along the St. Lawrence at the northern side of the basin. Developed and industrial areas include Massena, Malone, Ogdensburg, Canton, Gouverneur, Clayton, and Alexandria Bay.

Much of the southern and eastern portions of the watershed lie within the Adirondack Park, designated by the blue dotted line in Map 1. The Adirondack Park Agency oversees this area to "insure optimum overall conservation, protection, preservation, development and use of the unique scenic, aesthetic, wildlife, recreational, open space, historic, ecological and natural resources of the Adirondack Park" (APA Act, 2018).

2.1 Evolution and Current Configuration of the Basin

Melting ice, glacial debris, and changing glacial topography contributed to the formation of the St. Lawrence River basin. A quarter of a million years ago, a glacier advanced southward into the Adirondack region, creeping over hills and scraping up soil and rock from the land. Ice dams formed in river valleys due to the glacial debris, dotting the landscape with hundreds of lakes and ponds as the glacier began to melt and recede. Taking the path of least resistance, northwestern Adirondack waters drained into the St. Lawrence River, which developed approximately 10,000 years ago as a result of the rebounding continent from the Last Glacial Maximum, the Wisconsin Glaciation. The Wisconsin ice reached a thickness of more than 2 miles at its maximum extent. The glacier scoured the land depositing various thicknesses of till, significantly modifying the surface hydrology, slope, and terrain. During its final retreat, ice blocked the St. Lawrence valley causing water to flood the

Lake Ontario basin at its southeastern outlet creating Glacial Lake Iroquois, about 18 miles northeast of present-day Albany. As the 2 km of ice over the St. Lawrence Valley retreated, present day Lake Ontario drained into the St. Lawrence River on its course to the Atlantic Ocean. The eastern end of Lake Ontario and the St. Lawrence Valley continue their slow rebound (currently at a rate of 12 inches per century) from the weight of the massive ice sheet (Manninen and Gauthier, 1999). The gradual change in topography is altering the landscape and changing the slope of the river channel.

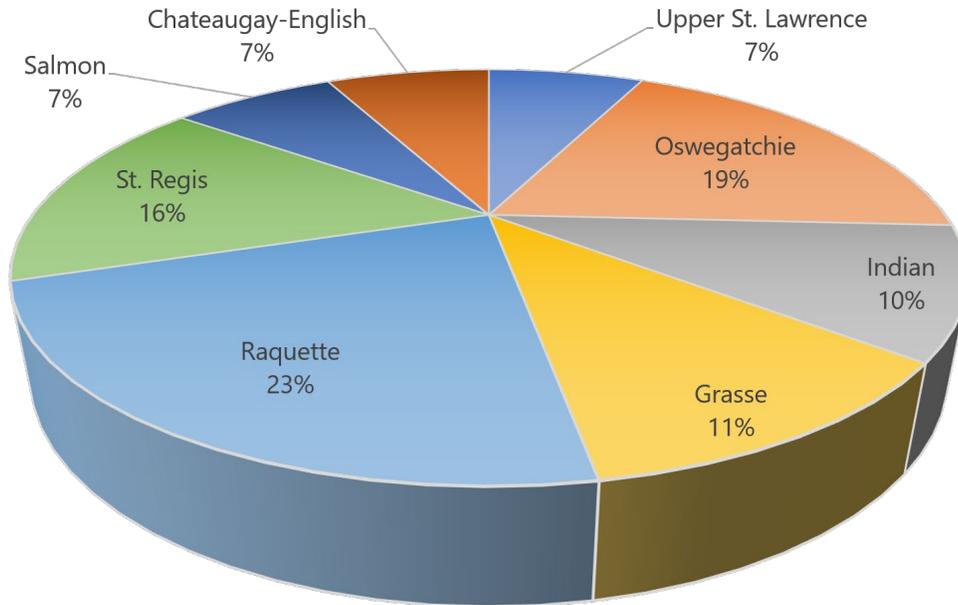
Today, New York's St. Lawrence River watershed extends from the northern and western slopes of the Adirondack Mountains at the southern end of the basin, to the plains along the St. Lawrence at the northern end of the basin. The river's headwaters are as far west as the northeast edge of Lake Ontario (cutting southeast between Watertown and Fort Drum) and as far east as Clinton and Essex Counties.

2.2 Subwatersheds

Watersheds are subdivided into smaller units that collectively contribute groundwater and surface water to larger watersheds or subbasins. Hydrologic units are used to create a baseline drainage boundary framework to account for all land and surface areas. Water basins in the United States are divided into hydrologic units identified by a unique hydrologic unit code (HUC) consisting of four to twelve digits based on six levels of classification: region (2-digit, HUC2), subregion (4-digit, or HUC4), accounting unit (6-digit, HUC6), cataloguing unit (8-digit, or HUC8), watershed (10-digit, or HUC10), and subwatershed (12-digit, or HUC12).

The St. Lawrence River is comprised of nine HUC8s, 43 HUC10 watersheds, and 180 HUC12 subwatersheds. In 2016, the US Geological Survey's (USGS) Watershed Boundary Dataset (WBD) retired the Upper St. Lawrence cataloguing unit (04150301) and subdivided it into the Headwaters St. Lawrence (04150309) and Raisin River-St. Lawrence River (04150310) (**Map 2**). However, much of the data cited and presented here was collected prior to this update and will be referenced as the Upper St. Lawrence subbasin (04150301). HUC8 codes were used to characterize and assess the areas within the St. Lawrence River watershed to better address the various environments, limitations, and needs of its respective area. **Figure 1** displays the percent of land area of the entire watershed contributed by each of the HUC8 watersheds. **Table 1** lists the HUC12 codes, waterbody names, and land areas, as well as the percent contribution of each HUC12 to their associated HUC8 subregion. Each individual HUC8 watershed and the contributing HUC12 subwatersheds are mapped. Progressing from east to west, **Map 3** displays the Upper St. Lawrence River; **Map 4** displays the Oswegatchie River; **Map 5** displays the Indian River; **Map 6** displays the Grasse River; **Map 7** displays the Raquette River; **Map 8** displays the St. Regis River; **Map 9** displays the Salmon River; and **Map 10** displays the Chateaugay-English River.

**Figure 1
HUC8 Areas, St. Lawrence River Watershed**



Source: 2011 CDL-NLCD Hybrid Land Cover dataset.

**Table 1
Hydrologic Units and Area within the St. Lawrence River Watershed**

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8
Upper St. Lawrence (04150301)	041503010101	French Creek	28.1	7.2
	041503010102	Wheeler Creek-Frontal Saint Lawrence River	35.9	9.2
	041503010103	Mullet Creek	26.1	6.7
	041503010104	Cranberry Creek-Frontal Saint Lawrence River	35.2	9.0
	041503010105	Crooked Creek-Cranberry Creek-Frontal Saint Lawrence River	20.1	5.1
	041503010106	Chippewa Creek	38.6	9.9
	041503010107	City of Morristown-Frontal Saint Lawrence River	31.1	7.9
	041503010201	Tibbits Creek	17.7	4.5
	041503010202	Whitehouse Bay-Frontal Saint Lawrence River	29.0	7.4

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8
	041503010203	Little Sucker Brook-Sucker Brook	46.2	11.8
	041503010204	Brandy Brook	36.3	9.3
	041503010205	Coles Creek-Frontal Saint Lawrence River	22.1	5.6
	041503010301	Dodge Creek-Frontal Saint Lawrence River	23.2	5.9
	041503010302	Raquette Creek-Frontal Saint Lawrence River	2.3	0.6
		SUBTOTAL- Upper St. Lawrence	391.9	
Oswegatchie (04150302)	041503020101	Robinson River-Oswegatchie River	48.3	4.6
	041503020102	Buck Brook-Oswegatchie River	26.5	2.5
	041503020103	Cranberry Lake-Oswegatchie River	67.6	6.4
	041503020201	Tamarack Creek	14.5	1.4
	041503020202	Upper Little River	31.9	3.0
	041503020203	Lower Little River	27.5	2.6
	041503020301	Sand Lake Outlet-Middle Branch Oswegatchie River	26.2	2.5
	041503020302	Wolf Creek-Middle Branch Oswegatchie River	48.7	4.6
	041503020303	Fish Creek	17.4	1.7
	041503020304	Browns Creek-Middle Branch Oswegatchie River	23.3	2.2
	041503020401	Headwaters West Branch Oswegatchie River	25.8	2.5
	041503020402	Blanchard Creek-West Branch Oswegatchie River	41.2	3.9
	041503020501	Jenny Creek	17.2	1.6
	041503020502	Big Creek	35.3	3.4
	041503020503	Meadow Brook-West Branch Oswegatchie River	21.2	2.0
	041503020504	West Branch Oswegatchie River	37.5	3.6
	041503020601	Peavine Creek-Oswegatchie River	46.7	4.5
	041503020602	Stammer Creek	21.5	2.0
	041503020603	Welch Creek-Oswegatchie River	30.5	2.9
	041503020604	Pork Creek-Oswegatchie River	16.2	1.5
041503020701	Sawyer Creek	31.5	3.0	
041503020702	Hawkins Creek-Matoon Creek	32.3	3.1	
041503020801	Turnpike Creek-Oswegatchie River	29.0	2.8	

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8
	041503020802	Malterna Creek-Oswegatchie River	33.7	3.2
	041503020803	Boland Creek	33.9	3.2
	041503020804	Vrooman Creek-Oswegatchie River	45.0	4.3
	041503020901	Anderson Creek-Oswegatchie River	31.1	3.0
	041503020902	Indian Creek	38.6	3.7
	041503020903	Beaver Creek	47.3	4.5
	041503020904	Barter Creek-Oswegatchie River	29.8	2.8
	041503021001	Town of Flackville-Lisbon Creek	23.9	2.3
	041503021002	Village of Heuvelton-Oswegatchie River	17.9	1.7
	041503021003	Oswegatchie River	30.8	2.9
			SUBTOTAL- Oswegatchie	1050.1
Indian (04150303)	041503030101	Weatherhead Creek-Indian River	37.9	6.7
	041503030102	Bonaparte Creek	23.0	4.1
	041503030103	Blanchard Creek-Indian River	34.0	6.0
	041503030201	Rockwell Creek-Indian River	51.3	9.1
	041503030202	West Branch Black Creek	23.4	4.2
	041503030203	Buck Creek-Black Creek	22.8	4.1
	041503030204	Beaver Meadows Creek-Black Creek	16.1	2.9
	041503030205	Hunter Creek-Indian River	21.6	3.8
	041503030301	West Creek	31.8	5.7
	041503030302	Otter Creek	24.4	4.3
	041503030303	Trout Brook-Indian River	28.9	5.1
	041503030401	Soapstone Creek-Indian River	19.7	3.5
	041503030402	Muskellunge Lake-Indian River	23.9	4.2
	041503030403	Bostwick Creek-Indian River	30.9	5.5
	041503030501	Jewett Creek	19.1	3.4
	041503030502	Butterfield Lake-Black Creek	17.9	3.2
	041503030503	Birch Creek	24.8	4.4
	041503030504	Fish Creek	36.1	6.4
	041503030505	Black Creek-Black Lake	74.9	13.3
		SUBTOTAL-Indian	562.5	
Grasse (04150304)	041503040101	Dead Creek	24.4	3.9
	041503040102	Massawepie Lake-South Branch Grasse River	52.7	8.3

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8	
	041503040201	Pleasant Lake Stream-Middle Branch Grasse River	31.9	5.0	
	041503040202	South Branch Grasse River	62.6	9.9	
	041503040203	North Branch Grasse River	61.2	9.7	
	041503040204	Deerskin Creek-Middle Branch Grasse River	40.3	6.4	
	041503040301	Grannis Brook	35.3	5.6	
	041503040302	Van Rensselaer Creek-Little River	46.7	7.4	
	041503040303	Tracy Brook-Little River	17.7	2.8	
	041503040401	Tanner Creek	38.1	6.0	
	041503040402	Elm Creek	41.1	6.5	
	041503040403	Plumb Brook-Grasse River	60.9	9.6	
	041503040404	Nettle Creek	16.4	2.6	
	041503040405	Line Creek	17.6	2.8	
	041503040406	Harrison Creek-Grasse River	29.1	4.6	
	041503040501	Town of Madrid-Grasse River	27.8	4.4	
	041503040502	McConnell Creek-Grasse River	29.2	4.6	
			SUBTOTAL-Grasse	633.0	
	Raquette (04150305)	041503050101	South Inlet	32.6	2.6
041503050102		Marion River	33.3	2.6	
041503050103		Raquette Lake	61.8	4.9	
041503050104		Moose Pond	26.5	2.1	
041503050105		Forked Lake-Raquette River	37.6	3.0	
041503050201		Upper Cold River	40.2	3.2	
041503050202		Ermine Brook-Moose Creek	15.3	1.2	
041503050203		Lower Cold River	30.1	2.4	
041503050301		Salmon River	21.8	1.7	
041503050302		Big Brook	40.4	3.2	
041503050303		Raquette River-Long Lake	53.6	4.3	
041503050401		Moose Creek	19.0	1.5	
041503050402		Stony Creek	31.5	2.5	
041503050403		Palmer Brook-Raquette River	17.6	1.4	
041503050404		Follensby Pond-Raquette River	38.3	3.0	
041503050405		Bog Stream	19.9	1.6	
041503050406		Round Lake Stream	56.1	4.5	
041503050407	Bog River	56.9	4.5		

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8
	041503050408	Wolf Pond	20.6	1.6
	041503050409	Jenkins Brook-Tupper Lake	58.5	4.6
	041503050501	Dead Creek	22.1	1.8
	041503050502	Mountain Brook-Raquette River	35.1	2.8
	041503050503	Willis Brook-Jordan River	19.9	1.6
	041503050504	Potter Brook-Jordan River	28.0	2.2
	041503050505	Ellis Brook-Raquette River	33.8	2.7
	041503050506	Joe Indian Inlet	21.3	1.7
	041503050507	Cold Brook-Raquette River	33.7	2.7
	041503050601	Cold Brook	20.2	1.6
	041503050602	Dead Creek-Raquette River	37.3	3.0
	041503050603	Parkhurst Brook	17.3	1.4
	041503050604	Stafford Brook-Raquette River	47.1	3.7
	041503050701	Upper Trout Brook	30.0	2.4
	041503050702	Lower Trout Brook	36.8	2.9
	041503050703	Village of Potsdam-Raquette River	34.4	2.7
	041503050704	Plum Brook	43.3	3.4
	041503050705	Squeak Brook	38.1	3.0
	041503050706	Hutchins Creek-Raquette River	49.8	4.0
			SUBTOTAL-Raquette	1259.6
St. Regis (04150306)	041503060101	Hays Brook	16.1	1.9
	041503060102	Osgood River	28.2	3.3
	041503060103	Pleasant Brook-East Branch Saint Regis River	55.7	6.5
	041503060201	Windfall Brook-West Branch Saint Regis River	52.7	6.1
	041503060202	Long Pond Outlet	42.7	5.0
	041503060203	Black Brook-West Branch Saint Regis River	24.3	2.8
	041503060204	Stony Brook	26.4	3.1
	041503060205	Alder Meadow Brook-West Branch Saint Regis River	53.5	6.2
	041503060206	Dan Wright Brook-Trout Brook	43.9	5.1
	041503060207	Tucker Brook-West Branch Saint Regis River	26.2	3.0
	041503060301	Mile Brook-Deer River	37.1	4.3
	041503060302	Trout Brook	37.3	4.3

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8	
	041503060303	Kingston Brook-Deer River	58.3	6.8	
	041503060304	Lawrence Brook	35.2	4.1	
	041503060305	Redwater Brook-Deer River	29.0	3.4	
	041503060401	Headwaters Saint Regis River	35.0	4.1	
	041503060402	Quebec Brook-Saint Regis River	32.8	3.8	
	041503060403	Goose Pond Brook-Saint Regis River	55.1	6.4	
	041503060404	Lake Ozonia Outlet	29.0	3.4	
	041503060405	Long Pond-Saint Regis River	19.8	2.3	
	041503060406	Hopkinton Brook	20.5	2.4	
	041503060407	Miller Brook-Saint Regis River	38.1	4.4	
	041503060408	Bell Brook-Saint Regis River	30.6	3.5	
	041503060409	Town of Hogansburg-Saint Regis River	35.5	4.1	
			SUBTOTAL-St. Regis	863.2	
	Salmon (04150307)	041503070101	Hatch Brook	39.9	9.8
041503070102		Ingraham Stream-Salmon River	62.4	15.4	
041503070103		Duane Stream	21.9	5.4	
041503070104		Winslow Brook-Salmon River	36.2	8.9	
041503070201		Headwaters Little Salmon River	15.4	3.8	
041503070202		East Branch Little Salmon River	16.6	4.1	
041503070203		Develin Brook-Little Salmon River	24.1	5.9	
041503070204		Farrington Brook	24.0	5.9	
041503070205		Town of Bombay-Little Salmon River	20.2	5.0	
041503070301		Branch Brook	19.1	4.7	
041503070302		Plum Brook-Salmon River	30.3	7.5	
041503070303		East Branch Deer Creek	24.7	6.1	
041503070304		West Branch Deer Creek	33.4	8.2	
041503070305		Pike Creek	28.0	6.9	
041503070306		Town of Fort Covington-Salmon River	9.4	2.3	
			SUBTOTAL-Salmon	405.6	
Chateaugay- English (04150308)	041503080101	Middle Kiln Brook	30.1	7.3	
	041503080102	Separator Brook	15.0	3.6	
	041503080103	Mountain Pond Stream-Upper Chateaugay Lake	36.1	8.8	
	041503080104	Bailey Brook-Chateaugay River	37.2	9.0	
	041503080201	Marble River	33.3	8.1	

HUC8	HUC12	Name HUC12 Watershed	Area (square miles)	% of HUC8
	041503080202	Hinchinbrook Brook	19.9	4.8
	041503080203	Collins Brook	8.3	2.0
	041503080204	Allen Brook-Chateaugay River	15.4	3.7
	041503080205	Beaver Pond Brook-Chateaugay River	19.2	4.7
	041503080301	Collins Brook-Trout River	57.6	14.0
	041503080302	Little Trout River	40.0	9.7
	041503080303	Briggs Creek	14.7	3.6
	041503080304	Town of Trout River-Trout River	8.9	2.2
	041503080401	Crystal Creek	14.5	3.5
	041503080402	Taylor Brook-English River	26.8	6.5
	041503080403	Allen Brook	5.5	1.3
	041503080404	Kellas Creek-English River	9.9	2.4
	041503080406	Ruisseau Norton	2.7	0.7
	041503080501	Ruisseau Noir	11.2	2.7
	041503080502	Riviere aux Outardes Est	3.2	0.8
	041503080503	Riviere aux Outardes	2.0	0.5
		SUBTOTAL- Chateaugay-English	411.6	
		GRAND TOTAL- St. Lawrence River Watershed Study Area	5,577.7	

SOURCE: 2011 CDL-NLCD Hybrid Land Cover dataset.

2.3 Settlement and Development in the Watershed

The St. Lawrence River basin is home to the Mohawks of the Iroquois Confederation, who call the river *Kaniatarowanenneh*, meaning “big waterway.” Original Mohawk territory extended from Schoharie Creek upriver to East Canada Creek. Today, the St. Regis Mohawk Reservation at Akwesasne covers 19,000 acres on the southern side of US-Canada border in Franklin and St. Lawrence Counties at the confluence of the St. Regis, St. Lawrence, and Raquette rivers. Their territory extends from Massena to Malone and across the St. Lawrence River from Cornwall, Ontario. As of 2016, there are approximately 15,900 members in the Saint Regis Mohawk Tribe (SRMT) (Saint Regis Mohawk Tribe, 2016). The SRMT is the only Mohawk community officially recognized by the United States; the Tribe administers its own environmental, social, policing, economic, health, and educational programs, policies, laws, and regulations. Today, Mohawk people have integrated historical culture, practices, and knowledge from centuries-old ways of living into their everyday lives. Traditional ecological knowledge, a term to describe Indigenous knowledge that has been passed down through generations to explain their place in the natural world, is important to the development and understanding of SRMT environmental management. Due to the Tribe’s historical reliance on natural resources, it is imperative that the environment remains healthy and safe for

continued cultural practices. This knowledge and appreciation for the St. Lawrence River and its connecting water systems is an important element in local and regional management decisions.

The St. Lawrence River valley became a popular settlement location driven by its access to Lake Ontario and its tributaries which provided fishing and hunting opportunities, as well as efficient travel for trade, diplomatic, and military purposes. Settlers of European descent began to flock to upstate New York after the War of 1812, drawn by the “curative” properties of sulfur mineral springs located on the Raquette River, which became the basis of the local economy. During the late 19th century, the Irish and French Canadians built settlements southeast of Massena and along the Franklin and St. Lawrence County border, respectively. Wealth in this region was primarily derived from mining, farming, and logging. Lead, iron, tremolite, zinc, feldspar, talc, and marble were mined from the land, leaving disturbed ground cover, open pits, and ruins. Today, marble, zinc, and tremolite mining is still integral to the towns of Fowler, Pierrepont, and Ogdensburg.

In 1902, the Massena Power Canal was constructed, allowing for an abundant hydroelectric energy supply in the area, which in turn drew more industry to the region (e.g., Pittsburgh Reduction Company, an aluminum producer). In the late 1950s, FDR’s Power Project brought additional low-cost electricity to the area followed by new industries in Massena, such as Reynolds Metals Company and General Motors.

The St. Lawrence Seaway opened in April 1959, allowing transatlantic trade and access for ocean vessels as well as commercial and recreational boaters to the Great Lakes. The Seaway System has been integral not only to local economies but to the US economy as a whole, generating more than \$4.3 billion in personal income, \$3.4 billion in transportation-related business revenue, and \$1.3 billion in federal, state, and local taxes (IJC 2014). In addition to commercial goods, dominant commodities shipped along the St. Lawrence Seaway include iron ore for the steel industry, coal for power generation, and limestone for construction and steel industries.

The waters of the St. Lawrence River watershed have various designated use dependent on their water quality. Some waters are used as a source of drinking water, while others are primarily for recreation and aquatic life. The watershed’s mix of abundant surface water, rugged peaks, rolling hills, expansive wetlands, and flat plains makes it a major destination for scenic viewing, hiking, fishing, kayaking, boating, snowmobiling and other recreational pursuits. Fifty percent of lakes have been identified as having poor water quality (NYSDEC 2016a). This is in part due to atmospheric deposition of pollutants (acid and mercury) originating outside the basin. In addition, the growth of agriculture and industry in the region since the 19th century has also had a lasting adverse impact on water quality in the watershed. In the late 1900s and early 2000s, The Great Lakes Area of Concern at Massena/Akwesasne and Superfund sites were established at Grasse River in Massena, NY (Alcoa, Inc.), the St. Lawrence River in Massena, NY (General Motors), and at Sealand Restoration, Inc. (disposal facility) in Lisbon, NY, where industrial activity had contaminated sediments and

groundwater with polychlorinated biphenyls (PCBs), volatile organic carbons (VOCs), and polycyclic aromatic hydrocarbons (PAHs). Owners of the facilities have taken responsibility for the contamination and are collaborating with Federal and State organizations to remediate legacy pollutants and restore impaired habitats.

Today, citizens of the St. Lawrence River watershed are proactively working toward reducing pollution and revitalizing their community by partnering with organizations and agencies to protect and restore valuable water resources. Taking action to improve and protect water quality will allow communities and economies to thrive and enjoy a sustainable future for years to come.

2.4 Existing Plans and Initiatives Related to Water Resources in the Study Area

Appendix B: Local Laws and Programs Affecting Water Quality, provides an overview of the institutional framework for local laws, programs, and practices affecting water quality in the watershed, as well as an assessment of the ability of local laws and programs to implement best management practices that would protect water quality.

Several federal and state regulatory and advisory programs are already in place to advance watershed planning within the St. Lawrence River watershed. Examples include:

- Great Lakes Focus
 - » Lake Ontario Lakewide Action and Management Plan (2018-2022)
 - » Great Lakes St. Lawrence Seaway Study (2007)
 - » New York’s Great Lakes Basin: Interim Action Agenda (Ongoing effort)
 - » Great Lakes Water Quality Agreement (1972, 1983, 1987, 2012)
 - » Great Lakes Restoration Initiative (2010) and Action Plans (2010, 2014, 2019)
 - » Healthy Fishing Communities Project: Great Lakes Biomonitoring
 - » Resiliency & Economic Development Initiative (2019)
- NY Statewide Plans and Initiatives of Interest
 - » New York State Riparian Opportunity Assessment (January 2018)
 - » New York State Invasive Species Comprehensive Management Plan (Nov 2018)
 - » New York State Wildlife Action Plan (September 2015)
 - » New York State Hazard Mitigation Plan (2018)
 - » Center of Excellence in Healthy Water Solutions
- IJC Climate-Related Plans and Guidance
 - » Lake Ontario – St. Lawrence River Plan (2014)
 - » Climate Change Guidance Framework for IJC Boards, A Highlights Report (2018)
- Akwesasne Climate Change Adaptation Plan (2013)
- Subwatershed Research

- » Watershed Protection of the St. Lawrence – Raquette River Watershed with Special Consideration to Large Wetlands and Large Landownership; Part One: The St. Regis River Basin
- » St. Regis Chain Limnology and Water Quality Report (2017)
- » Blue Mountain Lake Watershed Monitoring Program (2016)
- » Salmon River Watershed Management Plan, Phase I (2016)
- » St. Lawrence River Shoreline Resiliency Study (2020)
- » Adirondack Lake Assessment Program (ALAP)
- Local Watershed Plans and Initiatives
 - » Town and Village of Alexandria Bay LWRP (Draft, 2019)
 - » Town of Cape Vincent (1988, Update in Progress)
 - » Town and Village of Clayton (July 2013)
 - » Town of Essex (2003)
 - » Town and Village of Malone (2012)
 - » Town and Village of Morristown LWRP (1991)
 - » City of Ogdensburg LWRP (1987)
 - » Town and Village of Waddington LWRP (1991)
 - » Canton-Grasse River Waterfront Revitalization Plan (March 2018)
 - » Tupper Lake Local Waterfront Revitalization Strategy
 - » Tupper Lake LWRP (In Progress)
 - » Grasse River Blueway Trail Plan (Draft, 2018)
 - » Town of Indian Lake – Waterfront Access Strategy (Awarded 2018)
 - » Massena Brownfield Opportunity Area Revitalization Plan (2017)
 - » Village of Massena Local Waterfront Revitalization Plan (In Progress)
 - » Randy Preston Road Salt Reduction Legislation (overwhelming approval in State Legislature, awaits Governor Cuomo’s approval as of 10/2020)
- Adirondack Forest Preserve Unit Management Plans
 - » St. Lawrence Foothills (2015)
 - » Cranberry Lake Wild Forest (1984)
 - » Debar Mountain Wild Forest (2017)

The monitoring programs and watershed management plans provide key data and insights to inform the analysis of water quality and the environmental setting. The local watershed management plans, although specific to their locality, also address similar critical issues facing the St. Lawrence River watershed.

In response to an extended pattern of flooding along the shores of Lake Ontario and the St. Lawrence River, in 2019 Governor Andrew Cuomo commissioned the Resiliency & Economic

Development Initiative (REDI) to address the immediate and long-term resiliency needs of these areas while also enhancing economic development opportunities and health of the lake. This multiagency task force is charged with developing a plan to harden infrastructure in flood prone regions along Lake Ontario's waterfront while strengthening the region's local economies, which are heavily dependent on summer tourism. The Commission pledged \$300 million toward projects.

The REDI region encompassed eight counties along shorelines of Lake Ontario and the St. Lawrence River including Jefferson and St. Lawrence counties. Most of the river's shoreline lies within these two counties. While each region has a unique strategic plan and set of goals, there are common themes that relate directly to the priorities and approach of the watershed planning process currently underway:

- commitment to a regional approach to identifying challenges and finding solutions;
- recognition of the need to invest in infrastructure;
- an embrace of smart growth concepts;
- reclamation of waterfront assets for community and economic development;
- recognition of the need to strengthen the effectiveness of government and civic institutions in order to improve the quality of life for all.

In October 2019, Governor Cuomo announced that St. Lawrence and Jefferson Counties would be allotted \$50 million for 38 projects to advance REDI. The REDI Commission allocated \$20 million for homeowner assistance, \$30 million to improve the resiliency of businesses, and \$15 million toward a regional dredging effort to maintain navigation channels in harbors and bays along Lake Ontario and the St. Lawrence River. The remaining balance of \$235 million was allocated across the other six shoreline counties within the REDI region (Oswego, Cayuga, Wayne, Monroe, Niagara, and Orleans) towards local and regional projects that target at-risk assets such as critical water and wastewater infrastructure, public health and safety, and marinas and harbors. Selected projects emphasize incorporating nature-based features and green infrastructure. Projects selected by the REDI commission can be found at <https://www.ny.gov/lake-ontario-flooding/regional-projects-selected-redi-commission#jefferson-and-st-lawrence-counties>.

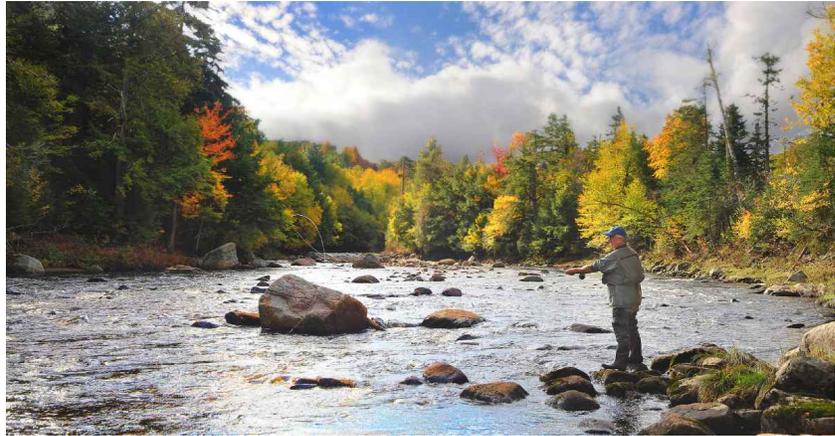
In addition to the REDI initiative, St. Lawrence County, in partnership with the City of Ogdensburg and the Town and Village of Morristown, conducted a study the St. Lawrence River Shoreline Resiliency Study. The goal of the study was to assess ecosystem vulnerability and identify resilience measures to enhance shore resilience along the Upper St. Lawrence River that can be incorporated into local planning for riverfront communities. The study concluded that the project area shoreline is naturally resilient to shoreline erosion and that most critical infrastructure (hospitals, schools, etc.) are located outside of the Proposed Floodplain Protection Overlay District. However, residential and

commercial property are at-risk of flooding and require adaptive mitigation strategies to prove resiliency. The study recommends adopting and/or strengthening floodplain protection regulations, protecting the natural environment and open space to provide flood attenuation services, and performing a detailed assessment of flood-prone tributaries, including critical culverts and bridges.

3 Environmental Setting

3.1 Water Resources

Water resources within the St. Lawrence River watershed support multiple human uses, including recreation, shipping, transportation, infrastructure, tourism, agriculture, and hydroelectric power generation. In addition, the watershed supports many critical ecosystem functions including habitat, carbon sequestration, and moderating the hydrologic cycle.



Fishing in Franklin County
Photo source: saratogaphotographer.com

3.1.1 Surface Water

Nineteen percent (19%) of the area in New York's St. Lawrence River watershed is surface water (**Map 11**). In addition to 185 miles of St. Lawrence River shoreline, this includes 12,030 miles of freshwater rivers and streams. Major tributaries include the Oswegatchie River (3,590 miles), Raquette River (2,016 miles), St. Regis River (1,734), Grasse River (1,607 miles), and Indian River (1,222 miles), which drain the northwestern Adirondack Mountains and together comprise 89% of total stream and river miles in the watershed. There are 376 significant freshwater lakes, ponds, and reservoirs covering 104,125 acres, the largest being Black Lake (7,754 acres), Cranberry Lake (6,795 acres), Raquette Lake (5,194 acres), Tupper Lake (4,858 acres), and Long Lake (4,094 acres), which together account for 33% of lake acres in the watershed.

Many of the streams originate as cold headwaters in the hills of the northern Adirondack region (Oswegatchie and Raquette Rivers) and flow to the St. Lawrence River across broad flat plains of lacustrine sands, clays, and peat deposits. Waterfalls and rapids are typical features of the major tributaries as these rivers pass through the mountains along steep gradients. In many places, the potential energy of the water flow is captured by operation of hydroelectric dams.

Fifty percent of lakes in the watershed are assessed as having poor water quality (NYSDEC 2016a), 18% as good or satisfactory, and 32% lack sufficient data for assessment (NYSDEC 2018). Of the river miles, 60% remain largely unassessed; of those rivers that have been assessed, 36% are classified as exhibiting good or satisfactory water quality and 5% as exhibiting poor water quality. Details of existing water quality conditions are presented in Section 5.

3.1.2 Groundwater

The water stored underground in the cracks and spaces in soil, sand, and rock constitutes a large unseen reservoir of water. In addition to human use, groundwater helps maintain flows in streams and wetlands during dry periods, supporting significant ecosystem functions. The Chateaugay Transboundary Aquifer, a semi-confined aquifer, is located along the St. Lawrence Lowlands and the Adirondack Mountains. This system is composed mainly of a sedimentary rock overlain by till and clay. Aquifer recharge occurs primarily in a north-northeast direction with a storage capacity of 37.5 km³ in the U.S. and 1,250 km³ in Canada.

Groundwater is an important source of drinking water, especially for the rural populations typical of the St. Lawrence River Basin. Primary aquifers are illustrated in **Map 11**. The 305(b) Ambient Groundwater Quality Monitoring project is an ongoing cooperation between USGS and NYSDEC DOW to characterize naturally occurring, or background, conditions, and identify long-term trends in groundwater quality. Two or three of the 14 major hydrologic basins of NYS are evaluated each year. The St. Lawrence River Basin was most recently evaluated in 2010 and 2015 (Nystrom, 2012; Scott, Nystrom, & Reddy, 2019).

Recent results indicate that groundwater in the St. Lawrence River Basin is generally of good quality, although some constituents sometimes approached or exceeded primary, secondary, or proposed drinking-water standards. Groundwater is typically hard and neutral to slightly basic. Bicarbonate, sulfate, and calcium are the major ions and exhibit the highest median concentrations; the dominant nutrient is nitrate. Trace elements strontium, iron, barium, and boron are present at the highest median concentrations. Radon-222 was detected in concentrations exceeding drinking-water standards in 14 of 21 samples (Scott, Nystrom, & Reddy, 2019), samples with the greatest radon activities originated from bedrock wells. Five of twenty samples exceeded NYS drinking-water standards for bacteria (Nystrom, 2012). Trace levels of six herbicides and one pesticide were detected in over 50% of sampled wells (Nystrom, 2012).

3.1.3 Wetlands

Wetlands are sensitive, productive ecosystems that provide important ecosystem functions including flood storage, filtration, and shoreline erosion protection as well as providing habitat for fish and wildlife. Hydrology varies seasonally and episodically in wetlands due to periodic inundation and saturation of soils. These unique areas support distinctive vegetation adapted to absorb the forces of flooding and erosion. Freshwater Wetlands are protected under Article 24 of the Environmental Conservation Law of NYS. NYSDEC maps and regulates all freshwater wetlands greater than 12.4 acres and requires permits for certain activities within 100 ft of their boundary.



Indian Creek Nature Center, Rensselaer Falls. Photo Source: <https://indiancreeknaturecenter.us/>

Wetlands are delineated in **Map 12**. The St. Regis watershed has 84,000 acres classified as wetlands representing 15% of the total land area. Other areas with significant wetlands include the Oswegatchie (81,000 acres, 12%), and the Raquette (71,000 acres, 9%). Wetlands are threatened by encroachment for residential use, pollution, eutrophication, and alterations in hydrology that can convert them to uplands. Water level management and its effects on wetland soil characteristics plays an important role in contaminant bioavailability and transport. A recent study by Brahmstedt *et al.* (2019) suggests that new water level management plans of the Great Lakes-St. Lawrence River could result in greater transformation and bioavailability of methylmercury in wetland soils of the Upper St. Lawrence River watershed.

3.1.4 Precipitation Patterns and Flooding

The St. Lawrence River watershed is characterized by long, frigid winters and short, relatively cool summers. Precipitation averages around 35 inches per year in the valley and lowlands and around 45 inches per year in the uplands (National Climatic Data Center, data from 1981-2010, Arguez *et al.*, 2010) (**Map 13**), largely dependent on elevation (**Map 14**). This rate is among the highest annual precipitation rates in New York State. The most precipitation occurs at the southeastern edges of the Raquette subbasin and southern edge of the Oswegatchie subbasin, with the lowest precipitation rates concentrated on areas adjacent to the St. Lawrence River. At the subwatershed level, the mean

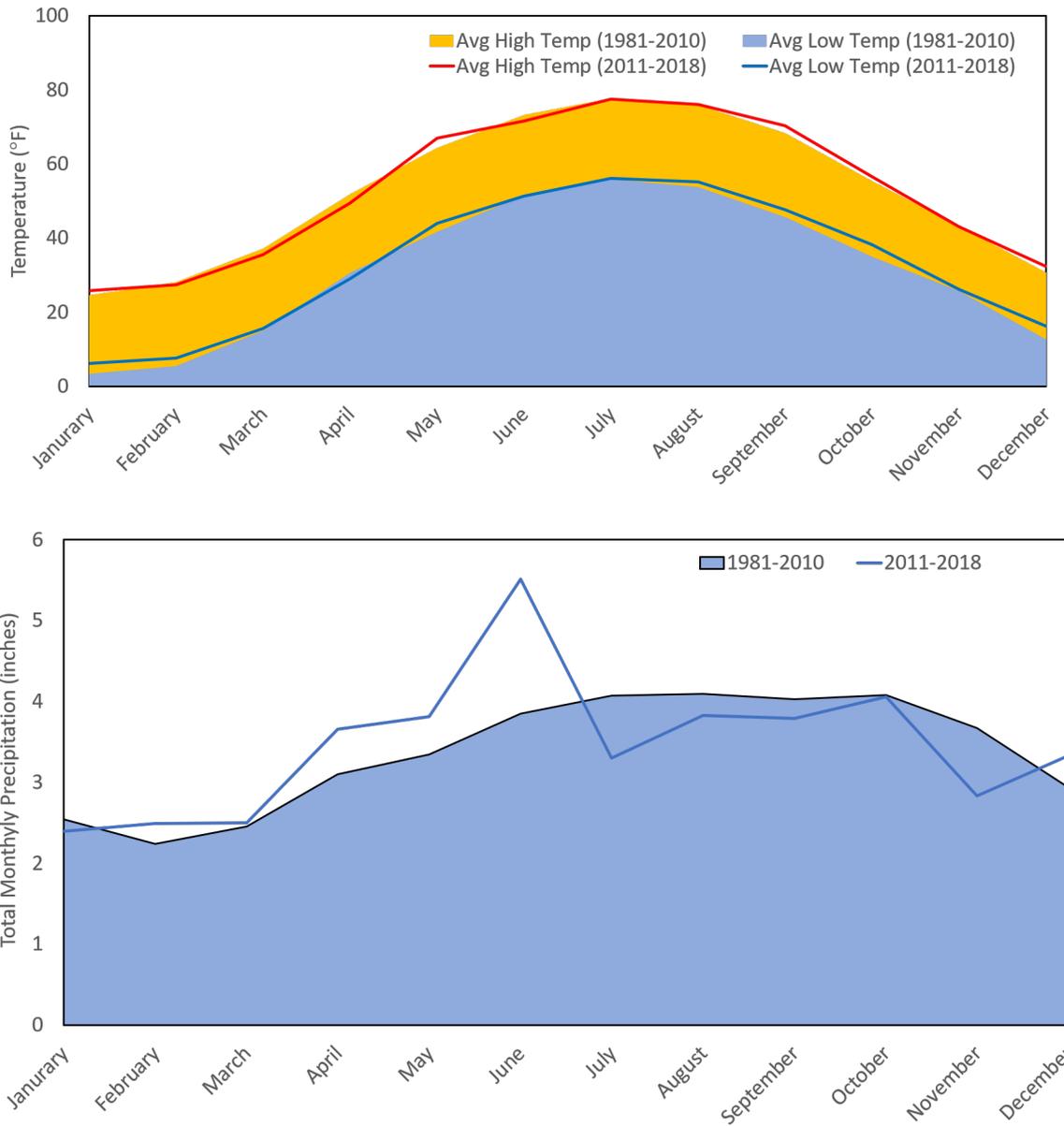
annual precipitation varies from a low of 37.6 inches in the Upper St. Lawrence to 43.9 inches in the Raquette (US EPA, Average Annual Precipitation 1981–2010). The National Oceanic and Atmospheric Administration (NOAA) calculates climate ‘normals’ by averaging over a recent 30-year period. The most recent averages are reported for the period from 1981–2010. NOAA operates seven climate monitoring stations throughout NY portion of the St. Lawrence watershed to continuously measure temperature and precipitation. Annual and seasonal normals collected by these stations are listed in **Table 2**. The watershed has a fairly consistent distribution of precipitation throughout the year, although most areas experience slightly higher precipitation rates (approximately 3.5–4.5 inches/month) in autumn and lower rates in the winter (approximately 2–3 inches/month) according to NOAA climatic normals from 1981–2010 (Arguez *et al.* 2010). Snowfall averages increase with elevation; highlands see upward of 100 inches of snowfall annually. It is typical for snowpack to persist in the Adirondacks well into March. The additional snowpack can be rapidly melted by warm spring rains, contributing to the potential for flooding and episodes of significant runoff.

Table 2
Climate Normals, 1981-2010

Climate Monitoring Station	Elevation	Average Temperature (°F)		Precipitation (inches)	
		Winter	Summer	Annual Average	Annual Average Snowfall
Wanakena Ranger School	460.2	19.8	66	44.18	114.2
Malone, NY	268.2	17.2	65.4	38.86	95.3
Canton 4SE, NY	136.6	19.4	66.6	37.34	79.6
Colton 2 N, NY	176.8			42.45	
Gouverneur 3 NW, NY	128	18.2	65.6	37.61	85.2
Tupper Lake Sunmount, NY	512.1	17.1	63.2	44.82	
Massena International Airport, NY	65.2	18.1	66.6	34.96	69.4

SOURCE: Annual/Seasonal Normals, 1981-2010, NOAA Climatic Data

Figure 2
Climate Patterns, Past and Present

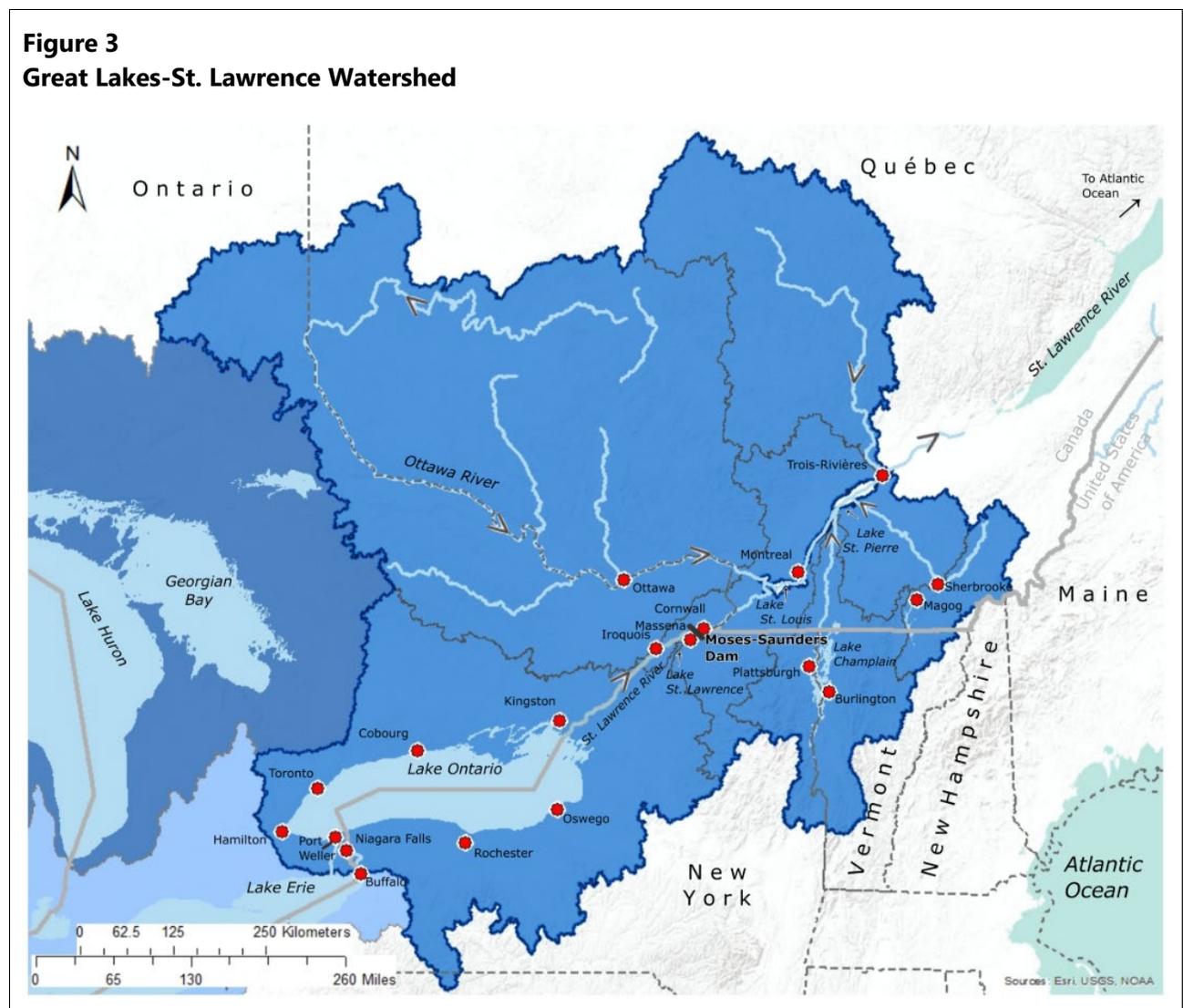


Source: Annual/Seasonal Normals, 1981-2010, NOAA Climatic Data; U.S. Climate Data, 2011-2018, usclimatedata.com
 Note: Data averaged from Malone, Tupper Lake, and Gouverneur NOAA climatic stations based on available monthly data.

Figure 2 compares monthly temperature and precipitation averages from monthly averages from years 1981-2010 (filled in area) and 2011-2018 (lines). The most recent years following the last 30-year climate normal assessments (1981-2010) have similar temperature patterns, with little variation in average high and low monthly temperatures. In contrast, precipitation differences between 1981-2010 and 2011-2018 precipitation totals are evident; most notably in increased rainfall during spring and early summer. The 4th National Climate Assessment projects that precipitation in the Northeast

will increase 5-20%, with much of that increased precipitation delivered through heavy rain events. In addition, the frequency, intensity, and duration of heat waves is expected to increase making the northeast more susceptible to drought (Melillo *et al.*, 2014).

The uptick in spring precipitation and resultant snowmelt has affected flooding within the St. Lawrence River watershed, which has become more devastating in recent years. Flooding occurs when intense or continuous rainfall exceeds the soil's absorptive capacity and channel capacity of local rivers and streams. Flooding along the St. Lawrence River is difficult to address as the Great Lakes-St. Lawrence Watershed receives inflow from a vast area that includes multiple jurisdictions and encompasses transboundary waters (**Figure 3**). Flooding and water-level management are discussed further in **Section 7.2**.



Source: IJC, International Lake Ontario-St. Lawrence River Board (2019), <https://ijc.org/en/loslr/b>.

Floodplains are mapped as low elevation areas adjacent to streams, rivers, and lakes that are prone to periodic flooding. In natural areas, floodplains typically support diverse a diverse assemblage of upland and wetland biota and provide groundwater recharge. Flood Insurance Rate Maps were sourced from the Federal Emergency Management Agency (FEMA) to determine the locations of floodplains within the watershed (**Map 15**). However, floodplain maps are not available across much of the St. Lawrence River watershed. Other factors such as slopes, soil types, and hydrologic characteristics must be used to delineate areas at risk of flooding.

3.2 Topography and Geology

In general, topography can be described as mountainous terrain in the southwestern area with lowland, agricultural plains lying inland from the St. Lawrence River within the eastern and northern region of the watershed. Defining ridgelines of the western Adirondack mountains have the highest elevation, exceeding 4,000 ft above mean sea level, with the highest elevations found along the southeastern edge of the basin the Adirondacks. The lowest elevations are found in the northern St. Lawrence River valley.

The surficial material throughout the basin was deposited during the Last Glacial Maximum, approximately 26,500 years ago (**Map 16**). Till and kame deposits within the Adirondack region is sand-rich and of metamorphic origin. It has poorly sorted, variable texture, from boulders to silt; permeability varies with thickness and compaction of the material due to deposition from a melting ice sheet. The Upper St. Lawrence, Indian, and western portion of the Oswegatchie subbasins are dominated by lacustrine silt and clay deposits that are generally calcareous and of low permeability. Surficial deposits within the northern central and western areas of the watershed primarily consist of till, marine and lacustrine silt and clay, and sands; these materials are generally of intermediate permeability.

Bedrock geology of the St. Lawrence River watershed predominantly consists of carbonate, sandstone, crystalline and metamorphosed rocks (**Map 17**). A large band of carbonates extends from the west to east along the St. Lawrence River shoreline adjacent to a thinner band of sandstone. The plains of the Upper St. Lawrence, Indian, and Oswegatchie subbasins are a conglomerate of glacial/alluvial deposits, carbonates, crystalline and sandstone. Crystalline rocks are the most dominant bedrock within the Adirondack region with some glacial deposits, metamorphosed clastic and crystalline, and shale and carbonate bedrock spreading throughout the range.

3.3 Soils

Soils are involved in many critical functions affecting the environment and water quality; they provide habitat to plants, animals, fungi, and microbes that contribute to nutrient and carbon cycling, filter water seeping into aquifers, and moderate the supply of essential nutrients for agricultural production. Soils differ spatially based on parent material, climate, organisms present, topography,

and age. Chemical, physical, and biological properties of soil directly affect contaminant fate and transport as well as erosion potential; these factors have a major influence on water quality.

The Natural Resource Conservation Service (NRCS) classifies soils into four hydrologic soil groups (A, B, C, D) based on the soil's runoff potential. Runoff potential generally increases from Group A to D. Group A soils are typically sand, loamy sand, or sandy loam soils with high infiltration rates. Group B soils are usually silt loam or loam soils with a fine to moderately coarse texture; these soils exhibit a moderate infiltration rate when thoroughly wetted. Sandy clay loams are representative of Group C soils, which have a low infiltration rate and a moderately fine to fine structure. Group D soils are typically clay loam, silty clay loam, sandy clay, silty clay, or clay having a high runoff potential and very low infiltration rates due to high swelling potential. The hydrologic soil groups throughout the basin are shown in **Map 18**.

The western areas of the watershed along the St. Lawrence River, including the Upper St. Lawrence, Indian, and Oswegatchie subbasins, are dominated by Groups C and D soils with high runoff potential and low infiltration rates. Land areas dominated by these soil types are at greater risk of flooding. Other Group C and D soils lie along the St. Lawrence River across the northern portions of the Raisin, Raquette, St. Regis, and Salmon River subbasins. The mountainous regions within the mid-southern area of the watershed are characterized by more variable hydrologic soil classes likely due to changing topography and abundant water resources in this area.

The potential for soil erosion by runoff and raindrop impact is measured by the soil erodibility k-factor. The NRCS developed this factor to estimate soil losses based on a soil's physical and chemical characteristics; values range from 0.02-0.69. A higher k-value represents greater susceptibility of the soil to rill and sheet erosion by rainfall. Typically, soils with higher permeability are less susceptible to erosion and are classified with a lower k-value. The erosion potential for the St. Lawrence River watershed is shown in **Map 19**, with erosion potential increasing as colors darken to deeper red. The watershed has an average k-factor of 0.29 with the highest average k-factor of the subbasins in the Upper St. Lawrence. However, areas with the highest k-factor locally lie within the mountainous areas of the Adirondack State Park with steep slopes and high annual precipitation.

3.4 Habitat

Habitat condition is directly affected to landscape position, vegetative cover, and land use, as well as hydrologic and biogeochemical processes. The St. Lawrence River watershed is within the most rural area of New York State. The diverse vegetation, unique geology, and numerous waterbodies within the St. Lawrence River watershed provide habitat to terrestrial, wetland, and aquatic assemblages. The landcover map, **Map 20**, illustrates the diversity of habitats throughout the watershed. A habitat condition index was developed by the National Fish Habitat Partnership (NFHP, 2015 National Assessment) to score habitats on their likelihood of aquatic habitat degradation with a score range

of 1 for high likelihood of aquatic habitat degradation, to 5 for low likelihood of aquatic habitat degradation. This score is dependent on land use, population density, roads, dams, mines, and point-source pollution sites. The habitat condition index for the entire watershed was calculated as 4.4, suggesting that there is a low likelihood of aquatic habitat degradation.

The St. Lawrence River is home to a wide variety of warm water fish species including small- and largemouth bass, northern pike, walleye, yellow perch, bullhead, and various panfish. Streams, rivers, and lakes of the Adirondack region support both warm- and cold-water fisheries due to their diverse habitats from deep, clear waters to rushing rapids and swirling pools. Species such as Lake, Brown, Brook, and Rainbow Trout, large- and smallmouth bass, land-locked salmon, walleye, perch, northern pike, and chain pickerel can be found in these waters.



Northern Harrier
Photo Source: National Audubon Society

NY's State Wildlife Action Plan (2015) identifies endangered, threatened, and species of conservation need within the region. Some important species include the endangered blanding's turtle, threatened northern harrier, threatened pugnose shiner, and northern pike. The New York Natural Heritage Program (NYNHP) aims to facilitate conservation and biodiversity by providing information and expertise on rare species and natural ecosystems within NYS. The Upper St.

Lawrence has the highest total count of at-risk species at 53, followed by the Raquette River at 48. The majority of these counts are characterized as flowering plant species; the second highest at-risk group is birds. A full list of rare, threatened, and endangered species of the St. Lawrence River watershed can be found at [New York Nature Explorer](#) (NYSDEC 2014). Invasive species are discussed in **Section 6.2**.

3.4.1 Ecological Zones

A wide range of terrestrial habitats such as forests in the Adirondack region, wetlands, and agricultural lands provide refuge for important bird, reptile, amphibian and mammal populations. These regional differences have been characterized into distinct ecological zones. Each zone, mapped in **Map 21**, represents an assemblage of interacting plant and animal populations that share a common environment. A description of the major zones follows.

Central Adirondacks. Most of this zone is within the southern half of the Raquette River subwatershed. It is characterized by boreal heath barrens, or shrubland that occurs at the outwash plains of the Adirondacks. Soils are sandy, dry, and poor in nutrients and may become seasonally flooded due to a discontinuous subsurface layer of podzolized soil that restricts infiltration rate. The area is characterized by various coniferous communities at higher elevations and mixed forests at lower elevations. A large proportion of this area is within the Forest Preserve and managed by the Adirondack Park Agency.

Champlain Transition. This zone is confined to the Chateaugay-English subbasin at its eastern end along the St. Lawrence River within Clinton County. It is characterized by a mix of perched bogs of acidic, shallow peat, heath shrubland with well-drained, sandy soils, and open canopy woodlands with very shallow acidic soils over sandstone bedrock. Jack pine and pitch pine are the dominant tree species in this zone.

Eastern Ontario Plains. This zone extends from the southwestern portions of the Upper St. Lawrence and Indian subwatersheds approximately to the St. Lawrence County line. This area consists of low elevation plains with shallow loam soils over limestone or dolostone bedrock. The natural biome supports wetlands, grasslands and shrub communities; these have now been largely replaced by agricultural pastures supporting the dairy industry. This area also exhibits alvar communities, a globally rare group of prairie-like plants found on thin mineral soils over limestone.

St. Lawrence Plains. The Upper St. Lawrence, Oswegatchie, and northern tips of the Raquette, St. Regis, and Salmon River subwatersheds fall within the St. Lawrence Plains ecozone. This area is characterized by riverside meadows with gently sloping cobble shores, sparse or patchy vegetation dominated by scrub oak or heath shrubs, and small wetland areas rich in organic matter or clay. Water levels and soil saturation fluctuate seasonally and ice from the St. Lawrence River scours the meadow, cutting back woody plants along its shoreline. The area has a cool microclimate. The forested areas are dominated by pitch pine, chestnut and red oak, red maple, American elm, and green and white ash. Grazing and other agricultural practices have altered the ecological zone.

Western Adirondack Foothills. The Western Adirondack Foothills is the dominant ecological zone of the St. Lawrence River watershed. The band extends from the southwestern edge of the Oswegatchie and stretches diagonally to the southern half of the Chateaugay-English subwatershed, traversing the bulk of the Grasse, the narrow, middle stretch of the Raquette, the southern half of the St. Regis, and the central Salmon River subwatersheds. Sandy, low fertility soils derived from glacial outwash deposits cover the foothills. The area contains many seasonally fluctuating, groundwater-fed ponds and associated wetlands typical of pine barrens. Peatlands and bogs occur along the gentle slopes of the foothills. The landscape is covered with extensive hardwood forests and supports similar communities to those found at the higher elevations of the Adirondacks.

3.4.2 Significant Habitats and Protected Areas

NYSDEC is responsible for approximately 4.5 million acres of public land, including 2.6 million acres in the Adirondack Park. After growing concerns regarding clear cutting of trees, the Adirondack Park was established and recognized in 1892 as a constitutionally protected Forever Wild area. In 1971, the Adirondack Park Agency was created to develop long-range public and private land use plans for the area. State lands fall under four classifications that determine management actions; forest preserve, state forests, wildlife management areas, and conservation easements. The Adirondack Park has 2.6 million acres in forest preserve, 15,000 acres in state forests, 4,000 acres in wildlife management areas, and 780,000 acres under conservation easement.

The Great Lakes and St. Lawrence River host many Significant Coastal Fish and Wildlife Habitats (SCFWH). SCFWHs are areas critical to the populations of fish and wildlife; they contain a unique combination of environmental and biological conditions which fish and wildlife need for survival either seasonally or year-round. Areas typically include coastal wetlands, breeding grounds, nursery areas, migratory routes, and areas of high human use of the fish and wildlife resource (Ozard, 1984). SCFWHs in the St. Lawrence River watershed are catalogued at the NYSDOS site;

<https://www.dos.ny.gov/opd/programs/consistency/scfwhabitats.html#greatlakes>.

New York State and NYNHP are working to protect select areas that are more vulnerable to ecological degradation and poor management. As a result, some areas are designated Critical Environmental Areas (CEA) or are managed by the NYNHP to enhance community resiliency and ecological integrity through restoration and protection. The Great South Woods of the Wilderness located in Colton was designated a CEA in 2003 because of its mature forests and its cultural, recreational, and educational value. CEAs are designated if they provide a significant benefit to public health, represent a natural setting or habitat, serve important agricultural, social, cultural, or historic values, or are inherently sensitive to ecological, geological, or hydrological changes.

The National Audubon Society's mission is to protect birds and the habitats they need to survive. To accomplish this, Important Bird Areas (IBA) that are critical habitats to the success of bird populations have been identified, monitored, and protected. Important Bird Areas must meet one of three criteria: an area where birds gather in large numbers at one time; a habitat for at-risk species; or an area that supports diverse habitat and bird species. The Upper St. Lawrence/Thousand Islands, Adirondack Forest Tract, Moose River Plains/Blue Ridge Area, Adirondack Loon Complex, Brasher Falls and Bombay Forests, Indian River/Black Lakes, Perch River Complex, Spring Pond Bog, Massawepie Mire, Fort Drum, Lisbon Grasslands, and Lower St. Lawrence River areas are designated IBAs. More information on these areas can be found at the National Audubon Society website; <https://www.audubon.org/important-bird-areas/state/new-york>.

Modeled after the National Audubon Society's IBA Program, New York State's Bird Conservation Area (BCA) Program was established in 1997 to safeguard and enhance bird populations and their habitats on state lands and waters. An area of 8,700 acres in St. Lawrence County in the Towns of

Canton and DeKalb was identified as a BCA. The area is a large complex of open water surrounded by marsh, shrub, swamp, and upland forests

3.5 Land Cover

Both land cover and land use can impact water quality in a watershed. Land cover refers to how much of a region is covered by forests, wetlands, agriculture, open water, and other natural features. Land use refers to how the landscape is utilized by humans, such as for farming, conservation, residential, or commercial purposes. Land cover can function as a buffer against environmental impacts; for example, wetlands provide a buffer against flooding, woodlands buffer waterbodies from runoff, and vegetation can stabilize steep slopes prone to erosion. Land use information helps determine which types of pollutants may be present and how much could potentially be released.

Land cover within the S. Lawrence River watershed (refer to Map 20 and Table 3) is dominated by forested woodlands, encompassing roughly 59% of the total area. The Raquette River subbasin has the most acreage dedicated to forests at 619,000 acres comprising 77% of the area. The region lost about 14,000 acres of its forests from 2001 to 2011 while areas classified as wetlands increased by 350 acres during this period. Agriculture occupies about 17% (616,000 acres) of the watersheds' landscape with the remainder in wetlands (14%), open water (3%), urban development (3%), shrub/scrub (2%), and grasslands (1%).



Farming in St. Lawrence County
Photo Source: northcountrypublicradio.org

Table 3
Land Cover, St. Lawrence River Watershed

HUC8	Forest (acres)	Scrubland (acres)	Grassland (acres)	Wetlands (acres)	Urban (acres)	Agriculture (acres)
Upper St. Lawrence	89166	7145	4758	37537	18116	86806
Oswegatchie	446827	10064	4245	81473	12560	93025
Indian	177609	11313	7714	53231	15768	77481
Grasse	260231	6824	2590	48455	12460	65046
Raquette	619203	17890	3712	70860	13269	27824
St. Regis	389709	16222	3104	83969	7628	34845
Salmon	145666	4884	2194	35512	8212	59140
Chateaugay-English	140762	7355	2443	52096	5158	51759
Watershed	2108346	84789	36167	496538	110193	616731
	% Forest	% Scrubland	% Grassland	% Wetlands	% Urban	% Agriculture
Upper St. Lawrence	36	3	2	15	7	35
Oswegatchie	66	1	1	12	2	14
Indian	49	3	2	15	4	22
Grasse	64	2	1	12	3	16
Raquette	77	2	0	9	2	3
St. Regis	71	3	1	15	1	6
Salmon	56	2	1	14	3	23
Chateaugay-English	53	3	1	20	2	20
Watershed	59	2	1	14	3	17

SOURCE: 2011 CDL-NLCD Hybrid Land Cover dataset.

The riparian zone of a landscape influences the water quality within, and downstream from, surrounding waterbodies. Identifying riparian zones in need of improvement and maintenance will enhance retention of excess nutrients and sediments and perform other critical hydrologic, geomorphic, and biological functions that improve a watershed's health. NYS Riparian Opportunity Assessment identifies riparian areas needing improvement at the subwatershed and catchment level using indicators of ecological health and stress. In general, the region has ample natural riparian cover with a higher density in the mountainous areas of the Adirondacks and approximately 50-85% riparian cover on the agricultural plains. Low cover areas are concentrated in the Indian and Oswegatchie River watersheds. Wheeler Creek (Upper St. Lawrence River watershed), encompassing urban areas such as Cape Vincent and Clayton along the St. Lawrence River shoreline, has the least natural riparian cover.

Agriculture is a leading industry and use of land in the area, as the northern skirt of the St. Lawrence River water basin is host to rich soils and flat plains suitable for farming (see Maps 14 and 18).

Agricultural districts are outlined in **Map 22**. According to the 2017 Census of Agriculture from the USDA National Agricultural Statistics Service (NASS), land dedicated to farming has decreased by approximately 7% since 2012 within the watershed. In 2017, 620,714 acres were dedicated to farming, hosting 2,344 farms, a decrease of 144 farms since the 2012 census. In 2017, cropland, pasture/grazing land, and woodlands occupied 333,350, 14,523, and 163,308 acres, respectively. Approximately 18,000 acres of cropland were idle or used for cover crops or soil-improvement but not harvested and not pastured or grazed. No-till practices are used on 191 farms occupying 21,377 acres (up from 173 farms holding 13,032 acres in 2012), and reduced tillage is practiced on 182 farms covering 33,508 acres (up from the 92 farms covering 15,543 acres). Manure is spread across 104,000 acres in the watershed, and 129,000 acres are treated with commercial fertilizers, lime, or soil conditioners. **Table 4** lists the harvested crops and livestock and poultry counts for the watershed. Agriculture census data can also be found for each county within the watershed.

Table 4
Crops and Livestock, St. Lawrence River Watershed

Selected Crop	Farms	Acres	% Harvested Cropland	Change in # of Farms since 2012	Change in Farmed Acres since 2012
Corn	398	74178	26.49	-54	-2615
Soybeans	62	8284	2.96	-11	1054
Small grains (wheat, oats, barley, rye)	117	4109	1.47	-10	625
Vegetables	170	1128	0.40	-33	-473
Orchards	91	296	0.11	-18	-265
Nursery, greenhouse, floriculture, and sod	71	77	0.03	-18	-68
All other crops	1710	191949	68.55	-93	-11897
Total	2619	280021	100	-237	-13639
Livestock/Poultry	Farms (2017)	Acres (2017)	% of Livestock Acres	Change in Farms since 2012	Change in Farmed Acres since 2012
Cattle and calves	1173	135567	55.64	-142	-1137
Hogs and pigs	148	1045	0.43	-42	-964
Sheep and lambs	120	3369	1.38	5	-1685
Horses and ponies	622	3753	1.54	-43	-728
Goats	125	1153	0.47	-12	151
Chickens	441	98758	40.53	-8	76936
Total	2629	243645	100	-242	72573

SOURCE: 2017 Agriculture Census, USDA, National Agricultural Statistics Service.

The Upper St. Lawrence is the most agriculturally intensive subbasin, dedicating 35% of its land to agricultural activities (87,000 acres). The Oswegatchie and Indian subbasins farm an additional 93,000 and 77,000 acres each, constituting 14% and 22% of their total area, respectively. The Oswegatchie and Indian subbasins have the highest count of surface water segments listed as impaired due to nutrients and requiring a TMDL under Section 303(d) of the Clean Water Act (CWA). The counts include state-assigned pollutants/causes identified as nutrients, organic enrichment/oxygen depletion, algal growth, or noxious aquatic plants. These IDs are associated with excess nutrients and sediment transport via agricultural runoff. From 2001 to 2011, the St. Lawrence River watershed increased its agricultural lands by 1,100 acres; approximately 70% were in hydrologically connected zones that are comprised of wet areas with high runoff potential, causing concern for future impairment of adjacent waterbodies.

Only 3% of the St. Lawrence watershed area is classified as urban; this region is among the least populated areas of NYS. With the low population density, impervious cover occupies a low 0.7% of the area (**Map 23**). The highest percentage of impervious surfaces (2%) is within the Upper St. Lawrence subbasin.



Dairy farm in the St. Lawrence River watershed.

Photo Source: Empire State Development; <https://esd.ny.gov/industries/agribusiness>

4 Community Characteristics

4.1 Municipalities and Population

In all, one Native American territory (Saint Regis Mohawk Indian Territory), one city (Ogdensburg), 22 villages, and 76 towns are wholly or partially within New York's St. Lawrence River watershed (**Table 5**). **Map 24** displays municipalities within the watershed and delineates major population centers. Population density within the St. Lawrence River watershed is displayed in **Map 25**. The total watershed population in 2010 was 196,503, the most populous areas were Potsdam (16,075), Malone (14,799), Fort Drum (12,955), and Massena (12,245) (US Census Bureau 2010). The Upper St. Lawrence subbasin has the highest population density (approximately 37 individuals/km²), and the Raquette subbasin is home to the largest population of 37,413 (WSIO Indicator Data, EPA EnviroAtlas "Dasymetric Population for the Conterminous United States", February 2015). The upcoming 2020 census will provide valuable information on population trends in this region of northern NY.

Table 5
Municipalities within the St. Lawrence River Watershed

Civil Boundary Type	Primary HUC8	Name	Population*	County
Tribal	St. Regis (04150306)	St. Regis Mohawk Tribe	3,398	Franklin
City	Upper St. Lawrence (04150301)	Ogdensburg	11,128	St. Lawrence
Village	Upper St. Lawrence (04150301)	Cape Vincent	726	Jefferson
		Clayton	1978	Jefferson
		Alexandria Bay	1,078	Jefferson
		Morristown	395	St. Lawrence
		Waddington	972	St. Lawrence
	Oswegatchie (04150302)	Antwerp	686	Jefferson
		Harrisville	612	Lewis
		Gouverneur	3,949	St. Lawrence
		Richville	323	St. Lawrence
		Rensselaer Falls	332	St. Lawrence
		Huevelton	714	St. Lawrence
	Indian (04150303)	Philadelphia	1,252	Jefferson
		Evans Mills	621	Jefferson
		Theresa	863	Jefferson
		Hammond	280	St. Lawrence
	Grasse (04150304)	Canton	6,314	St. Lawrence
Massena		10,936	St. Lawrence	

Civil Boundary Type	Primary HUC8	Name	Population*	County
	Raquette (04150305)	Speculator	324	Hamilton
		Tupper Lake	3,667	Franklin
		Norwood	1,657	St. Lawrence
		Potsdam	9,428	St. Lawrence
	Salmon (04150307)	Brushton	474	Franklin
		Malone	5,911	Franklin
	Chateaugay-English (04150308)	Chateaugay	833	Franklin
		Burke	211	Franklin
	Town	Upper St. Lawrence (04150301)	Cape Vincent	2,777
Orleans			2,789	Jefferson
Alexandria			4,061	Jefferson
Hammond			1,191	St. Lawrence
Morristown			1,974	St. Lawrence
Clayton			5,153	Jefferson
Lisbon			4,102	St. Lawrence
Waddington			2,266	St. Lawrence
Oswegatchie (04150302)		Fine	1,512	St. Lawrence
		Clifton	751	St. Lawrence
		Pitcairn	846	St. Lawrence
		Edwards	1,156	St. Lawrence
		Fowler	2,202	St. Lawrence
		Gouverneur	7,085	St. Lawrence
		De Kalb	2,434	St. Lawrence
		Oswegatchie	4,397	St. Lawrence
Indian (04150303)		Theresa	2,905	Jefferson
		Antwerp	1,846	Jefferson
		Philadelphia	1,947	Jefferson
		Le Ray	21,782	Jefferson
		Wilna	6,427	Jefferson
		Croghan	3,093	Lewis
		Diana	1,709	Lewis
		Rossie	877	St. Lawrence
		Macomb	906	St. Lawrence
		De Peyster	998	St. Lawrence
Grasse (04150304)		Colton	1,451	St. Lawrence
		Hermon	1,108	St. Lawrence
		Canton	10,995	St. Lawrence

Civil Boundary Type	Primary HUC8	Name	Population*	County	
		Russell	1,856	St. Lawrence	
		Clare	105	St. Lawrence	
		Pierrepont	2,589	St. Lawrence	
		Madrid	1,735	St. Lawrence	
		Louisville	3,145	St. Lawrence	
	Raquette (04150305)	Webb	1,807	Herkimer	
		Lake Pleasant	724	Hamilton	
		Long Lake	711	Hamilton	
		Arietta	304	Hamilton	
		Inlet	333	Hamilton	
		Indian Lake	1,342	Hamilton	
		Newcomb	436	Essex	
		North Elba	8,957	Essex	
		Harrietstown	5,709	Franklin	
		Tupper Lake	5,971	Franklin	
		Piercefield	310	St. Lawrence	
		Parishville	2,153	St. Lawrence	
		Potsdam	16,041	St. Lawrence	
		Norfolk	4,668	St. Lawrence	
		Massena	12,883	St. Lawrence	
		St. Regis (04150306)	Santa Clara	345	Franklin
			Hopkinton	1,077	St. Lawrence
	Waverly		1,022	Franklin	
	Brighton		1,435	Franklin	
	Duane		174	Franklin	
	Brandon		577	Franklin	
	Dickinson		823	Franklin	
	Lawrence		1,826	St. Lawrence	
	Moir		2,934	Franklin	
	Brasher		2,512	St. Lawrence	
	Stockholm		3,665	St. Lawrence	
	Salmon (04150307)	Franklin	1,140	Franklin	
Malone		14,545	Franklin		
Bangor		2,224	Franklin		
Bombay		1,357	Franklin		
Fort Covington		1,676	Franklin		
Westville		1,819	Franklin		

Civil Boundary Type	Primary HUC8	Name	Population*	County
	Chateaugay-English (04150308)	Bellmont	1,434	Franklin
		Dannemora	4,898	Clinton
		Ellenburg	1,743	Clinton
		Constable	1,566	Franklin
		Burke	1,465	Franklin
		Chateaugay	2,155	Franklin
		Clinton	737	Clinton
		Mooers	3,592	Clinton

SOURCE: New York State Civil Boundaries, NYS GIS Clearing House (June 2019).

Note: In some cases, only a portion of villages and towns lie within the watershed, so populations shown in the table cannot be summed to give the watershed population.

4.2 Regulatory and Programmatic Environment

The St. Lawrence River watershed is affected by regulations, plans, and programs at the federal, state, regional, county, and local level, as well as by collaborations involving nonprofit organizations and academic institutions, designed to help protect and maintain water quality and aquatic habitat. The Project Team worked with a consultant (Rootz) to compile and review the local laws of the watershed municipalities and evaluate their effectiveness in protecting water quality and habitat from point- and nonpoint-source pollution.

4.2.1 Approach to Reviewing Local Laws, Plans, and Programs

The inventory and assessment of municipal measures to protect water resources in the St. Lawrence River watershed were based on a modified version of the process outlined by the Genesee/Finger Lakes Regional Planning Council (2006). Due to the extensive size of the watershed, a rigorous assessment of individual municipalities was not feasible, and therefore the regulatory environment was assessed at the County level. Existing local laws and tools that guide land use were identified by municipal nonpoint assessment forms completed by County Department of Planning and/or SWCD professional staff. The review of existing documents included:

- Comprehensive Plans/Land Use Plans/Rural Development Plans/Waterfront Revitalization Plans;
- Zoning, Site Plan Review and Subdivision Regulations; and
- Water Quality Protection Programs/Measures
- Waterbody/Shore Protection
- Floodplain Protection
- Waste Management
- Wastewater/On-site Septic

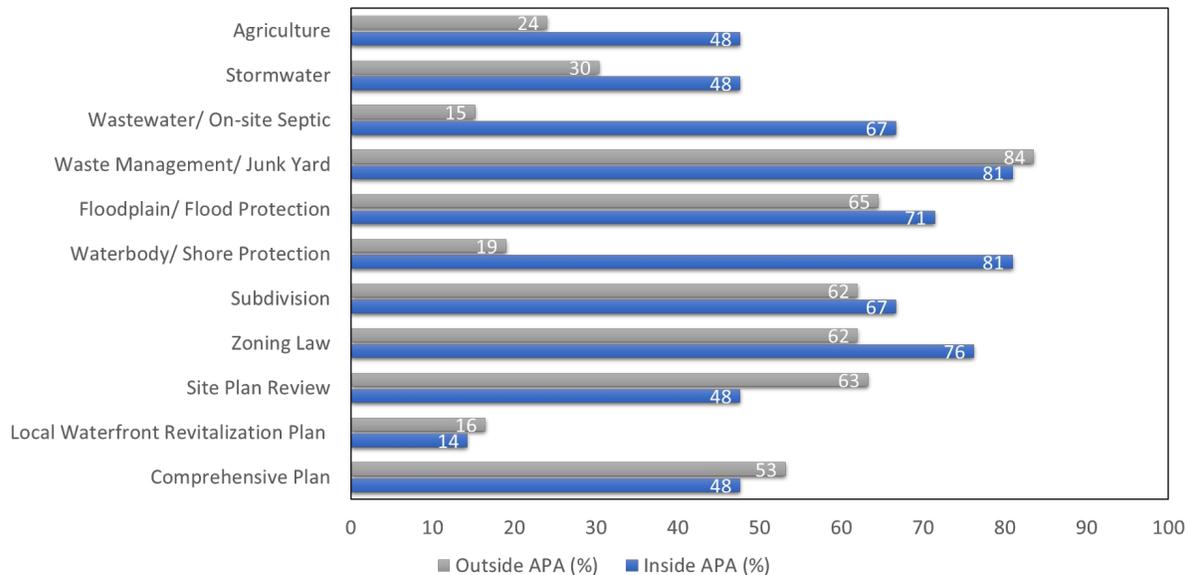
- Stormwater
- Agriculture

The resulting product is in **Appendix B: Local Laws and Programs Affecting Water Quality**. This document evaluates the current regulatory environment with respect to water quality and identifies improvements to local codes that would address water quality impacts from developmental activities more effectively. The St. Lawrence River Watershed Revitalization Plan will improve coordination amongst municipalities, organizations, and agencies to advance our shared understanding of the watershed and build upon the identified regulatory and programmatic gaps in local laws and programs to recommend laws and practices that could enhance sustainable land use and natural resource protection and future livelihood of the watershed.

4.2.2 Gap Assessment as Related to the Desired State

Within the St. Lawrence River watershed, multiple municipalities with several regulatory entities exist, which results in significant variation in regulatory tools and laws that address watershed resource protection. Some municipalities have greater resources available to them, regarding staffing, resources, and regulatory tools, while others are more vulnerable offering few local laws to manage water quality challenges. This variation is, in part, influenced by location within the Adirondack Park boundary. The APA is an important regulatory body, encompassing 44% of the watershed, and is responsible for maintaining protection of the forest preserve and regulating development on privately owned lands. This involves shoreline restrictions, tree removal, and protection of river systems and adjoining land.

Figure 4
Local Laws Assessment



Note: Percentage based on percentage of municipalities adopting practice/plan.

Based on the results of the evaluation, most municipalities do not adequately address the comprehensive protection and preservation of water quality in their regulatory programs. Due to the influence of the Adirondack Park on land use regulation and practices, it was useful to evaluate the adoption of local regulations or plans that influence water quality inside and outside the boundaries of the Adirondack State Park, shown in **Figure 4**. The largest discrepancies between inside and outside the park are with regards to on-site septic/wastewater and waterbody/shoreline regulation and practices. At the time of local law assessment inventory, only 32%, 26%, and 29% of municipalities utilize land use planning tools and regulations to target waterbody/shoreline protection, on-site septic systems, and agriculture, throughout the watershed, respectively. On the contrary, waste and junkyard management (83%) and floodplain protection measures (66%) are most consistently addressed within the watershed.

4.3 Water Use

Waters of the St. Lawrence River Watershed are diversely utilized by its community, providing navigation and commercial shipping channels, recreation, drinking water supplies, energy, and habitat.

4.3.1 Water Withdrawals

The Water Resources Law ([ECL Article 15, Title 15](#)) was updated in 2011 to protect New York's waters by requiring a NYSDEC permit for inter-basin diversions and water withdrawals of 100,000 gallons per day or more of surface water or groundwater. Water withdrawal reports can be found at [NYSDEC](#)

[Info Locator](#). **Table 6** shows reported withdrawals within the St. Lawrence River watershed. **Map 26** shows the locations of water withdrawals throughout the watershed and the sector associated with the withdrawal. Water withdrawals in the St. Lawrence River watershed is divided among four predominant sectors: public water supply, mine dewatering, industrial, and power generation. **Map 27** depicts hydroelectric, thermoelectric, solar, and biomass energy generation plants within the watershed.

Table 6
Water Withdrawals within the St. Lawrence River Watershed

HUC8	Facility Name	Withdrawal Type	Category Use	Reporting Year	Avg Day Withdrawal (MGD)
Upper St. Lawrence	Cape Vincent, Vg	Surface Water	Public Water Supply	2018	0.44
	Frontenac Crystal Springs	Surface Water	Bottled/Bulk Water	2019	0.01
	Clayton, Vg	Surface Water	Public Water Supply	2018	0.2
	Thousand Island Country Club	Surface Water	Recreational - Golf Course	2018	0.08
	Wellesley Island Water Corp	Surface Water	Public Water Supply	2018	0.04
	Alexandria Bay, Vg	Surface Water	Public Water Supply	2018	0.2
	Hanson Aggregates - Ogdensburg Quarry	Groundwater, Surface Water; Purchase	Mine Dewatering	2018	0.14
	Ogdensburg, City	Surface Water	Public Water Supply	2018	1.9
	Ogdensburg Energy Facility	Surface Water	Power - Fossil Fuel	2018	0
	Waddington, Vg	Groundwater	Public Water Supply	2018	0.1
	Massena, Vg	Surface Water	Public Water Supply	2018	1.15
	Arconic Inc	Surface Water	Industrial	2018	1.95
	St Lawrence/FDR Power Project	Surface Water	Power - Other	2018	94956
	Reynolds Metals - St Lawrence	Surface Water	Industrial	2018	0.08
	McKnight's River Breeze Farm	Groundwater	Agricultural	2018	0.06
Oswegatchie	Harrisville, Vg	Groundwater	Public Water Supply	2018	0.2
	Star Lake Water District	Surface Water	Public Water Supply	2018	0.06
	Newton Falls Fine Paper Company	Surface Water	Industrial	2011	0

HUC8	Facility Name	Withdrawal Type	Category Use	Reporting Year	Avg Day Withdrawal (MGD)
	St. Lawrence Zinc - Balmat Mines	Groundwater, Surface Water	Mine Dewatering	2018	1.3
	Vanderbilt Minerals - Gouverneur	Groundwater, Surface Water	Industrial	2018	0.07
	ZCA Hyatt Mine	Groundwater	Industrial	1996	0.76
	Dunn Ppaer (Cellu Tissue - Natural Dam)	Surface Water	Industrial	2018	1.35
	Kamine/Besicorp Natural Dam LP	Surface Water	Power - Fossil Fuel	1997	3.28
	Gouverneur, Vg	Surface Water	Public Water Supply	2018	0.66
	Corning Inc - Canton Plant	Groundwater, Surface Water	Industrial	2018	0.03
	Losurdo Foods	Groundwater	Industrial	2018	0.04
	Heuvelton, Vg	Groundwater	Public Water Supply	2018	0.09
	Royal J Acres	Groundwater	Agricultural	2018	0.07
Indian	Pominvilles Farm	Groundwater	Agricultural	2011	0.01
	Vanderbilt Minerals - #4 Mine	Groundwater, Surface Water	Mine Dewatering	2018	3.05
	Wilna Water District #2	Groundwater	Public Water Supply	2018	0.01
	US Army Fort Drum	Groundwater	Public Water Supply	2018	1.13
	Black River Generation, LLC (ReEnergy)	Surface Water; Purchase	Power - Fossil Fuel	2018	5.75
	Evans Mills, Vg	Groundwater	Public Water Supply	2018	0.07
	Philadelphia, Vg	Groundwater	Public Water Supply	2018	0.26
	Antwerp, Vg	Groundwater	Public Water Supply	2018	0.05
Grasse	Hermon, Vg	Groundwater	Public Water Supply	2018	0.12
	ZCA Pierrepont Mine	Groundwater	Industrial	2001	0.28
	Kraft Foods, Inc - Canton	Groundwater, Surface Water	Industrial	2001	0.06
	Canton, Vg	Groundwater	Public Water Supply	2018	0.54
	St. Lawrence University (Athletic Fields)	Surface Water	Recreational - Other	2018	0.04
	St. Lawrence University (Golf Course)	Surface Water	Recreational - Golf Course	2018	0.06
	Mapleview Dairy	Groundwater	Agricultural	2018	0.09
	Madrid Water District #1	Groundwater	Public Water Supply	2018	0.05

HUC8	Facility Name	Withdrawal Type	Category Use	Reporting Year	Avg Day Withdrawal (MGD)
	East Louisville Water District #1	Surface Water	Public Water Supply	2018	0.19
Raquette	Long Lake Water District #1	Groundwater	Public Water Supply	2009	0.01
	Blue Mountain Lake Water District #1	Surface Water	Public Water Supply	2018	0.05
	Long Lake Water District #2	Groundwater, Surface Water	Public Water Supply	2018	0.3
	Piercefield Water District	Groundwater	Public Water Supply	2018	0.01
	Tupper Lake, Vg	Surface Water	Public Water Supply	2018	0.64
	Colton Water District	Groundwater	Public Water Supply	2018	0.06
	Potsdam Town & Country Club	Surface Water	Recreational - Golf Course	2018	0.29
	Potsdam, Vg	Surface Water	Public Water Supply	2018	1.12
	Potsdam Specialty Paper Inc.	Surface Water	Industrial	2018	1.27
	Norwood, Vg	Groundwater	Public Water Supply	2018	0.17
	Barrett Paving - Norwood Quarry	Surface Water	Mine Dewatering	2018	1.84
	Norfolk Water District	Groundwater	Public Water Supply	2018	0.28
	APC Paper Company of New York	Surface Water	Industrial	2018	0.16
St. Regis	Camp Gabriels Correctional Facility	Groundwater	Institutional	2010	0
	Paul Smith's College	Groundwater	Institutional	2018	0.03
	Graymont Materials - Parishville Plant	Surface Water	Industrial	2018	0
	Parishville Water District #1	Surface Water	Public Water Supply	2018	0.04
	St. Regis Falls Water District	Groundwater	Public Water Supply	2018	0.06
	Stauffer Farms LLC	Groundwater	Agricultural	2018	0.1
	North Country Dairy, LLC	Groundwater	Industrial	2018	0.35
Salmon	Titus Mountain Family Ski Center	Surface Water	Recreational - Snow Making	2018	0.96
	Graymont Materials - Malone Quarry	Surface Water	Mine Dewatering	2018	0.85
	Childstock Farms	Groundwater, Surface Water	Agricultural	2018	0.08
	Malone Golf Club	Groundwater	Recreational - Golf Course	2018	0.09
	Malone, Vg	Groundwater	Public Water Supply	2018	2.06

HUC8	Facility Name	Withdrawal Type	Category Use	Reporting Year	Avg Day Withdrawal (MGD)
	Carsada Dairy	Groundwater	Agricultural	2018	0.09
	Papas Dairy	Groundwater	Agricultural	2018	0.11
	Fort Covington, Vg	Groundwater	Public Water Supply	2018	0.09
Chateaugay-English	Bilow Farm	Groundwater	Agricultural	2018	0.07
	Burke, Vg	Groundwater	Public Water Supply	2018	0.01
	Boralex NY (ReEnergy New York)	Groundwater	Power - Other	2015	0
	Agri-Mark, Inc - Chateaugay Plant	Groundwater	Industrial	2018	0.69
	Chateaugay, Vg	Surface Water	Public Water Supply	2018	0.48
	Chateaugay Correctional Facility	Groundwater	Institutional	2018	0
	NYSDEC Chateaugay Fish Hatchery	Surface Water	Other	2018	1.6
	Trainer Farm	Groundwater, Purchase	Agricultural	2018	0.04
	Aqua Arbor - Spring Wate	Not Reported	Bottled/Bulk Water	2018	0
	Aqua Arbor	Groundwater	Other	2018	0
	Graymont Materials - Clinton Quarry	Surface Water	Mine Dewatering	2018	0

SOURCE: [NYSDECInfo Locator](#) (accessed 10/22/22020)

4.3.2 Drinking Water Sources

The St. Lawrence River provides drinking water to approximately four million people in the United States and Canada; in New York State, the river serves as public water supply for the City of Ogdensburg, Town of Louisville, and Villages of Massena, Clayton, and Alexandria Bay. The Oswegatchie River serves 3,949 residents in the town of Gouverneur. The Raquette River provides municipal water for the Village of Potsdam with 1,624 water service connections. Canton primarily uses groundwater drawn from the Upland System which consists of a million-gallon reservoir, caisson, and groundwater extraction wells. Malone supplies groundwater drawn from two drilled wells to approximately 13,000 individuals via 2,819 village and town service connections. The Village of Tupper Lake is drilling wells to replace Tupper Lake as their primary source of drinking water.

Table 7 identifies waterbodies and municipalities served, if any, within the description column.

Groundwater aquifers are the main source of drinking water in the region. Groundwater availability is dependent on climatic and hydrogeologic factors. When pumped, changes in water levels of confined aquifers are manifested rapidly; in contrast, the effects of pumping unconfined or semi-confined aquifer systems are slowly made evident. Sand and gravel deposits generally produce the

highest yields in the St. Lawrence study area, the sandstone and carbonate aquifers along the northern edge of the basin produce more moderate yields. The crystalline bedrock in the Adirondacks generally produces the lowest yields of the aquifers in the basin. Public water works utilize groundwater and surface water to serve 65% (128,897 individuals, 2014 SWDIS data) and 44% (86,011 individuals, 2014 SWDIS data) of the watershed's population, respectively. Rural residents obtain potable water from deep wells drilled into bedrock. The NYSDEC Water Well Program mapped 973 water wells within the St. Lawrence River watershed, as depicted in the Water Wells map from the NYS GIS Clearinghouse (NYSDEC Division of Water 2016). Note that this data set encompasses only about 20% of private wells in NYS with records beginning post-2000.

Municipal water supplies from major aquifers, lakes and reservoirs, and wellheads are depicted in **Map 26**. The purple/maroon dots on **Map 26** refer to withdrawals for public water via publicly owned water utilities. The mapped water wells, shown as X's, are designated community water systems—those that either serve at least 15 service connections used by year-round residents or regularly serve at least 25 year-round residents, such as local town and village water districts. A comprehensive list of Public Water Systems by county is maintained by the NYS Department of Health (NYSDOH, 2018).

The NYSDEC Water Quality Standards Program classifies surface waters for their best use, including water supply. Class A and AA waters are waterbodies classified as suitable for drinking and culinary purposes, as well as primary and secondary contact recreation and fishing. **Table 7** summarizes Class A and AA surface waters of the St. Lawrence River watershed. Class A waters are drinking waters that require filtration and some treatment, and class AA waters are drinking waters with minimal treatment needed and no filtration. Only waters designated as Class A or Class AA can be used for drinking water. A full list of assigned classifications to fresh surface waters within the St. Lawrence River watershed can be found in the New York Codes, Rules, and Regulations, Division of Water (6 CRR-NY 910.6).¹

¹ NYSDEC intends to reclassify some surface waters within the St. Lawrence River basin: "The Division of Water expects to propose upgrades to the classifications of certain surface waters in 6 NYCRR Part 910 (St. Lawrence River drainage basin). These reclassifications are necessary to meet federal Clean Water Act (CWA) goals for water quality and, if adopted, would result in higher classifications (and thus more stringent water quality standards) for some waters in this drainage basin. Numerous Class D surface waters, which only provide protection for fish survival, would be proposed to be upgraded to higher classifications (Class C or higher)" (NYSDEC 2019a).

Table 7
Class A and AA Waterbodies

HUC8	Name	Description	Class	Standards
Upper St. Lawrence (04150301)	St. Lawrence River	The portion of river confined between the United States shore line and a line starting at Tibbetts Point Lighthouse, running directly north to the International Boundary Line, thence downstream along the International Boundary Line, terminating at the point of landfall of the International Boundary Line on St. Regis Point approximately 0.5 mile west of St. Regis Hamlet. For classification purposes, this includes all arms and bays in this included section and also includes all streams on islands in this section of the river, except the bay area described in item no. 1b below.	A	A
Oswegatchie (04150302)	Oswegatchie River	From 0.4 mile upstream from N.Y.C. railroad bridge over stream at Gouverneur to bridge over stream at Talcville.	A	A
	Oswegatchie River	From dam at Newton Falls to dam at Cranberry Lake.	A	A(T)
	Oswegatchie River (Cranberry Lake)	From Cranberry Lake outlet to footbridge at Wanakena. Cross reference item 1589. Parts not in forest preserve.	A	A(T)
	South Creek	From Village of Harrisville water supply dam at 0.35 mile upstream from mouth to trib. 5.	A	A(T)
	Cranberry Lake	Parts not in forest preserve.	A	A(T)
	Sylvia Lake		AA	AA
	Star Lake	Star Lake water supply.	AA	AA(T)
Indian (04150303)	Indian River	From old N.Y.S. Route 26 bridge over stream at Antwerp to trib. 42.	A	A
	Indian River Carthage Reservoir	From outlet of P 50 (Carthage Reservoir) to source of Indian River.	A	A(T)
	West Creek	From U.S. Route 11 bridge over stream to source. Evans Mills water supply.	A	A(T)
	Subtrib. of Black Creek	Military Reservation Reservoir.	A	A
Grasse River (04150304)	Grass River	From dam at Madrid to bridge at Morley.	A	A
	Grass River	From trib. 22 to Route 68 bridge at Canton.	A	A
	Little River	From trib. 16 to source.	AA	AA
	Tribs. of Little River and subtribs.	Trib. of Canton water supply.	AA	AA
	Van Rensselaer Creek	From mouth to 0.5 mile above trib. 5.	AA	AA(T)
	Van Rensselaer Creek	From 0.5 mile above trib. 5 to source.	AA	AA
	Dean Brook and tribs. and subtribs.	Trib. of Canton water supply.	AA	AA(T)

HUC8	Name	Description	Class	Standards
	Trib. of Dean Brook	Trib. of Canton water supply.	AA	AA
	Trib. of Van Rensselaer Creek and subtribs.	Trib. of Canton water supply.	AA	AA
	Taylor Creek	From mouth to trib. 3.	AA	AA(T)
	Taylor Creek tribs. and subtribs.	From trib. 3 to source.	AA	AA
	Trib. of Van Rensselaer Creek	Trib. of Canton water supply.	AA	AA
Raquette River (04150305)	Raquette River	From N.Y.S. Route 3 bridge over stream at Piercefield to railroad bridge at Raquette Pond (P 89 outlet).	A	A
	Eagle Crag Lake		A	A(T)
	Subtribs. of Dead Creek. Mt. Arab Lake		A	A
	Piercefield Flow	Used as water source by Hamlet of Piercefield.	A	A
	Tupper Lake	Water supply for Village of Tupper Lake.	A	A
	Blue Mountain Lake		A	A(T)
	Raquette River	From dams at Village of Potsdam north of U.S. Route 11 to bridge over stream at Hannawa Falls.	AA	AA
	Clear Pond	St. Regis Falls water supply.	AA	AA
	Black Pond Black Pond Outlet	St. Regis Falls water supply.	AA	AA
	Trib. of Dead Creek	From mouth to 0.25 mile above trib. 1. Used as water supply by Conifer.	AA	AA(T)
	Trib. of Dead Creek	From 0.25 mile above trib. 1 to source. Used as water supply by Conifer.	AA	AA
	Subtrib. of Dead Creek	Used as water supply by Conifer.	AA	AA
	Subtrib. of Dead Creek	Used as water supply by Conifer.	AA	AA
	Trib. of Tupper Lake and subtrib.	From P 110 outlet to source P 110 is water supply for Village of Tupper Lake.	AA	AA
	Little Simon Pond	Water supply for Village of Tupper Lake.	AA	AA(T)
	Trib. of Shaw Pond	Parts not in forest preserve. Used as auxiliary water supply for Town of Long Lake.	AA	AA(T)
	Trib. of Long Lake	Used as emergency water supply by Town of Long Lake.	AA	AA
	Lake Eaton	Future potential water supply for Long Lake. Parts not bordering forest preserve.	AA	AA(T)

HUC8	Name	Description	Class	Standards
	Raquette Lake	Used as water supply. Parts not bordering forest preserve.	AA	AA
St. Regis River (04150306)	Trib. of Trout Brook	Philadelphia Reservoir.	A	A
	Osgood Pond	Parts not in forest preserve.	AA	AA
	(Spitfire Lake) Subtrib. of Lower St. Regis Lake (Upper St. Regis Lake)		AA	AA
Salmon River (04150307)	Roaring Brook and tribs. and subtribs.	From mouth to source including Fishpole Pond (P 28a)	AA	AA(T)
	Trib. of Roaring Brook		AA	AA
	Trib. of Salmon River and subtrib.		AA	AA
Chateaugay-English (04150308)	Separator Brook	From dam at Lion Mountain water supply to source.	AA	AA
	Standish Brook	From Standish Water Supply Dam to source.	AA	AA(T)
	Trib. of Standish Brook and subtribs.		AA	AA

SOURCE: 6 CRR-NY 910.6

Although public utilities treat water used for human consumption, protecting source water from contamination can greatly reduce treatment costs and the risk to public health. NYSDOH manages a Drinking Water Protection Program dedicated to providing safe, quality drinking water. Under this program, NYSDOH (along with other agencies including county health departments and SWCDs) assists private homeowners with testing private water supplies to ensure that they meet public health standards. NYSDOH requires public utilities and water purveyors to test their water quality and inform consumers through an Annual Water Quality Report. These reports include information about the water system, source water, contaminant levels in finished water, and any violations of the national primary drinking water regulations. Typically, these reports can be found on the municipality's public utilities website or acquired by contacting managers or the utility or its respective local health department. NYSDOH operates a Source Water Assessment Program (SWAP) that provides water utilities with information to help them identify potential sources of contamination and implement management measures to prevent, reduce, or eliminate risks to the drinking water supply. Source water assessments have identified 503,000 acres in the watershed as Source Water Protection Areas, defined as areas with increased susceptibility to contamination (EPA Safe Drinking Water Information Systems, SDWIS, 2014 geospatial data).

4.3.3 Commercial Shipping – The St. Lawrence Seaway

The St. Lawrence River has been altered to facilitate transportation. Modifications began in 1680 when Dollier de Casson of the Sulpician Seminary in Montreal built a 1.5 m (5 ft) deep canal to bypass the Lachine Rapids between Lake St. Louis and Montreal. Today it is known as the Great Lakes - St. Lawrence Seaway, a deep draft waterway extending 2,340 miles from the Atlantic Ocean to the Great Lakes. The system serves mariners, farmers, and factory workers by moving a diverse array of commodities. The dominant commodities include iron ore for the steel industry, coal for power generation, limestone, grain for overseas markets, and cements, salt and stone aggregates for agriculture and industry.

The first joint U.S.-Canadian Deep Waterways Commission was formed in 1895 to investigate the feasibility of a Seaway, followed by establishment of the International Joint Commission (IJC) in 1909 and the signing of the Great Lakes – St. Lawrence Deep Waterway Treaty in 1932. Delayed by two world wars and other factors, the project began in 1954 when the St. Lawrence Seaway Authority mandated acquisition of lands for construction, operation, and maintenance of a deep draft waterway between the port of Montreal and Lake Erie, along with international bridges that cross it. The Seaway was completed in 1959 allowing navigation and access to global markets from the Great Lakes region. In 1993 and again in 2004, the Seaway's draft was increased by 3 inches from its original 26 feet, enabling ships to carry more cargo per voyage.

In 2017, the Montreal/Lake Ontario section of the seaway established a new record, remaining open from March 20 to January 11, a total of 298 days. The possibility of winter navigation and shipping on the Seaway are of great concern to shoreline communities. The U.S. Army Corps of Engineers conducted a study investigating the extension of the navigational season identifying probable impacts:

- erosion of shorelines and structural damage due to pressure waves induced by ship passage;
- damage to wetlands, benthic communities, and aquatic vegetation from high velocity water currents and ice scouring;
- re-suspension of sediments in spawning areas resulting in decreased egg and larvae vitality;
- degradation of water quality from resuspended sediment in the water column;
- decreased habitat connectivity, restricting normal migration patterns of native animals and fish; and
- potential loss of winter recreational activities such as ice fishing in small harbor areas due to unstable ice conditions resulting from ship passage.

4.4 Public Access and Recreation

Residents of, and visitors to, the St. Lawrence River watershed have diverse opportunities to enjoy water-related recreational activities including boating, swimming, hunting, fishing, and nature

observation. Public lands within the Adirondack Park are managed by the Adirondack Park Agency, which is part of NYSDEC. **Map 28** depicts NYSDEC recreational public access points supporting activities such as boating, camping, canoeing, fishing, hiking, and nature observation. A full list of NYS recreational areas is available at <https://www.dec.ny.gov/outdoor/>. In addition, many counties, cities, towns, and villages also offer boat launches for recreational access. Late spring and summer months are typically when recreational demand is along the St. Lawrence is at its peak.

Most of the shoreline along the St. Lawrence is privately owned with a few state parks managed by the Office of Parks, Recreation, and Historic Preservation (OPRHP). Surface water access to the St. Lawrence River is mostly provided by privately owned sites such as recreational clubs, marinas, restaurants, motels, and residential properties. However, demand for improving and enhancing opportunities for public access to swimming, fishing, and boating has increased throughout the watershed. Recreational freshwater fishing demand is highest for the Raquette (81,600 fishing day trips/year), Oswegatchie (69,300 fishing day trips/year), and St. Regis (55,900 fishing day trips/year) subbasins.

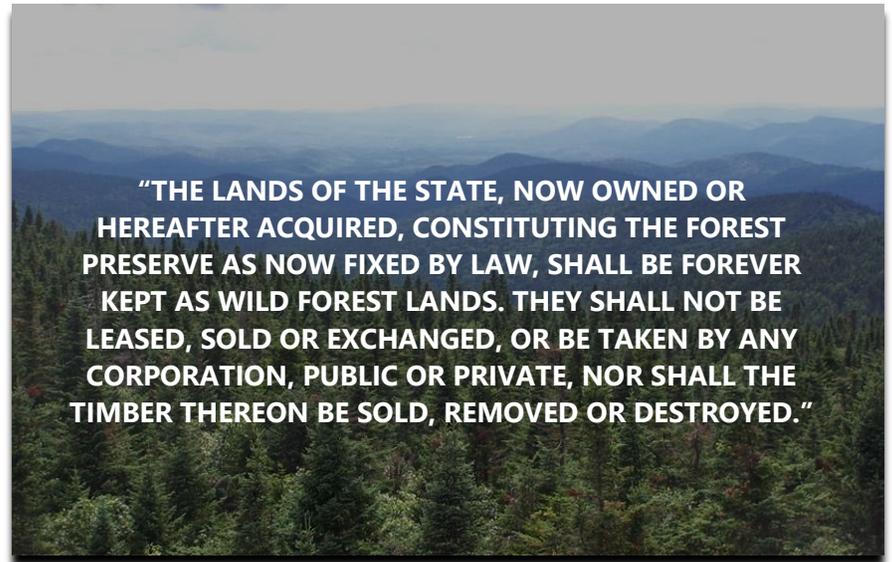
A recent study by the Trust for Public Lands researched the economic benefits of open space, conserved lands, public access and trails within the Thousand Islands region of Jefferson and St. Lawrence Counties. The study found that these amenities attract visitors and tourists, generating \$164 million in labor income and 6,100 jobs each year, as well as \$25.8 million in local taxes and \$21.0 million in state taxes annually (The Trust for Public Land, 2018, <https://tilandtrust.org/about-tilt/value-land-conservation>).

4.5 Protected Lands

In response to growing concerns regarding clear cutting of trees, NYS established the Adirondack Park in 1892 as a constitutionally protected Forever Wild area. Approximately 44% of the St. Lawrence River watershed lies within the Adirondack Park boundary. The Adirondack Park is a six-million-acre patchwork of public and private lands in northeastern New York. It cuts northeast from the southwestern corner of the Oswegatchie subbasin up to the middle of the Chateaugay-English subbasin. A significant proportion of this land is part of the Adirondack Forest Preserve, afforded

constitutional protections under Article 14 of the 1894 NYS Constitution, that prevent the removal of timber and guides management and land use within the park. These lands are rich in both recreational opportunity and ecological significance.

In 1971, the Adirondack Park Agency was created to oversee regulation that envelops the long-range public and private land use plans for the area. State lands fall under four classifications that determine management actions; forest preserve, state forests, wildlife management areas, and conservation easements. Public lands managed by NYSDEC and their classifications are shown in **Map 28**. The NYNHP has created the New York Protected Areas Database (<https://www.nypad.org/>) that collects and shares spatial information on lands protected, designated, or functioning as open space, natural areas, conservation lands, or recreational areas. In addition, the USGS maintains a Protected Areas Database and publicly available interactive map at <https://maps.usgs.gov/padus/>. It is important to note that these interactive mapping tools use the word “protected” somewhat loosely; lands can be public or private, open or closed to public use, permanently protected from development, or subject to future changes in management.



Article 14 of the 1984 New York Constitution
Photo Source: Stephen Williams, The Daily Gazette

4.6 Infrastructure

4.6.1 Dams

Dams serve many purposes within the St. Lawrence River watershed including recreation, flood control and storm management, navigation, water supply, and hydroelectric power generation. There is a total of 190 dams in the St. Lawrence River watershed with the most being in the Raquette and Oswegatchie subbasins (**Map 29**). **Table 8** lists the number of dams within each HUC8 of the St. Lawrence River watershed.

The Federal Energy and Regulatory Commission works with dam owners, local municipalities, and regulatory agencies to provide licensing for dams throughout the watershed. NYSDEC’s DOW operates a NYS Dam Inventory which assigns a hazard classification to each dam structure based on the height of the dam, maximum capacity, physical characteristics, and downstream land use. A dam would be considered a high hazard dam (Class C) when in the case that it was to fail, loss of life and

significant damage to homes, commercial buildings, public utilities, highways and roads would be expected to occur. Moderate hazard dams (Class B) would result in some damage to homes, buildings, infrastructure, and public utilities in the circumstance of a dam failure. Low hazard (Class A) dams would be expected to only damage isolated buildings, vacant lands, or rural roads in the event of failure. **Table 9** lists the 21 high hazard dams, designated Class C by NYSDEC and their respective subwatershed.

Table 8
New York State Dam Classifications, St. Lawrence River Watershed

HUC8	Low Hazard (A)	Moderate Hazard (B)	High Hazard (C)	Total Dams
Upper St. Lawrence	0	0	4	4
Oswegatchie	21	10	6	37
Indian	24	2	0	26
Grasse	12	0	0	12
Raquette	44	6	10	60
St. Regis	23	1	1	25
Salmon	13	3	0	16
Chateaugay-English	8	2	0	10
St. Lawrence River Watershed	145	24	21	190

SOURCE: NYS Dam Inventory, <http://www.dec.ny.gov/maps/nysdams.kmz>.

Table 9
High Hazard (Class C) Dams in the St. Lawrence River Watershed

Dam Name	Length (ft)	Height (ft)	Max Discharge (cubic ft/s)	Max Storage (acre-ft)	Basin
Long Sault Dam	2960	132	873000	2000000	Upper St. Lawrence
Robert Moses/Robert H Saunders Dam	3200	167	873000	2000000	Upper St. Lawrence
Massena Intake Dam	4000	75	0	5000	Upper St. Lawrence
Iroquois Dam	1980	72	310000	50	Upper St. Lawrence
Cranberry Lake Dam	360	24	14220	57400	Oswegatchie
Newton Falls Dam	640	40	1331	16000	Oswegatchie
Flat Rock Dam	680	80	10500	5020	Oswegatchie
Ogdensburg Water-Power Company Dam	400	19	26600	4175	Oswegatchie
Browns Falls Dam	870	70	8900	3593	Oswegatchie
Eel Weir Dam	1020	30	52120	810	Oswegatchie
Carry Falls Dam	623	66	31800	117595	Raquette
Blake Falls Dam	1593	70	50000	37800	Raquette

Dam Name	Length (ft)	Height (ft)	Max Discharge (cubic ft/s)	Max Storage (acre-ft)	Basin
Rainbow Falls Dam	2420	91	62800	25800	Raquette
Higley Falls Power Dam	435	50	16540	13960	Raquette
South Colton Dam	877	50	50300	4500	Raquette
Norwood Dam	910	30	17800	4080	Raquette
Five Falls Dam	1655	60	45400	3090	Raquette
Colton Dam	465	27	31770	2310	Raquette
Norfolk Dam	500	29	22030	108	Raquette
East Norfolk Dam	423	20	16530	94	Raquette
Allen Falls Development Dam	766	40	25400	1780	St. Regis

SOURCE: NYS Dam Inventory, <http://www.dec.ny.gov/maps/nysdams.kmz>.

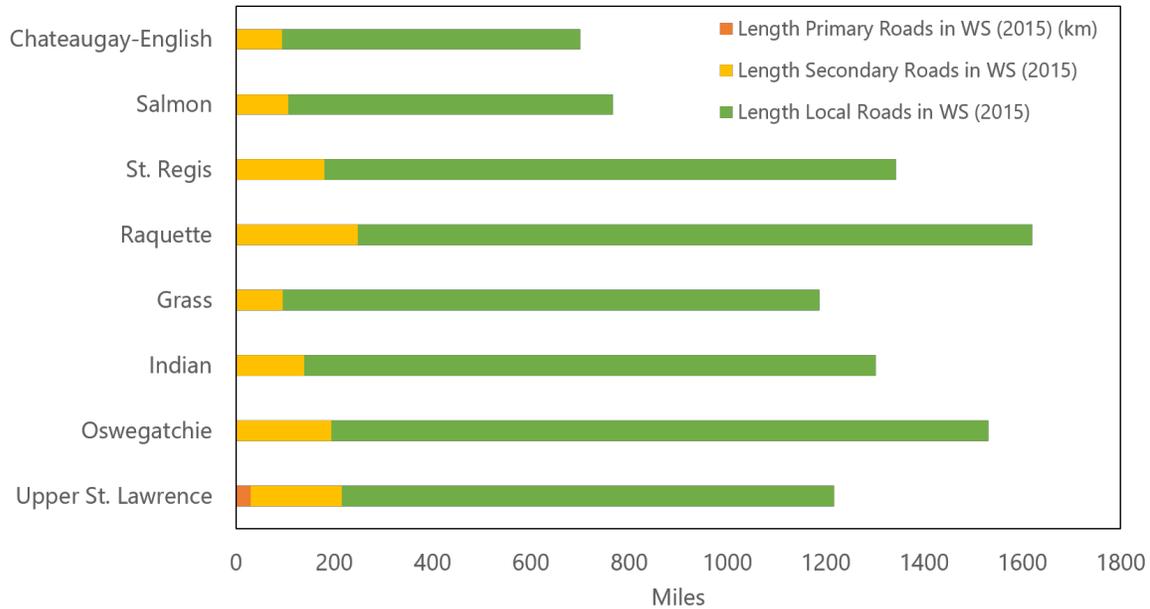
Dams serve as a major component of the watersheds' energy supply. Hydroelectric plants are reliable, cost-effective and support less-flexible sources of renewable energy. The Robert Moses-Robert H. Saunders Power dam first generated power in 1958 as part of the St. Lawrence-FDR project. It has 32 turbine-generators divided equally by the international border between the New York Power Authority (NYPA) and Canada's Ontario Hydro. The NYPA's 16 generating units can produce 800,000 kilowatts of electricity, more than enough energy to light a city the size of Washington, D.C. The Long Sault and Iroquois dams were also built as part of the St. Lawrence-FDR project.

4.6.2 Roads, Highways, and Railways

Roads, highways, and railways are shown on **Map 29**. The primary east-west highways are State Routes 11 and 37, which run parallel to the St. Lawrence River, and Highway 30, which runs north to south through Malone. Other significant roadways include State Routes 56, 68, 812, and 28. The watershed includes over 450 miles of railways with track CSXT crossing through Gouverneur to Massena and track ADCX traversing through the Adirondacks passing through Tupper Lake.

Roads, highways, and related infrastructure such as parking lots contribute to the amount of impervious area in a watershed. The St. Lawrence River watershed contains a small amount of impervious cover at 0.67%, covering a total area of approximately 24,000 acres (see Map 23). The greatest concentration of impervious cover lies within the Upper St. Lawrence and Indian River subbasins due to developed centers of Ogdensburg and Le Ray/Fort Drum. **Figure 6** illustrates the length of road miles in each watershed, categorized by primary, secondary, and local roads.

**Figure 5
Road Miles in Watershed**



Source: WSIO Indicator Data, 2018.

Notes: Primary roads refer to divided highways within the interstate highway system or under state management and are distinguished by the presence of interchanges and ramps for entrance/exit. Secondary roads are main arteries with one or more lanes of traffic in each direction that may be divided, and are usually in the US Highway, State Highway or County Highway system. Local roads are paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction and may be privately or publicly maintained.

4.7 Industries and Employment

The watershed developed centered around manufacturing and aluminum smelting along the St. Lawrence River with agricultural and forestry-related industries set more in-land. With time, a significant shift in the primary economic center of the watershed has occurred, incorporating areas such as Massena, Potsdam, and Gouverneur which host three of the five hospitals in St. Lawrence County. Colleges and Universities, including St. Lawrence University, SUNY Potsdam, SUY Canton, Clarkson University, Paul Smith’s College, and SUNY ESF Ranger school, are important employers and economic drivers within these communities. Agriculture utilizes much of the land in the St. Lawrence River watershed and continues to be a prominent contributing economy although it has experienced a 6% decrease in amount of farm and farmland from 2012 to 2017 (US Agricultural Census, 2017).

Significant industries within the counties of the St. Lawrence River watershed include manufacturing, educational services, health care, leisure and hospitality, public administration/government, transportation, and utilities (NYSDOL, 2015). The public sector employs nearly 20,000 people with an

average annual wage of \$53,300, making it the largest employment sector of the North Country. The educational services sector, carrying 19,000 jobs and an average annual wage of \$43,400 in 2015, lost hundreds of jobs between 2009 and 2014 due to declines in primary and secondary schools. The hospitality sector employs the third most workers of any sector in the North Country economy with more than 11,400 workers and average annual wages of \$14,500. The North Country region has an average annual unemployment rate of 5.3%, ranging from 4-7.5% throughout the year due to seasonal employment (NYSDOL, 2018).

5 Existing Water Quality Conditions

The NYSDEC Division of Water conducts regular, periodic assessments of waterbodies in the state to fulfill certain requirements of the Federal Clean Water Act (CWA). Waters are assessed according to their designated best use such as drinking water, recreation, and aquatic life, as defined by 6 CRR-NY 910.6.

- Class A, AA indicate a best usage for a source of drinking water, swimming, contact recreation, and fishing
- Class B indicates a best usage for swimming, contact recreation, and fishing
- Class C indicates a best usage for fishing and non-contact activities
- Class D indicates a best usage of fishing, but these waters will not support fish propagation

Waters with AA, A, B, and C classifications may also have “T” or “TS” classifications or standards, meaning that they support trout (T) populations or trout spawning (TS).

These assessments are compiled in an inventory database called the Waterbody Inventory/Priority Waterbodies List (WI/PWL). For waters classified as impaired, the Clean Water Act also requires states to consider a strategy, such as the development of a Total Maximum Daily Load (TMDL), to reduce the input of specific pollutant(s) restricting waterbody use. Impaired waterbodies are listed on the Section 303(d) list.

5.1 Waterbody Inventory and Priority Waterbodies

The Division of Water’s WI/PWL database compiles current water quality information, characterizes known or suspected water quality problems, and tracks progress toward their resolution. The documents can be found at <https://www.dec.ny.gov/chemical/36735.html>. The NYSDEC’s Rotating Integrated Basin Studies (RIBS), which sample water quality and macroinvertebrates in various regions on a five-year rotating basis, is a primary source of information. NYSDEC engages volunteers in water quality monitoring through citizen science programs, including the Citizen Statewide Lake Assessment Program (CSLAP) and the Water Assessments by Volunteer Evaluators (WAVE) program, which helps to provide additional water quality information and screening to determine where additional assessments are needed. According to NYSDEC staff, the WI/PWL assessments for the St. Lawrence River watershed reflect data collected through the 2014 NYSDEC sampling season, although the date of last assessment varies by waterbody.

The PWL identifies seven assessment classifications:

- *Impaired*: Waterbodies with well documented water quality problems that result in precluded or impaired uses

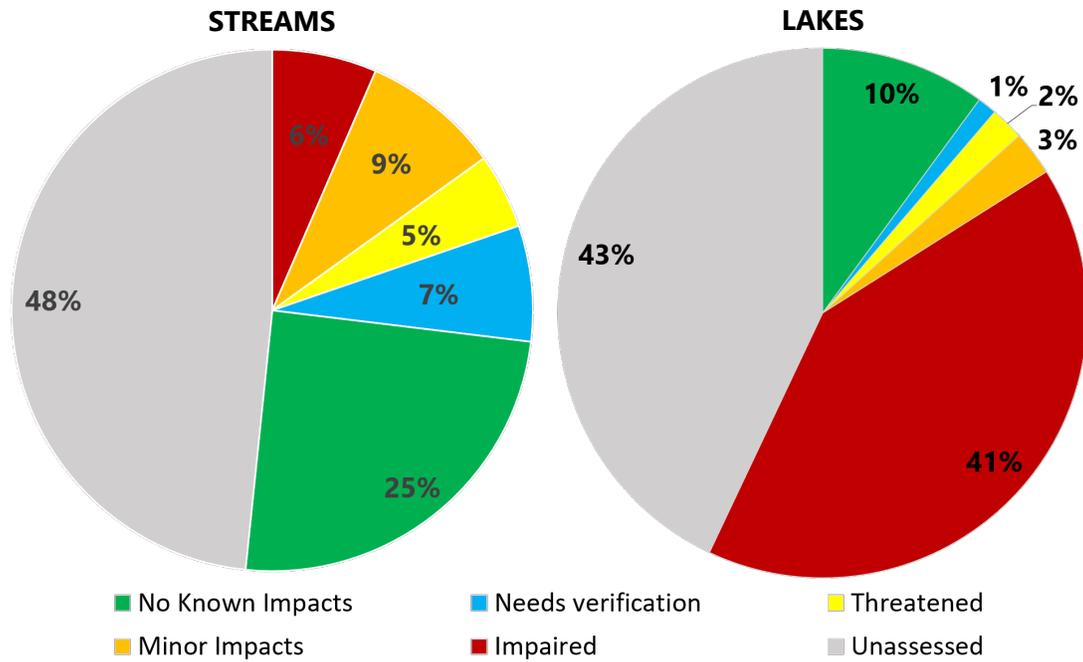
- *Minor impacts:* Waterbodies where less severe water quality impacts are apparent but uses are still considered fully supported
- *Needs verification:* Segments that are thought to have water quality problems or impact but for which there is not sufficient of definitive documentation
- *Threatened:* Waterbodies for which uses are not restricted and no water quality problems currently exist, but where specific land use or other changes in the surrounding watershed are known or strongly suspected of threatening water quality
- *Threatened (possible):* Waterbodies for which uses are not restricted and no water quality problems currently exist, but where waterbody classification, distinct uses, or other considerations make the water more susceptible to threats and additional protection efforts are warranted
- *No known impact:* Segments where monitoring data and information indicate that there are no use restrictions or other water quality impacts/issues
- *Unassessed:* Segments where there is no available water quality information to assess the support of designated uses

An overview of the PWL status for waterbodies in the St. Lawrence River watershed is presented in **Figure 6**. The WI/PWL assessed 52% (6,212 miles) of the total 12,030 miles of streams and rivers within the St. Lawrence River drainage basin. About 38% of the assessed stream miles are characterized as impaired, minorly impacted, or threatened. Thirteen (13%, 781 miles) of assessed stream miles were classified as impaired, signifying that the waters do not fully support their designated uses.

The 2016 WI/PWL assessed 57% of total lake acres within the watershed. Eighty percent (80%, 47,654 lake acres) of assessed (59,386) lake acres within the St. Lawrence River watershed were found to be impaired, minorly impacted, or threatened. About 72% of lake acres were found to be impaired and not supporting their designated use.

WI/PWL characterizations of lakes and streams in specific subwatersheds are shown in **Table 10** and **Map 30**.

Figure 6
WI/PWL Status of St. Lawrence River Watershed Waterbodies



SOURCE: NYSDEC, WI/PWL 2016

Table 10
Priority Waterbodies Assessment of St. Lawrence River Streams and Lakes

Streams (miles)						
HUC8	Impaired	Minor Impacts	Threatened	No Known Impacts	Unassessed	Assessed Impacted (%)
Upper St. Lawrence	254	204	--	--	166	100
Oswegatchie	298	181	265	157	1266	57
Indian	56	182	--	115	683	50
Grasse	30	175	--	707	548	19
Raquette	142	48	--	539	1677	26
St. Regis	--	58	--	841	722	5
Salmon	--	102	264	218	332	63
Chateaugay-English	--	84	32	398	423	22
Watershed	781	1034	560	2974	5818	38
Lakes (acres)						
HUC8	Impaired	Minor Impacts	Threatened	No Known Impacts	Unassessed	Assessed Impacted (%)
Upper St. Lawrence	--	--	--	--	1736	--

Oswegatchie	8581	--	--	638	8457	92
Indian	8487	2263	474	292	4998	97
Grasse	56	--	--	1294	2248	4
Raquette	21157	225	--	6220	21167	76
St. Regis	1782	356	1656	850	4568	82
Salmon	54	--	--	667	1174	4
Chateaugay-English	2564	--	--	543	390	83
Watershed	42681	2843	2129	10505	44739	80

SOURCE: NYSDEC WI/PWL 2016a

5.2 Section 303(d) List

Forty-three waterbodies in the St. Lawrence River watershed are classified as impaired and are therefore included on the Final NYS 2016 303(d) list. These waterbodies are listed in **Table 11**, which also indicates the specific pollutants causing impairment and their sources. Data reported in this document is from NYS's Final 2016 Section 303(d) List (NYSDEC 2016b).

The St. Lawrence River drainage basin lists four waterbodies under Section 303(d) Part 1, classifying them as waters with impairment requiring development of a total maximum daily load allocation. A TMDL quantifies the maximum amount of a pollutant that a waterbody can receive and maintain its designated uses and defines the magnitude of source reductions. Waterbodies in need of a TMDL include the Lower Raquette River and minor tributaries (pathogens from onsite waste treatment systems), Black Lake Outlet - Black Lake (phosphorus from agricultural runoff), Fish Creek and minor tributaries (phosphorus from on-site waste treatment systems), and Little River and tributaries (priority organics from industrial waste disposal).

Twenty-six waterbodies in the watershed are listed under Section 303(d) Part 2a, which means they are impaired by atmospheric deposition, or acid rain. In 2006, NYSDEC completed TMDLs for 143 acid-impaired lakes within the New York's Forest Preserve, the majority of which were listed as impaired on the inaugural 303(d) list in 1998. The Forest Preserve has expanded in recent years, and the current TMDL is focused on the remaining acid-affected lakes.

Thirteen of the St. Lawrence River drainage basin's waterbodies are listed under Part 2b, meaning they are subject to fish consumption advisories due to contamination with dioxin, pesticides, PCBs, and mercury. Note that Stark Fall Reservoir (0903-0073) and Willis Pond (0903-0105) have been added to the Draft 2018 303(d) List under Part 2b. A TMDL was developed to target mercury pollution in the Northeast Region in 2007.

In addition to the classifications shown in **Table 11**, Appendix A of Section 303(d) lists thirty-four waterbodies in the watershed that are classified as smaller lakes impaired by atmospheric deposition of acid rain.

Table 11
NYS 303(d) Listed Waterbodies in the St. Lawrence River Watershed

HUC8	Waterbody Name	Type	Class	Cause/Pollutant	Source
Part 1—Requiring TMDL Development					
Raquette	Raquette River, Lower, and minor tribs (0903-0059)	River	B	Pathogens	Onsite WTS
Indian	Black Lake Outlet, Black Lake (0906-0001)	Lake	B	Nutrients (P)	Agriculture
	Fish Creek and minor tribs (0906-0026)	River	C	Nutrients (P)	Onsite WTS
Oswegatchie	Little River and tribs (0905-0090)	River	C(T)	Priority Organics	Industry/Landfill
Part 2a—Impaired due to atmospheric deposition					
Grasse	Len, Wolf, Beaver Ponds (0904-0002)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
Salmon	Wolf Pond (0902-0006)	Lake	B	Acid/Base (pH)	Atmospheric Deposition
	Catamount Pond (0902-0092)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
St. Regis	Lower, Upper Twin Ponds, more (0902-0045)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Duck Pond, Benz Pond (0902-0021)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Diamond Lake (0902-0011)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
Raquette	Rock Pond (0903-0001)	Lake	B(T)	Acid/Base (pH)	Atmospheric Deposition
	High Pond (0903-0001)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Little Pine Pond (0903-0028)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Spruce Crouse, Spring, Graves Ponds (0903-0041)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Halfmoon Pond (0903-0032)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	South Pond (0903-0005)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Salmon Pond (0903-0004)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition

HUC8	Waterbody Name	Type	Class	Cause/Pollutant	Source
	Pilgrim Pond (0903-0043)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Haymarsh Ponds, Lone Pond (0903-0017)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Lost Pond (0903-0057)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
Oswegatchie	W. Br. Oswegatchie (0905-0003)	River	FP	Acid/Base (pH)	Atmospheric Deposition
	Dry Timber Lake	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Gregg Lake, Green, Twin, Loon Hollow Ponds (0905-0035)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Muskrat Pond (0905-0062)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Bear Pond, Diana Pond (0905-0062)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Lower, Middle, Upper South Pond (0905-0012)	Lake	D	Acid/Base (pH)	Atmospheric Deposition
	Desert, Jakes, Buck, Hog Ponds (0905-0038)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Crystal Lake (0905-0030)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Minor Lake Trib to Upper Oswegatchie (0905-0005)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
	Gull Lake (0905-0072)	Lake	C(T)	Acid/Base (pH)	Atmospheric Deposition
Part 2b—Impaired with respect to fish consumption					
Upper St. Lawrence	St Lawrence River (0901-0001)	River	A	Dioxin	Contaminated Sediment
				Mirex	Contaminated Sediment
				PCBs	Contaminated Sediment
	St Lawrence River (0901-0002)	River	A	Dioxin	Contaminated Sediment
				Mirex	Contaminated Sediment
				PCBs	Contaminated Sediment
	St Lawrence River (0901-0015)	River	A	Dioxin	Contaminated Sediment
				Mirex	Contaminated Sediment

HUC8	Waterbody Name	Type	Class	Cause/Pollutant	Source
	St Lawrence River (0901-0004)	River	A	PCBs	Contaminated Sediment
				Dioxin	Contaminated Sediment
				Mirex	Contaminated Sediment
				PCBs	Industr, Contam Sed
	Massena Power Canal (0904-0012)	River	D	PCBs	Industr, Contam Sed
Grasse	Grasse River (0904-0009)	River	B	PCBs	Industr, Contam Sed

SOURCE: NYS 303(d) list (2016)

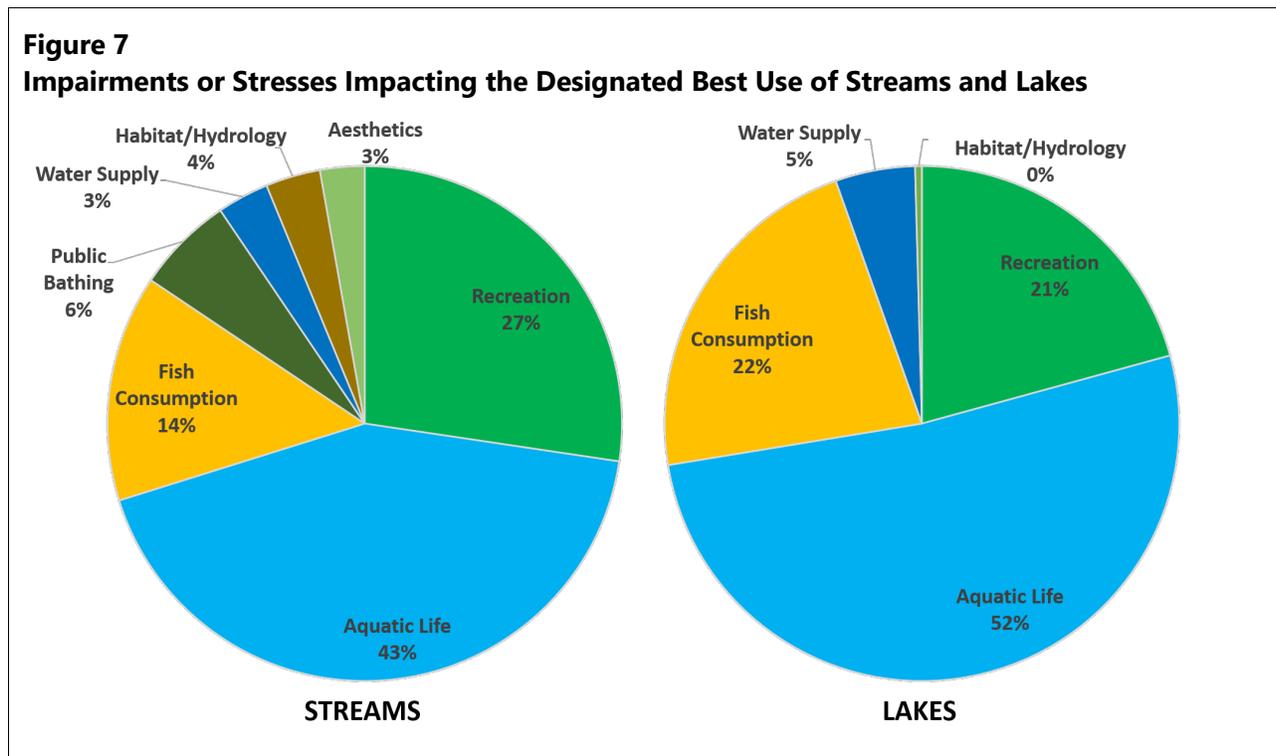
6 Waterbody Impairments and Potential Sources of Pollution

This section begins with an overview of known impairments and stresses to waterbodies in the St. Lawrence River watershed, and then summarizes potential sources of pollution that may contribute to those impairments and stresses.

6.1 Impairments to Designated Best Use

NYSDEC assesses impacts to waterbodies based on their designated best use and characterizes them as impaired or stressed if their best use is not being met, as was discussed in section 5. Waters of the St. Lawrence River watershed are best used for fishing, recreation, swimming, and potable water.

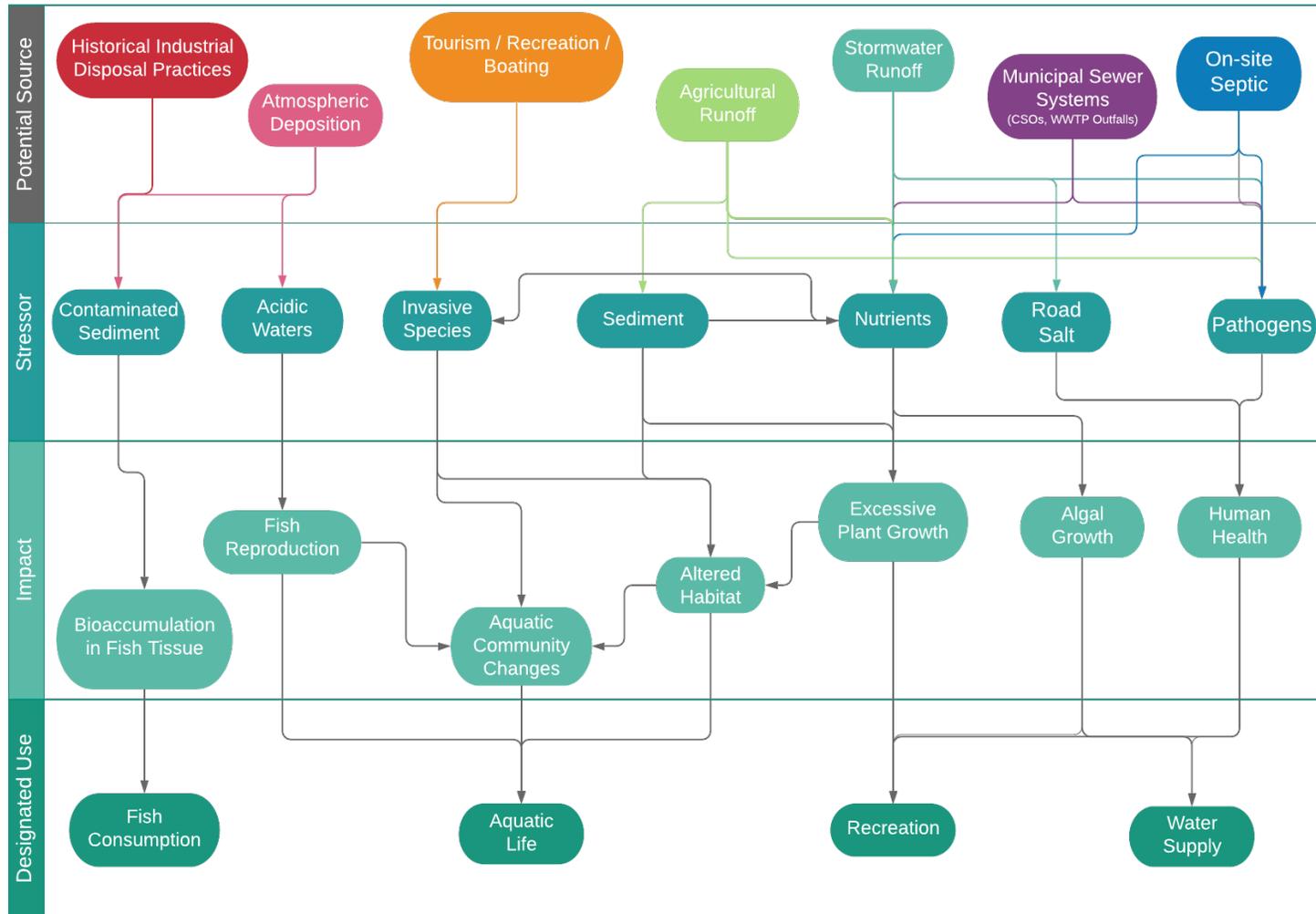
Figure 7 summarizes the percentage of streams and lakes in the watershed that do not meet their designated best use (including waterbodies found to be impaired, displaying minor impacts, threatened, and/or needing verification).



SOURCE: NYSDEC, WI/PWL (2016)

Aquatic life is “stressed” in 43% and 52% of impacted streams and lakes, respectively. The mountain and wilderness areas are host to cold-water fisheries, while lakes and streams in the open and wooded lowlands support warmwater fisheries. Fish consumption is affected in 14% of streams and 22% of lakes in the watershed. Use of 33% of streams and 21% of lakes are impacted in ways that affect recreation and swimming. A conceptual model linking sources, stressors, and their impact on a designated use of a waterbody in the St. Lawrence River watershed are shown in **Figure 8**.

Figure 8
Conceptual Model - Linking Sources, Stressors, Impacts, and Designated Use in the St. Lawrence River Watershed



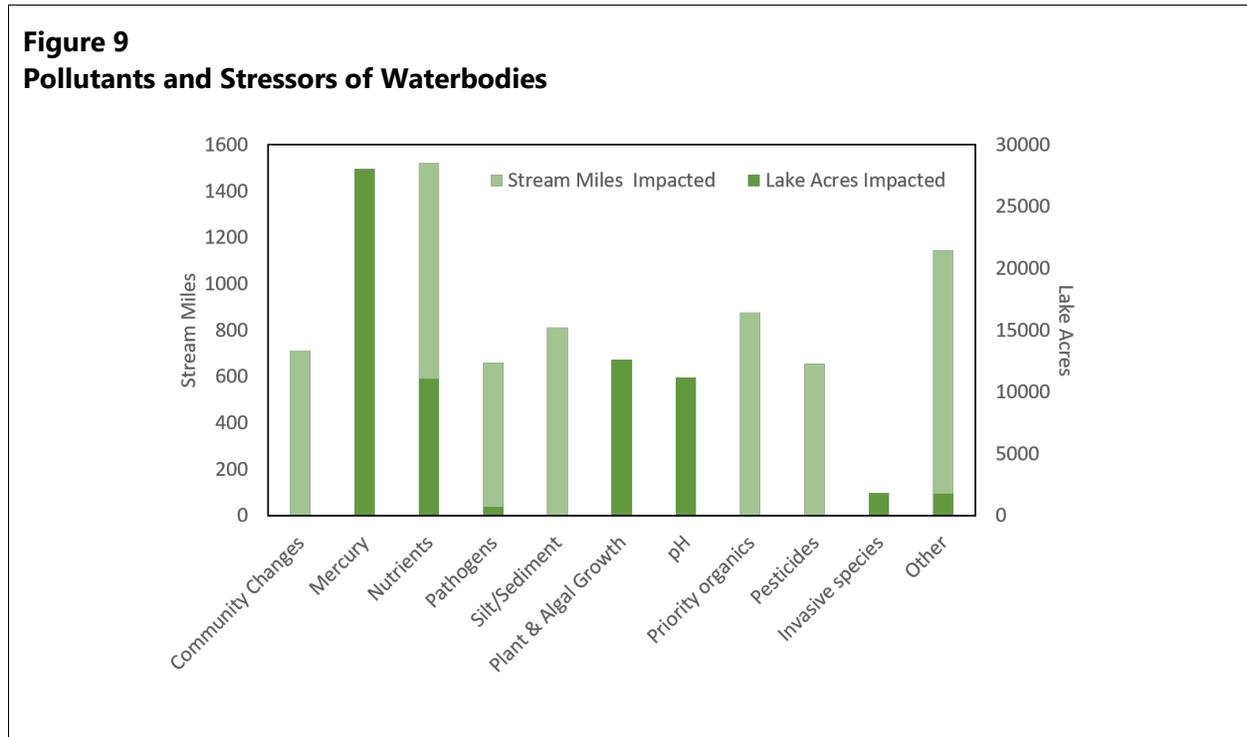
6.1.1 Fish Consumption Advisories

NYS has issued blanket and regional advisories for all waters in the St. Lawrence Valley and Adirondack region concerning consumption of specific species. The NYSDOH provides advisories for individual waterbodies and sportfish species and maintains a web site noting current status at https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/.

6.2 Impacts and Stressors Preventing Waterbodies from Meeting Their Designated Uses

The St. Lawrence River watershed has experienced numerous ecological impacts associated with the stresses brought on by such human activities as industry, commercial and recreational navigation, agriculture, and development. **Figure 9** characterizes the most frequently cited pollutants and stressors affecting water quality according to the 2016 NYSDEC WI/PWL and 303(d) List.

Pollutants and sources affecting water quality in the basin differ in streams and lakes. Nutrients (25% of assessed stream miles, 1,500 miles), priority organics such as PCBs, dioxins and PAHs (14%, 875 miles), and sediment (13%, 810 miles) are the most common pollutants of streams. Lakes in the watershed are primarily impacted by mercury (47%, 28,000 acres), excessive algal and plant growth (21%, 12,600 acres), and acidic waters (19%, 11,200 acres). Other threats to water quality in the watershed include community composition changes and invasive species, silt/sediment transport, salinization, and pathogens.



SOURCE: NYS WI/PWL & 303(d) List, (2016)

The subsections below discuss causes for impairment in lakes and streams that are not meeting their designated best uses of fish consumption, aquatic life, recreation, and water supply.

6.2.1 Mercury

Impaired Use: Fish Consumption

Approximately 47% of assessed lake acres in the watershed are threatened, stressed, or impaired due to mercury found in sediments, waters, and fish. Fish consumption advisories have been issued due to elevated levels of mercury in certain fish species and sediments of the St. Lawrence River watershed. In the aquatic environment, microbial processes can metabolize mercury into its organic form, methylmercury. Acidic lake conditions have been shown to enhance this transformation. Methylmercury is a potent neurotoxin that bioaccumulates in fish and aquatic organisms. Human exposure to mercury is largely through consumption of contaminated fish, where developing fetuses and young children are the most sensitive populations.

6.2.2 Contaminated Sediment

Impaired Use: Fish Consumption

As a result of historical industrial practices and improper waste disposal, stream bottom sediments in portions of the St. Lawrence River watershed have been contaminated by priority organics (14% of assessed streams, 876 miles) and pesticides (11%, 656 miles). The Upper St. Lawrence subbasin at the St. Lawrence River and Massena Power Canal, the Oswegatchie subbasin at Little River and tributaries, and the Grasse River at the mouth of the Power Canal within the Grasse River subbasin are on the 2016 state and federal list of impaired waters due to sediment contamination by organic chemicals. The pollutants are dioxins, PCBs, and Mirex (an organochlorine insecticide); all are known to be bioaccumulative and carcinogenic. Benthic organisms exposed to contaminated sediment can accumulate these compounds through oral and dermal exposure. These compounds biomagnify to increased concentrations along the food chain, making some species of fish unsuitable for human consumption.

6.2.3 Acidic Waters

Impaired Use: Aquatic Life

Acidic waters are the third leading pollutant of lakes of the St. Lawrence River watershed, affecting 19% (11,167 lake acres) of assessed lake acres and an additional 400 stream miles (WI/PWL, 2016). Acidified waters have many ecological effects, especially on aquatic life. These waters leach nutrients and metals (e.g., calcium, aluminum) from soil clay minerals, which then flow across the surface as runoff water into streams and lakes or sink into the soil. Aluminum is toxic to vegetation at high levels and impairs a plant's ability to take up water and withstand environmental stressors, while the loss of soil nutrients can stunt plant growth and productivity. Leached aluminum can interfere with

ion regulation in aquatic animals and can accumulate on the surface of fish gills, leading to respiratory dysfunction. In addition, low pH and increased aluminum levels have been shown to cause chronic stress to fish, resulting in lower body weight and size that makes them less capable of competing for food and habitat. Fish reproduction is adversely impacted by acidic waters; calcium levels in female fish become lower to the point where egg production or pass is not viable, or larvae development is abnormal. Aquatic community composition changes and biodiversity decreases as lakes and streams become more acidic and viable only for fish and plant species that can tolerate lower pH levels. Even fish species that are more tolerant of acidic waters may suffer population impacts due to decreased food supply.

NYSDEC has conducted a liming program of acidic waters since 1959 with the purpose of restoring or protecting fish communities. These efforts, in addition to reductions resulting from implementation of the Clean Air Act, have contributed to the trend of increasing pH across several lakes. Analysis of historical data reveals that 25% of lakes included in the Adirondack Lake Assessment Program (ALAP) with long-term data have exhibited an increasing trend in pH (Laxson *et al.*, 2018).

6.2.4 Invasive Species

Impaired Uses: Aquatic Life, Recreation

Native aquatic species in the St. Lawrence River watershed are vulnerable to the presence of invasive species—nonnative organisms, such as rooted, aquatic plants, algae, animals, bacteria, viruses, and insects, that can harm humans or the environment. Invasive species pose a threat to aquatic habitat, nutrient cycling, and a lake or stream's capacity to fully support its designated uses. **Table 12** lists known invasive species and "watch", or "prevention" species referenced by the Partnerships for Regional Invasive Species Management (PRISMs), which coordinate invasive species management and monitoring efforts. Although the 2016 WI/PWL (2016) listed only three St. Lawrence River watershed waterbodies as impacted by invasive species (1,767 acres, 3%), research by the St. Lawrence-Eastern Lake Ontario (SLELO) Partnership, and Adirondack Park Invasive Plant Program (APIPP), and the Adirondack Watershed Institute has documented the widespread scale of invasives.

Typically, invasives grow and reproduce quickly and spread aggressively due to a lack of predators in the invaded environment. Their presence can quickly alter community dynamics, decrease biodiversity, and threaten native wildlife. The viability and proliferation of invasive species is dependent on the type of habitat invaded and associated stressors of that ecosystem. As an invasive population increases in size, it demands greater resources for management and inflicts grater impacts. Therefore, rapid identification of invasive species is critical to successful management and minimizing impacts.

Two especially significant aquatic invasive species have been the target of management efforts in the watershed, Eurasian milfoil and variable leaf milfoil. These submerged plants compete aggressively with native plants, growing in dense mats that shade out native plants and tend to reduce the levels of dissolved oxygen below. The thick growth also interferes with fishing, swimming, and recreational access. Plant fragments often are transported from lake to lake on boat trailers of fishing gear, starting new populations. The plants can grow in a variety of environments and sediment types, contributing to its widespread distribution. The Adirondack Park Agency and many lake associations are actively working to reduce its presence, but once established it is very difficult to eliminate. Terrestrial invasive species, such as Japanese Knotweed, and forest pests, such as the Emerald Ash Borer, Asian Longhorned Beetle and Hemlock Woolly Adelgid, can impact water quality by threatening riparian health and cold-water stream habitat. APIPP maintains an interactive Invasive Species Distribution Map documenting the distribution and management status of target aquatic and terrestrial invasive species within the Adirondack region (<http://adkinvasives.com/Invasive-Web-Map/index.html>). NYNHP also operates an invasive species database and mapping tool, iMapInvasives, <https://www.nyimainvasives.org/>.

Additional impacts related to invasive species are discussed in **Section 6.2.6** in the context of aquatic plants (macrophytes) and adverse impacts on recreation.

Table 12
Invasive Species Targeted for Prevention, Early Detection, and Control

Species	Scientific Name	PRISM
Target/General Invasive Species		
Asian Clam	<i>Corbicula fluminea</i>	APIPP
Autumn Olive	<i>Elaeagnus umbellata</i>	APIPP
Bale & Pale Swallow-wort	<i>Cyanchum spp.</i>	SLELO
Buckthorns	<i>Rhamnus cathartica, Frangula alnus</i>	APIPP
Bush Honeysuckles	<i>Lonicera spp.</i>	APIPP
Chinese Mystery Snail	<i>Cipangopaludina chinensis</i>	APIPP
Common Reed Grass	<i>Phragmites australis</i>	APIPP
Cup Plant	<i>Silphium perfoliatum</i>	APIPP
Curly-leaf Pondweed	<i>Potamogeton crispus</i>	APIPP
Emerald Ash Borer	<i>Agrilus planipennis</i>	APIPP, SLELO
Eurasian Watermilfoil	<i>Myriophyllum spicatum</i>	APIPP, SLELO
European Frog-bit	<i>Hydrocharis morsus-ranae</i>	APIPP, SLELO
Fishhook Waterflea	<i>Cercopais pengoi</i>	APIPP
Garlic Mustard	<i>Alliaria petiolata</i>	APIPP
Giant Hogweed	<i>Heracleum mantegazzianum</i>	APIPP, SLELO
Glossy Buckthorn	<i>Frangula alnus</i>	SLELO
Hemimysis	<i>Hemimysis anomala</i>	SLELO

Species	Scientific Name	PRISM
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	APIPP
Japanese Barberry	<i>Berberis thunbergii</i>	APIPP
Japanese Honeysuckle	<i>Lonicera japonica</i>	SLELO
Japanese Knotweed	<i>Polygonum cuspidatum</i>	SLELO
Japanese Stilt Grass	<i>Microstegium vimeneum</i>	SLELO
Knotweeds	<i>Reynoutria spp.</i>	APIPP
Leafy Spurge	<i>Euphorbia esula L.</i>	SLELO
Leek Moth	<i>Acrolepiopsis assectella</i>	SLELO
Lesser Celandine	<i>Ficaria verna</i>	APIPP
Multiflora Rose	<i>Rosa multiflora</i>	APIPP
Norway Maple	<i>Acer platanoides</i>	APIPP
Oriental Bittersweet	<i>Celastrus orbiculatus</i>	APIPP
Phragmites	<i>Phragmites australis</i>	SLELO
Purple Loosestrife	<i>Lythrum salicaria</i>	APIPP, SLELO
Quagga Mussel	<i>Dreissena rostriformis bugensis</i>	SLELO
Round Goby	<i>Neogobius melanostomus</i>	SLELO
Scotch Broom	<i>Cytisus scoparius</i>	APIPP
Sirex (European) Woodwasp	<i>Sirex noctilio</i>	APIPP, SLELO
Spiny Waterflea	<i>Bythotrephes longimanus</i>	APIPP, SLELO
Spotted Knapweed	<i>Centaurea maculosa</i>	SLELO
Spring Viraemia		SLELO
Swallow-worts	<i>Cynanchum louiseae</i>	APIPP
Tree of Heaven	<i>Ailanthus altissima</i>	APIPP
Variable-leaf Watermilfoil	<i>Myriophyllum heterophyllum</i>	APIPP
Viral Hemorrhagic Septicemia		SLELO
Water Chestnut	<i>Trapa natans</i>	APIPP, SLELO
White Nose Syndrome		SLELO
Wild Chervil	<i>Anthriscus sylvestris</i>	SLELO
Winged Burning Bush	<i>Euonymus alatus</i>	APIPP
Yellow Iris	<i>Iris pseudacorus</i>	APIPP
Zebra Mussel	<i>Dreissena polymorpha</i>	APIPP
Prevention Watch-List Species		
Asian Longhorned Beetle	<i>Anoplophora glabripennis</i>	APIPP, SLELO
Asian Carp	<i>Cyprinus carpio</i>	SLELO
Asian Clam	<i>Corbicula fluminea</i>	SLELO
Asian Jumping Worm	<i>Amyntas spp.</i>	SLELO
Eurasian Boar	<i>Sus scrofa</i>	APIPP
Fanwort	<i>Cabomba caroliniana</i>	SLELO
Feral Swine	<i>Sus scrofa Linnaeus</i>	SLELO
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	SLELO
Hydrilla	<i>Hydrilla verticillata</i>	APIPP, SLELO

Species	Scientific Name	PRISM
Japanese Angelica Tree	<i>Aralia elata</i>	APIPP
Japanese Stiltgrass	<i>Microstegium vimineum</i>	APIPP
Kudzu (Vine)	<i>Pueraria lobata</i>	SLELO
Mile-A-Minute	<i>Polygonum perfoliatum</i>	APIPP, SLELO
New Zealand Mud Snail	<i>Potamopyrgus antipodarum</i>	SLELO
Porcelain Berry	<i>Ampelopsis brevipedunculata</i>	APIPP, SLELO
Quagga Mussel	<i>Dreissena rostriformis bugensis</i>	APIPP
Rock Snot (didymo)	<i>Didymosphenia geminate</i>	SLELO
Rusty Crayfish	<i>Orconectes rusticus</i>	APIPP/SLELO
Slender False Brome	<i>Brachypodium sylvaticum</i>	APIPP
Tench	<i>Tinca tinca</i>	SLELO
Water Soldier	<i>Stratiotes aloides</i>	SLELO
Wineberry	<i>Rubus phoenicolasius</i>	APIPP

SOURCE: SLELO and APIPP PRISMS, retrieved December 6, 2019.

Note: Bold rows refer to species on SLELO's General Invasive Species List.

6.2.5 Nutrients

Impaired Uses: Aquatic Life, Recreation

Although nutrients are required to support healthy ecosystems, excessive nutrients can harm water supplies, recreational uses, and aquatic life. Nutrient contamination of surface waters, primarily attributed to nitrogen and phosphorus, has been a longstanding issue that is not unique to the St. Lawrence River watershed. The WI/PWL cited nutrients as the primary pollutant of streams in the St. Lawrence River watershed, affecting 1,520 miles (24% of the assessed 6,212 miles). Nutrients affect the fourth greatest amount of assessed lake area (11,074 lake acres, 19%) in the watershed.

In freshwater systems, phosphorus is typically the limiting element on growth and productivity. Excessive levels of nutrients stimulate the growth of algae and aquatic plants, which upon dieback are decomposed by bacteria that consume oxygen on the water floor. This can result in hypoxia (low oxygen conditions), which is detrimental to aquatic life and habitat. Other impacts related to excessive plant and algal growth are discussed below.

6.2.6 Excessive Plant and Algal Growth

Impaired Uses: Aquatic Life, Recreation, Water Supply

Twenty-one percent of lakes (12,630 acres) and an additional 156 miles of streams in the watershed are impacted by excessive plant and algal growth. Excessive plant growth diminishes the recreational value of the waterbody by inhibiting swimming and boating, which in turn impacts local economies that are largely dependent on tourism and recreation. Excessive plant growth can also decrease habitat for fish and spawning beds. Often, the excessive growth is due to the introduction of invasive species that form dense beds on the lakebed and outcompete native species for habitat. In

particular, invasives such as Eurasian milfoil and curly leaf pondweed can inhabit various sediments, depths, and light conditions, altering conditions that were previously good conditions for spawning habitat.

Algae is a fundamental component of any aquatic food web, as it produces oxygen, provides food for many organisms, and removes nutrients from the water column. However, when a significant influx of nutrients occurs, algae can grow excessively, creating an unpleasant and unaesthetic atmosphere for swimmers and recreationists. Algal growth can contribute to taste and odor issues and clog intake pipes impacting drinking water sources. Large mats of algal growth block sunlight necessary for aquatic plants below the surface, altering habitat and reducing oxygen levels. In the dieback season, algae fall to the water floor where it is microbially decomposed in a process that reduces dissolved oxygen levels. Reduced oxygen levels significantly affect organisms in the benthic zone and cause changes in community dynamics and potential migration of organisms to areas with more suitable conditions.

Some algal species can produce toxins. Harmful algal blooms (HABs) are kept in check partly by native nontoxic algae that readily take up excess nutrients from the water column. However, HABs can proliferate in suitable environmental conditions, which include excess nutrients, increased precipitation, sufficient sunlight, low-flow conditions, warm temperature, and calm waters (low wind). Lake dynamics such as native algal species and presence of invasive species contribute to their presence. Lake associations and organizations such as the Adirondack Watershed Institute are actively involved in training the public and lake residents on how to identify and report HABs in the watershed. NYSDEC encourages lake users to “know it, avoid it, and report it” when a suspected HAB is observed and operates a NYHABS online notification and reporting system for HABs.

6.2.7 Sedimentation

Impaired Use: Aquatic Life, Recreation

Sedimentation affects 13% (812 miles) of assessed stream miles in the St. Lawrence River watershed (WI/PWL, 2016). Sedimentation occurs when loose sand, clay, silt, and other soil particles enter and fill catch and flood basins, structures that are important for mitigating flooding and increasing volumetric capacity during times of increased precipitation and snowmelt. When these structures are instead filled with excess sediment, their functionality is inhibited.

Sediment deposits in rivers can alter the natural flow of water and reduce water depth, affecting recreational use and navigation. In addition, soft sediment deposits can increase turbidity and make swimming undesirable. Aquatic life is also affected by the transport of sediment and associated nutrients; turbid conditions can prevent fish from finding prey, and sediment can clog fish gills, lowering growth rates and reducing resistance to disease.

6.2.8 Salt

Impaired Use: Aquatic Life, Water Supply

Salts from de-icing and residential water softeners can enter lakes and streams, and groundwater that supply drinking water. Just one teaspoon of salt can permanently pollute five gallons of water. Once in the water, treatment becomes difficult and expensive. The St. Lawrence River watershed has a growing salt contamination problem that threatens drinking water supplies and aquatic life. Lakes in watersheds with paved roads have a median sodium concentration four times greater than those in watersheds without paved roads (Kelting, Laxson, and Yerger 2012). Dissolved salts can leach into aquifers and ground water when exposed to rain, snow, and wind. Road salt that enters roadside soils can also displace other cations within the soil, leaching them from the soil for offsite transport and depleting soil fertility. This cation loss from soils demonstrates a flux that may have a significant impact on soil and waterbody biogeochemistry and ecosystem health by reducing water retaining capacity and increasing erosion potential. Deicing compounds are known to be nontoxic at lower concentrations, but at higher concentrations they can place stress on fish and insect community structure, diversity, and productivity. Ultimately, salt intolerant species are outcompeted by salt-tolerant species, which often include invasive species. In addition, chloride corrodes road surfaces, bridges, and other elements of infrastructure, increasing maintenance and repair costs.

The Adirondack Watershed Institute at Paul Smith's College collected data showing that wells in the Adirondacks were contaminated by road salt at unhealthy levels. Two-thirds (2/3) of the wells tested downslope from state roads contained concentrations of sodium beyond the federally recommended health limit of 20 parts per million (ppm). The natural salinity of water in the Adirondacks is 0.3-0.5 ppm. Sodium has been strongly linked with hypertension, a condition that affects 12–30% of the population. Chloride levels exceeded 250 ppm, the recommended NYSDOH guideline for chloride, in nearly one-third of the 157 wells downslope of state roads. Some wells contained around 1,000 ppm of chloride, a level deemed not potable or drinkable (Virtanen, 2019).

6.2.9 Pathogens

Impaired Use: Water Supply

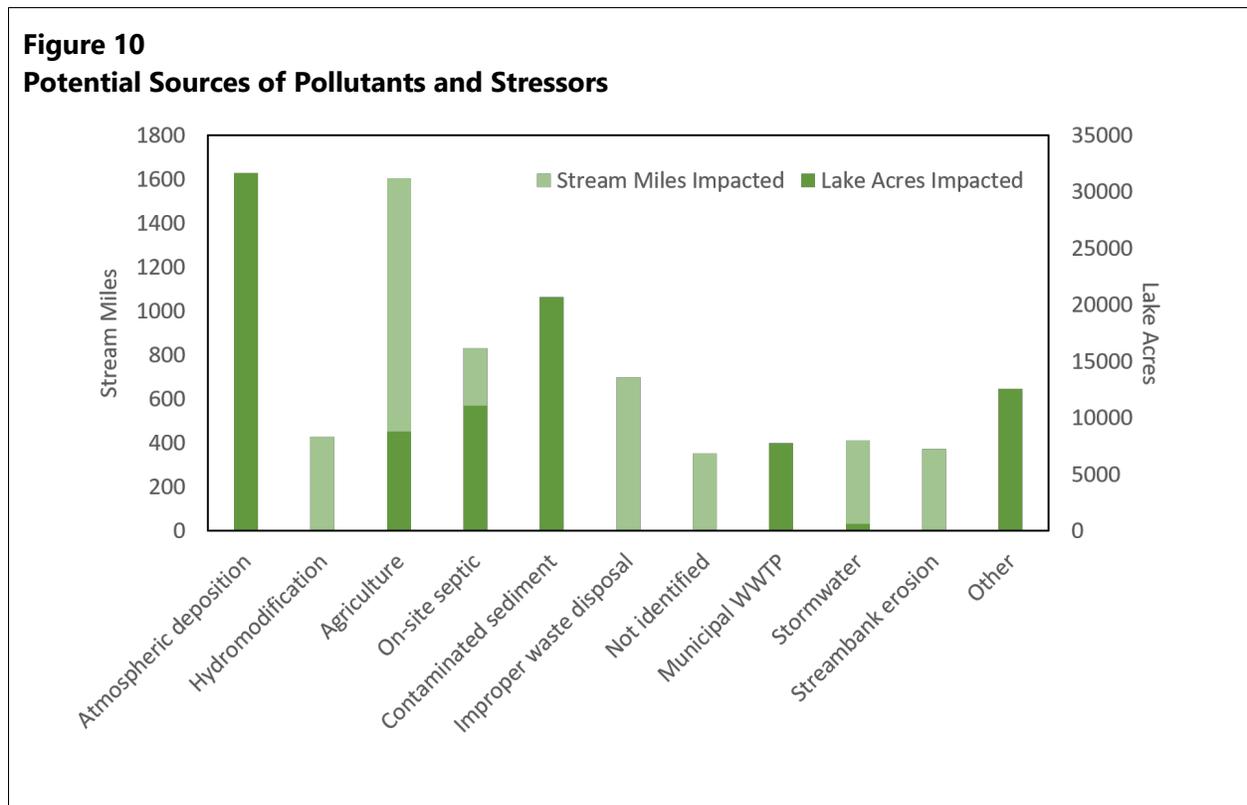
Pathogens affect 11% of assessed stream miles (661 miles) and 1% of lake acres (727 lake acres) (WI/PWL, 2016). Swimming in and drinking contaminated waters can make people ill, resulting in beach closures and an unsafe drinking water source. EPA has developed criteria to protect people from bacteria and their associated toxins in water bodies.

6.3 Potential Sources of Stressors

Lakes and streams in the St. Lawrence River watershed are affected by a combination of local and regional sources of pollution, which presents a challenge for those developing strategies to combat stresses and impairments to waterbodies. These sources include atmospheric deposition of

pollutants originating outside the basin (regional), as well as local point and nonpoint sources related to industry, agriculture, hydromodification, municipal infrastructure, development, and commercial and recreational navigation. Point sources refer to discharges that originate from a single, identifiable source such as a pipe or outfall from a sewage treatment plant, whereas nonpoint sources represent diffuse combinations of pollutants from a large area, such as stormwater runoff that accumulates contaminants from several sources and then flows into streams.

Figure 10 shows the potential pollutant sources affecting the St. Lawrence River watershed and the magnitude of their impact. **Maps 31** and **32** display pollution sources within the St. Lawrence River watershed, such as sites permitted under the National Pollution Discharge Elimination System (NPDES), Superfund, Brownfield, and Environmental Restoration sites, landfills, sites undergoing voluntary cleanup programs, and mines. Regional sources contributing to pollution, nonpoint local sources, and local point sources affecting the St. Lawrence River watershed are discussed in the subsections that follow.



SOURCE: NYS WI/PWL & 303(d) List, (2016)

6.3.1 Regional Nonpoint Sources

Atmospheric deposition of acid rain and mercury is the primary source of lake pollutants in the watershed, affecting 53% (31,680 lake acres) and 400 miles of streams. Atmospheric deposition is the process by which pollutants in the form of particulates, aerosols, and gases are transported by wind currents and released through precipitation to the earth's surface. For the St. Lawrence River watershed, the pollutants released through this process are inorganic acids (known as acid rain) and mercury. These pollutants represent historical sources that still affect the system due to the recycling of contaminants in the environment and the atmosphere; they are addressed by federal and state regulations, including the Clean Air Act and Clean Water Act.



Coal-fired plant in Monroe, Michigan
Photo source: crainsdetroit.com

6.3.1.1 Acid Rain

Acid rain is formed when sulfur dioxide (SO₂) and nitrogen oxides (NO_x) combine with moisture in the atmosphere to produce sulfuric and nitric acids. Sulfur dioxide and nitrogen oxides are largely produced through the combustion of fossil fuels and emitted by motor vehicles, power plants, and industries. Higher elevation areas of the St. Lawrence River watershed, including the Adirondacks, are highly susceptible to the impacts of acid rain due to their thin soils, which are largely devoid of limestone (calcium carbonate). This severely limits the soil's buffering capacity to counteract the impacts of acid rain, making lakes more vulnerable to its effects. Acid rain has affected 19% of lake acres (11,167 acres) in the watershed.

Federal and state programs including the Clean Air Act (1990), Clean Air Interstate Rule (CAIR), and NYS Acid Deposition Control Act have reduced emissions of nitrogen oxide and sulfur dioxide. Environmental improvements in the region have been documented recently in response to these air pollutant control strategies (Waller, 2012).

6.3.1.2 Atmospheric Deposition of Mercury

Mercury is emitted into the air through human activities such as mining and fossil fuel combustion and through natural processes such as volcanic eruptions. It is then deposited via atmospheric deposition onto land and water, where microbial processes can metabolize it into an organic form, methylmercury. Approximately 47% of the St. Lawrence River watershed lake acres are threatened, stressed, or impaired due to mercury found in sediments, waters, and fish. New York State has issued blanket and regional advisories for all waters in the Adirondack region concerning consumption of

specific species. The advisories include additional limits on fish consumption for women of child-bearing age and all children.

6.3.1.3 *Recreation and Commercial Transport*

Aquatic invasive species typically enter waterbodies via transport by boats and recreational users. The St. Lawrence River watershed is particularly susceptible to aquatic invaders due to international commerce from Eurasia across the Atlantic. Invasive plants and animals in ballast water enter the watershed through the St. Lawrence Seaway and rivers flowing from the Great Lakes. In addition, recreational boating, particularly in the Adirondack's region, can hasten the spread of invasive species. The NYSDEC coordinates efforts to combat invasive species through its Partnerships for Regional Invasive Species Management (PRISM).

6.3.2 Local Nonpoint Sources

6.3.2.1 *Runoff from Agricultural Areas*



Water flows off a farm following a storm.
Photo Source: Tim McCabe/NRCS

Agricultural activities and associated runoff contribute nutrients, sediments, and pesticides to receiving waters, which can have adverse effects on aquatic life and water quality. Twenty six percent (26%) of assessed stream miles (1,604 miles) and 15% of assessed lake acres (8,800 acres) in the watershed are threatened, stressed, or impaired due to agricultural activities (WI/PWL, 2016). There are 2,344 farms in the watershed

occupying 620,000 acres of land, and agricultural districts (**Map 22**) are concentrated primarily in the northern skirt of the basin, which is host to flat plains and rich soils (**Maps 14** and **18**). **Table 4** lists the farmed crops and livestock of the St. Lawrence River watershed and the associated amount of land used for the activity.

The Oswegatchie and Indian subbasins dedicate 14% and 22% of their total area, respectively, to agriculture and have the highest count of surface water segments listed as impaired due to nutrients. The counts include state-assigned pollutants/causes identified as nutrients, organic

enrichment/oxygen depletion, algal growth, or noxious aquatic plants. These IDs are associated with excess nutrients and sediment transport via agricultural runoff.

Fifteen percent (15%) of croplands and pasture in the watershed are contiguous to water, and 3% are on hydric soils. The Upper St. Lawrence has the highest percentage of agriculture contiguous to water at 31%. 70% of newly converted agricultural lands (1,100 acres) from 2001-2012 are within hydrologically connected zones, land that is comprised of wet areas with high runoff potential.

Impacts to local waterways can result from poor agricultural management, such as improper manure application on fields, intense cultivation of lands with little riparian buffer, and unrestricted access of livestock to streams. The St. Lawrence River watershed fertilizes 104,254 acres of farmland via manure application (USDA-NASS, 2018). An average of approximately 380 and 390 kg N/ha/year of manure and synthetic nitrogen, respectively, are applied to lands for fertilization purposes (WSIO Indicator Data, 2018).

6.3.2.2 *On-Site Water Treatment Systems (Septics)*

On-site septic systems are considered to threaten, stress, or impair 19% (11,100 acres) of lake acres and 13% (830 miles) of stream miles in the NY portion of the St. Lawrence River basin. Pathogens associated with sewage effluent can impair the use of a waterbody for contact recreation and as a source of potable water. Nutrients in wastewater can exacerbate algal growth, threatening aquatic life, recreation, and swimming access. The NYS Department of Health has established minimum standards for domestic septic systems. Other agencies, including the APA or local health departments may establish more stringent standards. Local municipalities can adopt local laws related to maintenance and inspection of septic systems that consider distance to waterways or critical environmental areas.

Historically, the St. Lawrence River watershed and the broader Adirondack region hosted many seasonal visitors from late spring to fall. Recent years have seen a rise in conversion of lakefront properties from seasonal cottages into year-round residences. If homes fail to upgrade their septic systems to accommodate this transition, they risk sewage effluents reaching nearby waterbodies. Depending on the age of the septic system, its distance from waterways, and the biogeochemical properties of the leach field (e.g., mineral composition and bulk density of soils, slope, depth to groundwater), even a well-maintained system may contribute nutrients to nearby waters and increase the risk of eutrophication.

The State administers a Septic System Replacement Fund Program through the NYS Environmental Facilities Corporation. This program provides funding to replace cesspools and septic systems in close proximity to priority waterbodies. At this moment (10/2020), Clinton (Upper Chateaugay Lake), Essex, Jefferson (Moon and Red Lakes and Indian River), and Saint Lawrence (Black Lake, St. Lawrence Main Stem, Little River and tributaries, Lower portion of Raquette River and Indian River) Counties

participate in the program. Black Lake has stepped through the first round of this program and is now proceeding to round two. In the first round (\$225K), 68 deficiencies were found, and 16 septic systems were replaced.

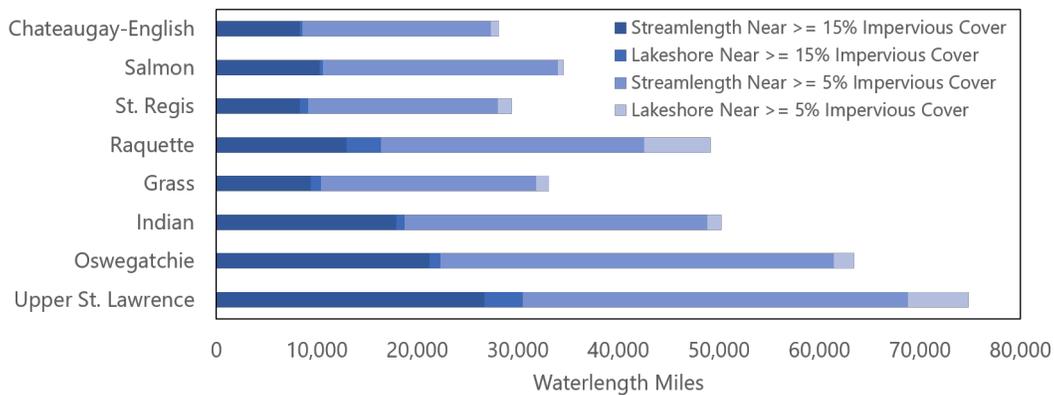
6.3.2.3 Road Deicing

Deicing compounds are effective and necessary for maintaining safe travel conditions for motorists throughout the winter months. The NYSDOT relies on sodium chloride (salt) as the primary de-icing chemical due to its low cost and availability. About 50% of salt applied to roads runs off to surface waters; the remainder accumulates in soils and eventually reaches groundwater (Kelting & Laxson 2017). Road salt runoff tends to be a problem in areas with increased impervious surfaces. **Figure 11** shows the stream and lakeshore length in each HUC12 within 30 meters of areas with greater than or equal to 15% and 5% impervious surfaces.



Road-deicing.
Photo Source: Paul Smith's College, Adirondack Watershed Institute, Road Salt Research

Figure 11
Waterbodies Near Impervious Cover



Source: WSIO Indicator Data, 2018; Based on analysis of the proximity of impervious cover to water features done by EPA using NLCD 2011 Percent Developed Imperviousness dataset (October 2014 version) and NHDPlus2 NHD Snapshot (June 2014).

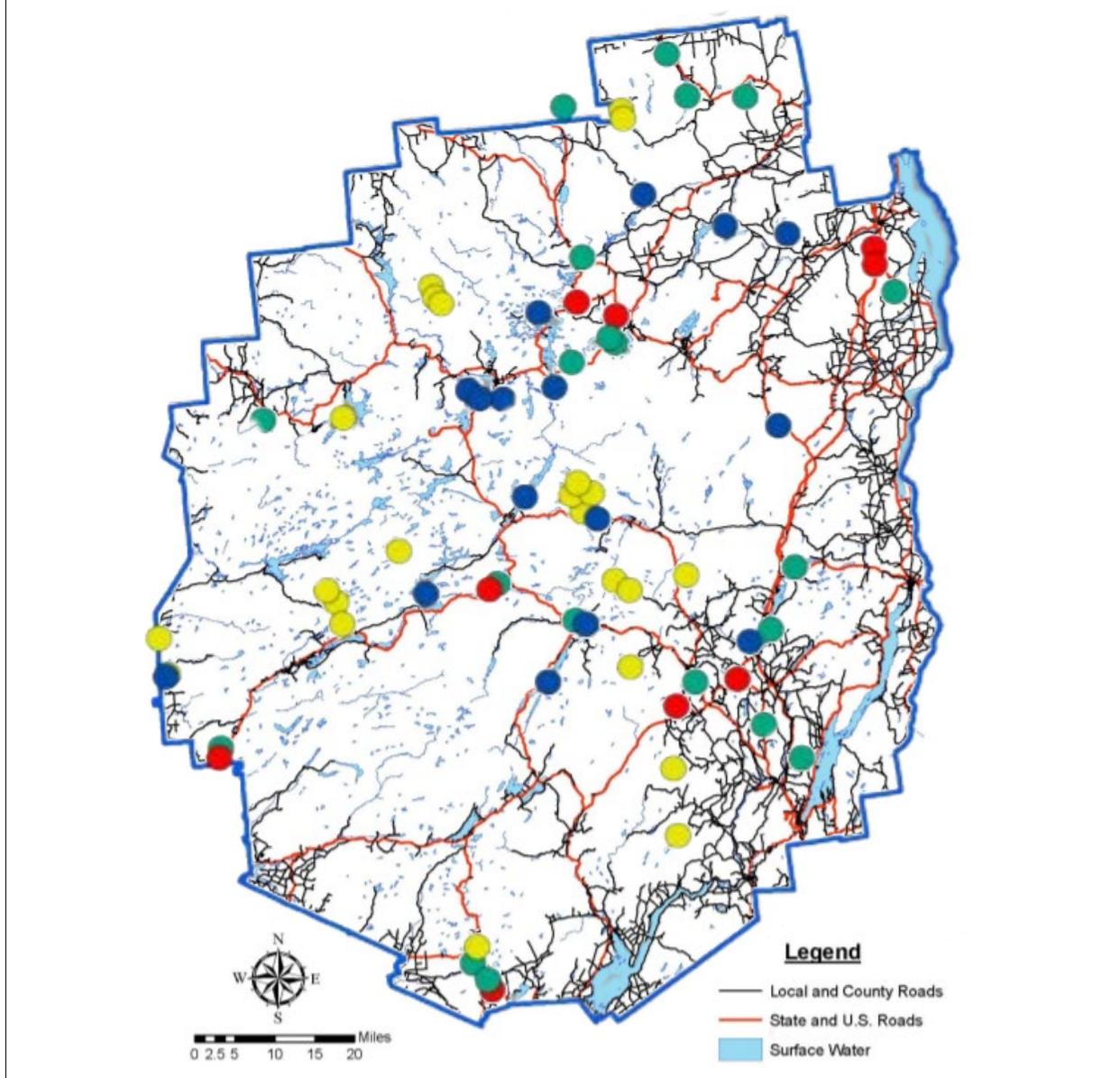
The Upper St. Lawrence watershed has the greatest percentage of waters near impervious surface, primarily due to developed areas around Ogdensburg, Waddington, Alexandria Bay, Clayton, and

Cape Vincent along the St. Lawrence River. The Oswegatchie, Indian, and Raquette watersheds have between 12-20 thousand miles of waterbody length within 30 m of areas with 15% impervious cover.

Studies found a high correlation between road density and sodium and chloride concentrations, pointing to road salt as the primary source of salt loadings to lakes (Kelting, Laxson, & Yerger 2012). This same study found that roads maintained following NYSDOT deicing protocols (state roads) are the greatest contributors to salinization of lakes in the Adirondack Park. **Figure 12** illustrates the proximity of road networks to waterbodies of the Adirondack Park. About 208,000 metric tons of road salt (NaCl) is applied to roads in the Adirondack Park every year, this equals an average application rate of 23 tons per lane kilometer of state roads (Laxson *et al.*, 2019). In addition, coarse texture glacial till and soils of granitic origin have high infiltration rates and low retention within the soil matrix, contributing to the rapid and increased migration of salts to aquifers and groundwater.

Salted roads are hydrologically connected to 77% of the surface water in the Adirondack Park (Regalado and Kelting, 2015). Roughly 72% of lakes assessed as part of the Adirondack Lake Assessment Program (ALAP) by the Adirondack Watershed Institute are influenced by road salt, with many of those lakes containing anywhere from 10-170 times the background concentration of chloride of 0.3-0.5 mg L⁻¹ (Laxson *et al.*, 2019).

Figure 12
Surface Water and Road Network in the Adirondack Park



SOURCE: Laxson *et al.*, 2018 for the road salt condition status of lakes. Laxson & Kelting, 2010 for the proximity of Adirondack Lakes to roads. Colored dots indicate road salt influence; blue, low influence (1-5 ppm chloride); green, moderate influence (5-20 ppm chloride); red, high influence (20-50 ppm chloride); and yellow, not significant (less than 1 ppm chloride).

The storage of deicing compounds is currently unregulated, and many municipalities have inadequate storage facilities, leaving deicing compounds exposed to the elements and increasing the potential for offsite transport. NYS updated its guidelines for snow and ice control in 2006 with revisions in 2012 (NYSDOT, 2012). The guidelines are maintained and updated by the Cornell Local Roads Program (CLRP) and form the basis for operator training conducted by the CLRP for NYSDOT.

These guidelines incorporate documents from the American Association of State Highway and Transportation Officials.

6.3.2.4 *Hydromodification*

Hydromodification is the alteration of the natural flow of water through a landscape that results from changes in land cover or channel modification. Road and streambank erosion, shoreline erosion, development, and the building of dams are examples of hydromodification. Seven percent (7%) of assessed stream miles in the St. Lawrence River watershed are impacted by hydromodification (WI/PWL, 2016).

Streambank and shoreline erosion. Sediment carried by rivers and streams draining large watersheds is primarily attributed to bank and channel erosion. When a stream is straightened or widened, whether via human manipulation or fast-flowing waters, its banks and shoreline can erode as the stream reestablishes a stable size and pattern. Vegetation removal and land use changes can contribute to more erosion. As sediments are released downstream, they can potentially settle in low-flow areas, altering stream flow and filling in areas that previously mitigated flooding. Banks and shorelines that are unvegetated, high sloped, and experience large flow rates during times of increased precipitation are more susceptible to erosion. The NY Riparian Opportunity Assessment assesses erosion potential and provides the data in a publicly available map at <https://www.arcgis.com/home/webmap/viewer.html?webmap=a914e62f4ffc497ea05cbeaf203fb819>. The heat map highlights HUC12s that receive runoff waters from steep, upslope areas that have a greater risk for erosion adjacent to the stream bank. McConnell Creek (Grasse River watershed) and Vrooman Creek (Oswegatchie River watershed) are ranked most vulnerable to erosion, with slopes of the Adirondacks also displaying some vulnerability.

Dams. Dams can alter hydrology, surface water quality, and aquatic habitat in the stream or river where they are located. There are 190 dams in the St. Lawrence River Watershed, shown on **Map 29**. Dams trap sediment and inhibit its transport downstream, altering both upstream and downstream habitat. Disrupting water flow and sediment transport by changing the quantity and timing of water flow affects the ecological web of a river system. For example, increased flow conditions are an important environmental cue for initiating the salmon run of Chinook salmon in the Salmon River. In recreational reservoirs impounded by dams, sedimentation is cited as a nuisance for swimmers and lakeshore residents, who experience difficulty navigating due to buildup of sediment and increased plant growth.

In some cases, a dam wall can block fish migrations or separate spawning habitats from rearing habitats. Barriers to stream connectivity have been mapped by the Northeast Aquatic Connectivity Project (<https://maps.freshwaternetwork.org/northeast/#>), depicting barriers such as road crossings and dams. In 2016, the Saint Regis Mohawk Tribe (SRMT) oversaw the removal of the Hogansburg

Dam at the mouth of the St. Lawrence River. The removal resulted in the connection of 441 km (274 miles) of river and stream migration routes to upstream spawning and nursery habitat, benefiting Walleye, Muskellunge, Atlantic Salmon, Lake Sturgeon, American Eel, and other species. This project marked the first removal of a hydropower dam in NYS. The North Atlantic Aquatic Connectivity Collaborative developed protocols for assessing road stream crossings for the Northeast, and maintains a map illustrating prioritized areas by HUC12 (found at TNC HUC12 Prioritization Tool under the Tools Tab at <http://streamcontinuity.org/>). However, it is important to note, barriers such as dams can play a beneficial role in preventing Sea Lamprey from accessing thousands of miles of additional spawning habitat and preventing the spread of other invasive species including Round Goby. The Great Lakes Fishery Commission has developed a Sea Lamprey control map that assesses barriers importance in preventing Sea Lamprey introductions (<http://data.glfsc.org/>).

Development. Development, of urban and rural areas, or “back-country sprawl,” is an emerging threat to aquatic ecosystems and water quality in the St. Lawrence River watershed. New development brings new roads, driveways, power and water lines, leach fields, invasive species, and other disruptions to the natural hydrography of the landscape. Culverts at road stream crossings can obstruct the passage of fish through tributaries, reducing aquatic habitat connectivity. Development also increases

impervious surfaces in the watershed that can disrupt the natural flow of water. Studies have shown that water quality can be harmed when as little as 2% of a watershed is converted from natural vegetation to artificial hard surfaces (Adirondack Council, 2008).



Town of Clayton, NY
Photo Source: townofclayton.com

The Massena Power Canal was constructed in the early 1900s to provide hydroelectric power to the local community and Alcoa Inc., an aluminum smelting facility. The Canal connects the St. Lawrence Seaway to the lower Grasse River. The Grasse River was widened and deepened to accommodate the additional source of streamflow from the Canal and St. Lawrence Seaway. The river was altered to have steep banks that extend from shallow areas along the shorelines to a relatively deep and flat river bottom, spanning about 400 to 600 feet wide. The Power Canal was closed in 1958 upon completion of the Moses-Saunders Power Dam and Eisenhower locks system. In addition to widening the river and altering flows, the closing of the Massena Power Canal significantly reduced

the volume of water transported through the Grasse River channel, resulting in low flow conditions throughout the river. Even under spring flows, velocities are still relatively low and difficult to measure with conventional equipment. The low flow velocities offer favorable conditions for the settling of solids entering from upstream, with one to three centimeters of solids deposited in the river bottom each year.

6.3.3 Point Sources

The Clean Water Act regulates point sources that discharge pollutants into a waterbody by requiring the discharger to have a National Pollutant Discharge Elimination Systems (NPDES) permit. The permit identifies the pollutant(s) of concern, the discharge allowance, and monitoring and reporting requirements. This system protects water quality by ensuring that the state's water standards are met and specifying acceptable levels of a pollutant, or pollutant indicator, in a discharge. NPDES sites in the St. Lawrence River watershed include publicly owned treatment works (39), combined sewer overflows (33), municipal separate storm sewer systems (2), stormwater constructs (8), industrial wastewater discharges (56), and concentrated animal feeding operations (72). NYSDEC's Info Locator map provides information about permitted facilities including links to permits. **Map 31** locates sources of pollution such as landfills, publicly owned treatment works, and industrial wastewater discharges.

6.3.3.1 Publicly Owned Treatment Works

Publicly owned treatment works (POTWs) are tasked with collecting municipal wastewater and treating it to meet discharge requirements before the effluent can be released into adjacent waters. Wastewater can contain pathogens, metals, suspended solids, residual chlorine, and trace contaminants that can threaten drinking water and recreational activity. Wastewater treatment plants (WWTPs) are cited as the suspected source of pollutants of 13% (3,130 lake acres) of assessed lake acres and 6% (410 miles) of assessed streams (WI/PWL, 2016). Sewage pollution discharge information is publicly accessible under the Sewage Pollution Right to Know Law (2013). **Map 33** illustrates boundaries of the St. Lawrence County public sewer district, Franklin County public sewer district and villages within St. Lawrence and Franklin Counties that have public sewer (DANC GIS sewerage areas within Jefferson, St. Lawrence, and Franklin counties of the St. Lawrence River watershed. This information was compiled by the Development Authority of the North Country (DANC). **Table 13** lists POTWs within the St. Lawrence River watershed. For more information regarding treatment capacity and environmental compliance, see [USEPA Environmental Compliance History Online \(ECHO\)](#).

The Clean Water Act, passed in 1972, provided funding to support the construction and upgrade of wastewater treatment facilities, which led to a significant improvement in water quality. However, funding for maintaining and upgrading these systems has been greatly reduced, which coincides with the end of these systems' 30- to 40-year design lives. Many sewage treatment systems in small

towns and villages are aging, inadequate, or operating beyond their capacity. Despite this, some municipalities have seen upgrades in their wastewater treatment plants, including the Village of Massena who upgraded their plant in 2000 with a secondary treatment process and anaerobic digester and dewatering system for biosolids that are then transported to a nearby composting facility. The Village of Potsdam is near-conclusion of a \$17 million upgrade to the wastewater treatment plant including a dewatering process for biosolids that can then be transported to nearby sites for beneficial reuse. The City of Ogdensburg accepted a bid to upgrade their WWTP focusing on emergency generator installations, grit removal, the Elizabeth Street pump station and force main, and the combined sewer overflow storage tank. Through the REDI initiative, Towns of Clifton, DeKalb and Hermon will be receiving funds to complete engineering reports that evaluate disinfection alternatives for each treatment plant.

Table 13
Publicly Owned Treatment Works Permitted under NPDES

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
Upper St. Lawrence	041503010102	Clayton (V) STP	NY0027545 NYL027545	
	041503010104	Alexandria Bay WWTP	NY0022501	St. Lawrence River
		Orleans/Alexandria Joint WWTP	NY0258059	St. Lawrence River
		Thousand Island Park STP	NY0030686	
		Us Coast Property At Wellesley Island	NY0022284	St. Lawrence River
	041503010107	Morristown (V) WWTF	NY0206997	
	041503010202	Ogdensburg Secondary WWTP	NY0029831	St. Lawrence River
		Waddington (V) WWTF	NY0030180	
041503010203	Lisbon STF	NY0257559	St. Lawrence River	
Oswegatchie	041503020102	Fine - T Wanakena Sewer District	NY0034533	
	041503020604	Edwards (V) WWTP	NY0023809	Oswegatchie River
	041503020802	*Gouverneur (V) WWTF	NY0020117 NYR00E780	Oswegatchie River
	041503020902	Dekalb Junction STP	NY0034762	Gulf Creek
	041503020904	Rensselaer Falls WWTP	NY0257613	Oswegatchie River
	041503021002	Heuvelton (V) WPCP	NY0027146	Oswegatchie River
Indian	041503030205	Antwerp (V) WWTP	NY0235890	Indian River
	041503030301	Evans Mills (V) WWTP	NY0024660	
	041503030303	Philadelphia (V) WWTP	NY0033022	Indian River
	041503030401	Theresa (V) WWTP	NY0207004	Indian River
	041503030501	Redwood SD	NY0215911	
	041503030505	Hammond (V) STP	NY0033561	
Grasse	041503040402	Hermon (V) WWTP	NY0257532	Elm Creek

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
	041503040404	*Canton (V) WWTP	NY0236586 NYR00E591	Grasse River
	041503040501	Madrid WPCP	NY0024635	Grasse River
	041503040502	*Massena (V) WWTP	NY0031194 NYR00E618	Grasse River
Raquette	041503050409	Tupper Lake (V) WPCP	NY0029939	Raquette River
	041503050604	Colton STP	NY0022012	Raquette River
	041503050703	Norfolk (T) SD#1	NY0023604	Raquette River
	041503050703	Norwood (V) WWTP	NY0021369	Raquette River
		Potsdam (V) WPCP	NY0020818 NYR00E695	Raquette River
041503050703	Potsdam Sewer District #1 STP	NY0023337	Raquette River	
St. Regis	041503060303	N. Lawrence & Nicholville STP	NY0110116	Saint Regis River
	041503060405	St Regis Falls WWTP	NY0255858	Saint Regis River
	041503060408	Brasher Falls SD#1 STP	NY0030732	
Salmon	041503070302	Malone (V) WWTP	NY0030376	Salmon River
	041503070306	High Street WWTP	NY0027863	Salmon River
Chateaugay-English	041503080102	Lyon Mountain SD WWTP	NY0239577	Separator Brook
	041503080104	Brainardsville SD#1 WWTP	NY0255726	
	041503080201	Chateaugay (V) STP	NY0024830	

SOURCE: Enforcement and Compliance History Online (ECHO), USEPA

NOTE: Bold rows are "major" permit types; Asterisks (*) denote facilities that receive industrial stormwater.

6.3.3.2 Stormwater Collection Systems

Stormwater runoff is generated when water from rain and snowmelt events flows over land or impervious surfaces and does not seep into the ground. If runoff is not captured or treated, it can



Stormwater Collection
Photo Source: Capitol Region Watershed District

accumulate and transport nutrients, chemicals, sediment, and other pollutants that adversely affect water quality in receiving waters. Urban and developed areas with a higher concentration of impervious surfaces are more vulnerable to the impacts of stormwater runoff. Stormwater impacts seven percent of assessed streams (410 miles) and one percent of assessed lakes (634 acres) in the St. Lawrence River watershed (WI/PWL, 2016). The CWA regulates combined sewer overflows (CSOs), municipal separate storm sewer systems (MS4s), industrial facilities, and construction sites to prevent and monitor discharges of pollutants in stormwater runoff.

Combined Sewer Overflows. Combined sewer systems collect water from domestic sewers and wastewater, industrial wastewater, and stormwater runoff. These systems are designed with relief points to mitigate periods of high flow. A CSO occurs when stormwater runoff from precipitation or snowmelt exceeds the sewer's capacity and excess waters are discharged directly to its receiving waterbody through the built-in relief points. CSO discharges may contain mixtures of domestic sewage, high levels of suspended solids, toxic chemicals, floatable material, and other pollutants. In the event of an overflow, receiving waterbodies may be hazardous for human and animal health and have significant water quality impacts such as bacterial contamination, algae growth, and reduced oxygen levels in the water. As permittees, municipalities are required to comply with long-term control plans that present mechanisms to reduce the frequency and volume of CSO discharges. Popular methods include separating stormwater and sewer lines, expanding wastewater treatment capacity, creating retention basins to hold overflow during storm events, and using green infrastructure to reduce stormwater flows.

There are 33 permitted CSOs in the St. Lawrence River watershed (**Table 14**). CSOs are concentrated in the City of Ogdensburg, and Villages of Massena, Clayton, Tupper Lake, Gouverneur, and Potsdam. The highest number of CSOs exist within the City of Ogdensburg, with 17 overflows monitored and owned by the City of Ogdensburg WWTP. The Village of Massena monitors ten CSOs operated by the Massena WWTP. The NYSDEC website presents a [mapping tool](#) showing the locations of CSOs

within the state. CSO violations are tracked and publicly available at the [USEPA Environmental Compliance History Online \(ECHO\)](#) database.

Table 14
Permitted CSOs

HUC8	HUC12	Receiving Waterbody	Permit ID	Facility Owner	Operating CSOs
Grasse	041503040502	Grasse River	NY0031194	Village of Massena, WWTP	5
Raquette	041503050706	Raquette River	NY0031194	Village of Massena, WWTP	5
	041503050409	Raquette Pond	NY0029939	Village of Tupper Lake, WPCP	2
	041503050703	Raquette River	NY0020818	Village of Potsdam, WPCP	1
Oswegatchie	041503020802	Oswegatchie River	NY0020117	Village of Gouverneur, WWTF	1
	041503021003	Oswegatchie River	NY0029831	City of Ogdensburg, WWTP	10
Upper St. Lawrence	041503010202	St. Lawrence River	NY0029831	City of Ogdensburg, WWTP	7
	041503010102	St. Lawrence River	NY0027545	Village of Clayton, STP	2

SOURCE: [CSO Outfalls Google Earth Map](#), NYSDEC; Enforcement and Compliance History Online (ECHO), USEPA.

Municipal Separate Storm Sewer Systems. The St. Lawrence River watershed hosts two MS4s, serving areas within the Indian River subwatershed at Fort Drum and the adjacent town, LeRay (**Table 15**). These systems utilize a collection of structures, including retention basins, ditches, roadside inlets, and underground pipes, to gather stormwater from flooded areas and discharge it into local streams and rivers without treatment. Many rural developments use similar stormwater management structures, but only communities that the US Census Bureau classifies as “urbanized areas” (based on population density) are required to become part of the MS4 program and retain a permit. Urbanized areas contain more impervious surfaces and development that leads to increased stormwater runoff. In conjunction with retaining an NPDES permit for these systems, communities are required to develop a stormwater management plan and six minimum control measures.

Table 15
Permitted MS4s

HUC8	HUC12	Receiving Waterbody	Permit ID	Facility Name	Operating MS4s
Indian	041503030301	West Creek	NYR20A556	Fort Drum	Base-wide, Fort Drum

			NYR20A557	LeRay	Town-wide, Evan Mills
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SOURCE: Enforcement and Compliance History Online (ECHO), USEPA.

Jefferson County established a Stormwater Coalition in 2014 in order to comply with federal stormwater regulations and improve water quality in a cost-effective manner (<https://jcnystormwater.com/coalition/>). Public participation is a key element of the MS4 Permit requiring that certain documents be made available to the public including an annual report and stormwater management program goals and implementation documents.

Industrial Wastewater and Stormwater. Industrial wastewater may contain pollutants at levels that have adverse impacts on water quality. Effluents may contain components that interfere with POTWs that receive their wastewater. Industry and construction are often exposed to the weather, where runoff from rainfall or snowmelt can potentially transport pollutants to stormwater catchments or adjacent waterbodies. The NPDES permitting program establishes discharge limits and conditions for industrial sources with specific standards relevant to the type of industrial activity. Relevant subjects to regulation in the St. Lawrence watershed subject include sand and gravel storage sites, mines, manufacturing, and solid waste management facilities. **Table 16** lists industrial facilities subject to the NPDES permitting system.

Table 16
Industrial Wastewater and Stormwater Sites Permitted under NPDES

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
Upper St. Lawrence	041503010101	French Creek Marina	NYR00A10F	St. Lawrence River
	041503010102	Northern Marine Inc	NYR00A494	St. Lawrence River
	041503010106	Stout's Ready Mix Ltd.	NYR00F161	Chippewa Creek
	041503010107	Acco Brands USA LLC	NYR00E721	St. Lawrence River
	041503010201	Acco Brands	NYR00G008	
		Maxam Us, LLC	NYR00F749	
		Ogdensburg Distribution And Manufacturing Facility	NYR00F496	
		Ogdensburg Power Plant	NYR00D126	
041503010202	Port of Ogdensburg	NYR00A860	St. Lawrence River	
Oswegatchie	041503020503	Viking Cives Inc USA	NYR00B403	West Branch Oswegatchie River
	041503020702	Bestway of New York	NYR00F489	
	041503020801	Gouverneur Division, #1 Mill And #2 Mine	NYR00A595	
		Gouverneur Division, #3 Mill	NYR00A894	

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
	041503020802	Cargill Feed and Nutrition Gouverneur	NYR00C212	Oswegatchie River
		Cives Steel Company	NYR00B413	
		Dunn Paper - Natural Dam Inc	NYR00F629	Oswegatchie River
	041503020804	Seavey Road Quarry	NYR00B614	Oswegatchie River
	041503020902	Stiles Used Auto Parts	NYR00G028	
		Losurdo Foods Inc	NYR00D375	Oswegatchie River
		Sunopta Aseptic Inc	NYR00E518	Oswegatchie River
041503021003	Ogdensburg International Airport	NYR00A859		
Indian	041503030102	Gouverneur Division, #4 Mine	NYR00B205	Clark Creek
	041503030301	Building 2084 - Jp-8 Storage Tanks	NYR00F375	Black River
		Building 21510 Central Vehicle Wash Facility	NYR00F376	Black River
		Fort Drum Military Installation	NYR00E835	
Grasse	041503040303	Poulin Grain Inc	NYR00F610	Tracy Brook
	041503040406	Canton Usarc	NYR00C438	Grasse River
		St Lawrence County Manufacturing & Properties LLC	NYR00A798	Grasse River
		Witherbee And Whalen Inc	NYR00B829	Grasse River
	041503040502	Massena Energy Facility	NYR00E893	Robinson Creek
Raquette	041503050603	UPS-Potsdam	NYR00C046	Plum Brook
	041503050604	Potsdam Quarry And Concrete	NYR00F954	Stafford Brook
		Waste-Stream Inc	NYR00D032	Stafford Brook
	041503050703	Knapps Station Facility	NYR00B231	
		Norwood Facility	NYR00B658	Raquette River
	041503050704	Potters Industries, LLC	NYR00D568	Raquette River
	041503050706	Massena Ready Mix Plant	NYR00G151	
		Massena Terminal Railroad Company	NYR00D761	Raquette River
Salmon	041503070204	Malone Quarry	NYR00F957	Farrington Brook
	041503070302	Malone Ready Mix Plant	NYR00G126	
		Westville Facility	NYR00B660	Salmon River
	041503070303	Malone Distribution Warehouse	NYR00G146	
Chateaugay- English	041503080102	Wi Ore Sand	NYR00F865	
	041503080103	Lyon Mountain Convenience Sta	NYR00E340	Separator Brook
	041503080201	McAdam Plant Chateaugay	NYR00D497	Marble River
	041503080202	Clinton Quarry	NYR00F955	
	041503080203	Grasslands	NYR00D031	
	041503080301	Waste Stream Management Transfer Station	NYR00D595	
	041503080303	County of Franklin Solid Waste Management Authority	NYR00D523	
	041503080406	Mooers Transfer Station	NYR00D597	English River

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
	041503080501	Churubusco Convenience Station	NYR00E548	Hinchinbrook Brook

SOURCE: Enforcement and Compliance History Online (ECHO), USEPA.

6.3.3.3 Concentrated Animal Feeding Operations

Animal feeding operations and their associated manure and wastewater contribute nutrients, pathogens, organic matter, hormones, and antibiotics to the environment. Agricultural animal feeding operations are defined by the following conditions:

- Animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and
- Crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility

Animal feeding operations that meet the regulatory definition of a *concentrated* animal feeding operation (CAFO) are considered point sources, as defined by the [CWA \[Section 502\(14\)\]](#) and regulated under the NPDES permitting program. CAFOs are classified by the type and number of animals they contain, and the way they discharge waste into a waterbody. A CAFO is defined as a “large” when 1,000 or more head cattle are present (including heifers, steers, bulls, and cow/calf pairs). A “medium” CAFO” has 300-999 head and meets one of the criteria below:

- Pollutants are discharged into waters through a manmade ditch, flushing system, or other similar manmade device, or
- Pollutants are discharged directly into waters that originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation (122.23(b)(2)).

“Small” CAFOs—those with fewer than 300 animal units—are designated CAFOs on a case by case basis, depending on factors such as size, manure production, location relative to waters, slope, vegetation, rainfall, and other factors that affect the likelihood and frequency of discharge to waters.

There are 69 CAFOs permitted under the NPDES program in the St. Lawrence River watershed (**Table 17**). CAFOs with effective coverage under the general permit also submit CAFO-specific nutrient management plans, which provide information on production and land application areas, best management practices, an implementation schedule, and an emergency action plan. These plans and permits are essential to reducing the risk of nutrient and pathogen transport to surface and groundwaters from agricultural activities.

Table 17
CAFOs Permitted under NPDES

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
Upper St. Lawrence	041503010102	Bourcy Farm Property	NYA001542	
		Wood Farms LLC	NYA000351	
	041503010106	Pitcher Farms	NYA000579	
	041503010107	Beamish Farm	NYA000547	
	041503010202	Woodcrest Dairy LLC	NYA000561	
	041503010203	Five Mile Farms	NYA000071	
		Flack Farms	NYA000628	
		Harvest Dairy Farm	NYA000267	
		Keystone Dairy	NYA001385	Squaw Creek
		Lisbon Centre Farms, LLC	NYA000565	
	041503010204	Brandy Brook Haven Farms, LLC	NYA001374	Brandy Brook
		Brandy View Farms	NYA000615	Brandy Brook
		Ceda-Meadow Farm	NYA000448	
	041503010205	Fobare Lake Farm	NYA001380	Coles Creek
		River-Breeze Farm	NYA000083	Grasse River
		Corscadden Family Farm	NYA000207	
	Oswegatchie	041503020902	McClean Farms	NYA001432
041503020903		Martin Farm	NYA000076	Merrill Creek
041503020904		Kelly Farm	NYA000573	Beaver Creek
		Rainbow Acres	NYA001386	
041503021002		Chambers Farms LLC	NYA000013	Oswegatchie River
041503021003		Bruce Nichols	NYA000569	
		Fishel Farms LLC	NYA000498	
		Royal-J-Acres LLC	NYA000090	
		Virgil Valley Farms	NYA000480	
		Pominvilles Farm	NYA001556	Indian River

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
Indian	041503030303	Leuze Farms	NYA000354	Indian River
		Thompson Farm Property	NYA001538	
	041503030504	Dori B S Farm	NYA000461	
		Shady Brook Farm	NYA001578	Mud Lake Outlet
	041503030505	White Acre Farms	NYA000560	
Grasse	041503040401	Gebarten Acres	NYA001325	
	041503040402	Gotham Family Farm, LLC	NYA000162	
	041503040404	Greenwood Dairy Farm, LLC	NYA000067	Nettle Creek
		Lloyd T. Smith & Sons	NYA001394	Grasse River
	041503040406	Jordan Farms	NYA000206	Grasse River
		Kingston Brothers Farm	NYA000515	Grasse River
		Teriele Family Dairy, LLC	NYA000428	
	041503040501	Mapleview Dairy LLC	NYA000059	
Paradise Valley Farm		NYA000020	Grasse River	
Raquette	041503050603	Snell Farm	NYA001369	
	041503050604	Adon Farms	NYA000092	
		Chambers Dairy	NYA001424	
St. Regis	041503060302	Durant Farms	NYA000581	Allen Brook
		Dutch Pride Farm	NYA001357	
		New Beginnings	NYA000073	
		Roberts Dairy Farm LLC	NYA001329	
	041503060303	Stauffer Farms	NYA000489	Deer River
	041503060305	Tri Oak Lea Farm	NYA001519	
	041503060406	Norco Farms	NYA000068	Hopkinton Brook
	041503060407	Adirondack Heifer Management, Inc.	NYA000082	
Salmon	041503070203	Jimali Holsteins	NYA001320	
	041503070302	A. Miller	NYA001431	
		Dan's Dairy LLC	NYA001458	Salmon River
	041503070303	Carsada Farms	NYA001292	East Branch Deer Creek

HUC8	HUC12	Facility Name	NPDES ID	Receiving Waterbody
		Clearview Dairy	NYA001355	
		Ellsworth Farms	NYA001339	
		Monica Farms	NYA001321	East Branch Deer Creek
		Papas Dairy, LLC	NYA001315	
		White's Dairy Farm LLC	NYA001316	West Branch Deer Creek
	041503070305	Brockway Hilltop Farm	NYA001289	Pike Creek
Chateaugay-English	041503080201	Brior Farm	NYA001537	Marble River
	041503080203	Trainer Farm, LLC	NYA001310	
	041503080204	Sunset Lake Farm #2 LLC	NYA00C010	Allen Brook
		Swanston Farms, Inc.	NYA001313	Allen Brook
	041503080205	Shipman Farm LLC	NYA001452	Flynn Brook
	041503080303	Metcalf Farms	NYA001317	
	041503080402	Lamberton Farms	NYA000542	English River

SOURCE: Enforcement and Compliance History Online (ECHO), USEPA

6.3.3.4 Legacy Industrial Waste Disposal Practices

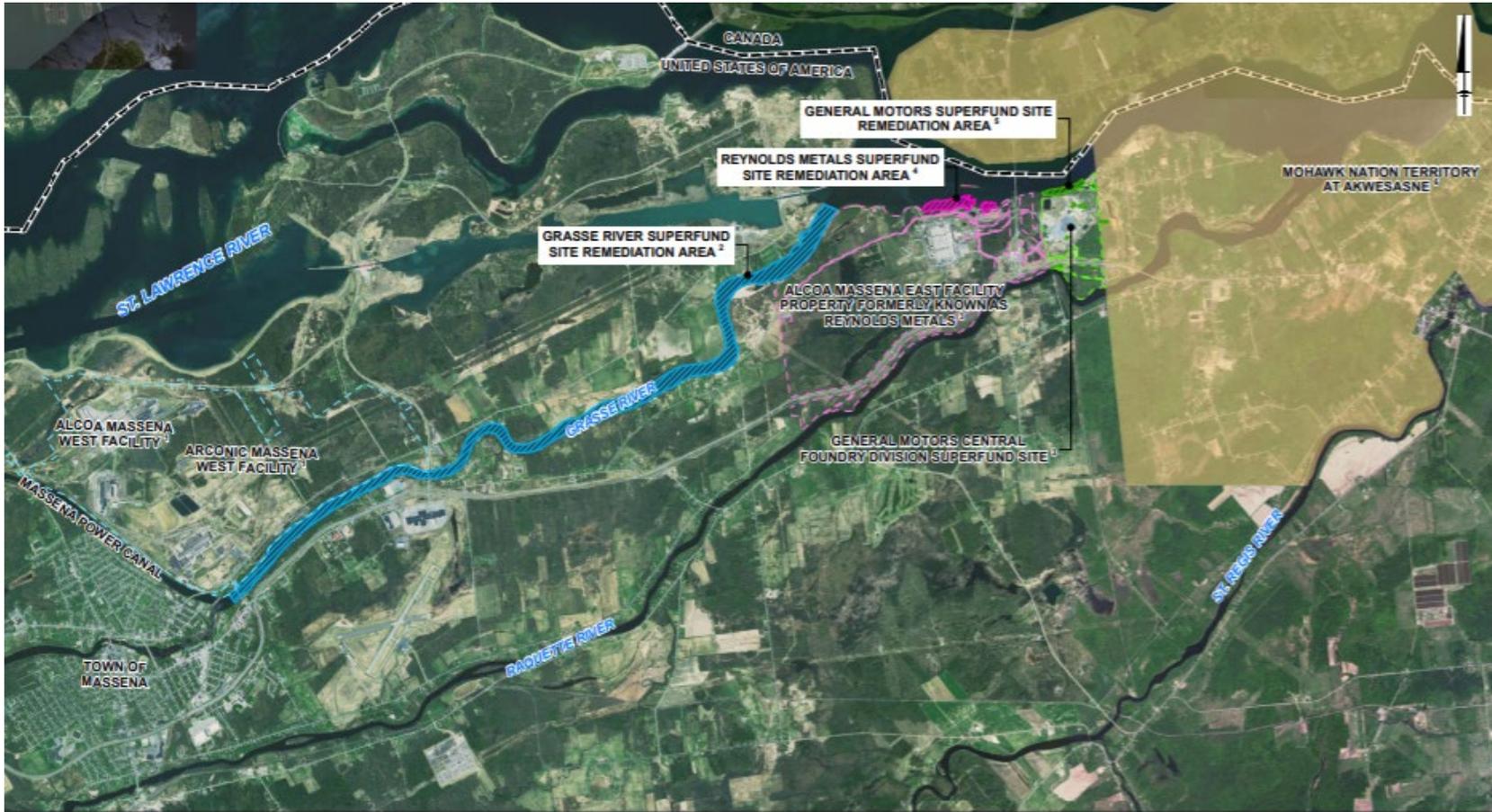
The St. Lawrence River watershed has been affected by industrial production and improper waste disposal practices that resulted in contamination of sediments and waterways. The Massena area in northeastern St. Lawrence County, once an industrial powerhouse, is now addressing pollution resulting from past waste management practices. Priority organics (PAHs, PCBs) and pesticides have contaminated 875 stream miles (14% of assessed miles), and 700 miles are suspected to be contaminated due to improper industrial waste disposal practices. The threat to human health from consumption of contaminated fish resulted in designation of the St. Lawrence River at Massena/Akwesasne as a Great Lakes Area of Concern (<https://www.epa.gov/great-lakes-aocs/st-lawrence-river-area-concern-massenaakwesasne>), inclusion on the National Priority List, and implementation of Federal and State Superfund restoration activities at the sites (**Figure 13**).

The boundaries of the Area of Concern (AOC) are mapped in **Figure 14**. The area includes waters of the St. Lawrence River upstream of the Canadian boundary to the Massena public water supply intake, the Grasse River from its mouth upstream to the breached dam in the village of Massena, the Raquette River from its mouth upstream to the NYS Route 420 bridge, and the St. Regis River from its mouth upstream to the dam at Hogansburg. Remediation and restoration actions are outlined in the Remedial Action Plan (RAP). RAPs are developed in three stages.

- Stage 1: identifies specific problems, called Beneficial Use Impairments, and sources of pollution. The Massena Stage I RAP was completed in November 1990.
- Stage 2: proposes restoration actions and implementation plan. The Stage II RAP was completed in August 1991.
- Stage 3: provides documentation that all Beneficial Use Impairments in an AOC have been addressed and that the AOC is ready to be delisted. Stage III remains in progress. Currently, water, sediment, and biota within St. Lawrence River AOC are being tested to evaluate whether the Massena area cleanup efforts have improved the local ecosystem to a point where specific Beneficial Use Impairments have been restored. NYSDEC and the SRMT recently collaborated on an assessment of fish tissue contamination from fish sampled from waters in proximity to the AOC on the St. Lawrence River and its adjoining tributaries. The report provided data necessary to update fish advisories and examine impairments. Fish sampled inside the AOC were found to have significantly more contamination than fish sampled outside the AOC, with the greatest risk to fish consumers driven by PCB concentrations (Skinner, David, & Ritcher, 2018).

Currently, water, sediment, and biota within St. Lawrence River AOC are being tested to evaluate whether the Massena area cleanup efforts have improved the local ecosystem to a point where specific Beneficial Use Impairments have been restored. NYSDEC and the SRMT recently collaborated on an assessment of fish tissue contamination from fish sampled from waters in proximity to the AOC on the St. Lawrence River and its adjoining tributaries. The report provided data necessary to update fish advisories and examine impairments. Fish sampled inside the AOC were found to have significantly more contamination than fish sampled outside the AOC, with the greatest risk to fish consumers driven by PCB concentrations (Skinner, David, & Ritcher, 2018). Remedial Action Plans and other relevant information are available at the St. Lawrence River at Massena/Akwesasne Area of Concern website maintained by NYSDEC <https://www.dec.ny.gov/lands/98794.html>

Figure 13
St. Lawrence River Area of Concern at Massena/Akwesasne



NOTES:

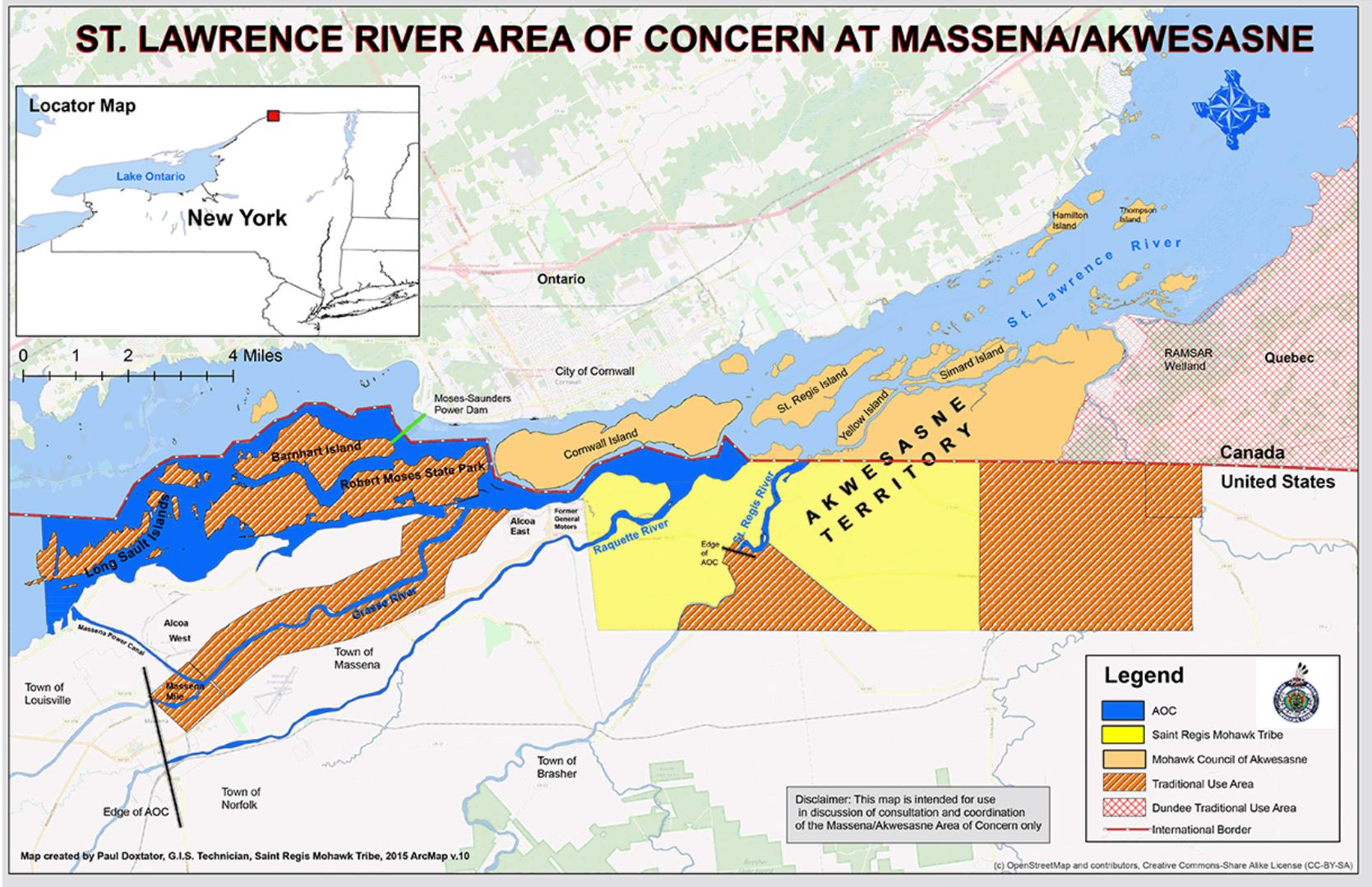
1. ARCONIC MASSENA WEST FACILITY BOUNDARY PROVIDED BY ARCONIC IN FIGURE 1-1 VICINITY MAP - VILLAGE OF MASSENA, MASSENA WEST & MASSENA EAST UPDATED 2015 AUG 17.
2. EXTENT OF GRASSE RIVER SUPERFUND SITE REMEDIATION AREA REMEDIATION DEFINED IN THE RECORD OF DECISION (USEPA, APRIL 2013).
3. GENERAL MOTORS PROPERTY AND THE REYNOLDS METALS PROPERTY BOUNDARIES WERE OBTAINED FROM THE ST. LAWRENCE COUNTY WEB MAP PORTAL.
4. REYNOLDS METALS SITE REMEDIATION AREA DEFINED IN THE EXPLANATION OF SIGNIFICANT DIFFERENCES (USEPA, DECEMBER 2008).
5. GENERAL MOTORS SUPERFUND SITE REMEDIATION AREAS PROVIDED IN EXPLANATION OF SIGNIFICANT DIFFERENCES, GENERAL MOTORS CORPORATION - CENTRAL FOUNDRY DIVISION SUPERFUND SITE, MASSENA, NEW YORK. 04/26/2000.
6. MOHAWK NATION TERRITORY AT AKWESASNE BOUNDARY OBTAINED FROM THE NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES GIS PROGRAM OFFICE (GPO). RESERVATION ON US SIDE UNDER JURISDICTION OF THE SAINT REGIS MOHAWK TRIBE.



MASSENA-AREA FEDERAL SUPERFUND SITES

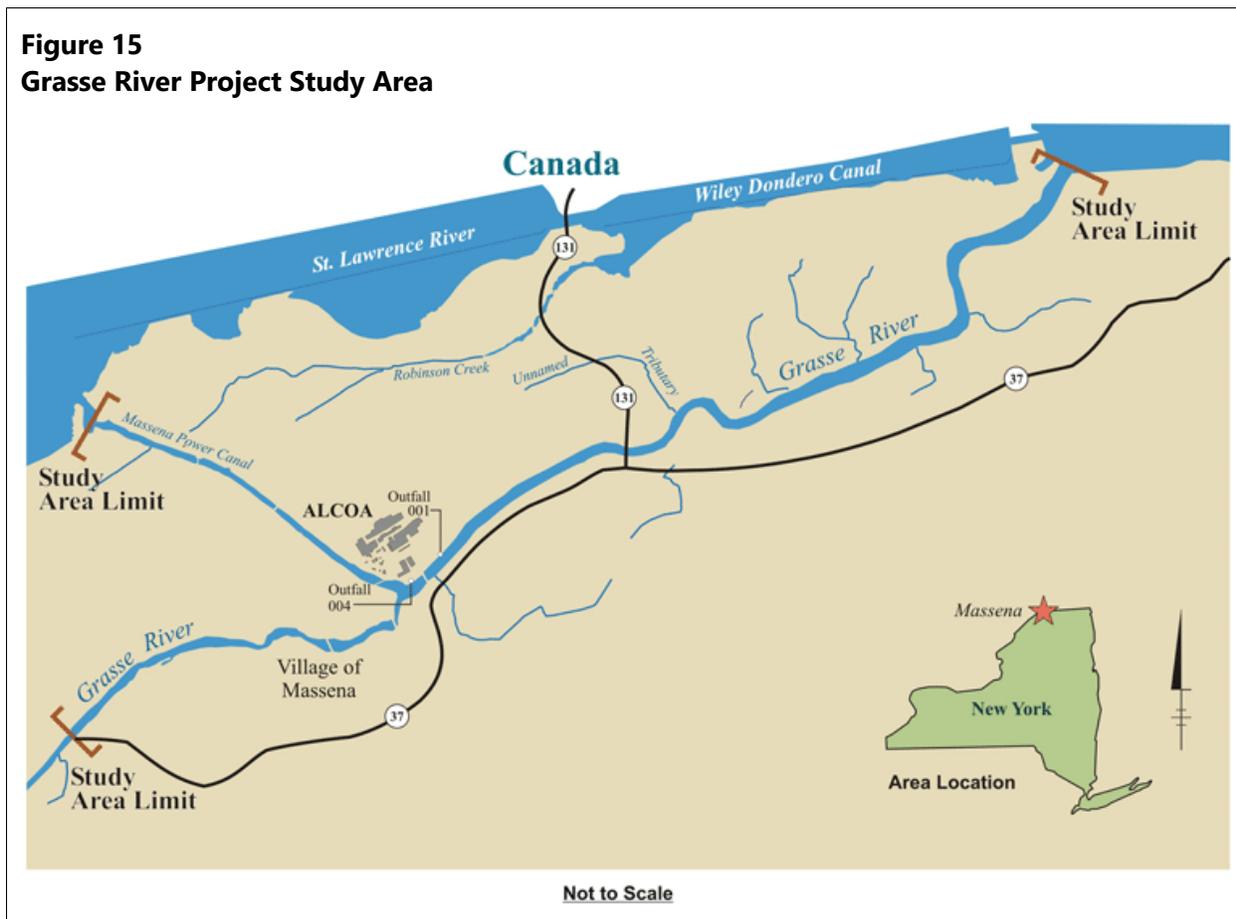
SOURCE: USEPA, Site Area Map, 2017.

Figure 14
St. Lawrence River Area of Concern Boundary Map



SOURCE: USEPA, St. Lawrence River AOC Boundary Map, Great Lakes AOCs, 2015.

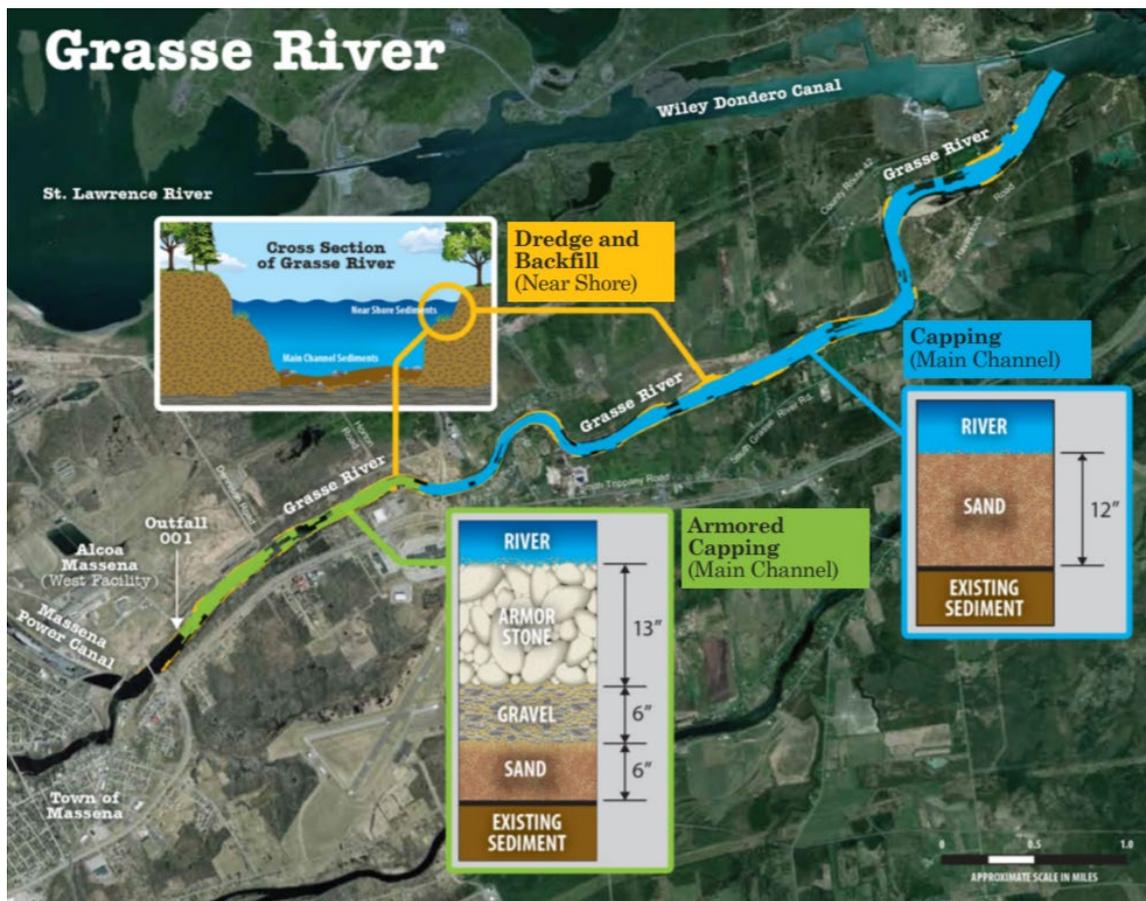
Figure 15
Grasse River Project Study Area



SOURCE: [Grasse River Project, http://www.thegrassriver.com/about.html](http://www.thegrassriver.com/about.html)

Grasse River Superfund Site In 1990, the NYSDOH advised the public to not eat any fish from the mouth of the Grasse River to the Massena Power Canal. From 1995 to 2001, Alcoa completed some dredging and capping of the contaminated site, but a severe ice jam event in the Grasse River damaged a portion of the capping, so subsequent monitoring and remediation is needed. In 2013, the USEPA issued a record of decision (ROD) which selected a final cleanup plan for the Grasse River Superfund site. As shown in **Figure 16**, the cleanup consists of some near-shore dredging, capping and armored capping in a 7.2 mile stretch of the lower Grasse River and the St. Lawrence River (USEPA, 2013). The plan also requires monitoring of fish, water and habitat, along with long-term monitoring of the capped areas to ensure that the caps remain intact. In November 2016, Alcoa separated into two companies – Alcoa Corp. and Arconic. Upon separation, Arconic assumed responsibility for the Grasse River remediation project. Arconic continues to work with the EPA, NYSDOH, and the SRMT to implement the EPA Record of Decision for the Grasse River remediation project. More information and updates can be found at the Grasse River Project website, <http://www.thegrassriver.com/>.

Figure 16
Grasse River Project Remediation Strategy



SOURCE: Grasse River Project, <http://www.thegrasseriver.com/>

Reynolds Metals Superfund Site, (EPA ID: NYD091972554). The Reynolds Metals Company operated a 1,600-acre facility on the St. Lawrence River, approximately eight miles east of the village of Massena. The facility is now owned and operated by Alcoa Corp. Industrial wastes contaminated with PCBs and PAHs were discharged into river through four permitted outfalls. The USEPA issued a Unilateral Administrative Order ordering investigation and cleanup of the site to address contamination of river sediments. An excavation program was implemented in 2001 which removed 20,200 pounds of PCBs from the St. Lawrence riverbed (USEPA, 1993). Dredging and capping of remaining contamination was completed in 2009 with ongoing cap and erosion monitoring. The Superfund program conducts assessments every five years to evaluate the continued effectiveness of remediation. The last site assessment occurred in 2016 and USEPA concluded that the remedial measures remain protective of human health and the environment.

General Motors, Central Foundry Division Superfund Site, (EPA ID: NYD091972554). In 1984, a 270-acre site in Massena was added to the Superfund National Priorities List. General Motors

produced aluminum cylinder heads and operated as an aluminum die-casting plant from 1959 to 2009. This site lies between the St. Lawrence River to the north, the SRMT to the east, and the Raquette River to the south. Various industrial wastes were deposited on-site resulting in contamination of two disposal areas, an industrial landfill, and four industrial lagoons. PCB contamination of groundwater, on-site and off-site soils, and sediment in the St. Lawrence and Raquette Rivers, Turtle Cove, and Turtle Creek have been documented. Cleanup work is carried out by the current owner of the site, RACER Trust, which was created through the GM bankruptcy in 2011, and overseen by the EPA, SRMT Environmental Division, and NYSDEC. In 1987, the industrial landfill was capped to prevent migration of contaminants. Dredging and excavation of contaminated materials, followed by on-site treatment and disposal of residual contamination, and groundwater extraction and treatment were selected remediation strategies outlined in the USEPA's 1992 ROD (USEPA, 1992). This site is still undergoing cleanup, including construction of a groundwater collection and treatment system and dredging of a ten million-gallon lagoon. Cleanup work is expected to be completed in 2020.

J&L Steel/Benson Mine (NYSDEC Site Code: E645029). The former J&L site is in the northwestern corner of the Adirondack Park along the border of the Towns of Clifton and Fine. The 54-acre site mined iron ore from 1889 through the late 1970s. The US Defense Plant Corporation built a processing plant on site to expand US production capabilities of military equipment. In the 1950s, this site was the largest open pit magnetite mine in the world, employing up to 1,000 people.

Processing operations led to soil and groundwater contamination by substances including friable asbestos, polychlorinated biphenyls (PCBs), metals, and petroleum. In 1988, NYSDEC was notified of an oil spill in the Little River, a tributary to the Oswegatchie River adjacent to the mine. A polyvinyl curtain measuring 1,000 ft. by 15 ft. was installed to separate the contamination area from the Little River. The curtain has lost its effectiveness allowing oil to seep into the river. Cleanup funded by the Oil Pollution Act of 1990/Oil Spill Liability Trust Fund began in 2013.

St. Lawrence County applied to NYSDEC's Environmental Restoration Program (ERP) to complete site investigations and define remedial measures. The oil plume was found to extend over large portions of the lowlands south of the Little River and portions of the adjacent uplands. Eight PCB hot spots were identified, and sediment along the bank of the Little River was found to be saturated with petroleum, noting periodic releases of petroleum to a depth of at least eight feet. A Record of Decision (ROD) was issued in 2013 to remediate areas affected by the oil spill and PCBs under the NYSDEC's State Superfund Program

https://www.dec.ny.gov/docs/remediation_hudson_pdf/e645029rod.pdf.

6.4 Sensitive Areas

The St. Lawrence River watershed encompasses many sensitive areas, including lakes and streams, steep slopes, wetlands and hydric soils, floodplains, and primary aquifers (**Map 34**). These areas provide multiple essential ecosystem services. For example, wetlands provide a buffer against flooding; woodlands and natural land cover of riparian areas buffer waterbodies from runoff; and intact vegetation stabilizes steep slopes prone to erosion. The St. Lawrence River watershed includes a large area within the Adirondack region exhibiting slopes greater than or equal to 15%; these are associated with a high risk of soil erosion. The plains of the northern region traversing the St. Lawrence River shoreline are dominated by emergent and forested wetlands, which are threatened by encroaching agricultural practices and changing land use patterns.

7 Emerging Issues

In addition to the previously mentioned stressors, climate change and water-level management are significant issues. Solutions to these problems require knowledge and a collaborative effort that transcends watershed boundaries. An ecosystem-based management approach, formalizing watershed planning as a continual process that engages stakeholders, is a viable path to solving such long-term, complex challenges.

7.1 Climate Change

Seasonal differences in Northeast temperatures have decreased in recent years as winters have warmed three times faster than summers (Giroux *et al.*, 2018). The 4th National Climate Assessment for the Northeast and Great Lakes Regions predicts a 20% increase in precipitation delivered in heavy rainfall events, an increase in drought events, reduced ice over on the Great Lakes, and increased invasive species threats and vulnerability (Dupigny-Giroux *et al.*, 2018). A decrease in early winter snowfall and earlier snowmelt will lead to a shorter snow season. Winters are seeing a shift in the proportion of precipitation falling as rain or snow, with fewer days without temperatures below freezing resulting in decreased snow depth, fewer days without snow on the ground, and multiple snowmelt events each year. Changes in seasonal precipitation and frequency have been noted in recent years, with increases in heavy rainfall events in the spring and fall, and periods of low precipitation and drought during the summer months.

Climate change affects the severity of numerous water quality issues. Water resources are influenced by factors such as temperature, amount and duration of snowfall and snow cover, rainfall, and evaporation. Climate change has the potential to shrink water supplies for human desired uses and degrade the quality of remaining supplies. Warmer weather and more variable precipitation complicate efforts to manage both the natural and built environments. Heavy rains create hazardous runoff conditions and increase vulnerability to flooding. Higher temperatures, changing precipitation and wind patterns, and increased nutrient-rich runoff exacerbate the risk of eutrophication. Changing precipitation patterns and a warming climate also threaten fish populations by decreasing the levels of dissolved oxygen, increasing water temperature and turbidity, and altering water flow. As these impacts are not due to local or point sources, adaptation strategies should incorporate resiliency and “smart growth” principles to help mitigate stress on waterbodies and prepare for the future.

The winter recreation industry is an important economic resource for rural areas and the Adirondacks and is strongly influenced by weather and climate, making it particularly vulnerable to climate change. Agriculture, a leading industry in the watershed, is expected to benefit from a changing climate over the next half-century due to greater productivity and a longer growing season. However, excess moisture is already a leading cause of crop loss in the Northeast (Dupigny-Giroux *et*

al., 2018) and intense precipitation can increase soil compaction and reduce the number of workable field days.

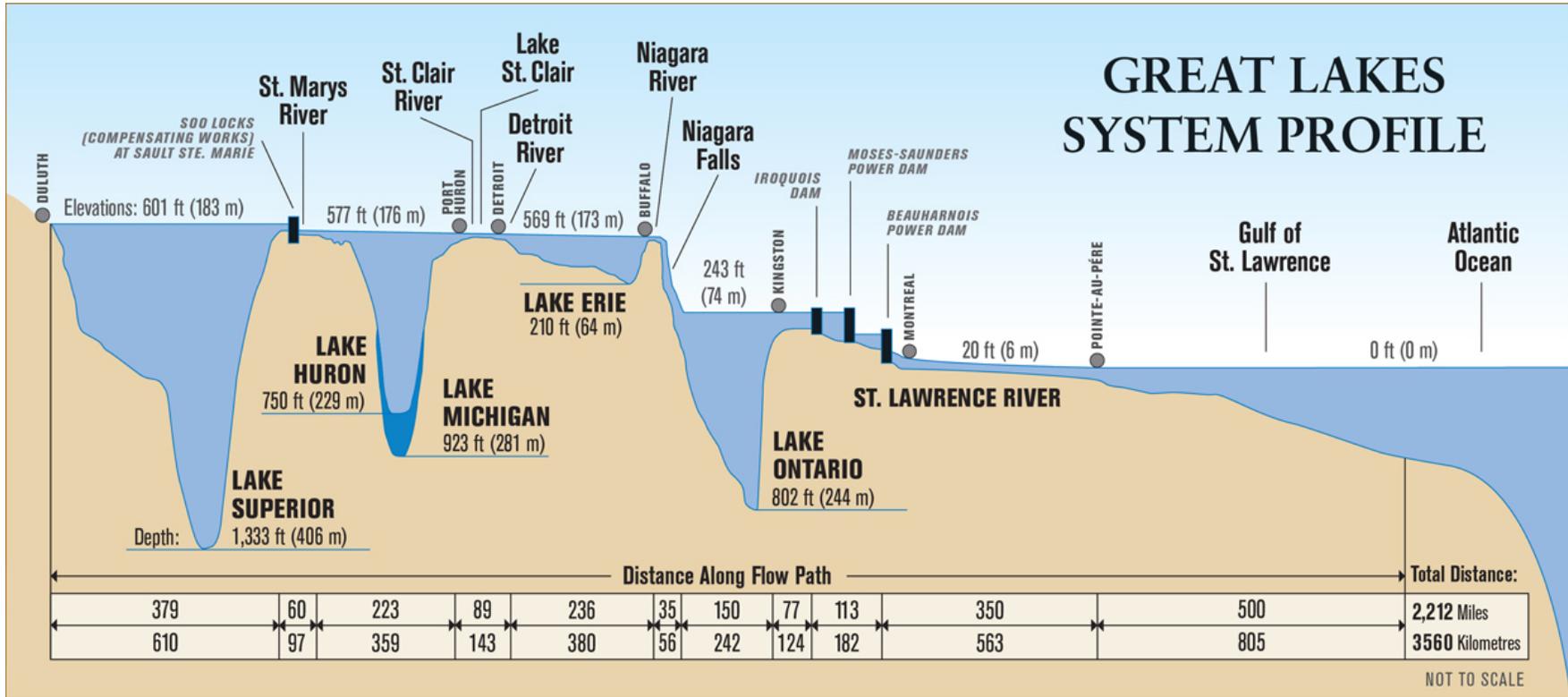
7.2 Floodplain and Water-Level Management

Many communities along the St. Lawrence River watershed and shoreline of Lake Ontario experienced extreme high water and flooding conditions in 2017 and 2019. Historically high rainfall across the Great Lakes Basin caused high water levels in upstream lakes and rivers, which flowed into Lake Ontario and out the St. Lawrence River. Water levels in the St. Lawrence River are primarily affected by Lake Ontario outflow. The Moses-Saunders and Long Sault Dams are the primary means of regulating Lake Ontario outflow. According to the IJC, changing the outflow by 323 cubic meters per second (m^3/s) for one week will change the level of Lake Ontario by only 1 cm; in contrast, this change in outflow modifies the St. Lawrence River level by 16 cm (IJC, 2014). If Lake Ontario's outflow rate is too low, shoreline communities will flood. At the same time, too little water released to the river will threaten river navigation and increase the risk of ship groundings. Large releases may reduce the risk of flooding Lake Ontario shoreline areas but increase river flooding. Managing this water system and balancing the risks to human uses along with the natural and built environment is complex and difficult. **Figure 17** illustrates the Great Lakes system profile, including depths and widths of waterbodies and important water-level control sites.



Docks are submerged along the flooded St. Lawrence River
Photo Source: wwnytv.com

Figure 17
Great Lakes System Profile



Source: The Great Lakes Basin, map/poster, NOAA-Great Lakes Environmental Research Laboratory, Coastwatch

Widespread and record-setting precipitation in 2017 and 2019 brought significant water volumes and flooding to both Lake Ontario and the St. Lawrence River, affecting residents, business owners, and municipalities. Impacts from the flooding affect local economies due to expensive remediation and infrastructure repairs, decreased tourism, and damage to residential and business properties. Rapid runoff resulting from increased precipitation is expected to affect sediment and contaminant transport, impairing waterways and eroding shorelines. Alterations in flow patterns and consequential sedimentation of low-flow areas can decrease fish spawning and egg viability, biodiversity, and habitat. Adaptation strategies to flooding should focus on projects that contribute to the resiliency of shorelines and infrastructure to high volumes of water. These should involve infrastructure that enhances natural hydrologic processes (soil infiltration, groundwater recharge, evaporation) and slows the movement of water instead of rapidly conveying it to waterbodies.

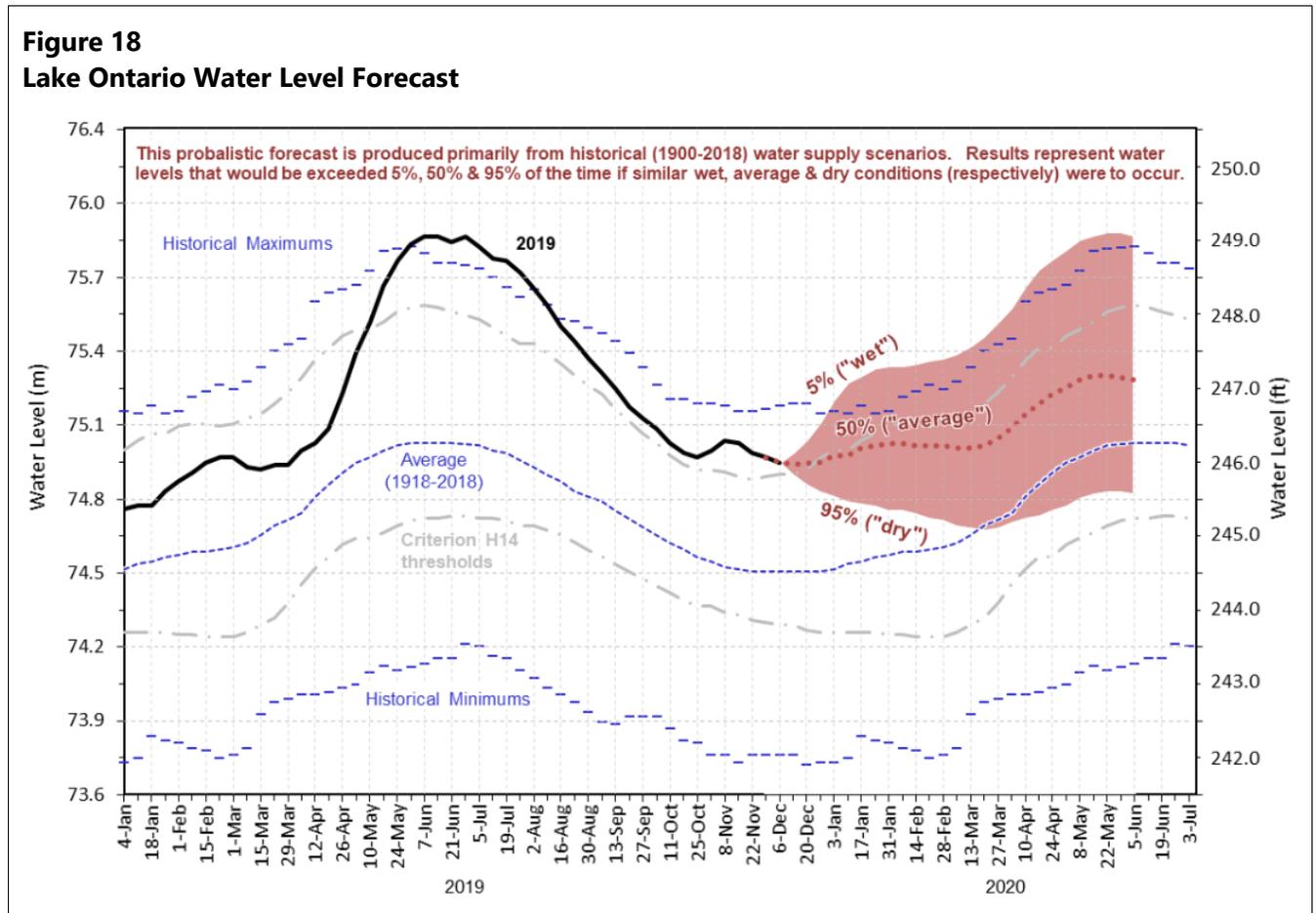
The International Joint Commission (IJC) was established to resolve issues between the US and Canada under the 1909 Boundary Waters Treaty. As a committee within the IJC, the Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee undertakes monitoring, modeling, and assessment needed to support ongoing evaluation of the regulation of water levels and flows. In addition, IJC's International Lake Ontario-St. Lawrence River Board works alongside GLAM to ensure that outflows from Lake Ontario meet the requirements of the IJC order and communicate with the public about water levels and flow regulation. The International Lake Ontario-St. Lawrence River Board implemented Plan 2014 which sets the flow rate of the Moses-Saunders Dam, effective in January 2017. Plan 2014 generally works to:

- increase Lake Ontario outflows as water levels rise,
- reduce flows when the Ottawa River peaks,
- increase flows when downstream conditions improve, and
- prevent peak levels on both Lake Ontario and St. Lawrence River.

Major flooding has occurred in recent years (2017 and 2019) resulting in millions of dollars in damages. From January to June 2017, inflows to Lake Ontario were above average but did not set records. From January to March, inflows from Lake Erie combined with heavy rainfall and snowmelt caused Lake Ontario to rise 60 cm (2 ft), twice the normal rise for this time of year. In addition, unusual weather caused the St. Lawrence River to experience five freeze/thaw cycles during January to March. When ice is forming, the flow of water must be reduced to prevent ice jams that can potentially block the flow of water and cause localized flooding. April and May 2017 were two of the wettest months on record with historic precipitation records. Record flows from the Ottawa River, the outflow from Lake Ontario were adjusted nearly every day in an attempt to balance water flows. St. Lawrence County, in partnership with the City of Ogdensburg, and the Town and Village of Morristown is conducting an assessment of ecosystem vulnerability to determine how resiliency measure can be incorporated into local planning. Ongoing efforts and programs such as REDI aim to

help communities adapt to this new pattern of flooding in the area through hardening key infrastructure and smart growth principles. Resiliency guidelines and resources to reduce the risk of future damage and minimize habitat impacts have been compiled by NYSDEC at <https://www.dec.ny.gov/lands/117819.html>, FEMA’s Community Rating System also offers planning support and incentives to communities who work to mitigate their risks to flooding under increased precipitation.

The IJC maintains historic records on lake levels, flows, and precipitation and provides forecasts for upcoming years at <https://ijc.org/en/loslr/watershed/forecasts>. **Figure 18** shows the most recent weekly forecast of Lake Ontario through June 2020. The forecast illustrates the projected range of water levels and flows that are expected to occur under potentially wet, average, and dry conditions. It is important to note that actual future water levels and flows are dependent on precipitation, weather, and existing water supplies.



Source: IJC, International Lake Ontario-St. Lawrence River Board (Dec 2019)

7.3 Contaminants of Emerging Concern (CECs)

Historically, chemical pollution and toxicity has been focused on “priority” pollutants that are persistent in the environment and commonly used in industry. However, a new a diverse group of chemicals known collectively as “emerging contaminants” or “contaminants of emerging concern” (CECs) are gaining attention. Captured under the umbrella of CECs are compounds such as pharmaceuticals, personal care products, pesticides, herbicides, endocrine disruptors, flame retardants, and microplastics. With advanced analytical instrumentation and technology, CECs have been detected in trace amounts in surface waters and wastewater treatment effluents (Glassmeyer *et al.*, 2017).

These compounds and their bioactive metabolites are continually released into the aquatic environment as complex mixtures primarily through sewage treatment systems and wet weather runoff. This group of chemicals is unique in that many of these compounds were designed to be biologically active at trace levels and therefore can elicit a biological response at environmentally relevant levels. Although biochemical actions and mechanisms of many of these compounds in humans is known, the known pathways of actions are not always the only mechanisms at work. Understanding of the complex biochemical signaling pathways and their targets is limited making possible effects on nontarget organisms largely unknown (Daughton and Ternes, 1999). Knowledge of the effects of these compounds in the aquatic and terrestrial environment is lacking, especially with respect to low-dose, cumulative, and multi-generational exposure of complex mixtures. This is particularly troublesome for aquatic organisms who are captive to continual life-cycle, multigenerational exposure. Cumulative exposure over time can potentially manifest into changes that are not observed with current toxicity-directed screening methods.

8 Data Gaps

This watershed characterization process uses available data to evaluate current metrics of watershed health and define effective strategies for restoration and protection. Ultimately, this information and analysis will inform the revitalization plan and help define milestones to assess progress in response to recommended actions. Several important data gaps are noted:

- Only 48% of stream miles and 43% of lake acres have been assessed for water quality, meaning that nearly 50% of the waters within the watershed were not characterized or monitored for impairment. Of the assessed waters, 38% of stream miles and 80% of lake acres were found to be threatened, stressed, or impaired. Given that high percentage, it is likely that many of the unassessed waters are also impacted.
- Due to the extensive size of the watershed, it was not feasible to ground truth all data. Therefore, a heavy reliance was placed on federal, state, and local data/reports and reviewed by the WAC who holds local knowledge of the watershed.
- The North Country of New York State is largely unmapped by FEMA for identification of high-risk flood areas. Consequently, parameters such as slope, soil type, storage capacity, and incoming flow were used to evaluate which areas are more vulnerable to flooding.
- Citizen science is a major source of data for detecting invasive species and cyanobacterial blooms and assessing water quality and benthic macroinvertebrate communities. While citizen data are essential for stakeholder engagement and expanding capacity of resource management agencies, selective sampling can introduce bias if there are major disparities in sampling frequency and spatial coverage.
- The land use characterization does not include a detailed analysis of local codes for each municipality, due to the complexity and level of effort required to collect these data across such a large study area. However, since 44% of the watershed is within the Adirondack Park and a substantial percentage of the remainder is currently in agricultural use, analysis of local land use laws affecting nonpoint sources of pollution are less significant in this rural area. Moreover, the characterization demonstrates that water quality impairments are primarily the result of regional (atmospheric) sources and/or legacy contaminants; neither source is subject to local control. Despite this finding, improvements to local codes for water resource management is an important recommendation for long-term protection as this rural area undergoes development.

Despite these data gaps, the findings of the Characterization Report support development of recommended actions and priorities.

9 References

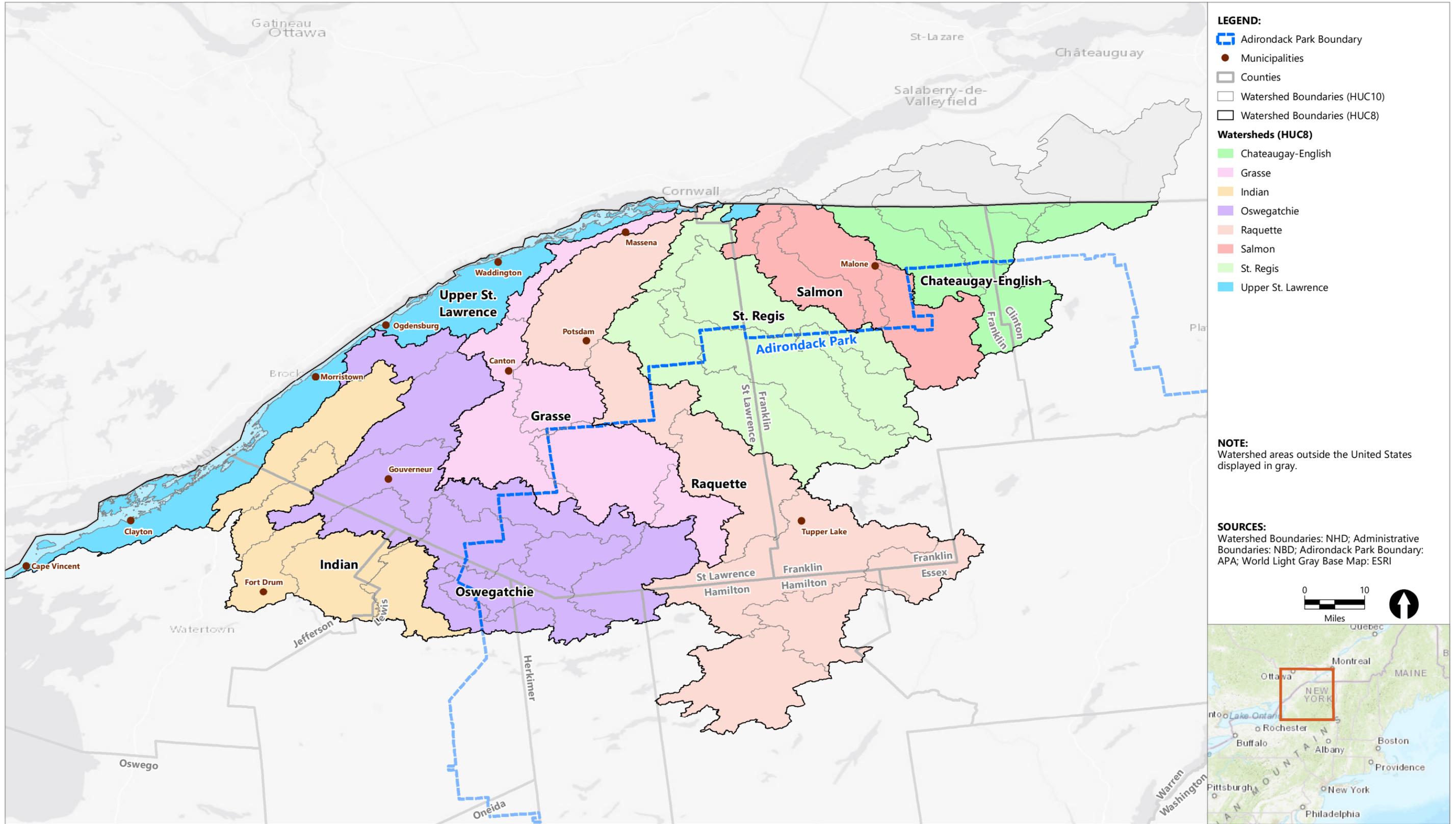
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Maps



- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Watersheds (HUC8)**
- Chateaugay-English
 - Grasse
 - Indian
 - Oswegatchie
 - Raquette
 - Salmon
 - St. Regis
 - Upper St. Lawrence

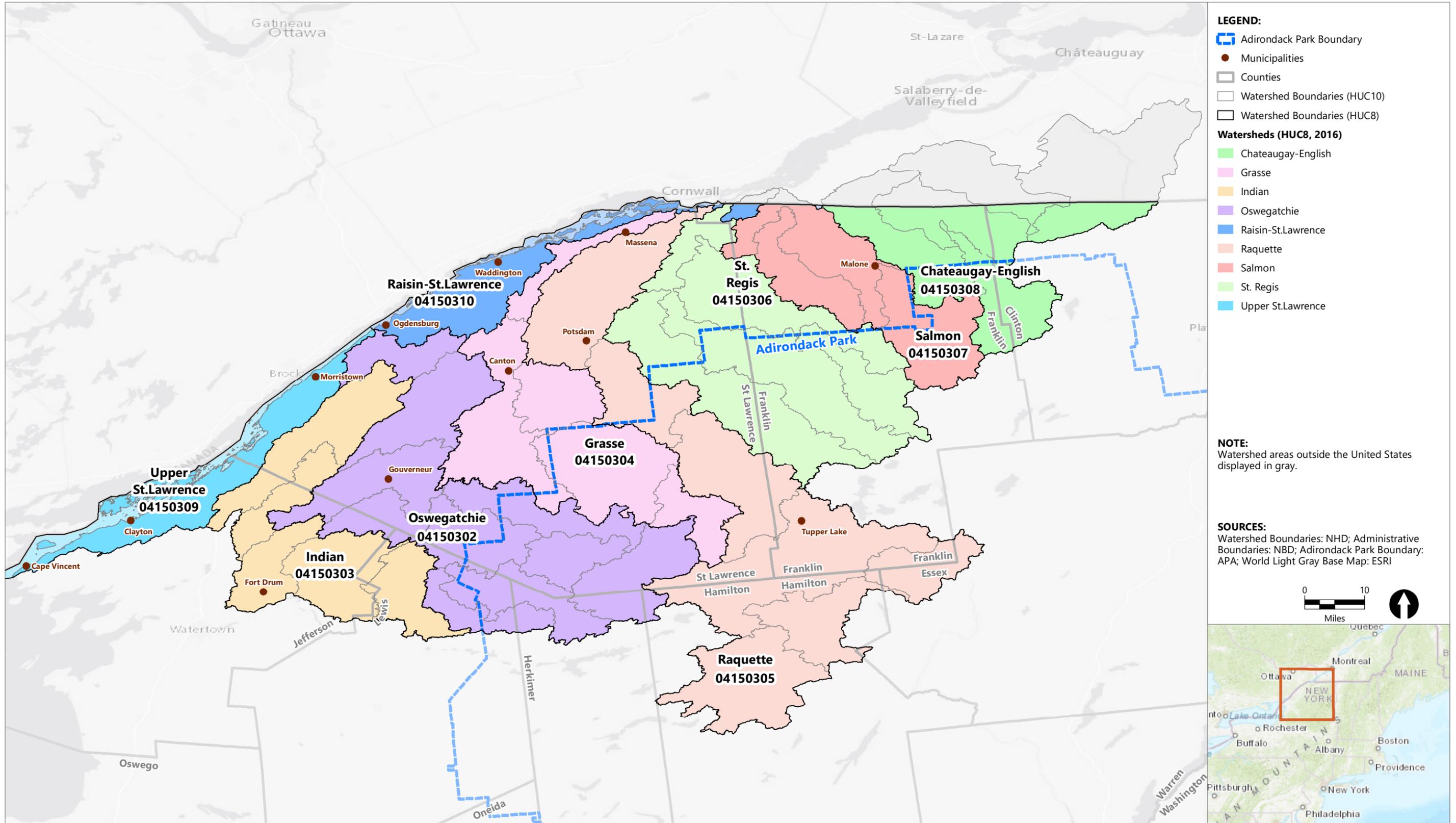
NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI



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Filepath: \\orcas\gis\Jobs\Franklin_County_SWCD\GIS\ArcMap_Documents\FINAL_VERSION\SLR_Watershed_Characterization_Map.mxd





- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Watersheds (HUC8, 2016)**
- Chateaugay-English
 - Grasse
 - Indian
 - Oswegatchie
 - Raisin-St. Lawrence
 - Raquette
 - Salmon
 - St. Regis
 - Upper St. Lawrence

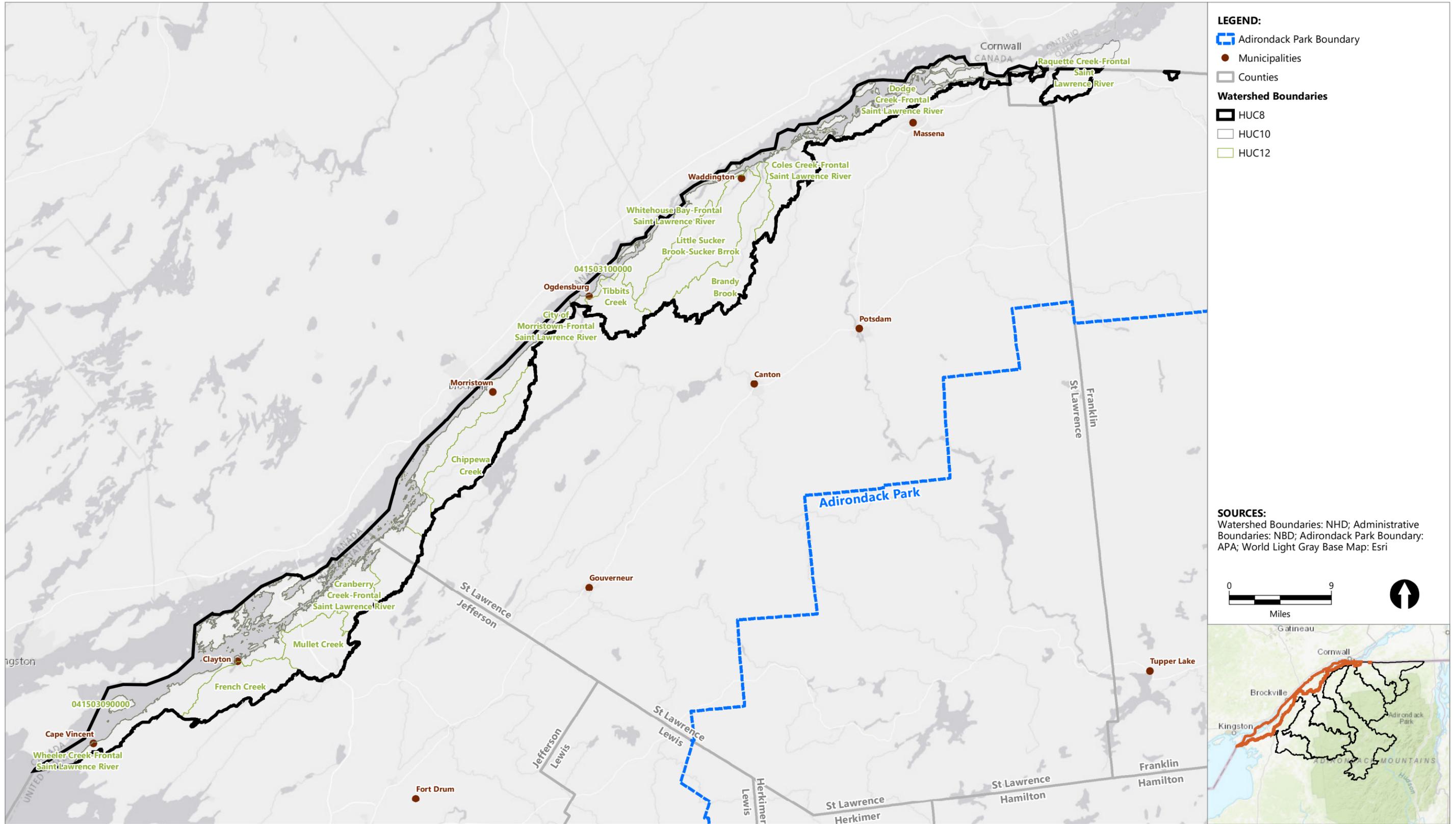
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SOURCES:
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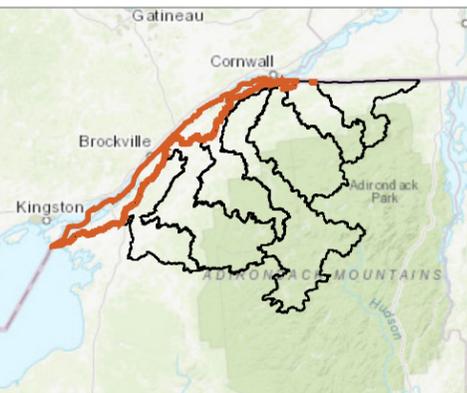
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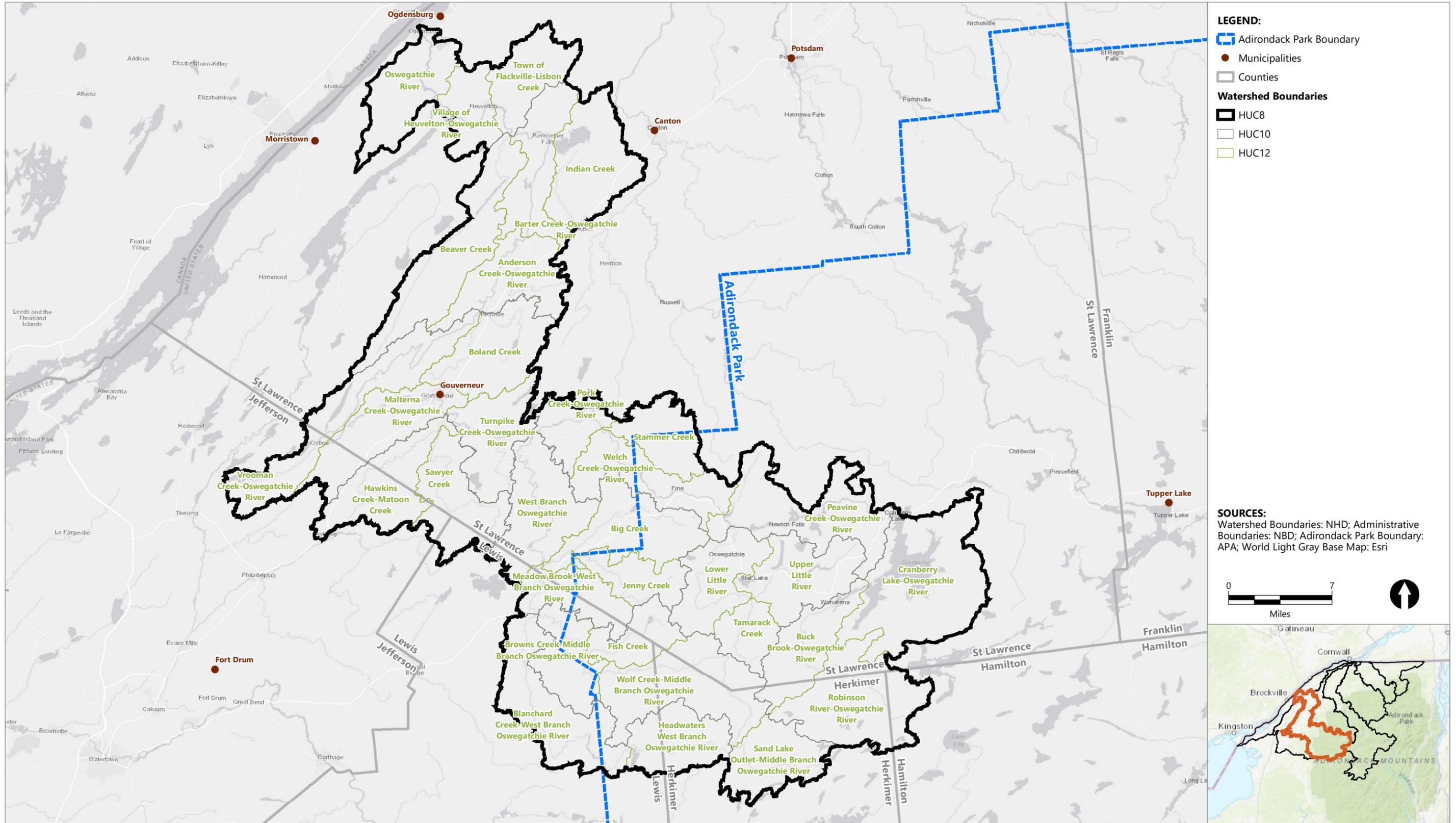
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries**
 - HUC8
 - HUC10
 - HUC12

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: Esri



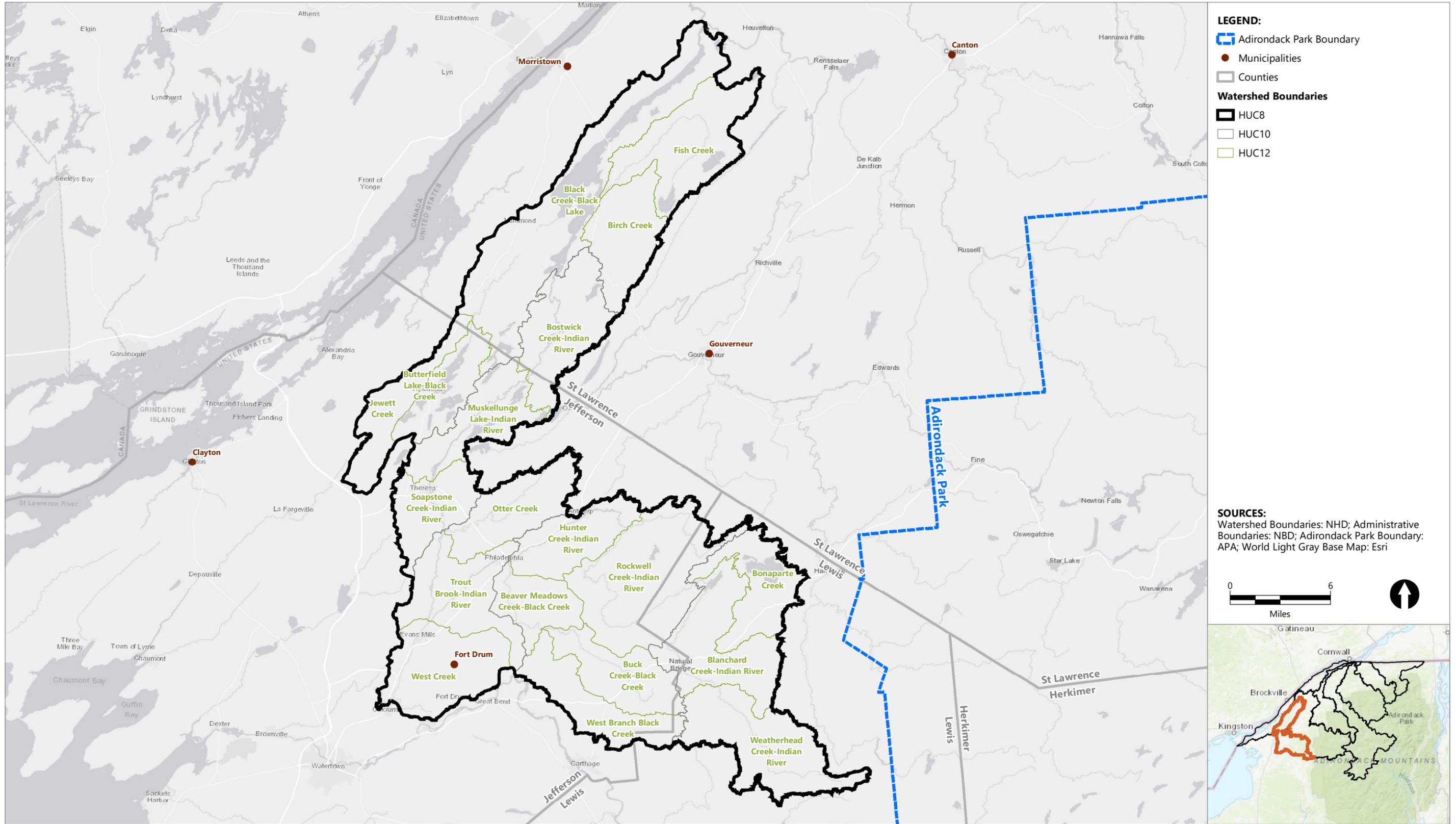
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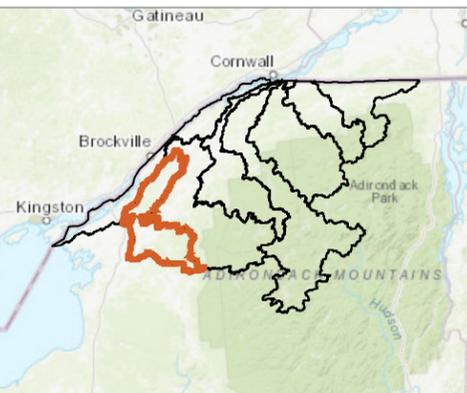
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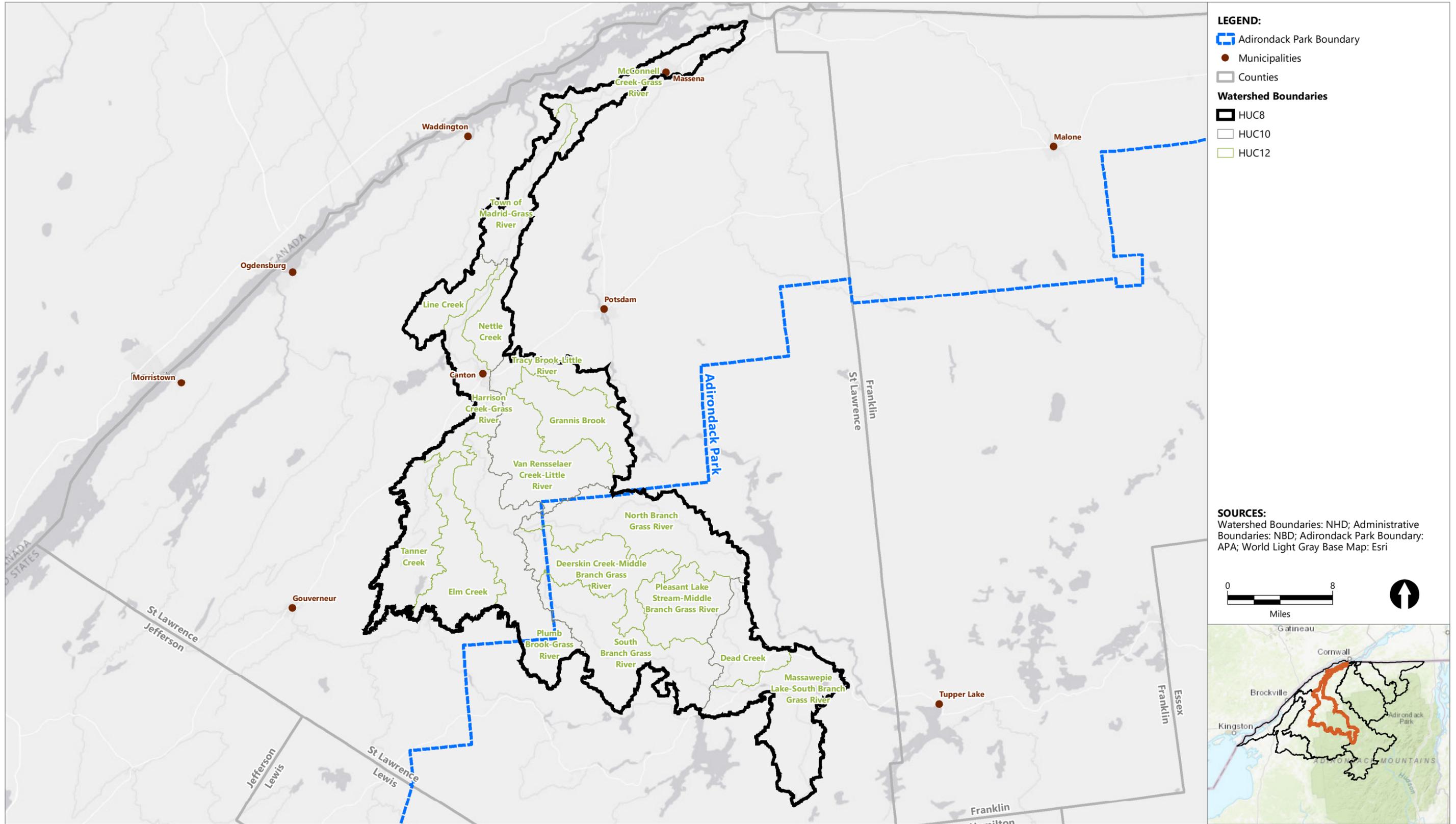
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
- Watershed Boundaries**
- HUC8
 - HUC10
 - HUC12

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: Esri

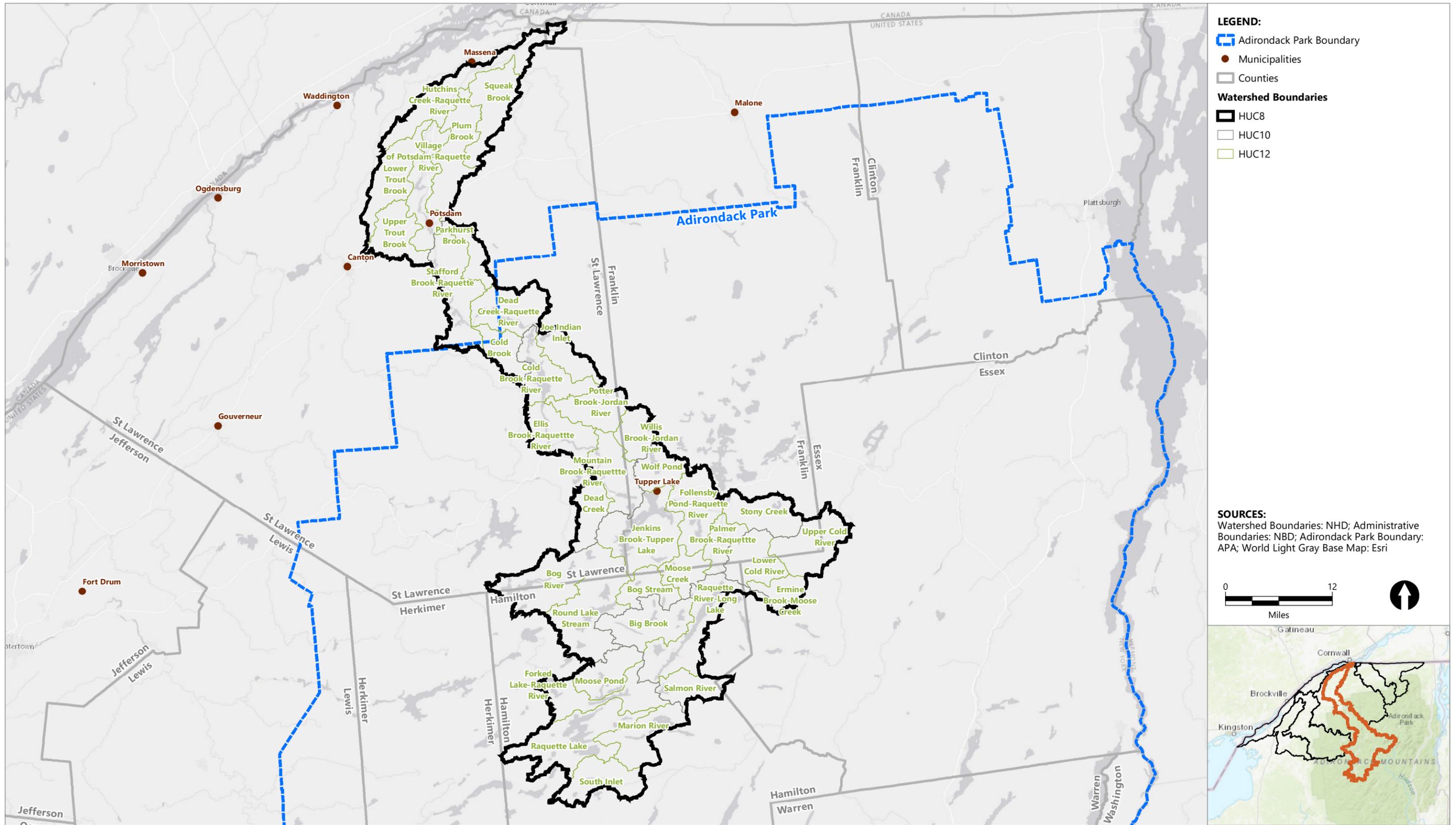


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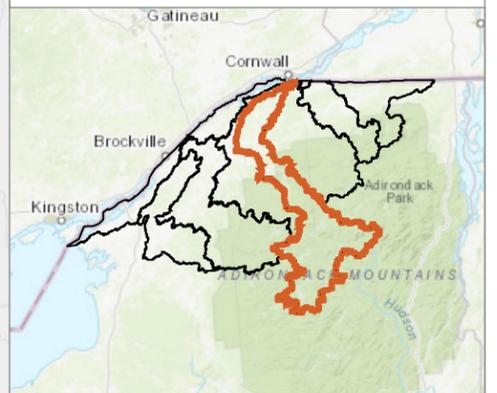
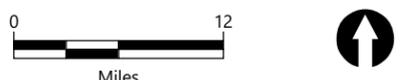


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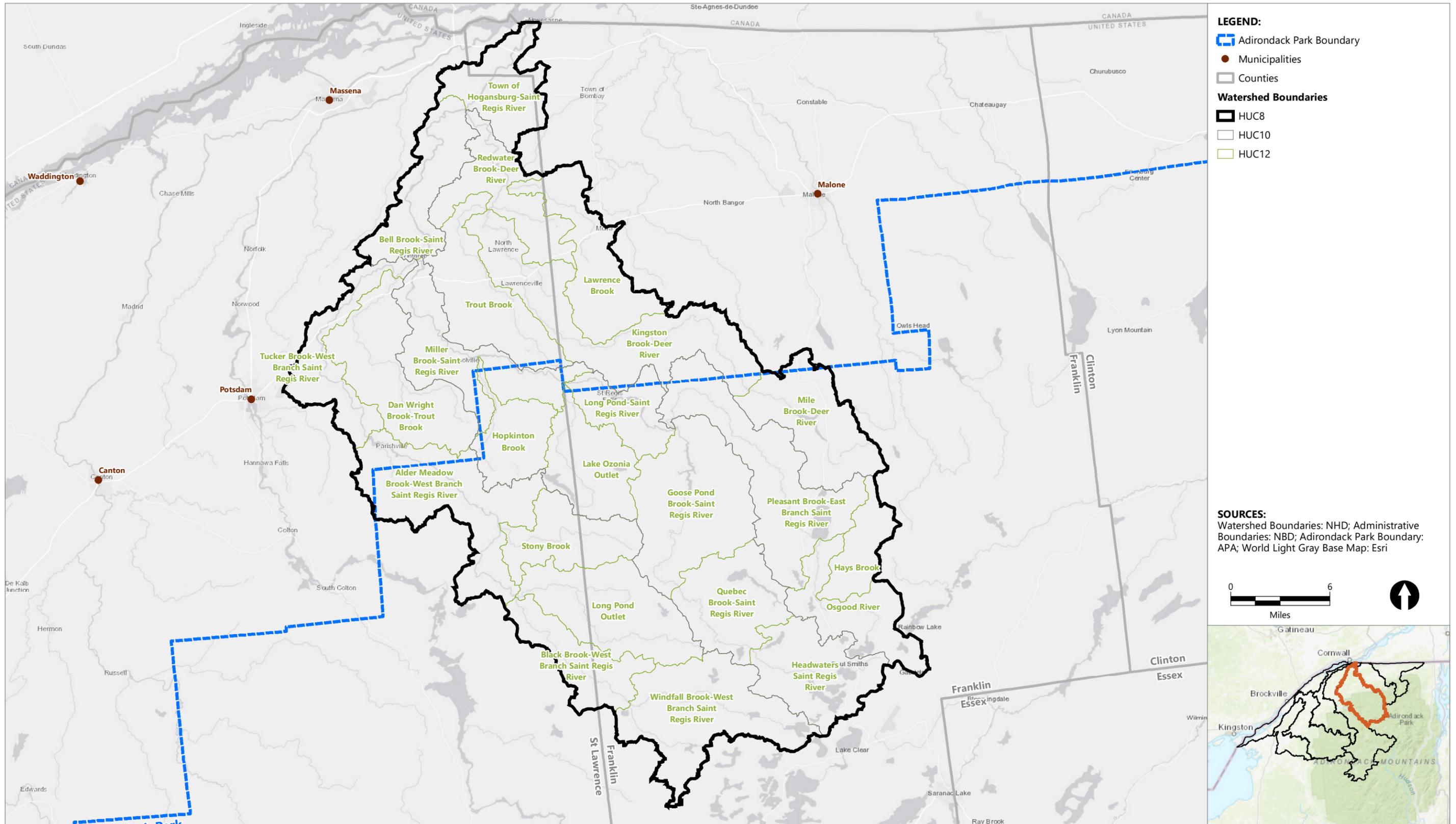
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
- Watershed Boundaries**
- HUC8
 - HUC10
 - HUC12

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: Esri



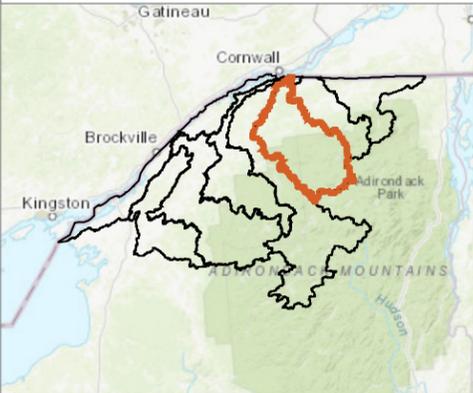
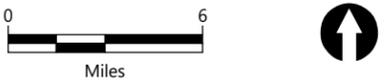
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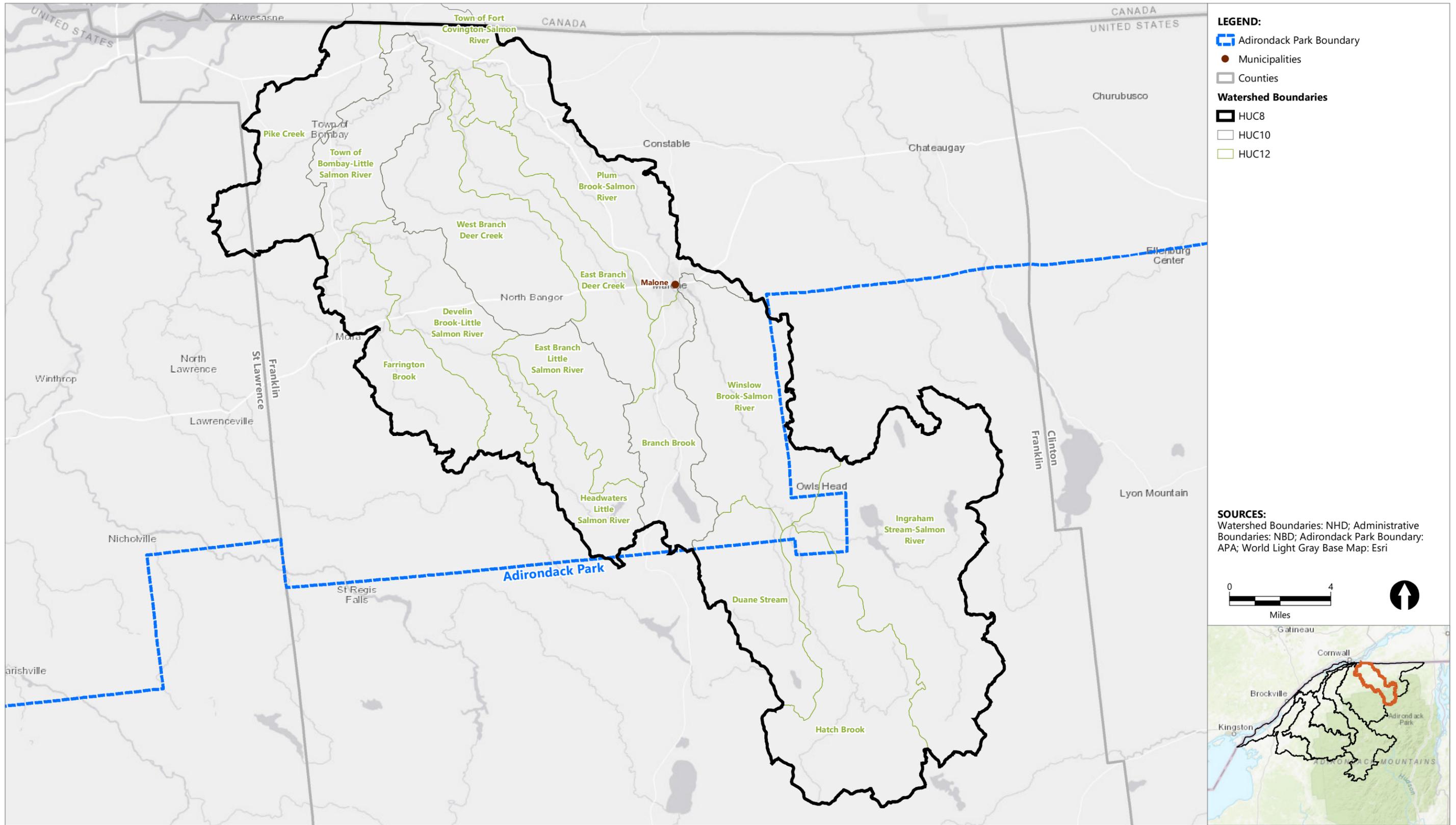


- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
- Watershed Boundaries**
- HUC8
 - HUC10
 - HUC12

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: Esri

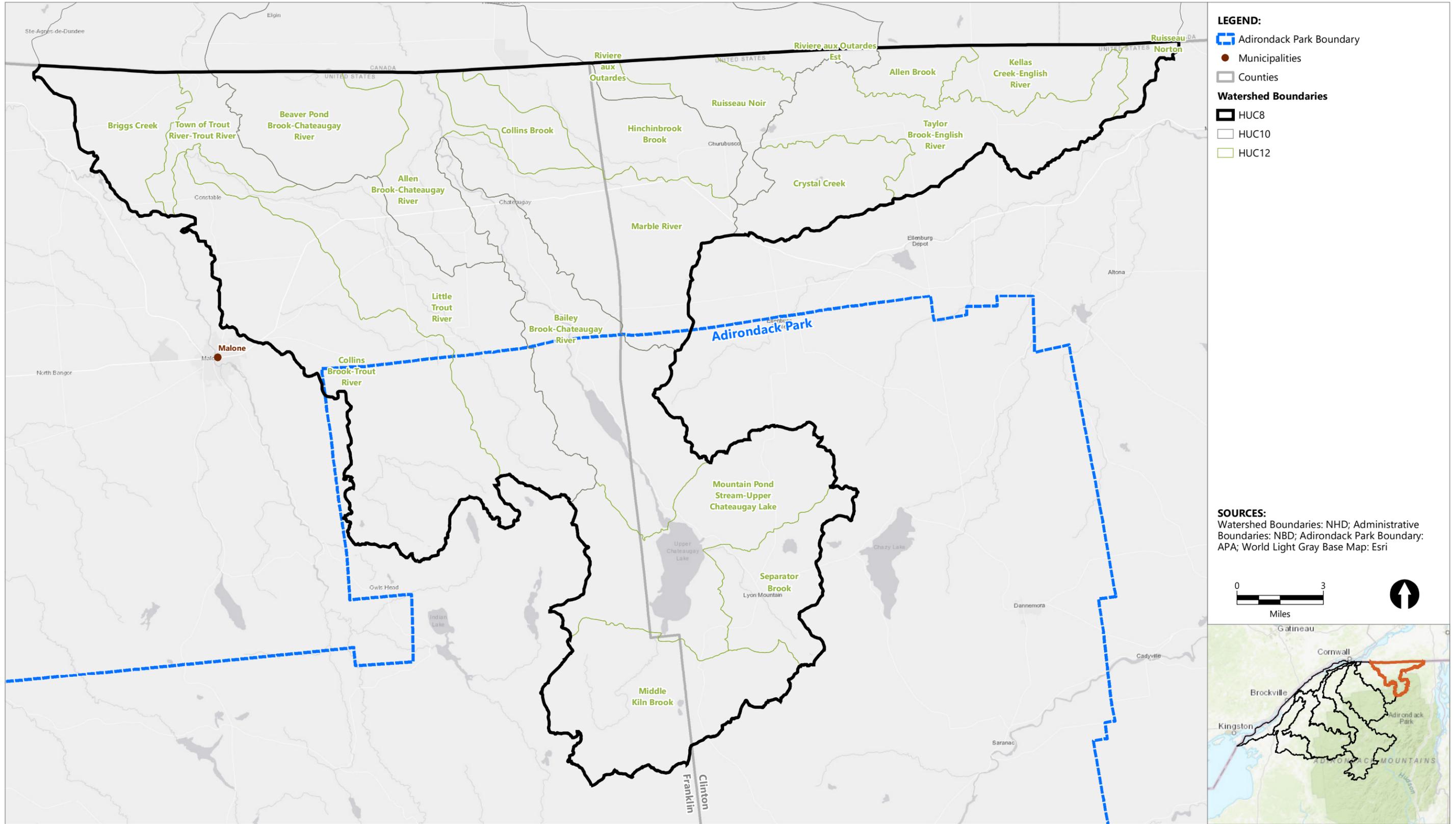


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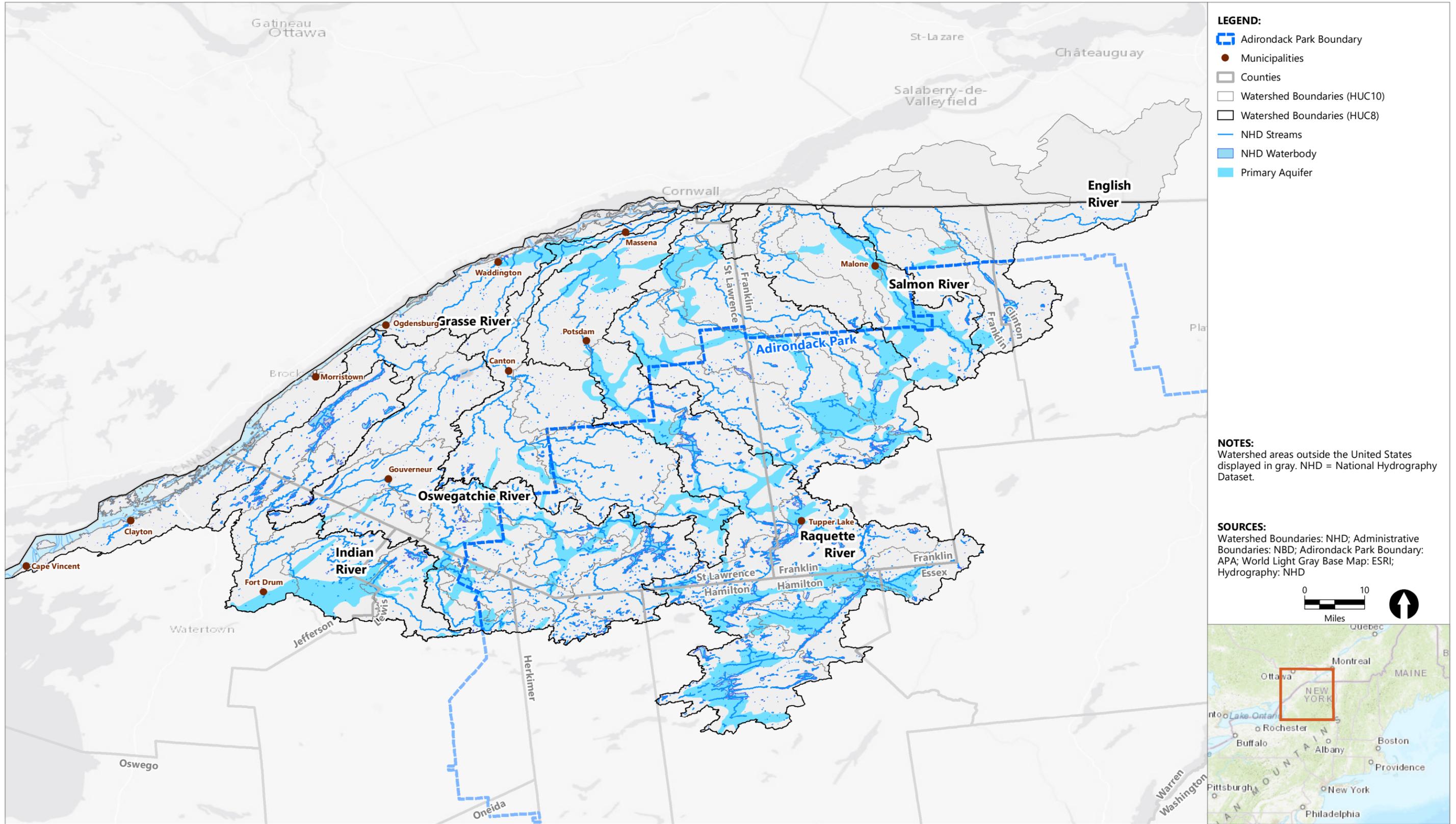
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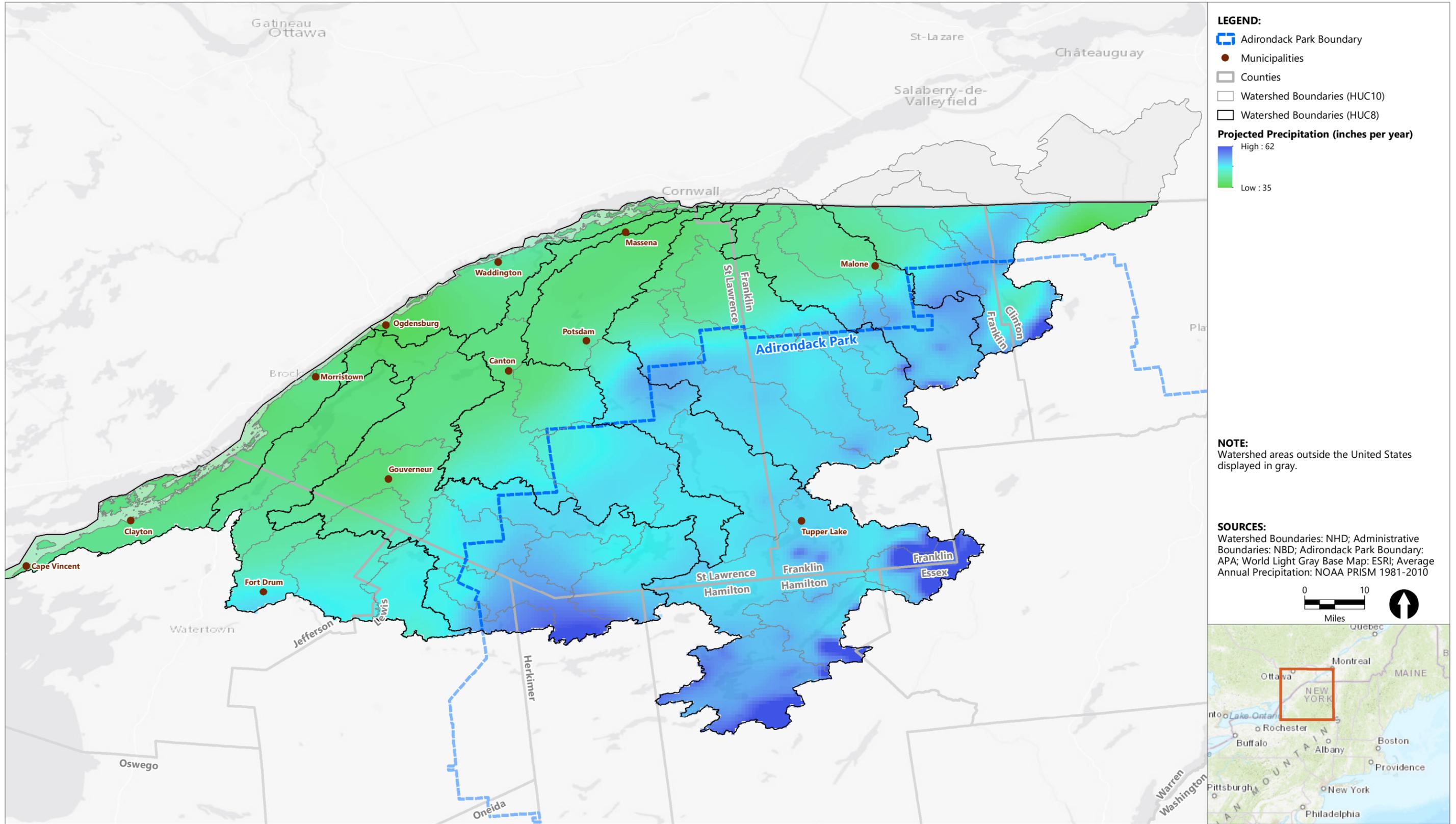
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - NHD Streams
 - NHD Waterbody
 - Primary Aquifer

NOTES:
 Watershed areas outside the United States displayed in gray. NHD = National Hydrography Dataset.

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Hydrography: NHD



Publish Date: 2019/12/19, 9:24 AM | User: pkwon
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LEGEND:

- Adirondack Park Boundary
- Municipalities
- Counties
- Watershed Boundaries (HUC10)
- Watershed Boundaries (HUC8)

Projected Precipitation (inches per year)

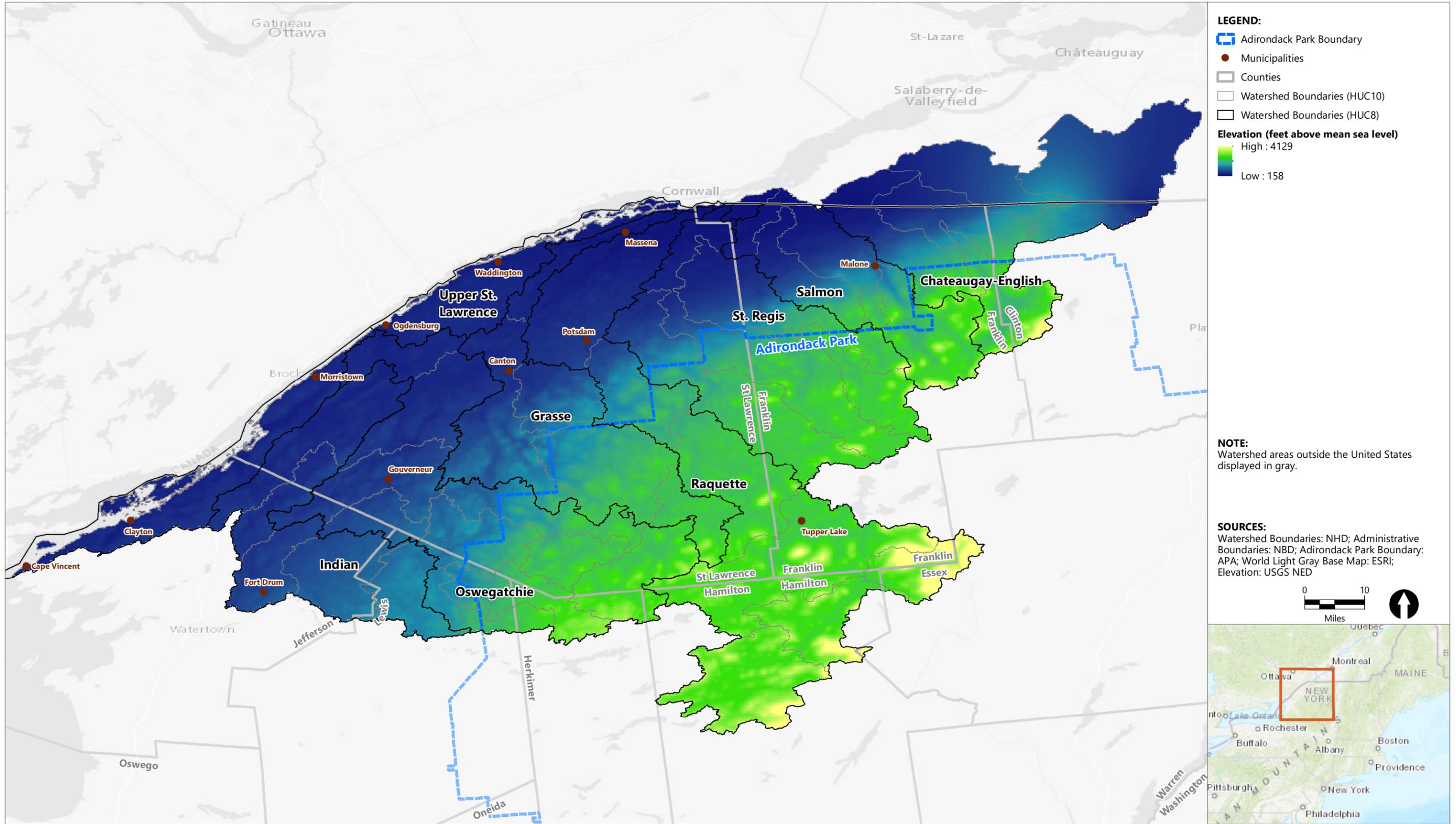
High : 62
Low : 35

NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Average Annual Precipitation: NOAA PRISM 1981-2010



Publish Date: 2019/12/19, 9:34 AM | User: pkwon
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LEGEND:

- Adirondack Park Boundary
- Municipalities
- Counties
- Watershed Boundaries (HUC10)
- Watershed Boundaries (HUC8)

Elevation (feet above mean sea level)

High : 4129

Low : 158

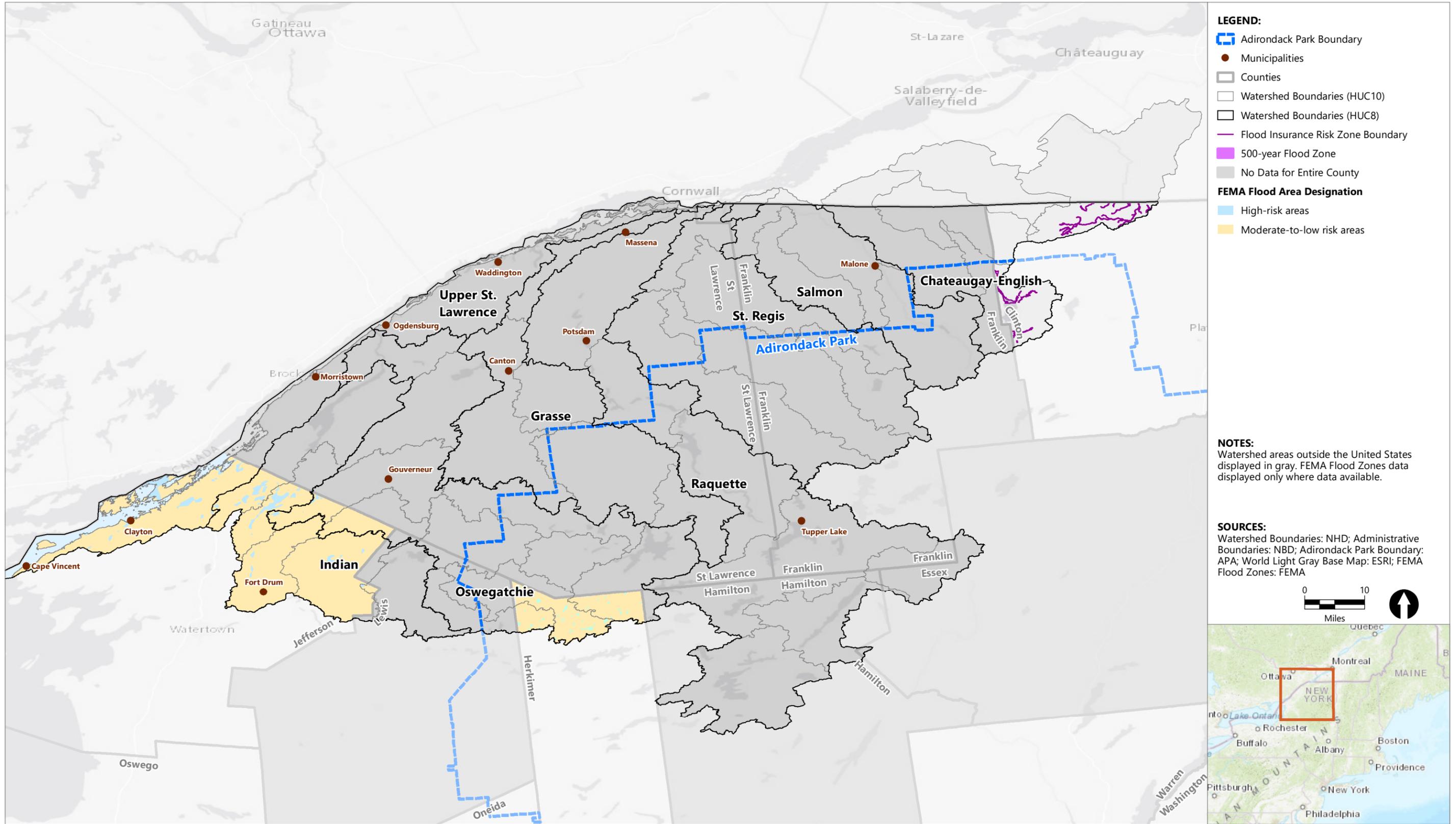
NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Elevation: USGS NED

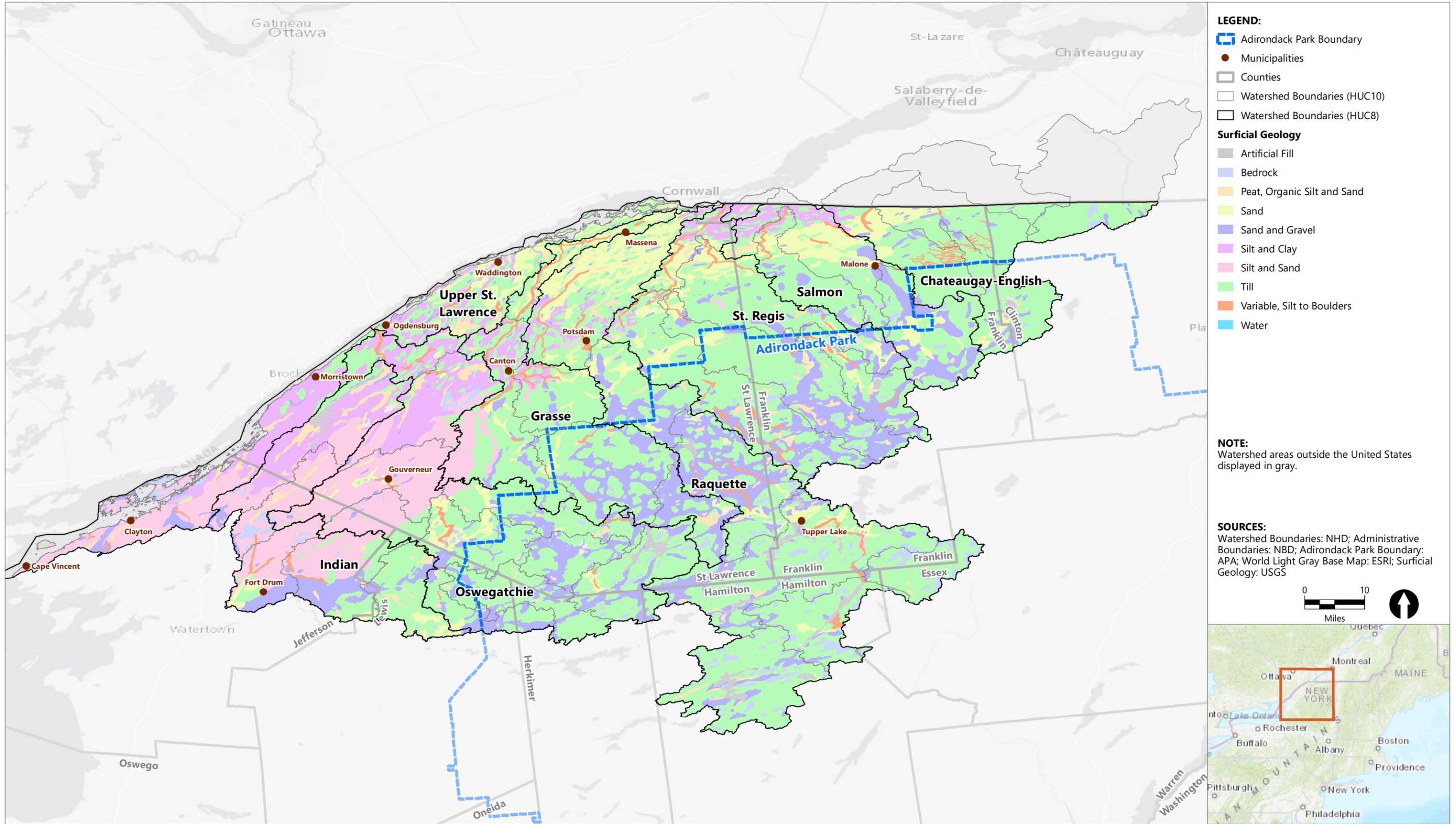


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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Surficial Geology**
- Artificial Fill
 - Bedrock
 - Peat, Organic Silt and Sand
 - Sand
 - Sand and Gravel
 - Silt and Clay
 - Silt and Sand
 - Till
 - Variable, Silt to Boulders
 - Water

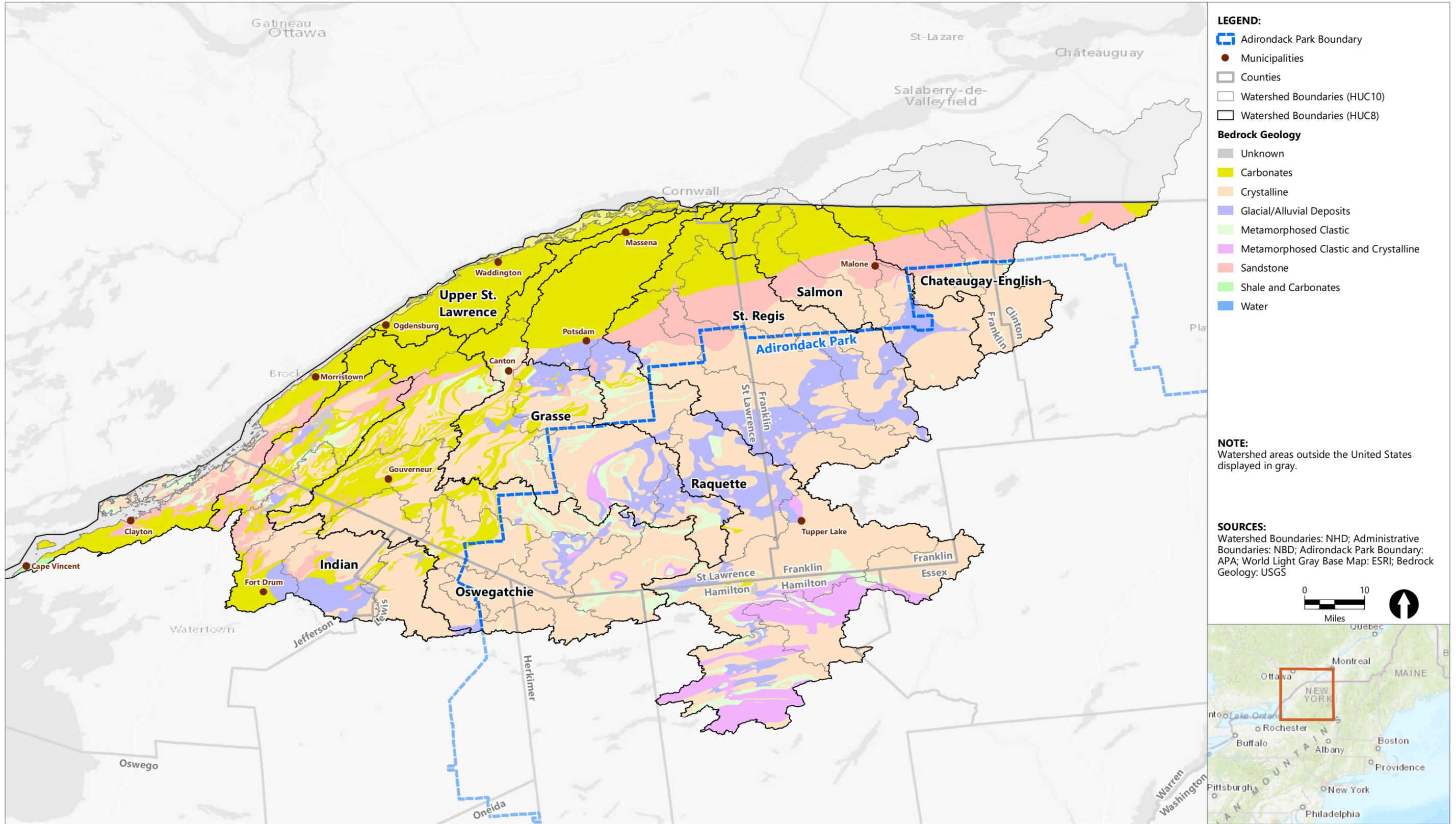
NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Surficial Geology: USGS



Publish Date: 2019/12/19, 10:26 AM | User: pkwon
Filepath: \\orcas\gis\Jobs\Franklin_County_SWCD\GIS\ArcMap_Documents\FINAL_VERSION\SLR_Watershed_Characterization_Map.mxd





- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Bedrock Geology**
- Unknown
 - Carbonates
 - Crystalline
 - Glacial/Alluvial Deposits
 - Metamorphosed Clastic
 - Metamorphosed Clastic and Crystalline
 - Sandstone
 - Shale and Carbonates
 - Water

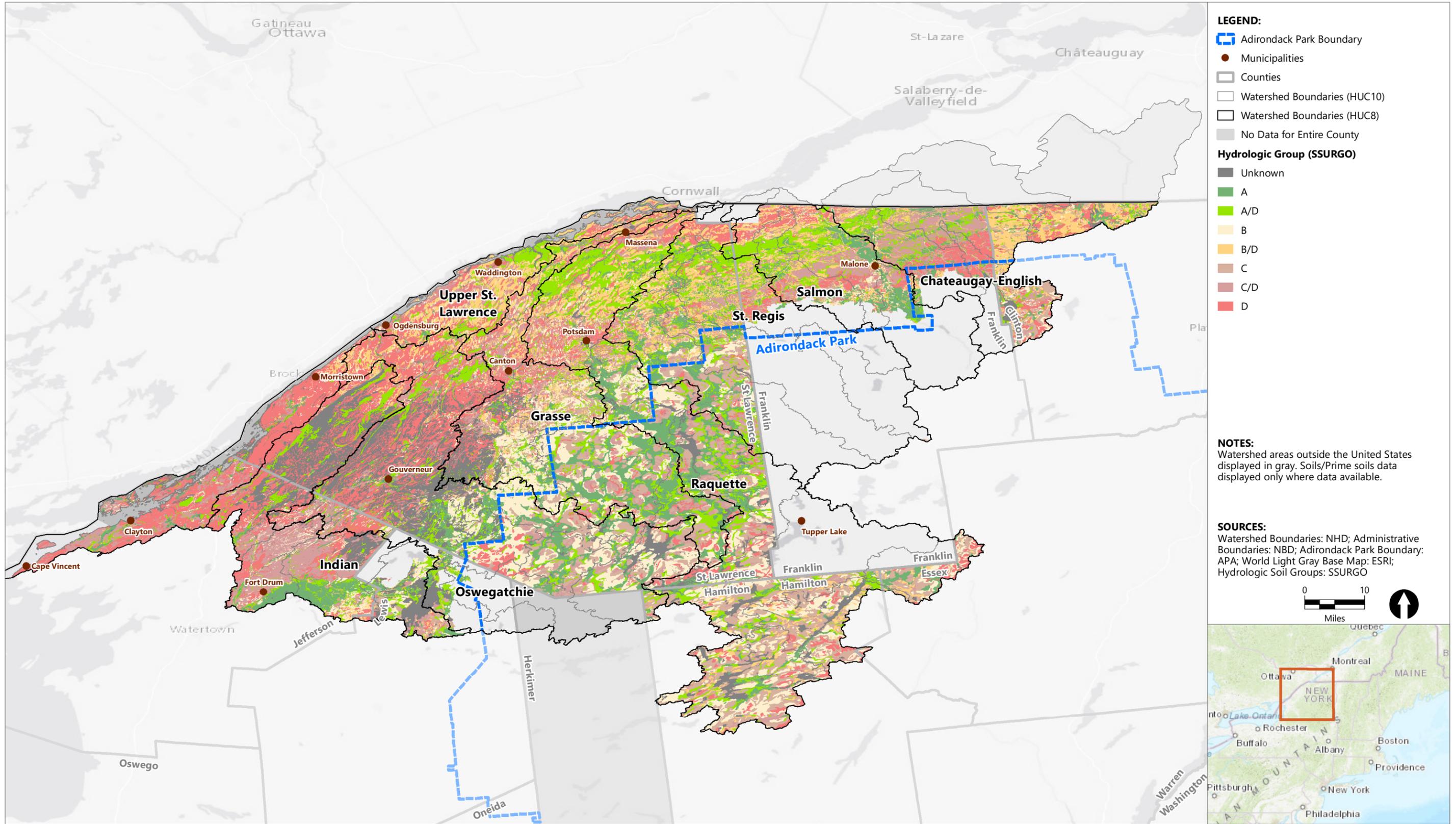
NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Bedrock Geology: USGS

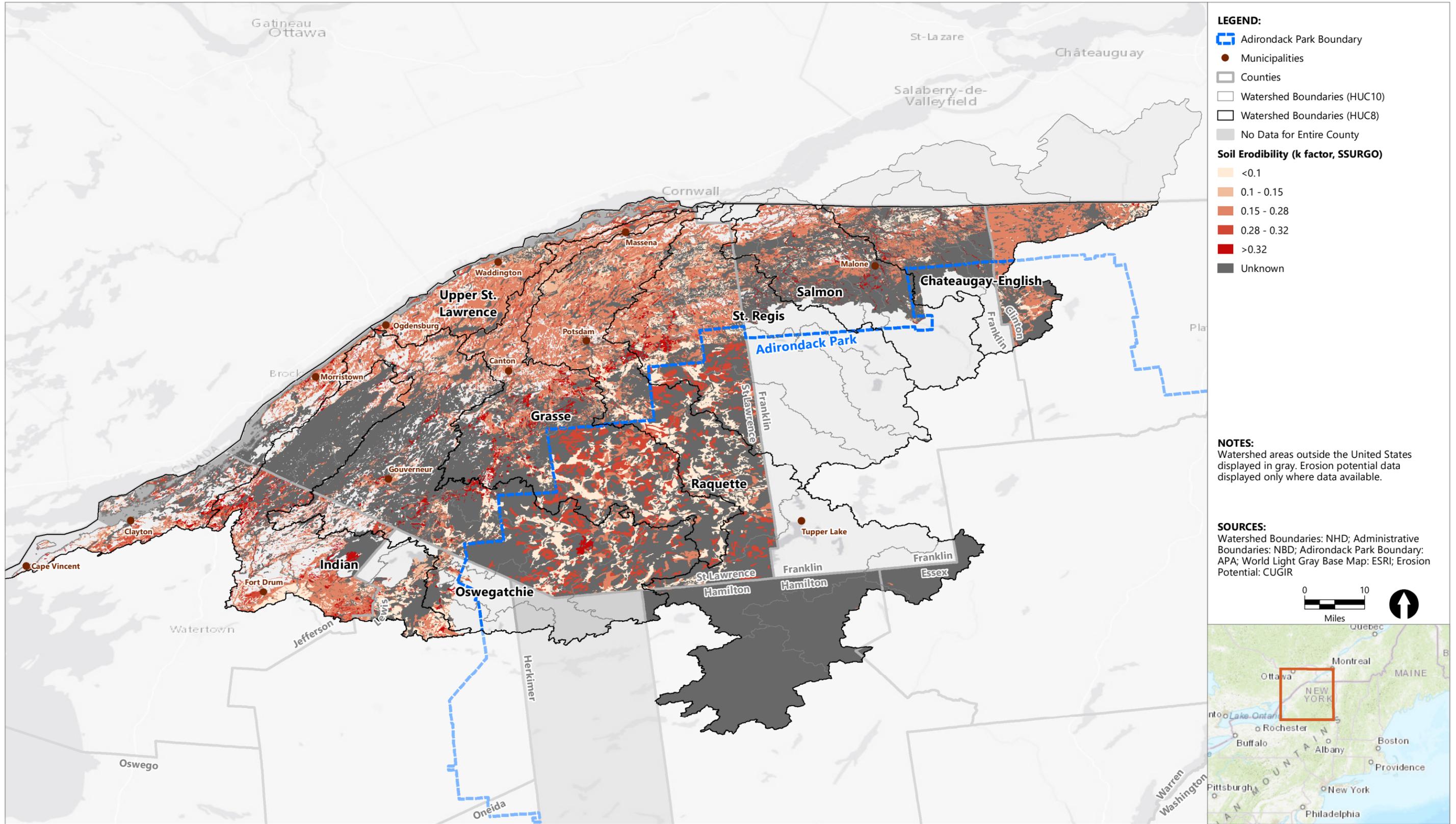


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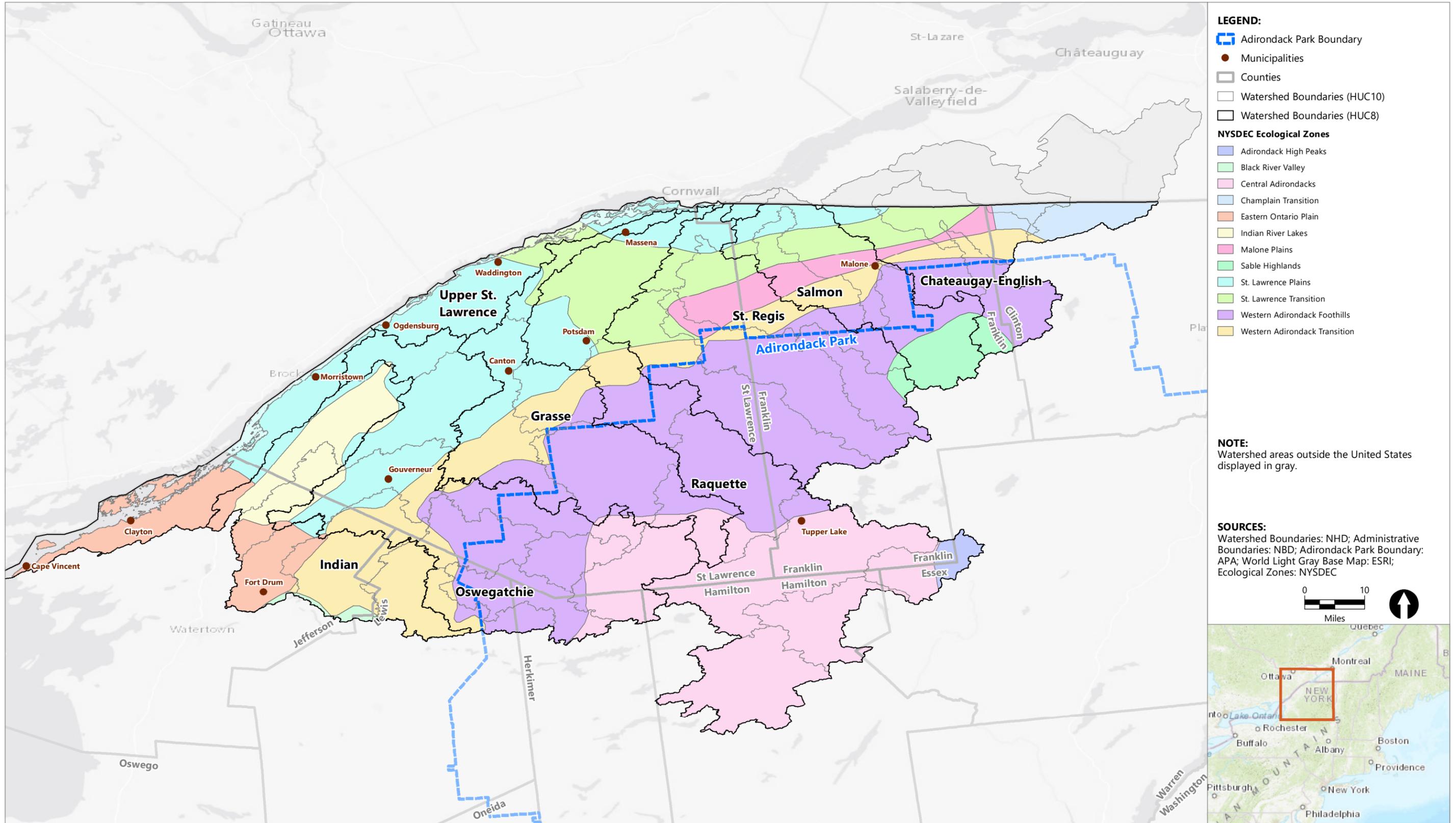




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Publish Date: 2019/12/19, 10:38 AM | User: pkwon
 Filepath: \\orcas\gis\Jobs\Franklin_County_SWCD\GIS\ArcMap_Documents\FINAL_VERSION\SLR_Watershed_Characterization_Map.mxd



- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- NYSDEC Ecological Zones**
- Adirondack High Peaks
 - Black River Valley
 - Central Adirondacks
 - Champlain Transition
 - Eastern Ontario Plain
 - Indian River Lakes
 - Malone Plains
 - Sable Highlands
 - St. Lawrence Plains
 - St. Lawrence Transition
 - Western Adirondack Foothills
 - Western Adirondack Transition

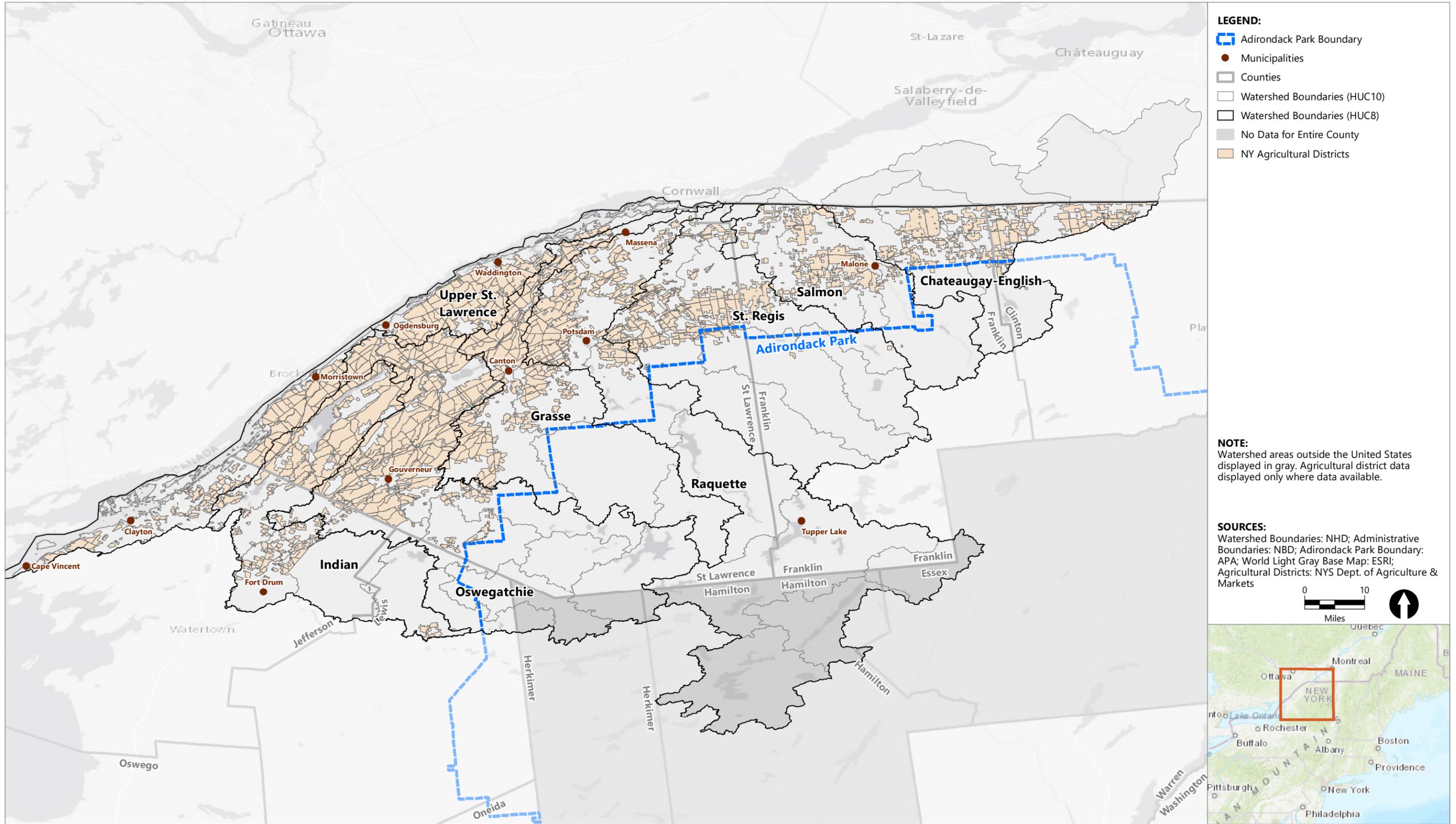
NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Ecological Zones: NYSDEC



Publish Date: 2019/12/19, 10:41 AM | User: pkwon
Filepath: \\orcas\gis\Jobs\Franklin_County_SWCD\GIS\ArcMap_Documents\FINAL_VERSION\SLR_Watershed_Characterization_Map.mxd





- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - No Data for Entire County
 - NY Agricultural Districts

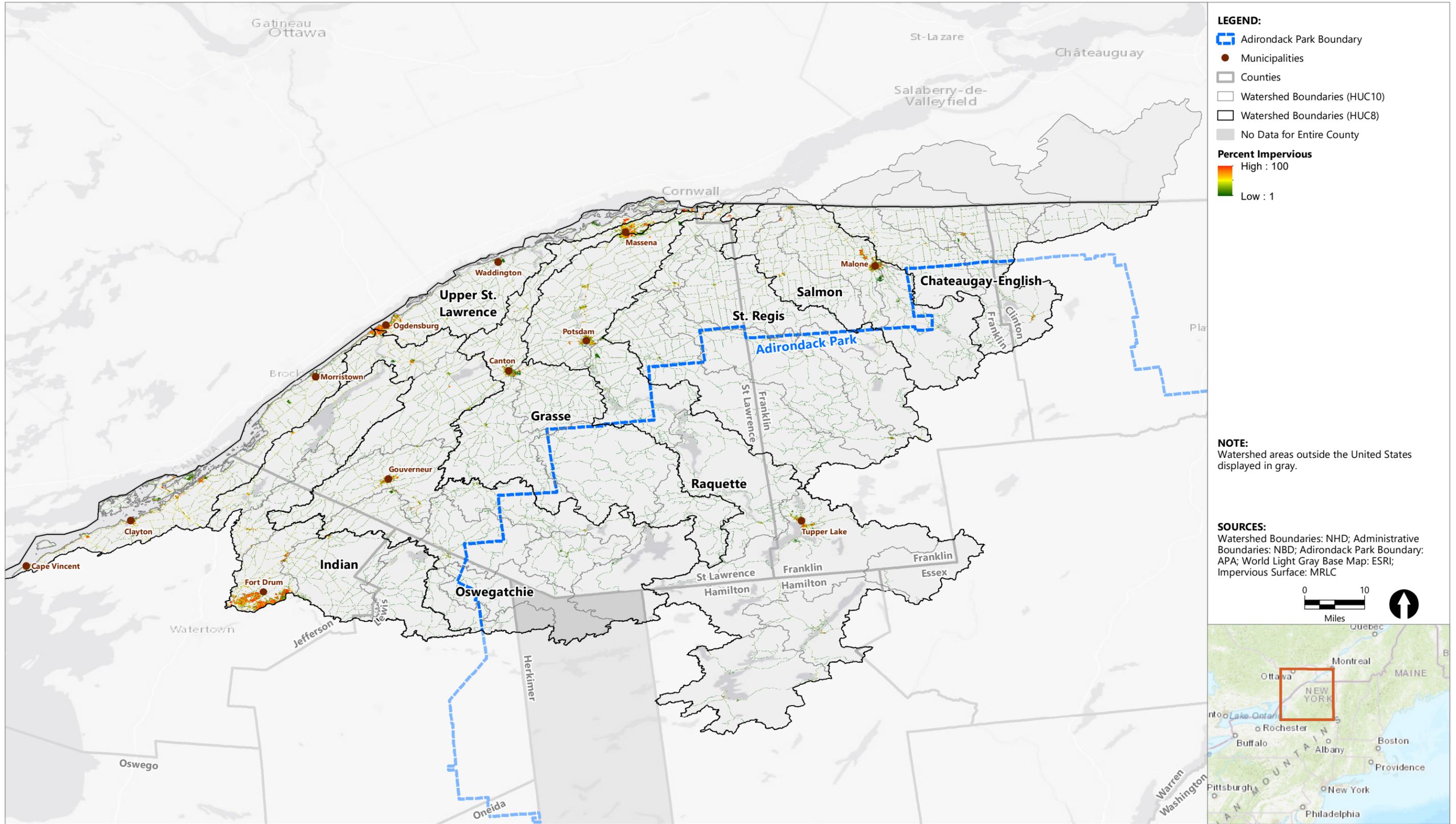
NOTE:
Watershed areas outside the United States displayed in gray. Agricultural district data displayed only where data available.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Agricultural Districts: NYS Dept. of Agriculture & Markets



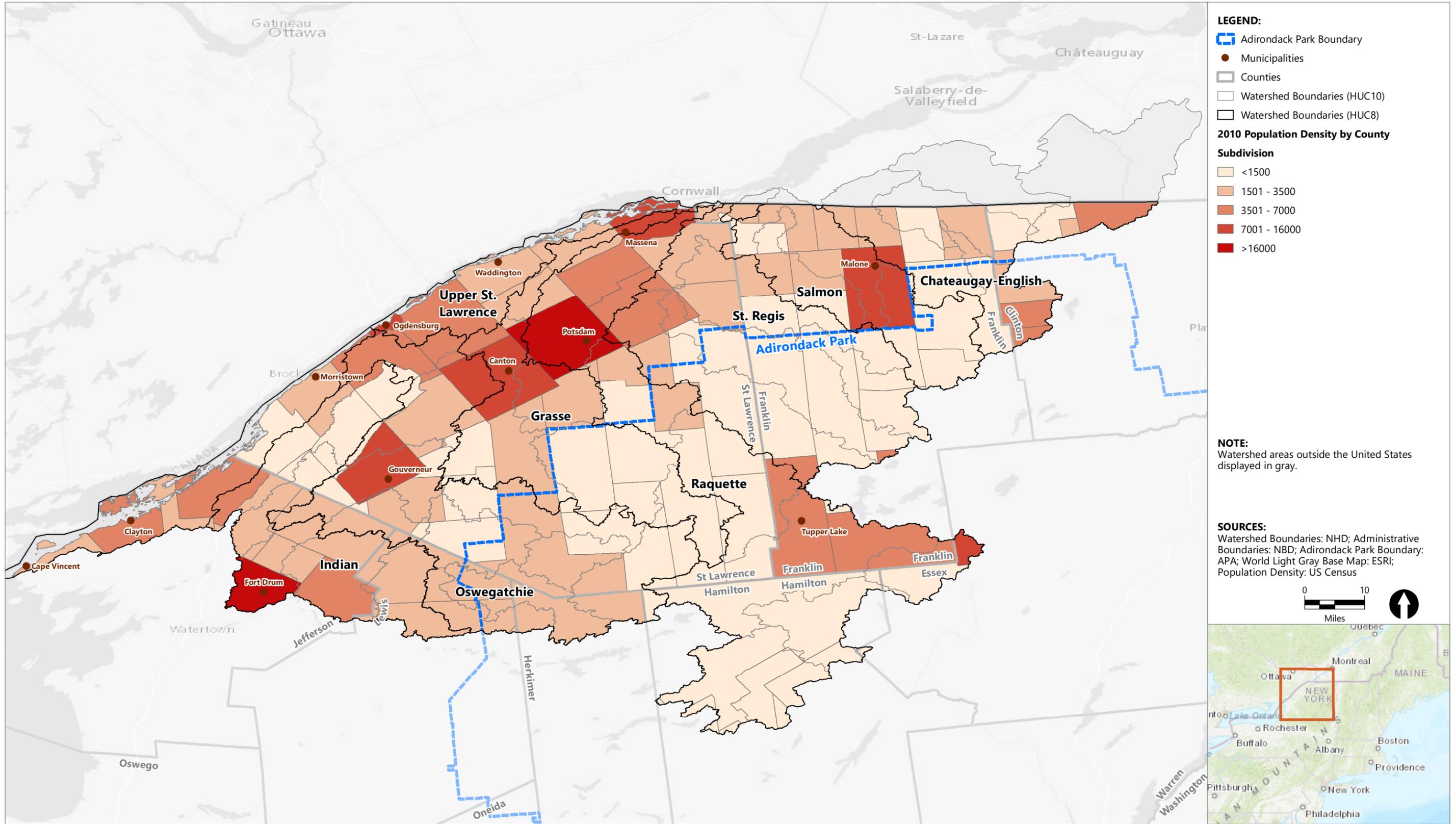
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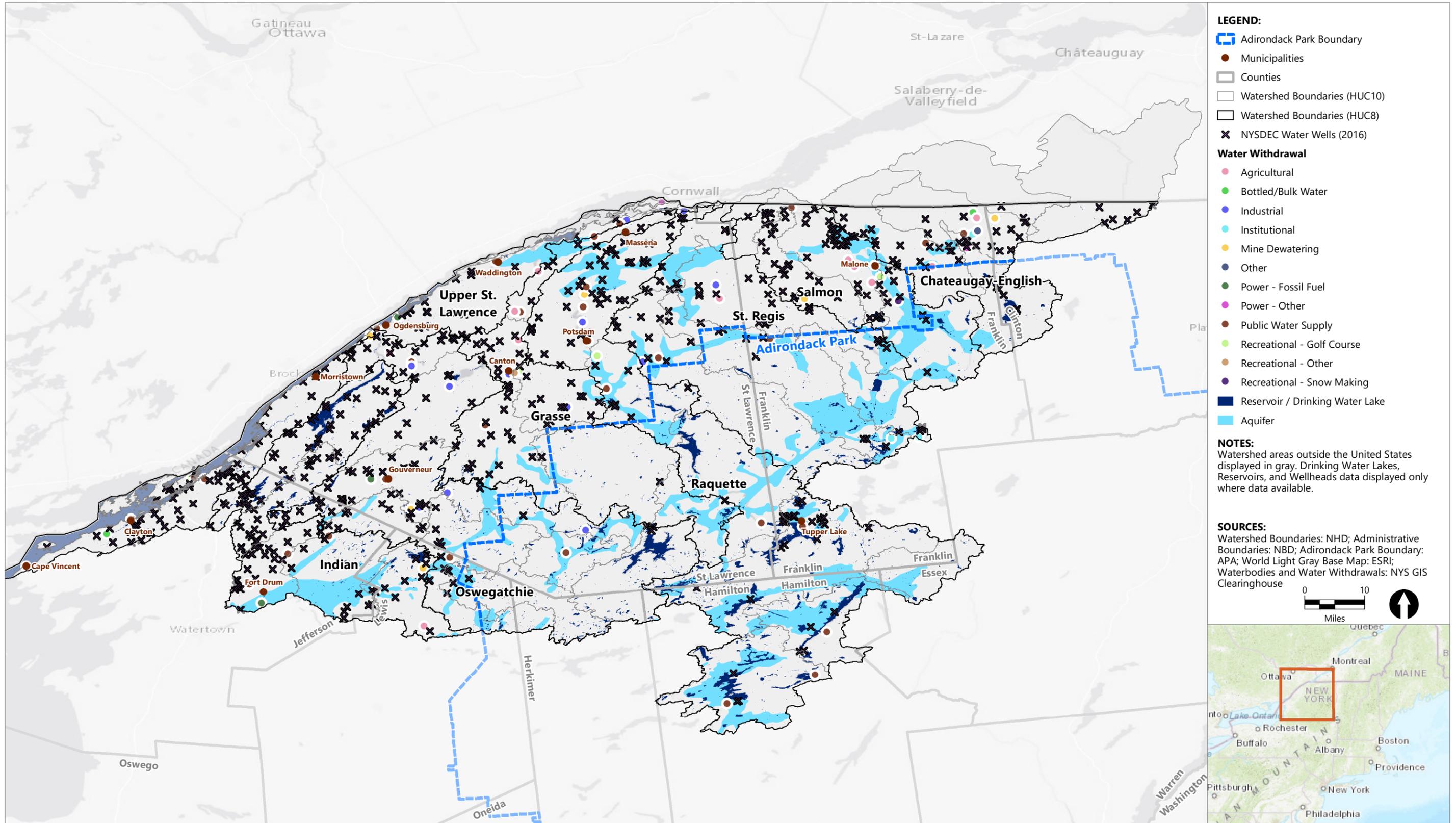
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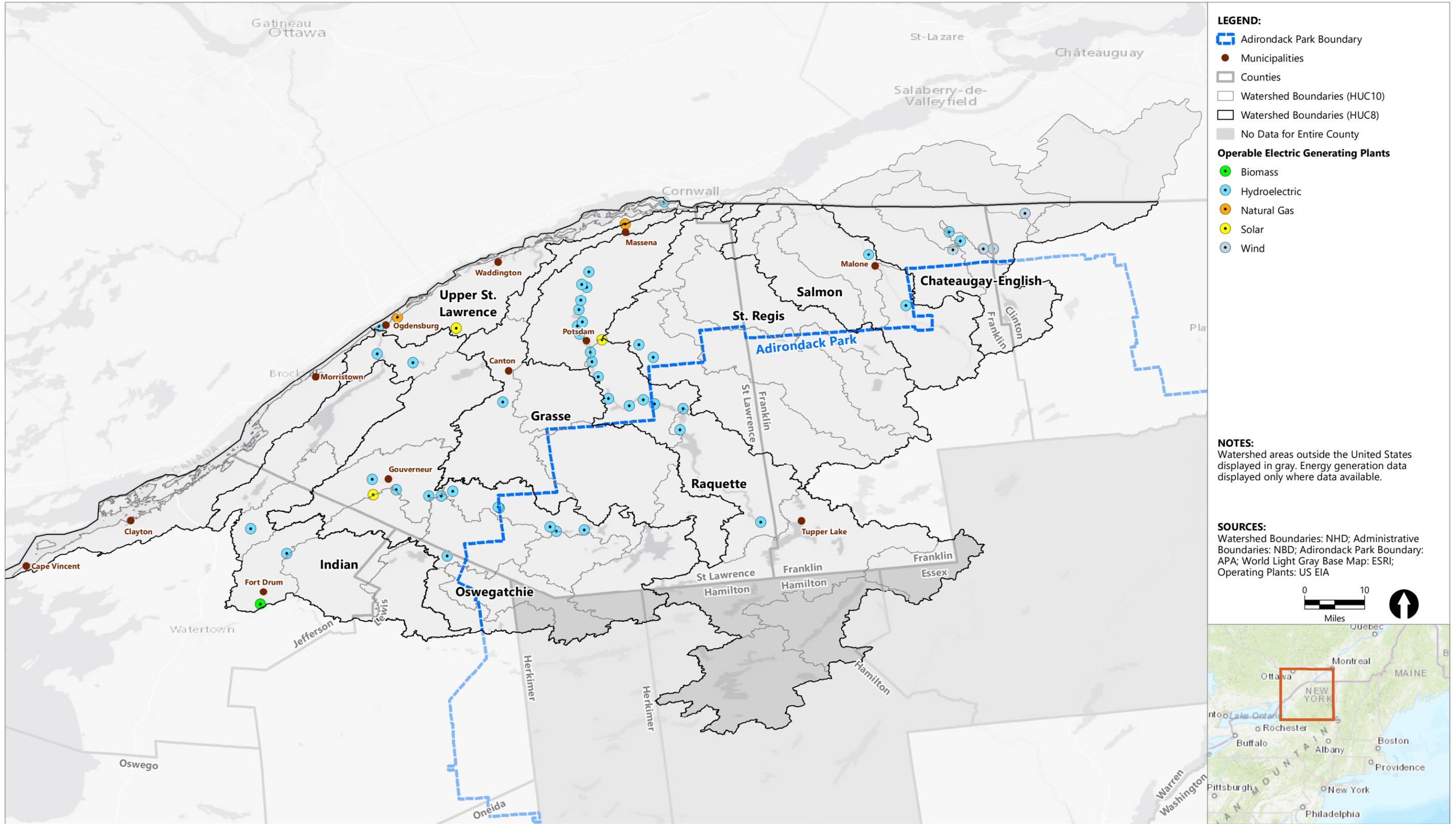


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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - No Data for Entire County
- Operable Electric Generating Plants**
- Biomass
 - Hydroelectric
 - Natural Gas
 - Solar
 - Wind

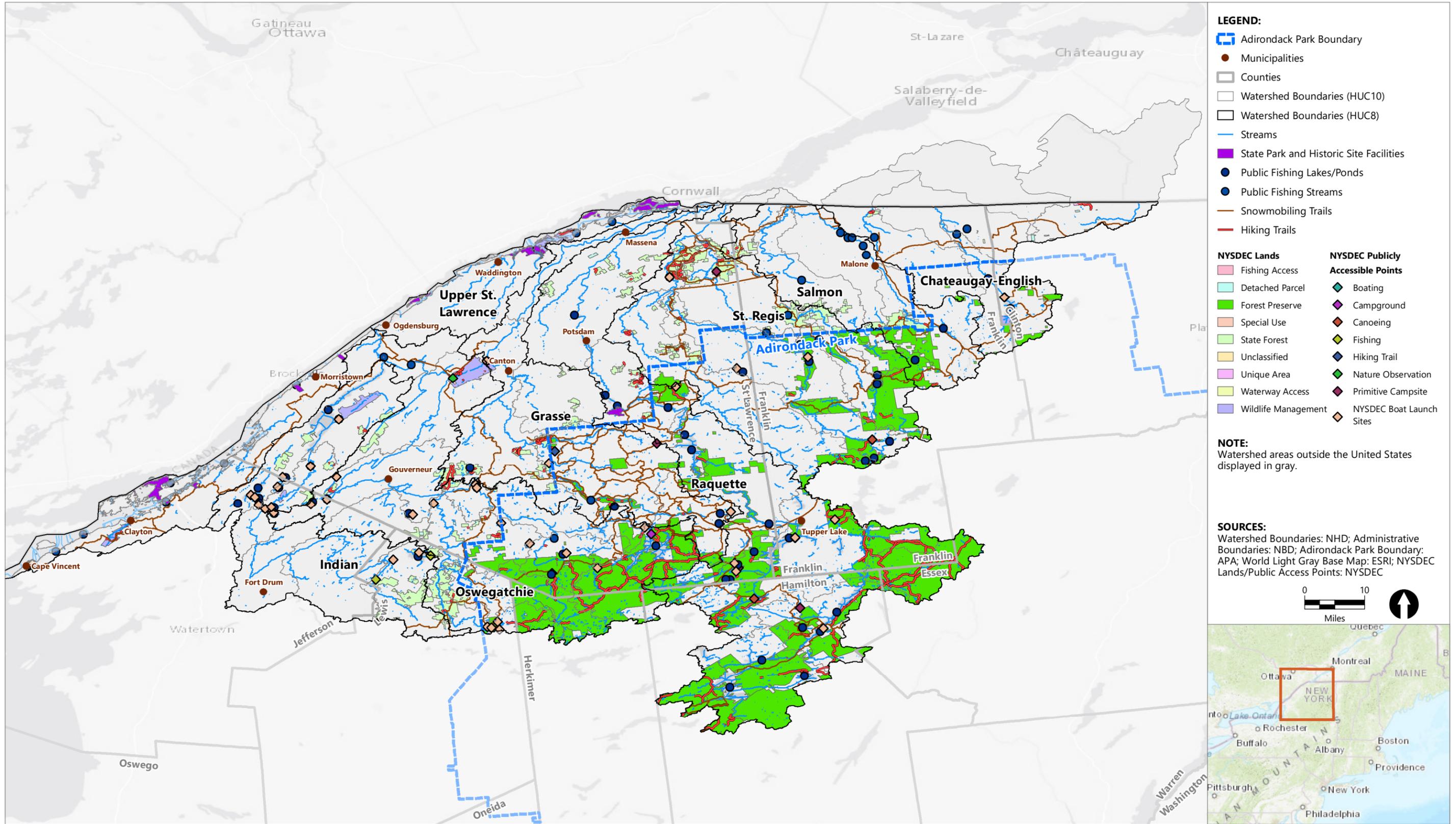
NOTES:
Watershed areas outside the United States displayed in gray. Energy generation data displayed only where data available.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Operating Plants: US EIA

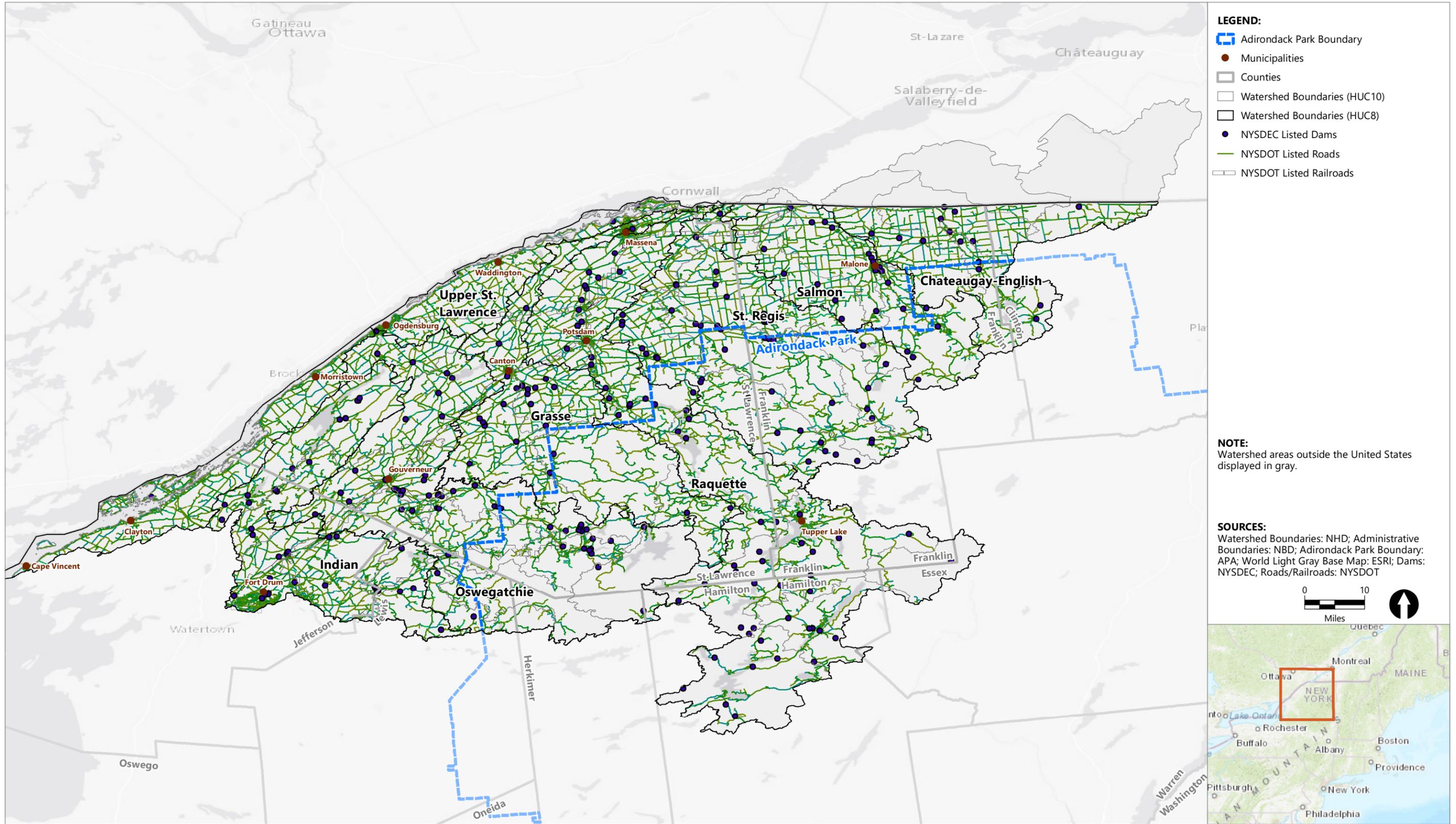


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Publish Date: 2019/12/19, 10:50 AM | User: pkwon
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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - NYSDEC Listed Dams
 - NYS DOT Listed Roads
 - NYS DOT Listed Railroads

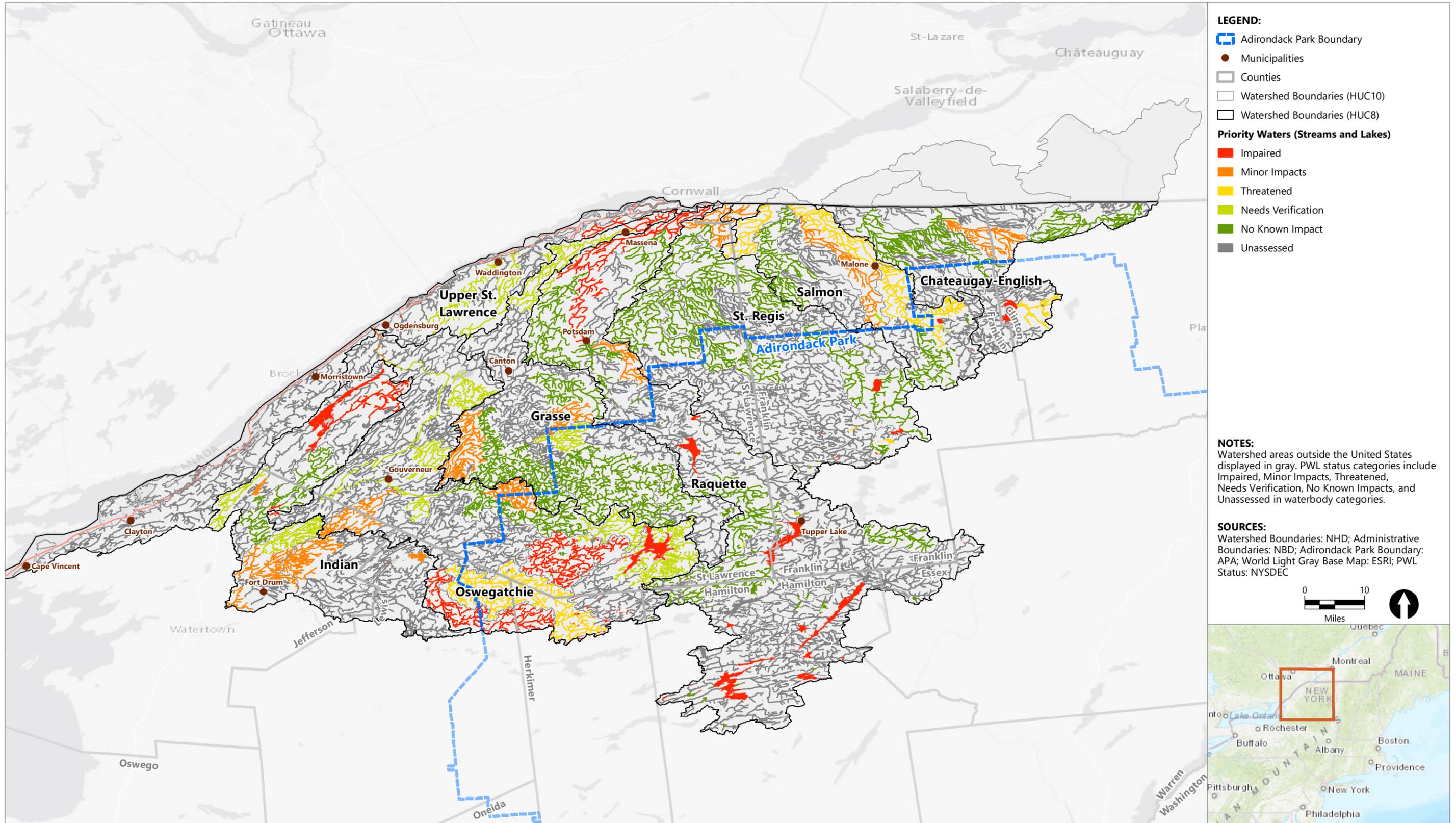
NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Dams: NYSDEC; Roads/Railroads: NYS DOT



Publish Date: 2019/12/19, 10:51 AM | User: pkwon
Filepath: \\orcas\gis\Jobs\Franklin_County_SWCD\GIS\ArcMap_Documents\FINAL_VERSION\SLR_Watershed_Characterization_Map.mxd





- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Priority Waters (Streams and Lakes)**
- Impaired
 - Minor Impacts
 - Threatened
 - Needs Verification
 - No Known Impact
 - Unassessed

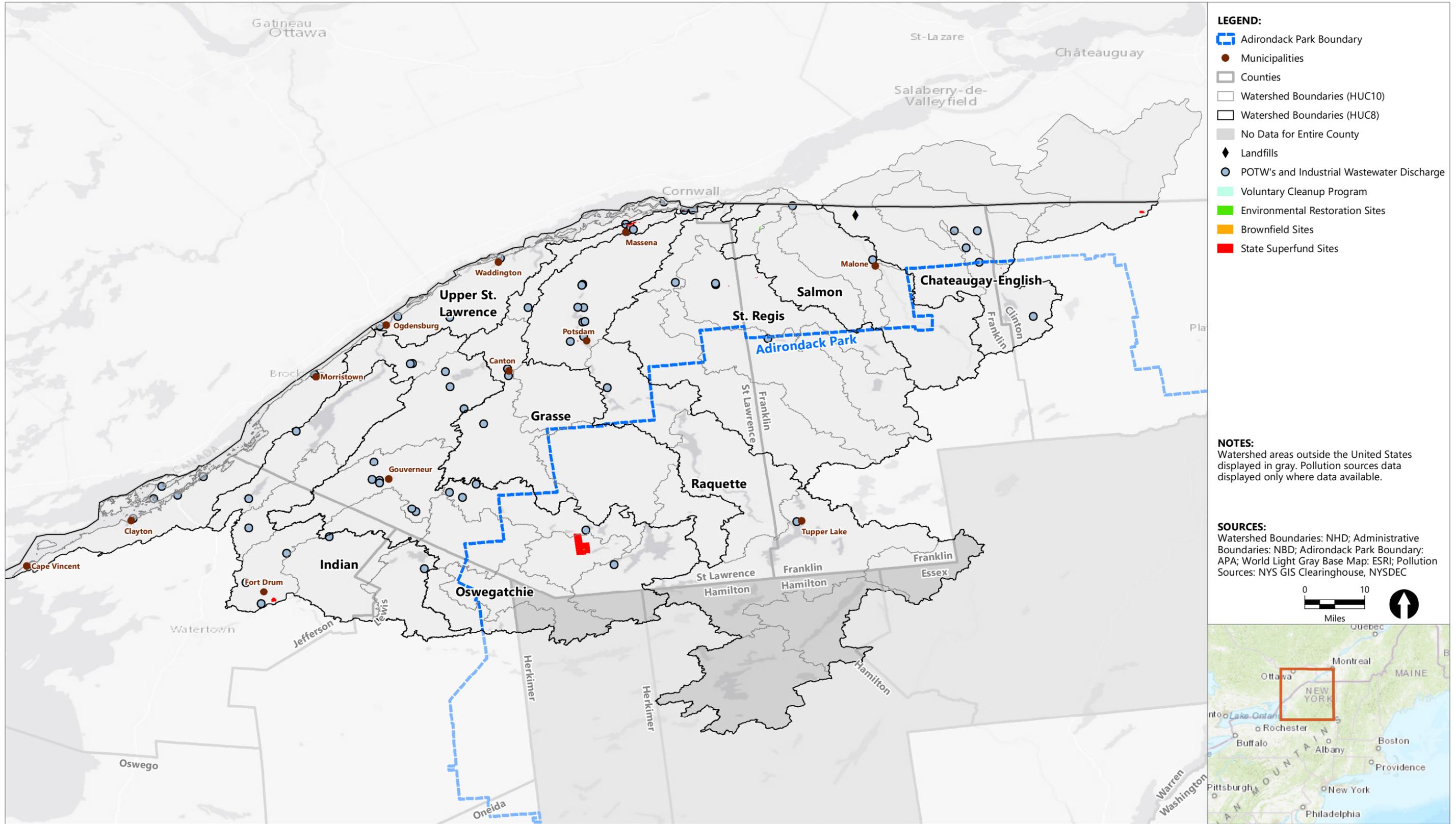
NOTES:
 Watershed areas outside the United States displayed in gray. PWL status categories include Impaired, Minor Impacts, Threatened, Needs Verification, No Known Impacts, and Unassessed in waterbody categories.

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; PWL Status: NYSDEC



Publish Date: 2019/12/19, 10:58 AM | User: pkwon
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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - No Data for Entire County
 - Landfills
 - POTW's and Industrial Wastewater Discharge
 - Voluntary Cleanup Program
 - Environmental Restoration Sites
 - Brownfield Sites
 - State Superfund Sites

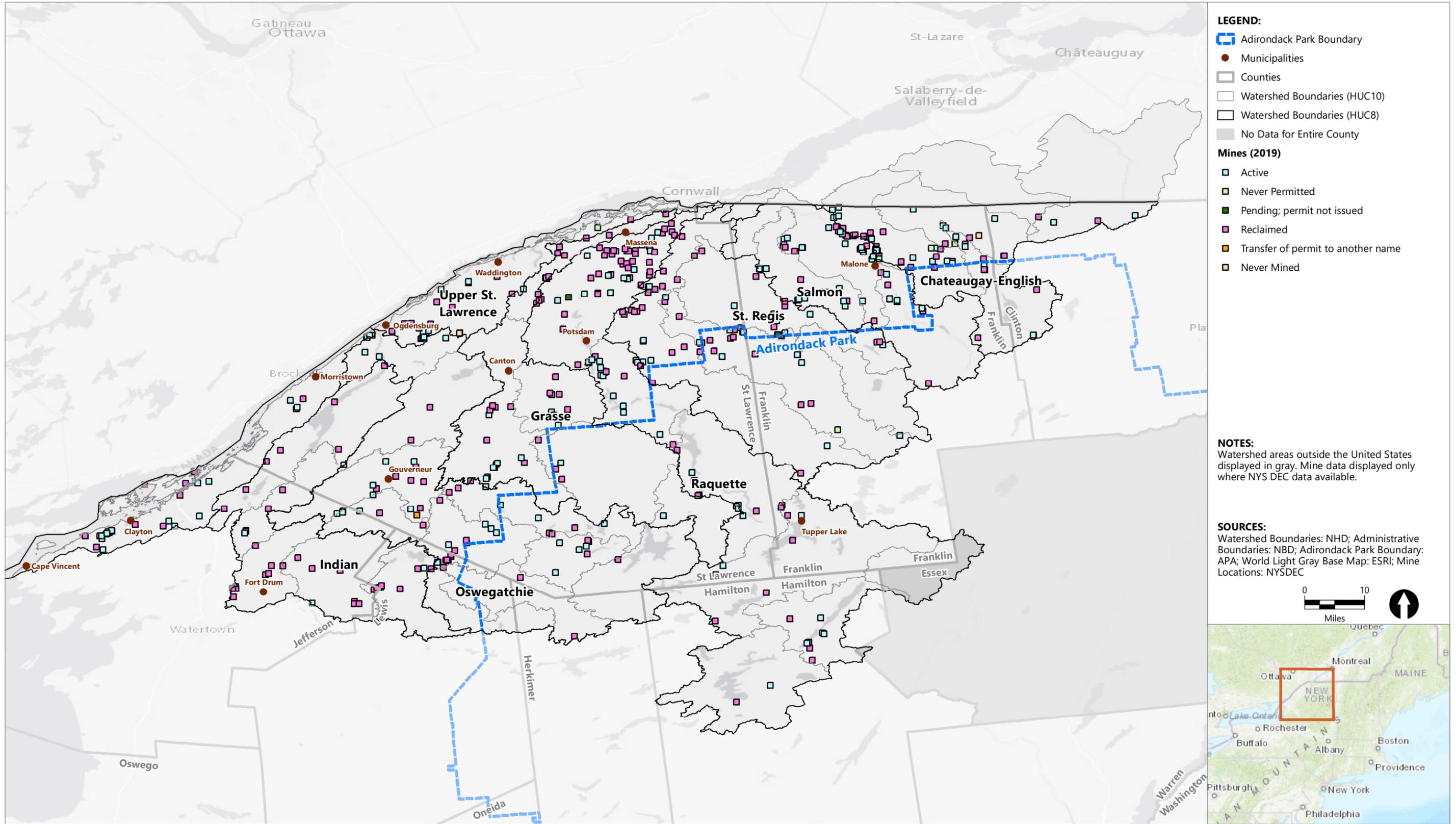
NOTES:
 Watershed areas outside the United States displayed in gray. Pollution sources data displayed only where data available.

SOURCES:
 Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Pollution Sources: NYS GIS Clearinghouse, NYSDEC



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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - No Data for Entire County

- Mines (2019)**
- Active
 - Never Permitted
 - Pending; permit not issued
 - Reclaimed
 - Transfer of permit to another name
 - Never Mined

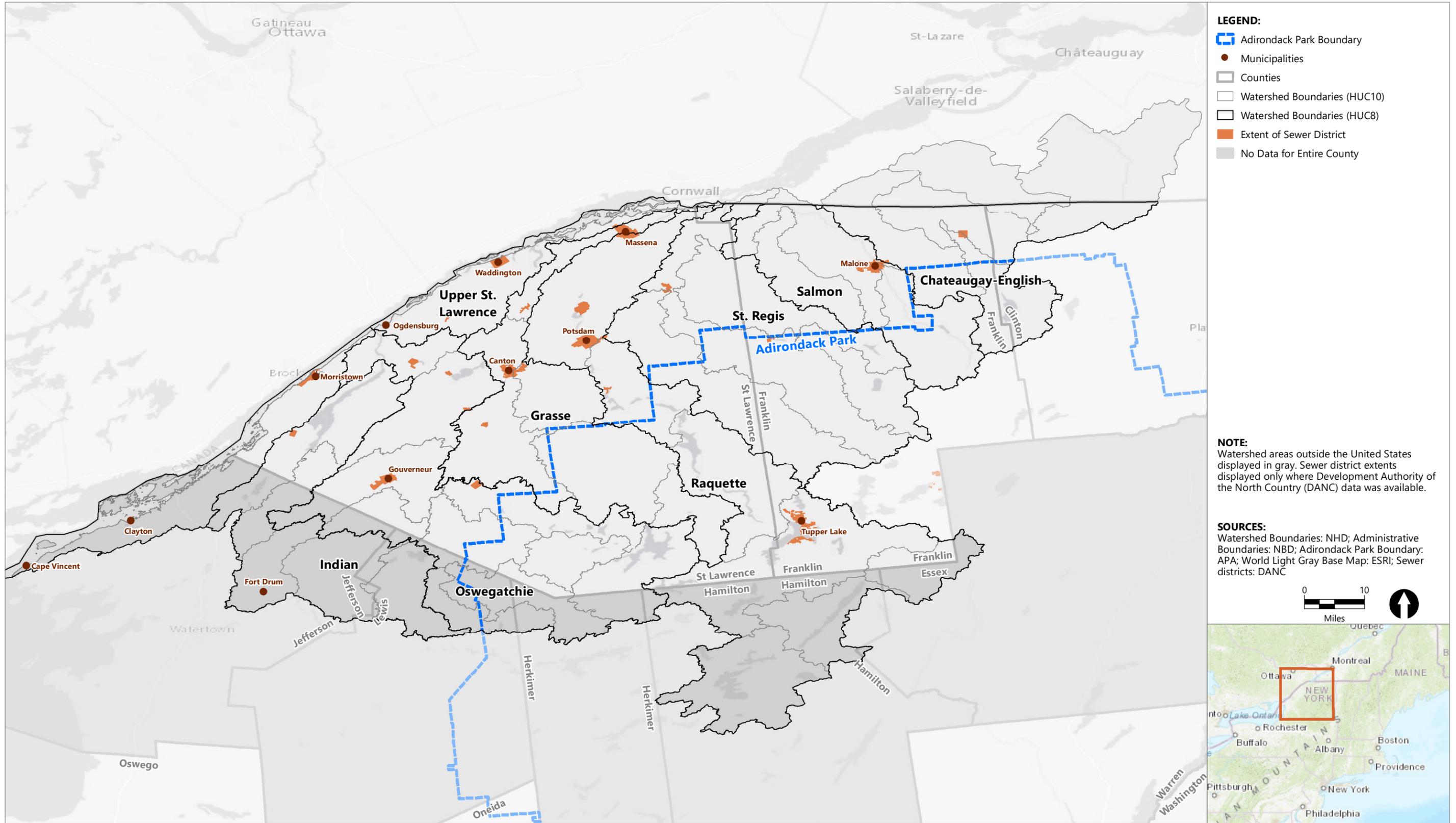
NOTES:
Watershed areas outside the United States displayed in gray. Mine data displayed only where NYS DEC data available.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Mine Locations: NYSDEC



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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - Extent of Sewer District
 - No Data for Entire County

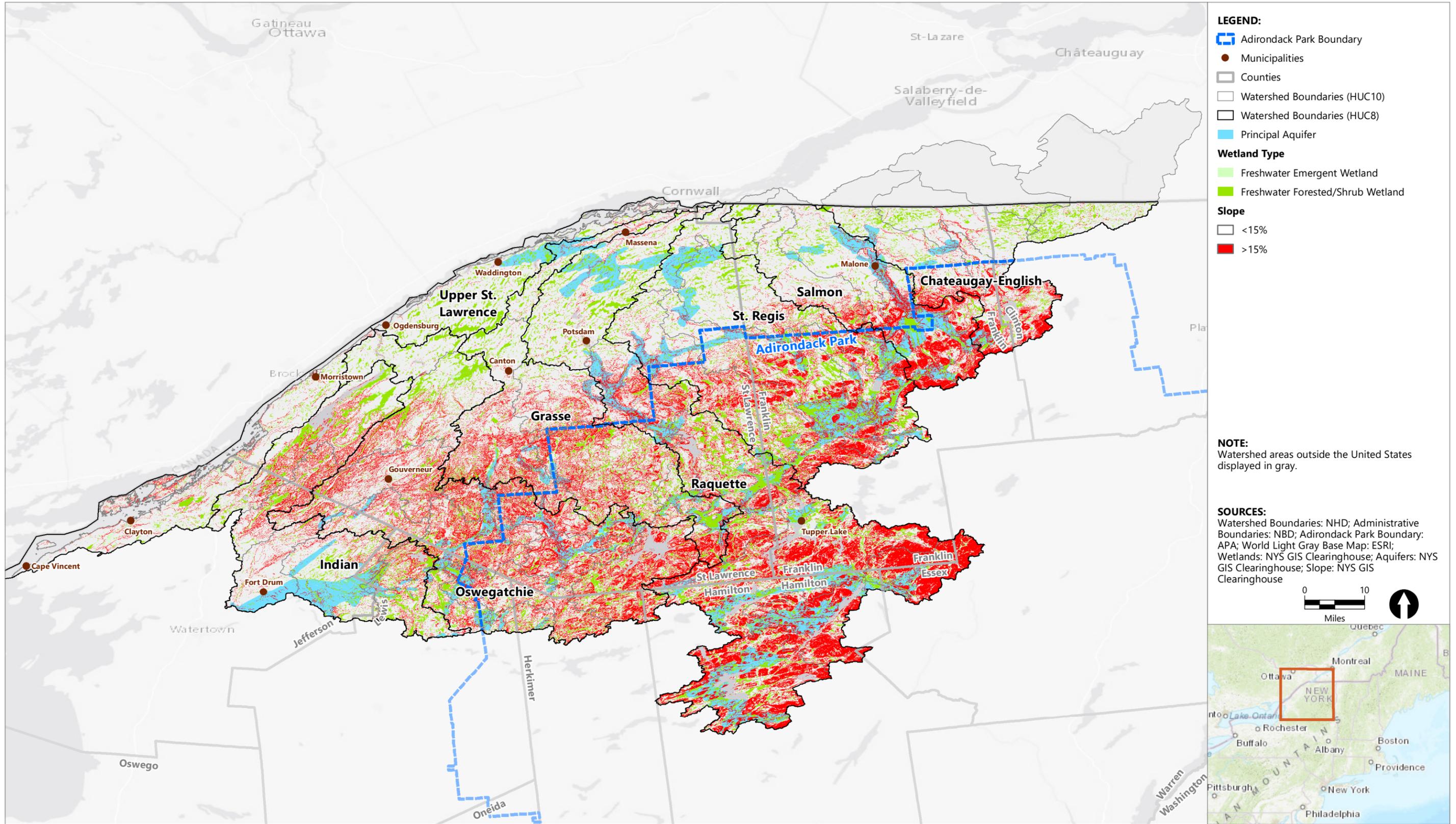
NOTE:
Watershed areas outside the United States displayed in gray. Sewer district extents displayed only where Development Authority of the North Country (DANC) data was available.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Sewer districts: DANC



Publish Date: 2020/05/28, 9:03 AM | User: alesueur
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- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
 - Principal Aquifer
- Wetland Type**
- Freshwater Emergent Wetland
 - Freshwater Forested/Shrub Wetland
- Slope**
- <15%
 - >15%

NOTE:
Watershed areas outside the United States displayed in gray.

SOURCES:
Watershed Boundaries: NHD; Administrative Boundaries: NBD; Adirondack Park Boundary: APA; World Light Gray Base Map: ESRI; Wetlands: NYS GIS Clearinghouse; Aquifers: NYS GIS Clearinghouse; Slope: NYS GIS Clearinghouse



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FINAL



November 2020

St. Lawrence River Watershed Subwatershed Assessment



EcoLogic

Prepared for Franklin County Soil & Water Conservation District



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



**Department
of State**

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November 2020

St. Lawrence River Watershed Subwatershed Assessment

Prepared for

Franklin County Soil & Water Conservation District
151 Finney Blvd.
Malone NY 12953

Prepared by

EcoLogic, LLC
9 Albany St. Suite 3J
Cazenovia, NY 13035

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ABBREVIATIONS

ECHO	Environmental Compliance History Online
HUC	Hydrologic Unit Code
NLCD	National Land Cover Dataset
NRCS	Natural Resources Conservation Service
NYSDEC	New York State Department of Environmental Conservation
SPDES	State Pollution Discharge Elimination System
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WI/PWL	Waterbody Inventory / Priority Waterbodies List

1 Objective

1.1 Purpose of the Assessment

The watershed analysis and prioritization are intended to categorize the subwatersheds of the St. Lawrence River watershed in order to better understand and identify areas requiring additional measures to improve and protect water quality.

A watershed based approach is necessary for effective management of an area as vast and diverse as the St. Lawrence River watershed. A watershed consists of smaller streams successively joining larger ones, with upstream conditions and practices influencing downstream conditions. In this way, we recognize that restoration and protection efforts at smaller units will progressively and cumulatively improve the health of the entire watershed. This assessment serves to set priorities for addressing degraded areas of the watershed at its source, protecting areas that are not degraded but may be threatened without effective management, and areas of public interest. However, “priority” is not meant to limit the potential for projects to receive funding in any given area of the watershed. Recommendations for addressing the restoration and protections issues uncovered in this assessment are discussed in the **St. Lawrence River Watershed Recommendations & Implementation Strategy** document.

1.2 Assessment Criteria and Procedure

This subwatershed assessment was designed to incorporate the stakeholder defined vision and goals for the St. Lawrence River watershed described below.

Vision: The St. Lawrence River watershed is a sustainable source of clean water, recreation, renewable energy, transportation, and timber and food production.

Watershed Goals:

- Protect and enhance habitats of native plants and animals
- Adapt to a changing climate
- Ensure that communities retain their essential character while providing economic opportunity
- Resolve issues of legacy contamination and atmospheric deposition
- Increase awareness of how human actions affect the ecosystem
- Prepare for emerging issues and threats

The public survey results and comments provided input on the communities’ greatest concerns within the watershed.

1.2.1 Selection of Watershed Indicators for Assessment

To identify existing and potential water quality issues within the St. Lawrence River watershed, a methodology for scoring and prioritizing the subwatersheds was developed to assist in identifying problem areas and ultimately, recommendations for mitigating and improving water quality. The prioritization model includes fourteen indicators (**Table 1**) that have a direct influence on natural resources. These factors have been grouped into four indices.

- Documented Impairments
- Environmental Setting
- Human Impacts
- Local Capacity for Restoration/Protection

Each index was assigned a score that incorporated various quantitative indicators (metrics) of watershed health, and each indicator was weighted for overall significance. A cumulative score encompassing all indicators and their weighted-significance, can be used to help define priority areas (subwatersheds with the lowest overall scores), while preserving important information regarding the underlying causes for concern. Quantitative indicators and resulting scores for each index of watershed health are described in this section.

Table 1
Assessment Indices, Indicators and Data Sources

	Indicator	Description	Data Source
Documented Impairments	% of Locally Impacted Waters ¹	The sum of locally impacted surface waters that are impaired, have minor impacts, threatened, or needing verification as a percentage of assessed surface waters.	WI/PWL
	% of Waters Impacted by Atmospheric Deposition/Industrial Pollution ¹	The sum of atmospheric deposition and industrial pollution impacted surface waters as a percentage of assessed surface waters.	WI/PWL
Environmental Setting	% Natural Land Cover	Percent of subwatershed that is in the riparian zone and classified as natural land cover (forest, wetlands, shrubland, and grassland)	National Land Cover Database ² , 2016
	Soil Erodibility	Average soil erodibility (K) factor in the subwatershed.	NRCS Soil Survey Geographic (STATSGO2) database, USGS 2013
	Flood Risk	Areas at risk of flooding with significant impacts	History, NHDPlus2 Flow Accumulation grids (downloaded October 2012)

	Indicator	Description	Data Source
	Water Resource Value	Metric is meant to target areas that have a water resource-dependent local economy, assessed by waterbody area of the HUC10.	NHDPlus WBD Snapshot, EnviroAtlas Version (February 2015 version).
Human Impacts	SPDES Count	Count of SPDES locations divided by HUC12 acreage	USEPA Environmental Compliance History Online (ECHO)
	Road Density	Density of total road miles in the HUC10 (km/sq. km)	US Census Bureau TIGER Roads National Geodatabase (2015 version).
	% Agricultural Lands	Percent of the subwatershed classified as agriculture cover. Includes cropland and pasture/hay.	National Land Cover Database ² , 2016
	Livestock Density	Farm animal populations for an area of interest are estimated from county-level data by first calculating an average “animals per farmland acres” for each animal type for each county.	USDA County Level Agricultural Assessments
	% Impervious Surfaces	Sum of impervious surfaces in a subwatershed as a percentage of the HUC10 area.	National Land Cover Database ² , 2016, Percent Imperviousness dataset (April 2019 version).
Local Capacity for Protection/Restoration	% Unassessed Waters	Percent of total surface waters assessed as part of NYSDEC’s Waterbody Inventory	WI/PWL
	% Protected Lands	Percent of the subwatershed designated as having Status 1 or Status 2 protection by the USGS Gap Analysis Program. These lands are defined as having permanent protection from conversion of natural land cover and a mandated management plan. This includes lands held by national, state, or local governments or non-profit organizations, as well as voluntarily protected private lands.	Protected Areas Database of the United States Version 1.2 from the USGS Gap Analysis Program; EPA EnviroAtlas “Protected Lands for the Conterminous United States” dataset, 2015 version.

Notes:

1. “Impaired” waters have frequent and persistent water quality conditions which prevent, limit, or discourage the use of the waterbody. Waterbodies with “minor impacts” are considered stressed and have documented water quality impacts less severe than impaired waters. “Threatened” waters have no existing water quality problems but are included in the Priority Waterbodies List due to land use changes in the watershed that are known or strongly suspected to threaten water quality.
2. The National Land Cover Database (NLCD) uses Landsat imagery to differentiate between types of land cover and estimate impervious surfaces. Therefore, it is important to note that sometimes land cover types can be misrepresented. For example, \ Fort Drum maintains an area of grassland to practice field operations which is classified as “agricultural hay/pasture” by the NLCD, resulting in the Otter Creek – Indian River (0415030303) subwatershed having a relatively high percentage of agricultural lands.

1.2.2 Calculation and Scoring of Watershed Indicator Values

Directionality of indicators was first configured to ensure that all indicators demonstrate values that signify ‘higher is more stressed’. Watershed indicator values were calculated for each HUC10 watershed on a five point scale by allotting scores that fell within respective ranges for each

indicator, with ranges determined by analyzing the range and distribution of the indicator. Additionally, as certain indicators have a greater influence on water quality than others, weighting factors were assigned to each indicator based on the category to which they were assigned. A higher weight indicates factors with a greater influence on water quality. See **Table 2** for indicators and their respective weighting factor.

**Table 2
Indicator Scoring**

	Indicator	Scoring Scales	Weighting Factor	
Documented Impairments	Impacted Waters ¹ (% of assessed)	< 20	1	2
		20-40	2	
		40-60	3	
		60-80	4	
		> 80	5	
	Waters Impacted by Atmospheric Deposition/Industrial Pollution (% of assessed)	< 20	1	1
		20-40	2	
		40-60	3	
		60-80	4	
		> 80	5	
Environmental Setting	Natural Land Cover (%)	> 80	1	2
		70-80	2	
		60-70	3	
		50-60	4	
		< 50	5	
	Soil Erodibility (k-factor, unitless)	< 0.26	1	1
		0.26-0.29	2	
		0.29-0.32	3	
		0.32-0.35	4	
		> 0.35	5	
	Flood Risk (upstream grid pixels)	< 1500	1	1.5
		1500-3000	2	
		3000-4500	3	
		4500-6000	4	
		> 6000	5	
Water Resource Value (acres)	< 500	1	2	
	500-1000	2		
	1000-1500	3		
	1500-2000	4		

	Indicator	Scoring Scales	Weighting Factor
	SPDES Count	> 2000 5	1
		< 3 1	
		3-6 2	
		6-9 3	
		9-12 4	
		> 12 5	
	Road Density (km/sq km)	< 0.75 1	1.5
		0.75-1.5 2	
		1.5-2.25 3	
		2.25-3 4	
		> 3 5	
	Agricultural Lands (%)	< 10 1	2
		10-20 2	
		20-30 3	
		30-40 4	
		> 40 5	
	Livestock Density (lb./acre)	0-0.03 1	1
		0.03-0.06 2	
		0.06-0.09 3	
		0.09-0.12 4	
		> 0.12 5	
	Impervious Surfaces (%)	< 0.5 1	1
		0.5-0.75 2	
		0.75-1 3	
1-1.25 4			
> 1.25 5			
Local Capacity for Protection/Restoration	Unassessed Waters	<p>First, HUC10s were given a score based on total stream miles and lake acres present (streams: <100 miles, 1; 100-200, 2; 200-300, 3; 300-400, 4; > 400, 5; lakes: <500, 1; 500-1000, 2; 1000-1500, 3; 1500-2000, 4; > 2000, 5). The scores were then multiplied by the percentage of unassessed streams or lake acres, respectively. The product of this calculation was averaged and used for the Unassessed Waters indicator score.</p>	2

	Indicator	Scoring Scales	Weighting Factor	
		< 75	1	
		75-150	2	
		150-225	3	
		225-300	4	
		> 300	5	
	Protected Lands (%)	> 50	1	1
		40-50	2	
		30-40	3	
		20-30	4	
		<20	5	

Calculating Index Scores. Indices include documented impairments, environmental setting, human impacts, and local capacity for protection/restoration. A watershed’s index score was calculated by summing indicator scores after they had been multiplied by their weighting factor.

Calculating Composite Scores. The composite score represents the overall priority ranking of subwatersheds and provides a summary of watershed health and a preliminary assessment of restoration and protection potential. Higher scores indicate areas of higher overall watershed health and are potential candidates for conservation. Lower scores indicate areas with greater overall stress and are possible targets for restoration. Scores in the mid-range indicate areas with less extreme challenges in terms of overcoming sources of high stress, but where restoration work may have a large impact. Potential values range from 18-89.

Table 3
Composite Score Ranges

Priority	Score Range
Lower	0 - 35
Medium	36 - 55
High	56 - 85

2 Subwatershed Assessment Results

2.1 Documented Impairments

The documented impairments index is used to highlight locations that are impacted by human activity and where riparian protection or restoration activities could improve water quality. Higher scores indicate areas where water quality is under less stress and efforts should focus on protection. Low scores indicate areas of high stress for water quality, generally areas with more human use for agriculture or development. The data source for this assessment is the 2019 NYSDEC Waterbody Index/Priority Waterbodies List (WI/PWL). The scores calculated for these metrics are presented in **Table 4**. The total 'documented impairments' score ranges from 3-15. 'Locally impacted waters' is weighted higher to give greater emphasis on waters that respond to local and voluntary mitigation efforts. This is in contrast to 'regionally impacted waters' as efforts to remediate or minimize sources is subject to

Locally Impacted Waters (Weighting Factor = 2)

Locally impacted waters are displayed in **Map 1**. There is a strong correlation between heavy human use area and water quality impairment. Highly scored areas are concentrated in the Indian River and lower waters of the Oswegatchie River watersheds. This happens to also be where agriculture is a dominant land use. The headwaters of the Oswegatchie, Raquette, St. Regis and Chateaugay-English generally scored low likely because headwaters typically are more pristine due to the fact that headwaters are the beginning of flow for a watershed and due to the fact that they are positioned within the Adirondack Park which receives some protection and is generally forested with natural land cover intact. As subwatersheds and waters highlighted under this metric are most likely impaired to local land use practices, subwatersheds should focus on incorporating best management practices relevant to their respective water impairment sources.

Regionally Impacted Waters (Weighting Factor = 1)

Regionally impacted waters refer to waters that have been impacted by atmospheric deposition or industrial pollution; **Map 2** highlights these areas. The headwaters of the Raquette River and Oswegatchie River watersheds scored high due to acid impairment of high-elevation lakes. Robinson Creek – Upper St. Lawrence (0415030103) includes the St. Lawrence River Area of Concern at Massena/Akwesasne, polluted from several sources including historical industrial discharges resulting in high levels of PCBs, PAHs, and pesticides. Acid rain affected waters should continue to be monitored for aquatic distress. Subwatersheds affected by industrial contamination should strive to continue remediating those areas in a timely fashion and restore them to alternative uses.

Table 4
Summary of Documented Impairment Scores at the HUC10 Level

Subwatershed	% Regionally Impacted of Assessed Waters	Regionally Impacted Score	% Locally Impacted of Assessed Waters	Locally Impacted Score	Documented Impairments Weighted Score
0415030101	46	3	46	3	9
0415030102	14	1	19	1	3
0415030103	100	5	94	5	15
0415030201	98	5	0	1	7
0415030202	52	3	50	3	9
0415030203	50	3	0	1	5
0415030204	100	5	0	1	7
0415030205	9	1	0	1	3
0415030206	0	1	32	2	5
0415030207	0	1	100	5	11
0415030208	0	1	100	5	11
0415030209	0	1	100	5	11
0415030210	0	1	100	5	11
0415030301	23	2	77	4	10
0415030302	0	1	100	5	11
0415030303	0	1	100	5	11
0415030304	34	2	0	1	4
0415030305	0	1	100	5	11
0415030401	2	1	0	1	3
0415030402	0	1	50	3	7
0415030403	0	1	42	3	7
0415030404	0	1	32	2	5
0415030405	24	2	76	4	10
0415030501	87	5	0	1	7
0415030502	25	2	0	1	4

Subwatershed	% Regionally Impacted of Assessed Waters	Regionally Impacted Score	% Locally Impacted of Assessed Waters	Locally Impacted Score	Documented Impairments Weighted Score
0415030503	85	5	9	1	7
0415030504	34	2	1	1	4
0415030505	36	2	2	1	4
0415030506	0	1	42	3	7
0415030507	0	1	37	2	5
0415030601	58	3	0	1	5
0415030602	27	2	23	2	6
0415030603	6	1	40	3	7
0415030604	2	1	40	3	7
0415030701	18	1	42	3	7
0415030702	0	1	0	1	3
0415030703	0	1	100	5	11
0415030801	83	5	15	1	7
0415030802	0	1	52	3	7
0415030803	0	1	0	1	3
0415030804	0	1	0	1	3
0415030805	--	3	--	3	9

Note: Subwatersheds with two dashes "--" indicate subwatersheds where all waters are unassessed.

2.2 Environmental Setting

The scores calculated for these metrics are presented in **Table 5**. The environmental setting index is meant to capture the intrinsic character of the watershed including its geography, hydrography, land cover, and its natural vulnerability.

Percent Natural Land Cover (Weighting Factor = 2)

Natural land cover provides excellent protection for waterbodies by providing vegetative cover. **Map 3** shows how each subwatershed was scored with respect to its percent natural land cover. The Adirondack area remains largely forested due to the Adirondack Park and its protections on development. Otter Creek – Indian River (0415030303), home to Fort Drum, Lisbon Creek – Oswegatchie River (0415030210), and Chippewa Creek – Upper St. Lawrence River (0415030101) have under 50% natural land cover, scoring as the highest priority subwatersheds with respect to percent natural land cover. High scoring subwatersheds should focus on incorporating natural land cover along waterways to improve habitat and water quality.

Soil Erodibility (Weighting Factor = 1)

Soil erodibility is a measure of the intrinsic susceptibility of a soil to erosion by runoff and raindrop impact. Soils high in clay typically have low erosion potential because they are resistant to detachment. Soil erodibility score distribution throughout the watershed is displayed in **Map 4**. Otter Creek – Indian River (0415030303) and Cold River – Raquette River (0415030502) are most susceptible to erosion and score the highest. The soils of the high-elevation areas in the Raquette River as well as Chippewa Creek – Upper St. Lawrence River, and Little River – Grasse River (0415030403) are moderately susceptible to erosion. High priority subwatersheds should examine soil conditions and find best suited practices to stabilize streambanks and work to restore natural hydrology to minimize risk of erosion.

Flood Risk (Weighting Factor = 1.5)

Due to recent issues concerning flooding along the St. Lawrence River and some inland areas, a flood risk metric was incorporated to capture a watershed's natural vulnerability to flooding. **Map 5** shows the results of the flood risk assessment. All three HUC10s within the Upper St. Lawrence River watershed, lower waters of the Oswegatchie River and Raquette River watersheds scored the highest indicating high risk and priority. These subwatersheds should focus on incorporating stormwater management, restoring natural hydrology, and restoring streambanks in order to reduce sediment and associated nutrient transport during high flow events.

Water Resource Value (Weighting Factor = 2)

The St. Lawrence River watershed is dense with water resources. Waters of the St. Lawrence provide a variety of services for its community including wildlife habitat, recreation, beautiful scenery, drinking

water, navigation, and energy. **Map 6** shows how each HUC10 was ranked concerning water resource value. A significant portion of the St. Lawrence River watershed scores high with respect to its water resource value, highlighting popular recreation areas like Tupper Lake and Blue Mountain Lake within the Raquette River, the Upper St. Lawrence River subwatersheds, and much of the St. Regis River watershed.

Table 5
Summary of Environmental Setting Scores at the HUC10 Level

Subwatershed	% Natural Land Cover	Natural Land Cover Score	Soil Erodibility (k-factor)	Soil Erodibility Score	Water Resource Value (acres)	Water Resource Value Score	Flow Accumulation (Upstream grid pixels)	Flood Risk Score	Environmental Setting Weighted Score
0415030101	49	5	0.32	4	1363	5	216	5	31.5
0415030102	57	4	0.29	2	265	5	321	5	27.5
0415030103	65	3	0.31	3	109	5	1215	5	26.5
0415030201	92	1	0.29	2	8350	5	805	1	15.5
0415030202	94	1	0.28	2	1733	4	598	1	13.5
0415030203	97	1	0.29	2	1483	3	868	1	11.5
0415030204	97	1	0.30	3	565	2	722	1	10.5
0415030205	94	1	0.26	2	889	2	2370	2	11
0415030206	91	1	0.30	3	1896	4	4036	3	17.5
0415030207	75	2	0.29	2	279	1	471	1	9.5
0415030208	63	3	0.29	2	1781	4	9265	5	23.5
0415030209	65	3	0.28	2	627	2	6805	5	19.5
0415030210	43	5	0.30	3	131	1	12579	5	22.5
0415030301	91	1	0.28	2	2141	5	570	1	15.5
0415030302	87	1	0.28	2	987	2	1422	1	9.5
0415030303	42	5	0.35	5	55	1	2095	2	20
0415030304	72	2	0.29	2	1474	3	5721	4	18
0415030305	61	3	0.28	2	11856	5	1627	2	21
0415030401	95	1	0.25	1	1417	3	399	1	10.5
0415030402	97	1	0.28	2	1026	3	1406	1	11.5
0415030403	77	2	0.32	4	121	1	713	1	11.5
0415030404	68	3	0.30	3	975	2	3514	3	17.5
0415030405	57	4	0.29	2	60	1	16440	5	19.5
0415030501	90	1	0.30	3	12128	5	692	1	16.5

Subwatershed	% Natural Land Cover	Natural Land Cover Score	Soil Erodibility (k-factor)	Soil Erodibility Score	Water Resource Value (acres)	Water Resource Value Score	Flow Accumulation (Upstream grid pixels)	Flood Risk Score	Environmental Setting Weighted Score
0415030502	98	1	0.38	5	734	2	505	1	12.5
0415030503	91	1	0.33	4	7083	5	1446	1	17.5
0415030504	91	1	0.30	3	20049	5	2703	2	18
0415030505	93	1	0.27	2	6963	5	5347	4	20
0415030506	89	1	0.26	2	2141	5	6536	5	21.5
0415030507	74	2	0.28	2	173	1	8384	5	15.5
0415030601	95	1	0.26	2	2481	5	755	1	15.5
0415030602	92	1	0.28	2	2285	5	1913	2	17
0415030603	85	1	0.27	2	655	2	1218	1	9.5
0415030604	88	1	0.28	2	3790	5	4119	3	18.5
0415030701	93	1	0.28	2	1705	4	874	1	13.5
0415030702	72	2	0.29	2	353	1	1093	1	9.5
0415030703	62	3	0.28	2	504	2	2784	2	15
0415030801	88	1	0.30	3	3361	5	823	1	16.5
0415030802	59	4	0.27	2	27	1	1129	1	13.5
0415030803	74	2	0.26	2	40	1	1367	1	9.5
0415030804	87	1	0.32	3	50	1	675	1	8.5
0415030805	81	1	0.29	3	19	1	553	1	8.5

2.3 Human Impacts

The human impacts scores are presented in **Table 6**. This category targets the built environment and land use within the watershed. Higher scoring subwatersheds typically comprise the developed and agricultural areas. Lower scoring subwatersheds are found in the Adirondack region where there is little to no development or intensive agriculture.

SPDES Count (Weighting Factor = 1)

The State Pollutant Discharge Elimination System (SPDES) count distribution across the watershed is displayed in **Map 7**. Subwatersheds with lower densities pose a lower risk to water quality and are considered a lower priority. The SPDES permit program regulates activities for facilities or construction that discharges wastewater into surface waters or ground waters of the state. Therefore, municipal wastewater treatment facilities, combined sewer overflows, municipal separate storm sewer systems, industrial facilities, and concentrated animal feeding operations are required to obtain a permit. Although the SPDES programs provides a means to regulate discharge, the discharges themselves present the opportunity to affect water quality and ecology. The developed, more populous subwatersheds score high here largely due to the existing wastewater infrastructure and presence of agriculture. Facilities and respective municipalities should develop sufficient monitoring protocols to ensure compliance with the SPDES program.

Road Density (Weighting Factor = 1.5)

Road density scores are found in **Map 8**. Subwatersheds with higher concentrations of impervious cover with close proximity to waters allow for a greater potential of pollutant transport such as road salt, sediment, and nutrients as well as increased stormwater runoff. The greatest road density is found along the Upper St. Lawrence River watersheds as well as the more metropolitan areas of Fort Drum, Gouverneur, Potsdam, and Malone.

Percent Agriculture (Weighting Factor = 2)

Map 9 displays the scores for each HUC10 based on percentage of agricultural land. The extent of agriculture within a watershed can negatively impact water quality, with areas comprising larger amounts of agriculture often exhibiting higher sediment, bacteria, and nutrient loads. The highest scored watersheds are Lisbon Creek – Oswegatchie River (0415030210), Otter Creek – Indian River (0415030303), and Chippewa Creek – Upper St. Lawrence River (0415030101) with additional high priority areas for watersheds along the St. Lawrence River. Efforts to incorporate agricultural best management practices are a high priority for these high-scoring subwatersheds.

Livestock Density (Weighting Factor = 1)

HUC10 livestock density scores are shown in **Map 10**. While not all livestock use in a given watershed is detrimental to water quality, livestock use can impact water quality by increasing coliform bacteria, sediment, and water temperatures, as well as decrease dissolved oxygen

concentrations. Thus, watersheds with increased concentrations of livestock are considered to be of higher priority. Livestock densities are highest in the Upper Chateaugay River (0415030802) and Lisbon Creek – Oswegatchie River (0415030210) subwatersheds. Barnyard, pasture, and manure management are particularly important for these subwatersheds to reduce erosion and nutrient contribution to both surface and ground waters.

Impervious Surfaces (Weighting Factor = 1)

Impervious surfaces include surfaces that do not allow water to penetrate and cause it to runoff rather than infiltrate into the soil. This includes roadways, parking lots, sidewalks, driveways, and roofs. Indicator scores for impervious surfaces within the watershed are pictured in **Map 11**.

Increased impervious surfaces in a watershed leads to more stormwater runoff during high rainfall events and hydromodification. Therefore, watersheds with urban centers contribute to increased impervious surfaces, highlighting the Upper St. Lawrence River watershed which includes the City of Ogdensburg and Towns of Clayton, Waddington, and Massena, and also highlights the Fort Drum subwatershed, Otter Creek – Indian River (0415030303). It is important for these watersheds to incorporate stormwater best management practices to slow surface water runoff, encourage water infiltration, and reduce pollutant transport to waterways.

Table 6
Summary of Human Impact Scores at the HUC10 Level

Subwatershed	SPDES County	SPDES Score	Road Density (km/sq km)	Road Density Score	% Agriculture	Agriculture Score	Livestock Density (lb/acre)	Livestock Density Score	% Impervious Surfaces	Impervious Surfaces Score	Human Impact Weighted Score
0415030101	18	5	2.3	5	43	5	0.119	4	1.80	5	31.5
0415030102	28	5	1.8	4	35	4	0.099	4	1.33	5	28
0415030103	2	1	4.1	5	16	2	0.055	2	6.04	5	19.5
0415030201	1	1	0.3	1	0	1	0.000	1	0.01	1	6.5
0415030202	0	1	1.0	2	0	1	0.002	1	0.10	1	8
0415030203	0	1	0.5	2	0	1	0.001	1	0.02	1	8
0415030204	0	1	0.8	2	0	1	0.002	1	0.03	1	8
0415030205	1	1	1.1	3	2	1	0.008	1	0.15	1	9.5
0415030206	2	1	1.0	2	3	1	0.016	1	0.15	1	8
0415030207	1	1	1.3	3	22	3	0.079	3	0.34	1	15.5
0415030208	12	4	1.6	4	29	3	0.110	4	0.88	3	23
0415030209	11	4	1.3	3	30	4	0.109	4	0.34	1	21.5
0415030210	11	4	1.7	4	50	5	0.140	5	1.28	5	30
0415030301	4	2	1.1	3	2	1	0.015	1	0.13	1	10.5
0415030302	2	1	1.8	4	8	1	0.047	2	0.50	2	13
0415030303	11	4	2.6	5	45	5	0.117	4	5.33	5	30.5
0415030304	1	1	1.4	3	21	3	0.063	3	0.52	2	16.5
0415030305	7	3	1.3	3	27	3	0.087	3	0.48	1	17.5
0415030401	0	1	1.2	3	0	1	0.002	1	0.06	1	9.5
0415030402	0	1	0.7	2	0	1	0.003	1	0.03	1	8
0415030403	2	1	1.6	4	18	2	0.062	3	0.50	1	15
0415030404	21	5	1.4	3	26	3	0.082	3	0.56	2	20.5
0415030405	9	3	2.4	5	28	3	0.081	3	2.83	5	24.5
0415030501	3	1	0.5	1	0	1	0.000	1	0.04	1	6.5
0415030502	0	1	0.2	1	0	1	0.000	1	0.00	1	6.5

Subwatershed	SPDES County	SPDES Score	Road Density (km/sq km)	Road Density Score	% Agriculture	Agriculture Score	Livestock Density (lb/acre)	Livestock Density Score	% Impervious Surfaces	Impervious Surfaces Score	Human Impact Weighted Score
0415030503	1	1	0.8	2	0	1	0.000	1	0.09	1	8
0415030504	2	1	0.9	2	0	1	0.001	1	0.19	1	8
0415030505	0	1	1.0	2	0	1	0.001	1	0.06	1	8
0415030506	8	3	1.4	3	4	1	0.015	1	0.16	1	11.5
0415030507	15	5	1.7	4	18	2	0.067	3	1.07	4	22
0415030601	0	1	0.6	2	0	1	0.002	1	0.08	1	8
0415030602	0	1	1.0	3	4	1	0.017	1	0.10	1	9.5
0415030603	9	3	1.2	3	11	2	0.046	2	0.19	1	14.5
0415030604	9	3	1.2	3	6	1	0.022	1	0.27	1	11.5
0415030701	0	1	1.1	3	3	1	0.015	1	0.25	1	9.5
0415030702	3	1	1.3	3	23	3	0.105	4	0.35	1	16.5
0415030703	17	5	1.6	4	32	4	0.113	4	1.09	4	27
0415030801	5	2	1.1	3	5	1	0.022	1	0.30	1	10.5
0415030802	14	5	1.4	3	38	4	0.158	5	0.29	1	23.5
0415030803	4	2	1.2	3	22	3	0.082	3	0.31	1	16.5
0415030804	3	1	0.9	2	10	2	0.055	2	0.12	1	11
0415030805	1	1	0.8	2	16	2	0.097	4	0.11	1	13

2.4 Local Capacity for Restoration/Protection

This index is intended to give some indication of watershed stakeholders ability to affect how the land is managed. **Table 7** shows the indicator scores for each HUC10 corresponding to its local capacity for restoration/protection.

Protected Lands (Weighting Factor = 1)

Indicator scores for protected lands are displayed in **Map 12**. As development is unlikely to occur on these lands, subwatersheds comprising large proportions of these areas pose a lower risk to water quality than do subwatersheds comprising smaller amounts. As the Adirondack Park exhibits various levels of protection within its boundaries, therefore the headwaters and watersheds wholly or partially within the park are scored lower, meaning protections extend to larger proportions of the watershed. Alternatively, the valley watersheds outside of the Park boundary have small proportions of protected lands, typically below 20% with some exceptions at the lower waters of the St. Regis watershed.

Unassessed Waters (Weighting Factor = 2)

Due to the vast, expansive, water-dense, and largely wild and forested area of the St. Lawrence River watershed, there is a large proportion of unassessed waters. This could mean that waters have not been assessed or have not been assessed recently enough to provide a current assessment. **Map 13** shows the indicator score for unassessed waters in the watershed. Unassessed waters are waterbodies where adequate water quality information is not available to evaluate the support of a respective waterbody's designated uses. Unassessed waters cannot be defined as healthy or stressed and were therefore given a score of 3 when scoring 'Documented Impairments' in **Section 2.1**. This metric measures the extent to which a subwatershed's waters are unassessed. The lack of available knowledge threatens the ability of a community or municipality to address any issues and measure effectiveness of restoration efforts. West Branch Saint Regis River (0415030602), Upper Grasse River (0415030402), Tupper Lake – Raquette River (0415030504), and Boland Creek – Oswegatchie River (0415030208) have the highest percentage of unassessed waters when normalized to surface water area.

Table 7
Summary of Local Capacity for Restoration/Protection Scores at the HUC10 Level

Subwatershed	Unassessed Waters (Unitless, see Table 2)	Unassessed Waters Score	% Protected Lands	Protected Lands Score	Local Capacity Weighted Score
0415030101	213	3	7	5	11
0415030102	0	1	9	5	7
0415030103	2	1	38	3	5
0415030201	220	3	90	1	7
0415030202	171	3	59	1	7
0415030203	110	2	62	1	5
0415030204	63	1	61	1	3
0415030205	223	3	21	4	10
0415030206	135	2	11	5	9
0415030207	96	2	37	3	7
0415030208	302	5	5	5	15
0415030209	257	4	13	5	13
0415030210	137	2	2	5	9
0415030301	158	3	34	3	9
0415030302	275	4	73	1	9
0415030303	54	1	28	4	6
0415030304	117	2	8	5	9
0415030305	151	3	9	5	11
0415030401	0	1	64	1	3
0415030402	344	5	79	1	11
0415030403	118	2	5	5	9
0415030404	191	3	7	5	11
0415030405	39	1	1	5	7
0415030501	279	4	69	1	9

Subwatershed	Unassessed Waters (Unitless, see Table 2)	Unassessed Waters Score	% Protected Lands	Protected Lands Score	Local Capacity Weighted Score
0415030502	162	3	100	1	7
0415030503	185	3	62	1	7
0415030504	336	5	57	1	11
0415030505	213	3	48	2	8
0415030506	256	4	22	4	12
0415030507	78	2	8	5	9
0415030601	31	1	82	1	3
0415030602	415	5	49	2	12
0415030603	83	2	33	3	7
0415030604	224	3	46	2	8
0415030701	172	3	61	1	7
0415030702	110	2	5	5	9
0415030703	70	1	7	5	7
0415030801	109	2	40	3	7
0415030802	85	2	0	5	9
0415030803	156	3	12	5	11
0415030804	76	2	6	5	9
0415030805	100	2	0	5	9

2.5 Overall Score

The total relative assessment scores (incorporating documented impairments, environmental setting, human impacts, and local capacity for restoration/protection) for each of the HUC10 subwatersheds are shown in **Table 8** and **Map 14**.

Table 8
Summary of Final Weighted Scores and Priority Watersheds

HUC10 Name	HUC10	Score	High	Medium	Low
Chippewa Creek-Frontal Saint Lawrence River	0415030101	83	X		
Sucker Brook-Frontal Saint Lawrence River	0415030102	65.5	X		
Robinson Creek-Frontal Saint Lawrence River	0415030103	66	X		
Headwaters Oswegatchie River	0415030201	36		X	
Little River	0415030202	37.5		X	
Middle Branch-Oswegatchie River	0415030203	29.5			X
Upper West Branch-Oswegatchie River	0415030204	28.5			X
Lower West Branch - Oswegatchie River	0415030205	33.5			X
Stammer Creek - Oswegatchie River	0415030206	39.5		X	
Matoon Creek	0415030207	43		X	
Boland Creek - Oswegatchie River	0415030208	72.5	X		
Beaver Creek - Oswegatchie River	0415030209	65	X		
Lisbon Creek - Oswegatchie River	0415030210	72.5	X		
Headwaters Indian River	0415030301	45		X	
Black Creek-Indian River	0415030302	42.5		X	
Otter Creek-Indian River	0415030303	67.5	X		
Red Lake - Indian River	0415030304	47.5		X	
Black Lake - Indian River	0415030305	60.5	X		
Headwaters Grasse River	0415030401	26			X
Upper Grasse River	0415030402	37.5		X	
Little River	0415030403	42.5		X	
Middle Grasse River	0415030404	54		X	
Lower Grasse River	0415030405	61	X		
Raquette Lake - Raquette River	0415030501	39		X	
Cold River	0415030502	30			X
Big Brook - Raquette River	0415030503	39.5		X	
Tupper Lake - Raquette River	0415030504	41		X	
Jordan River - Raquette River	0415030505	40		X	
Parkhurst Brook - Raquette River	0415030506	52		X	
Raquette River	0415030507	51.5		X	
East Branch Saint Regis River	0415030601	31.5			X
West Branch Saint Regis River	0415030602	44.5		X	
Deer River	0415030603	38		X	

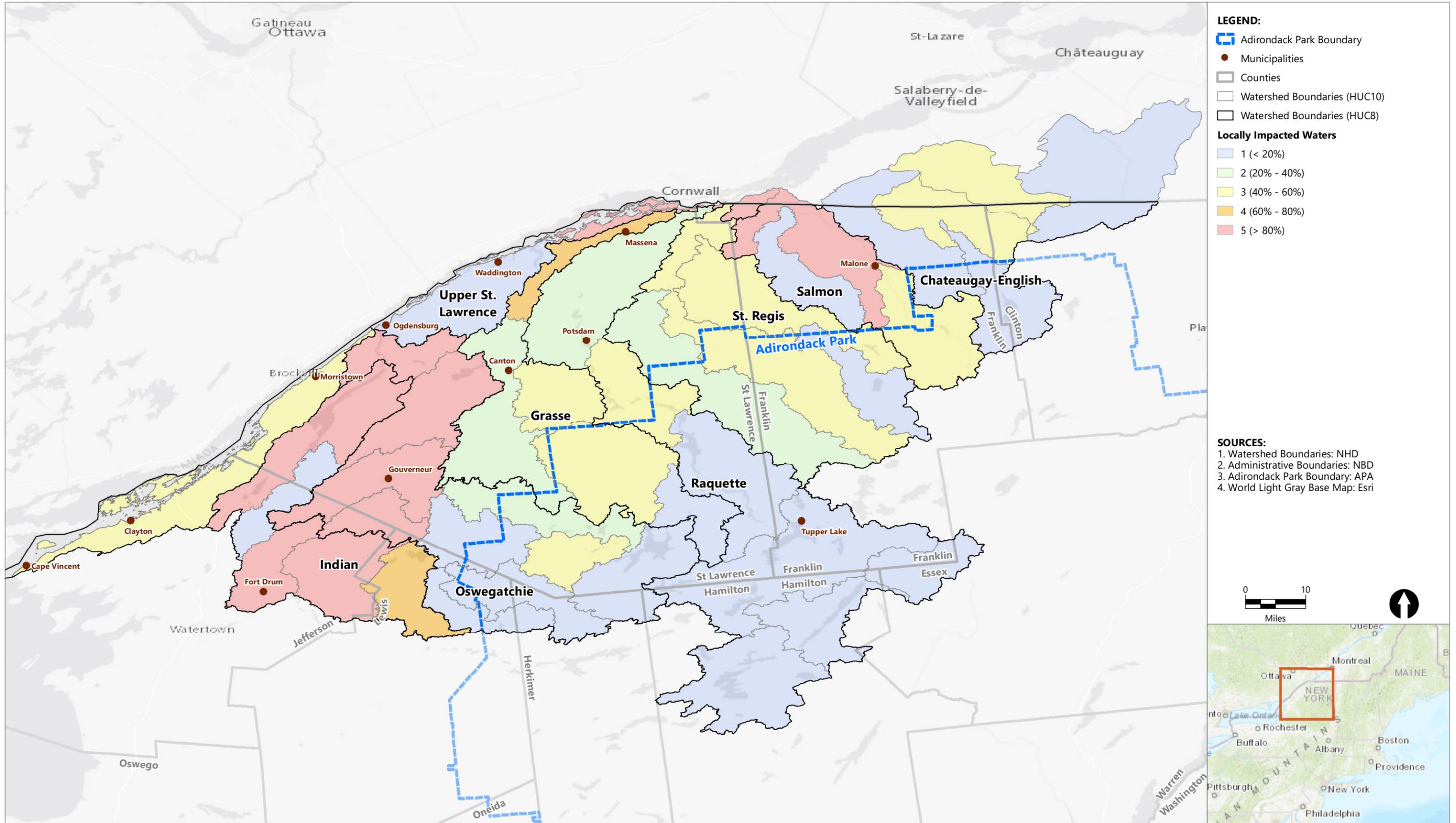
HUC10 Name	HUC10	Score	High	Medium	Low
Saint Regis River	0415030604	45		X	
Headwaters Salmon River	0415030701	37		X	
Little Salmon River	0415030702	38		X	
Salmon River	0415030703	60	X		
Headwaters Chateaugay River	0415030801	41		X	
Upper Chateaugay River	0415030802	53		X	
Trout River	0415030803	40		X	
English River (mostly in Canada)	0415030804	31.5			X
Middle Chateaugay River (mostly in Canada)	0415030805	39.5		X	

Recall that higher scores indicate greater impairment, resource value, and vulnerability and suggest the need for restoration. In contrast, lower scores indicate healthy conditions that warrant protection. Referring to the assessment composite scores, there are three scoring categories, Low, Medium, and High, with the following ranges:

- High** Scores of 56-85. Subwatersheds in this range are considered unhealthy and in need of restoration.
- Medium** Scores of 36-55. Subwatersheds in this range have a mix of unhealthy and healthy conditions and need more restoration and protection.
- Low** Scores of 0-35. Subwatersheds in this range are considered healthy and in need of protection.

The high-elevation headwater subwatersheds are typically the lowest priority subwatersheds, with priority increasing (darker colors) as water flows north through the valley to the St. Lawrence River. The darker-shaded subwatersheds exhibit the high and medium range of scores; these subwatersheds are focused along the northern skirt of the St. Lawrence River valley. These areas are associated with the higher percentages of residential, commercial, and agricultural land uses (**Map 14**). This includes the entire Upper St. Lawrence River watershed, and the lower waters of the Indian, Oswegatchie, and Salmon River watersheds. High priority subwatersheds would benefit from efforts to incorporate best management practices that minimize pollutant transport, restore natural hydrology, and improve habitat. The lighter shaded (lower priority) subwatersheds are typically located in the pristine, undeveloped areas. Low scoring subwatersheds tend to concentrate within the high elevation areas of the Adirondack region where natural land cover has been maintained and there is limited human development (**Map 14**). This area is valued for its high abundance of water resources, pristine habitat, and scenic vistas making it a popular destination for recreationists. These subwatersheds would benefit from continued natural resource protection, planning that maintains the community character, and improves habitat.

Prioritization Indicator Score Maps



LEGEND:

- Adirondack Park Boundary
- Municipalities
- Counties
- Watershed Boundaries (HUC10)
- Watershed Boundaries (HUC8)

Locally Impacted Waters

- 1 (< 20%)
- 2 (20% - 40%)
- 3 (40% - 60%)
- 4 (60% - 80%)
- 5 (> 80%)

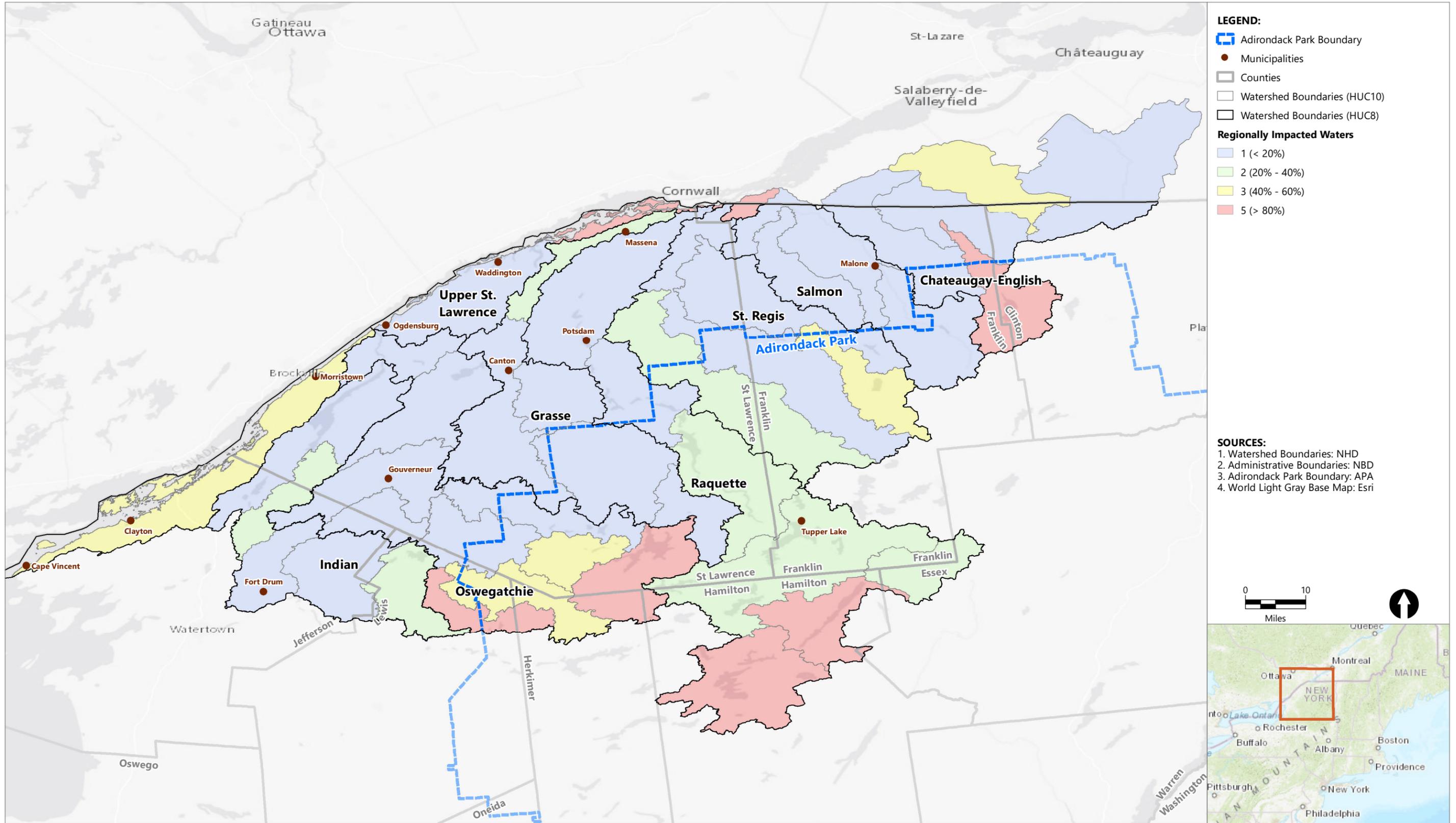
SOURCES:

1. Watershed Boundaries: NHD
2. Administrative Boundaries: NBD
3. Adirondack Park Boundary: APA
4. World Light Gray Base Map: Esri



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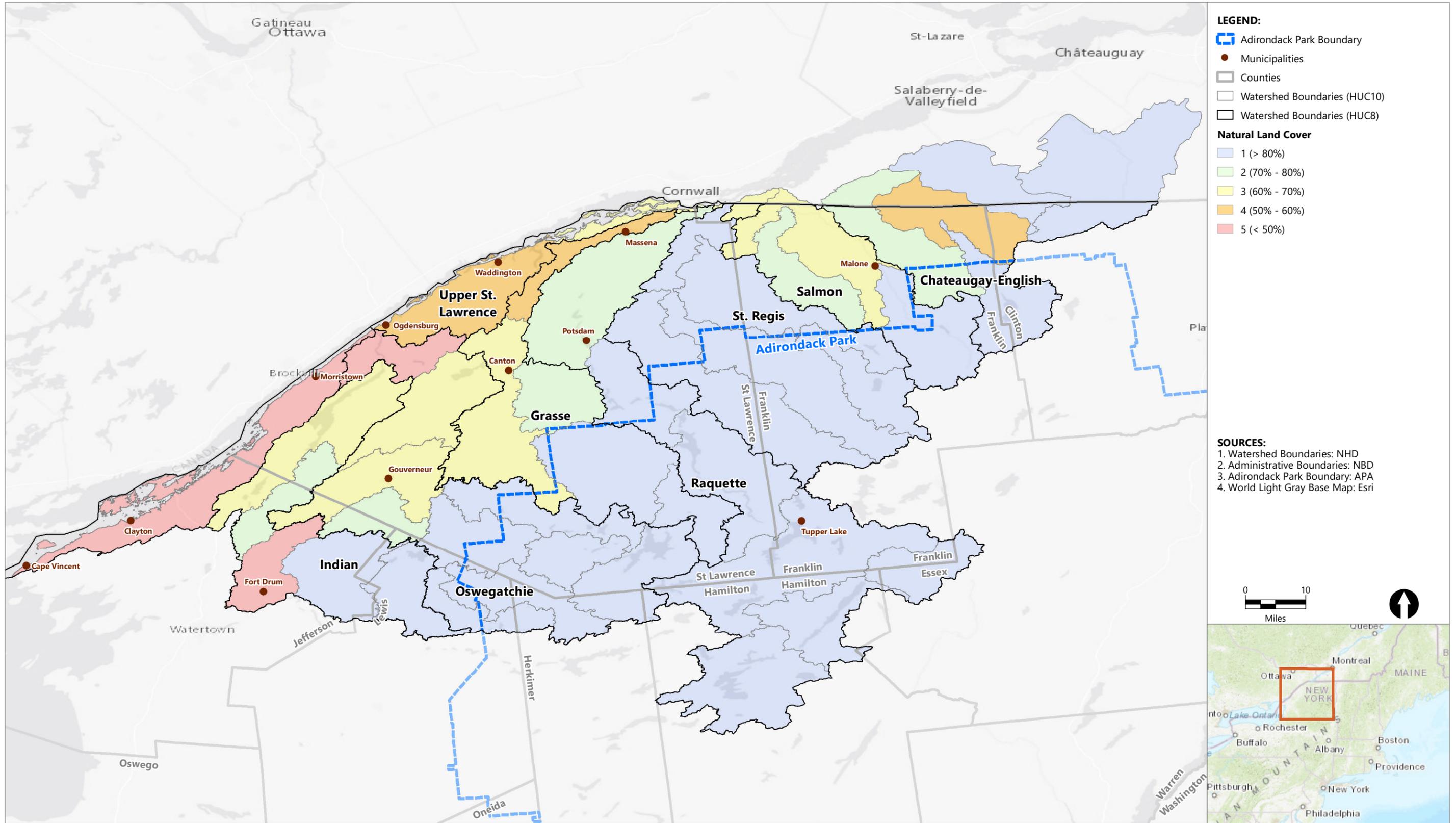
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Regionally Impacted Waters**
- 1 (< 20%)
 - 2 (20% - 40%)
 - 3 (40% - 60%)
 - 5 (> 80%)

- SOURCES:**
1. Watershed Boundaries: NHD
 2. Administrative Boundaries: NBD
 3. Adirondack Park Boundary: APA
 4. World Light Gray Base Map: Esri

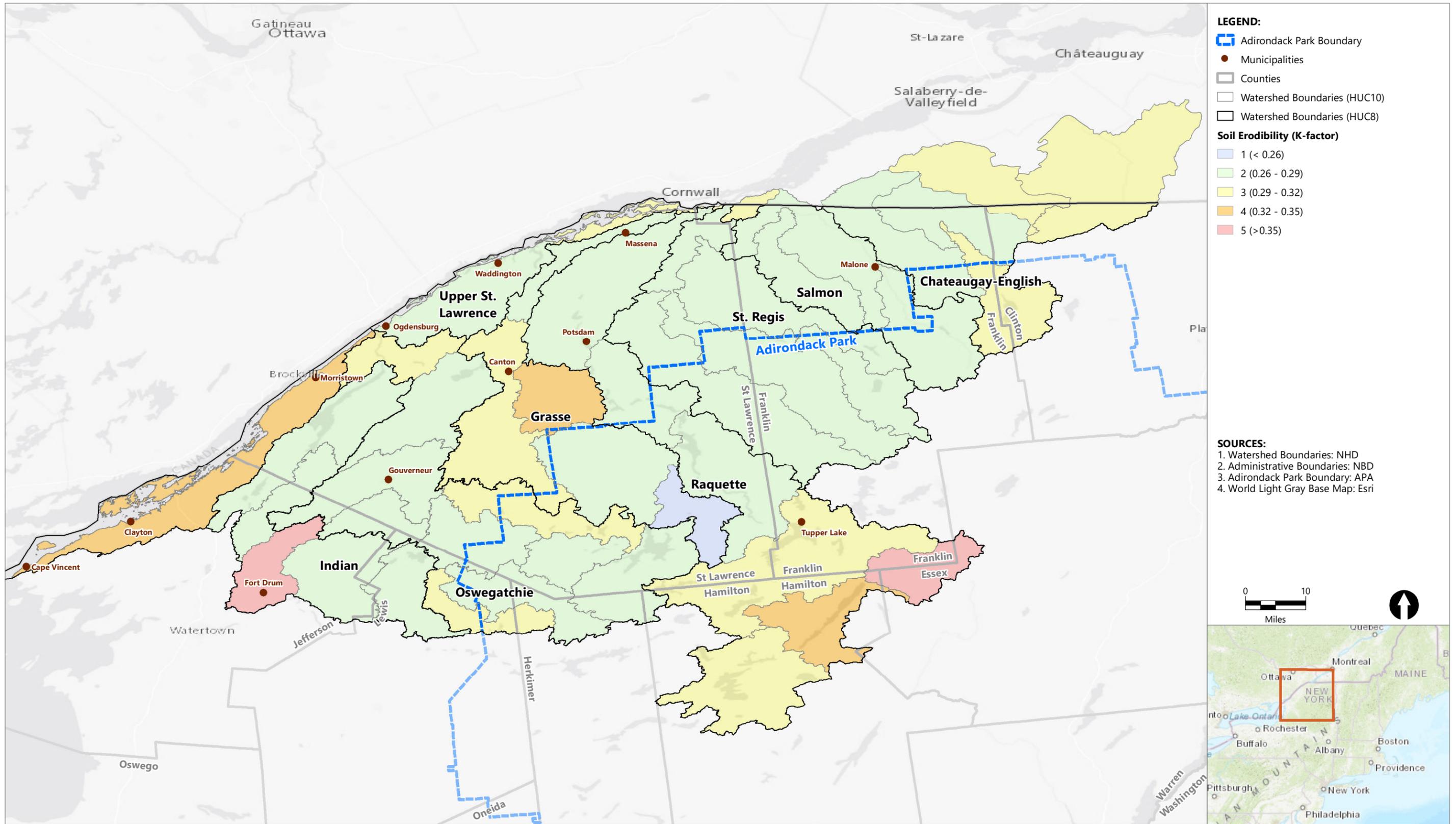


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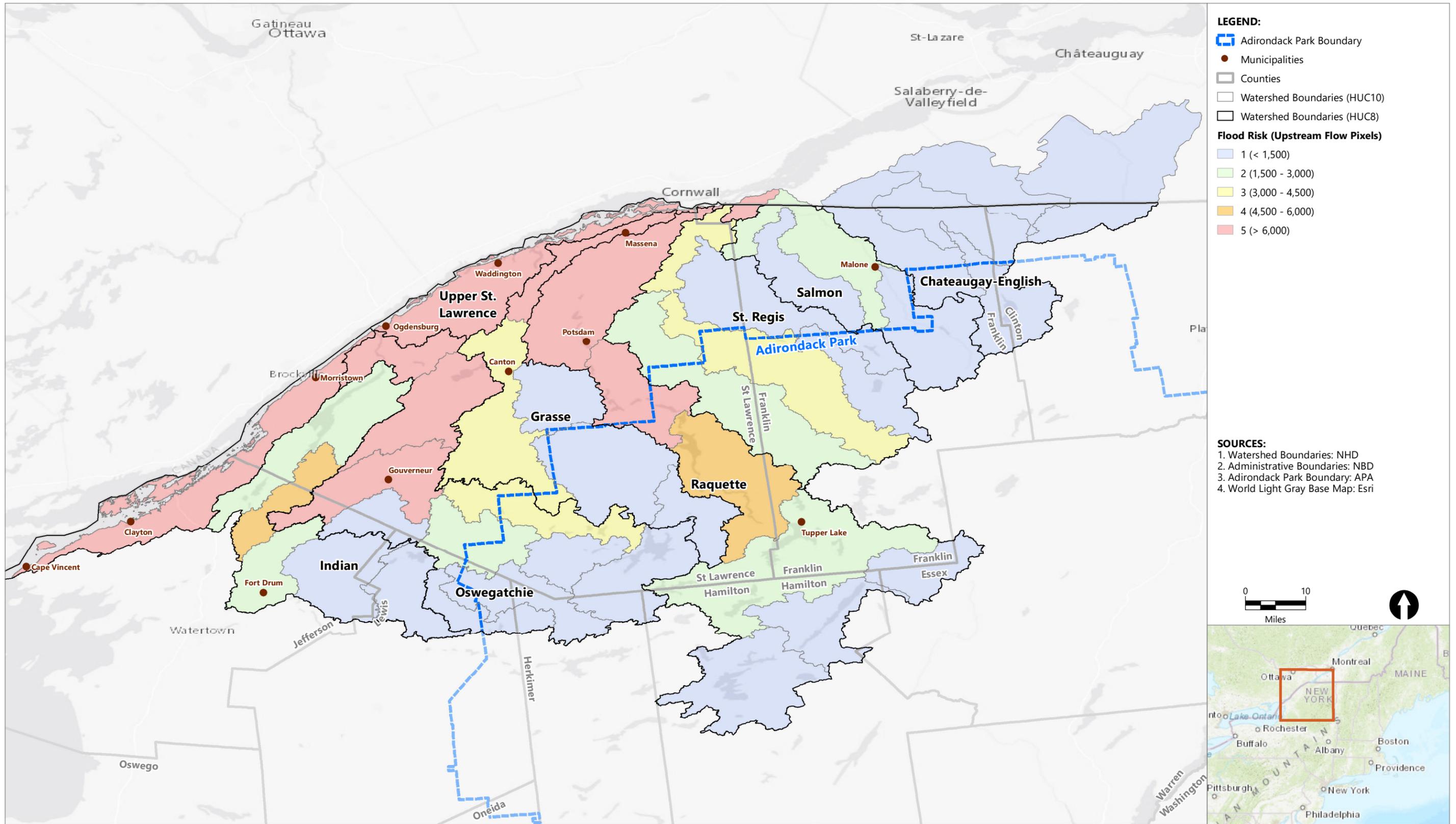
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Soil Erodibility (K-factor)**
- 1 (< 0.26)
 - 2 (0.26 - 0.29)
 - 3 (0.29 - 0.32)
 - 4 (0.32 - 0.35)
 - 5 (> 0.35)

- SOURCES:**
1. Watershed Boundaries: NHD
 2. Administrative Boundaries: NBD
 3. Adirondack Park Boundary: APA
 4. World Light Gray Base Map: Esri



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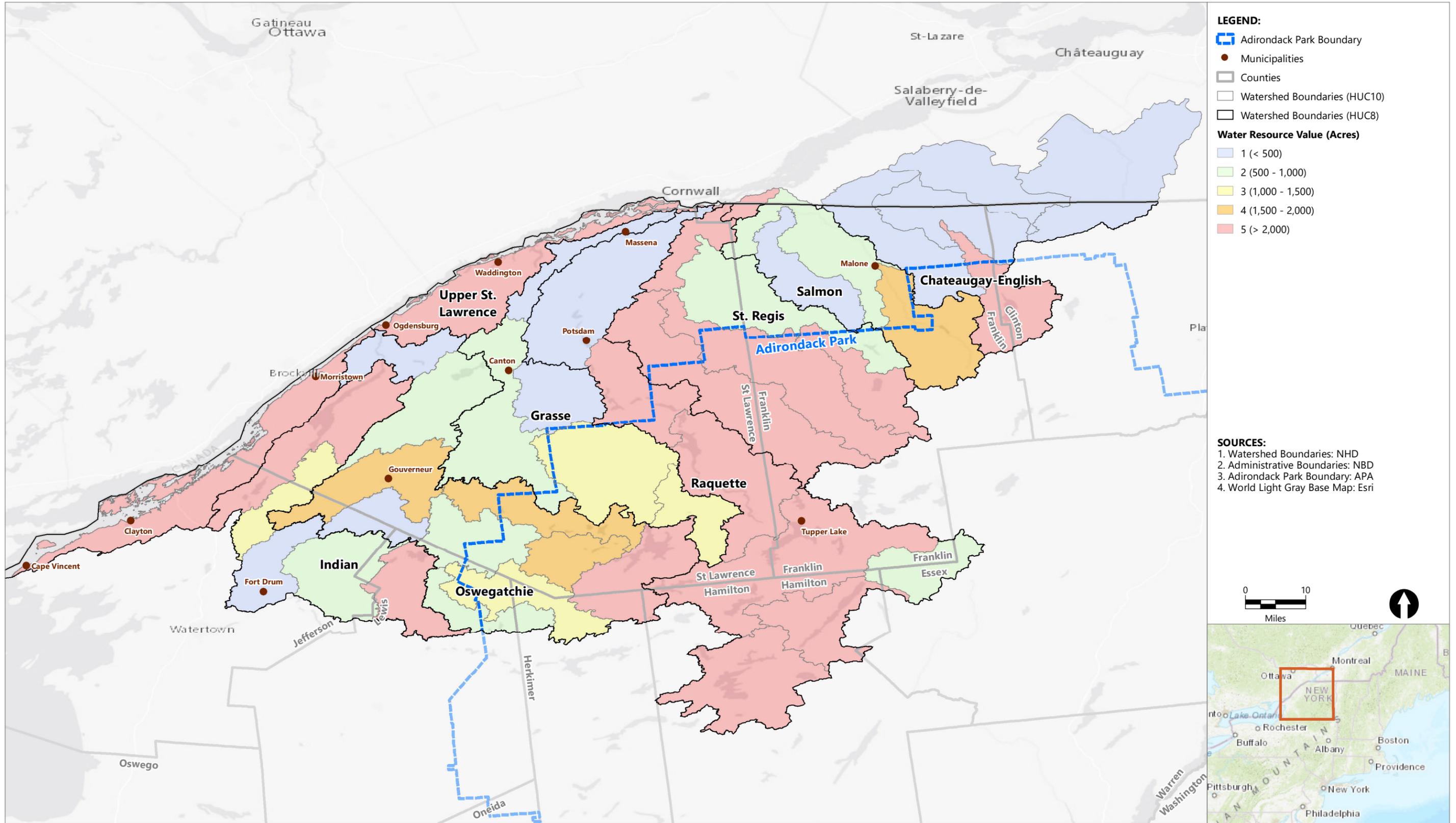
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Flood Risk (Upstream Flow Pixels)**
- 1 (< 1,500)
 - 2 (1,500 - 3,000)
 - 3 (3,000 - 4,500)
 - 4 (4,500 - 6,000)
 - 5 (> 6,000)

- SOURCES:**
1. Watershed Boundaries: NHD
 2. Administrative Boundaries: NBD
 3. Adirondack Park Boundary: APA
 4. World Light Gray Base Map: Esri



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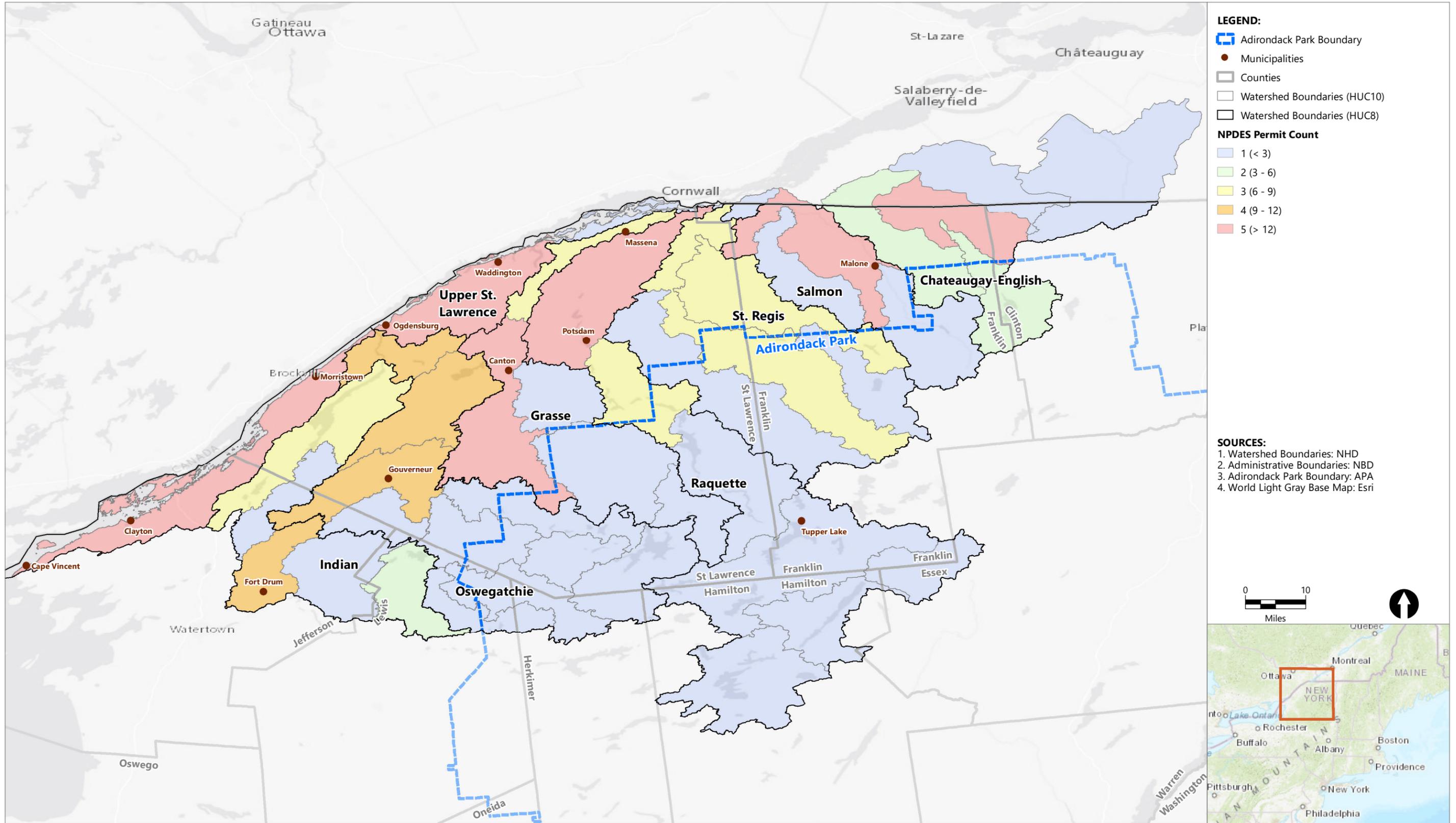
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Water Resource Value (Acres)**
- 1 (< 500)
 - 2 (500 - 1,000)
 - 3 (1,000 - 1,500)
 - 4 (1,500 - 2,000)
 - 5 (> 2,000)

- SOURCES:**
1. Watershed Boundaries: NHD
 2. Administrative Boundaries: NBD
 3. Adirondack Park Boundary: APA
 4. World Light Gray Base Map: Esri

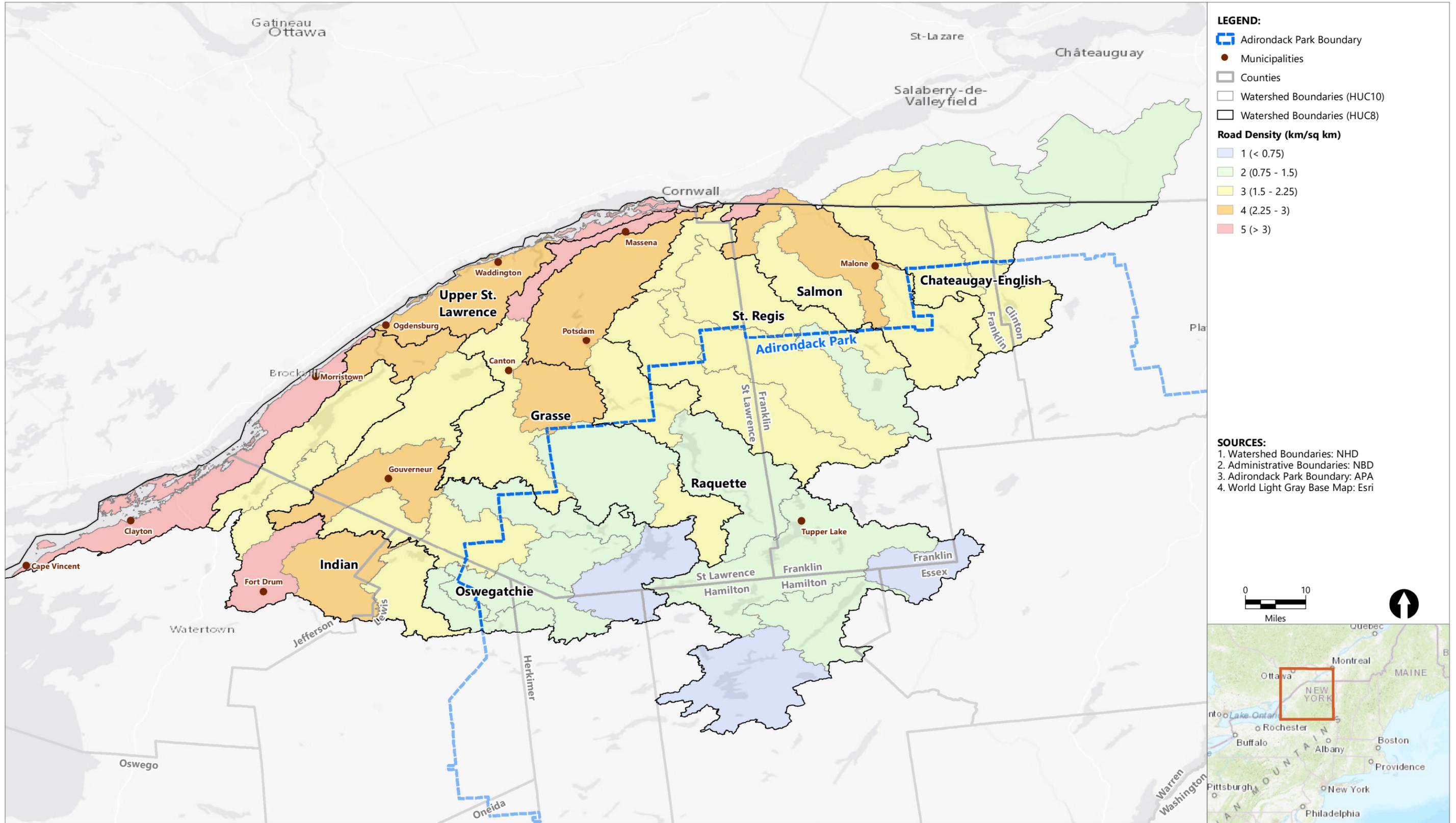


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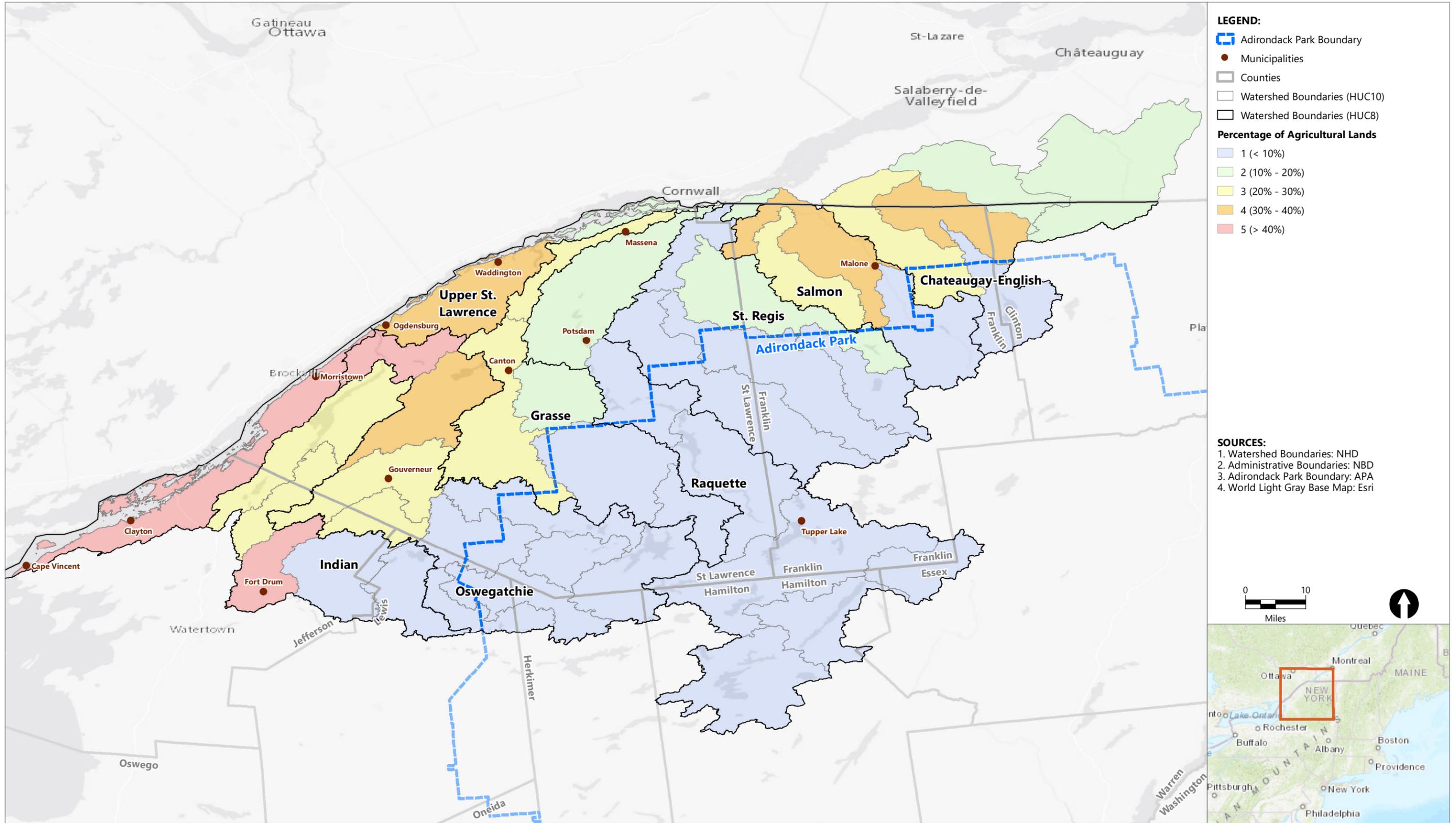




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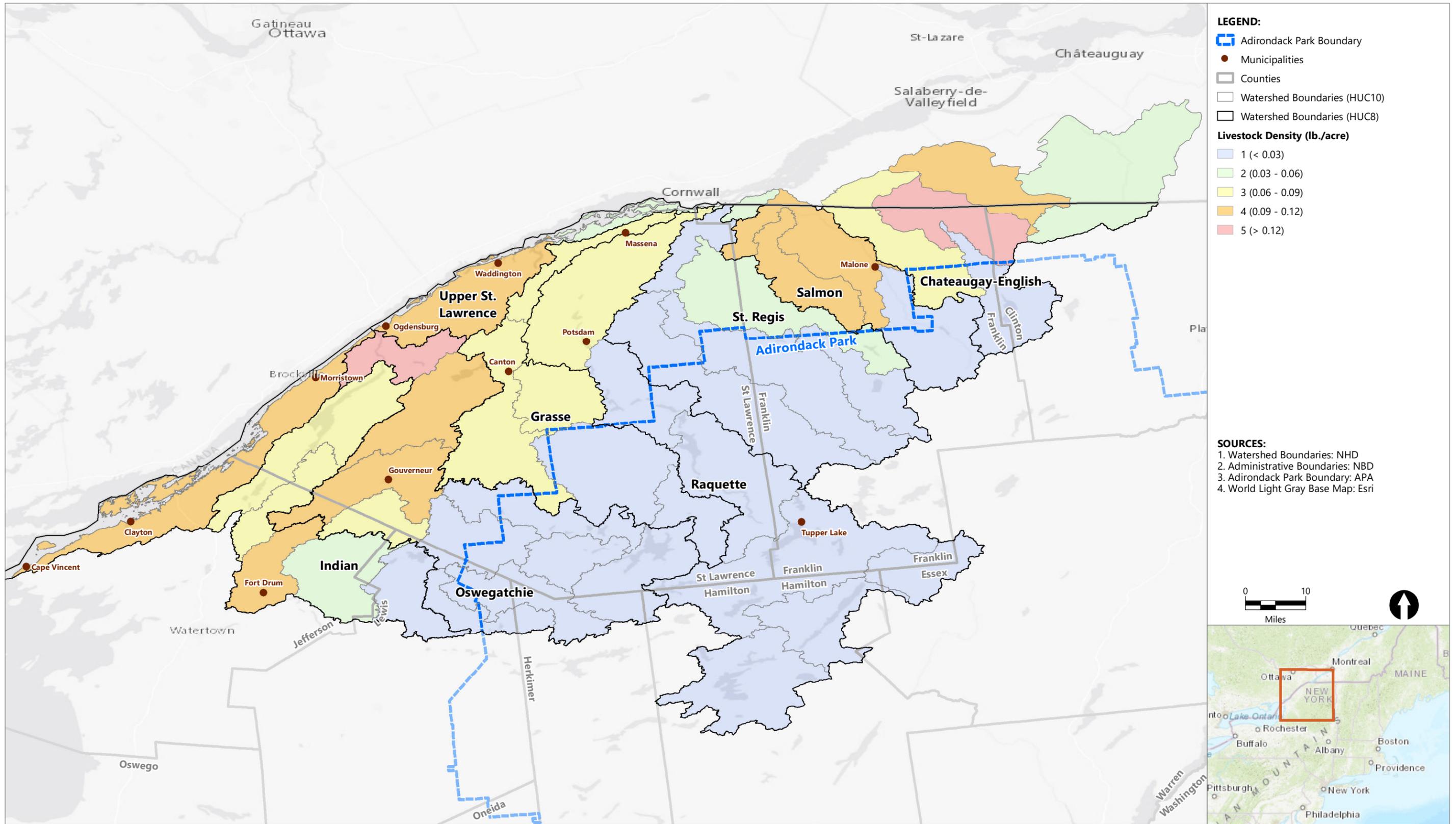


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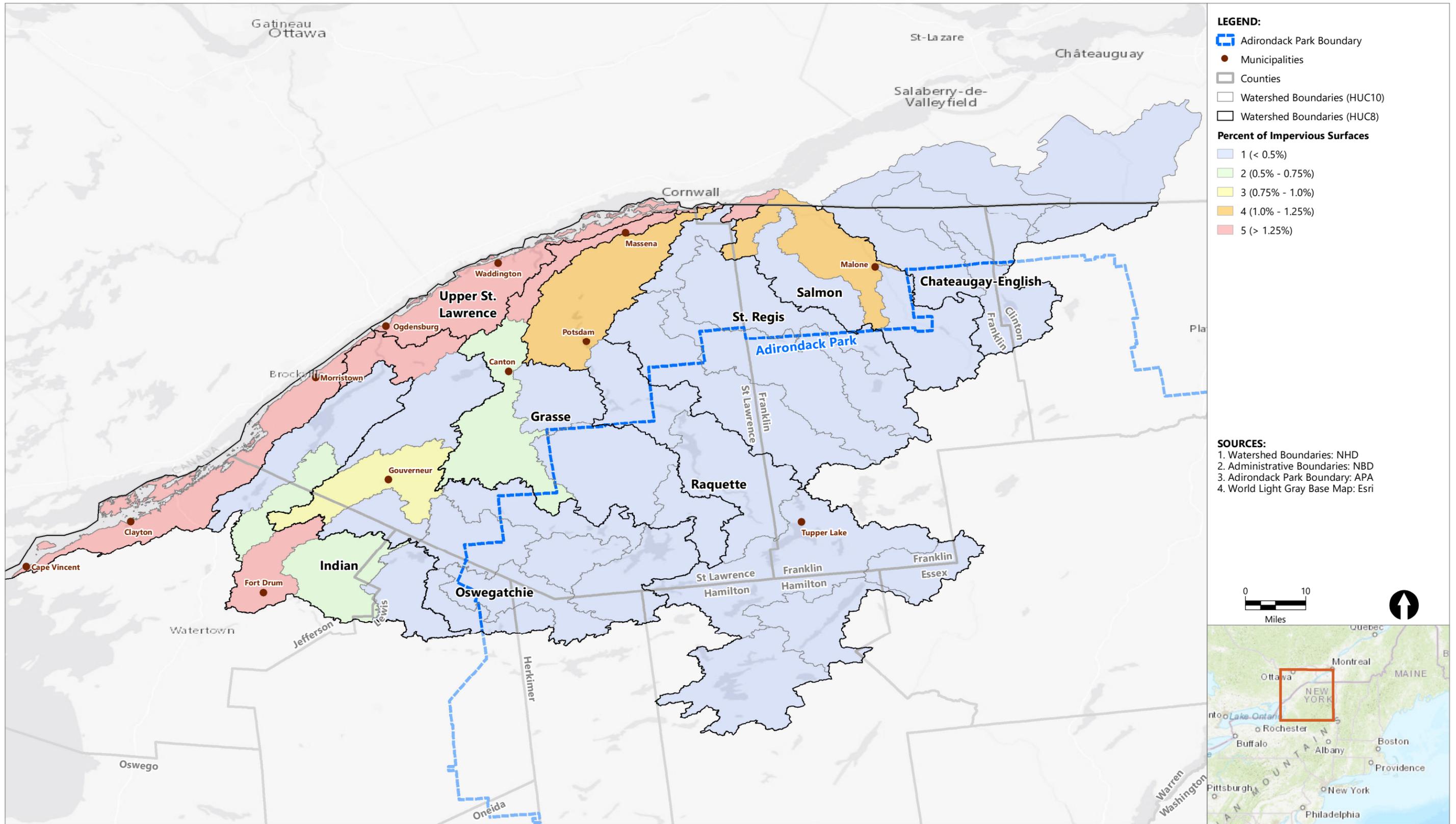




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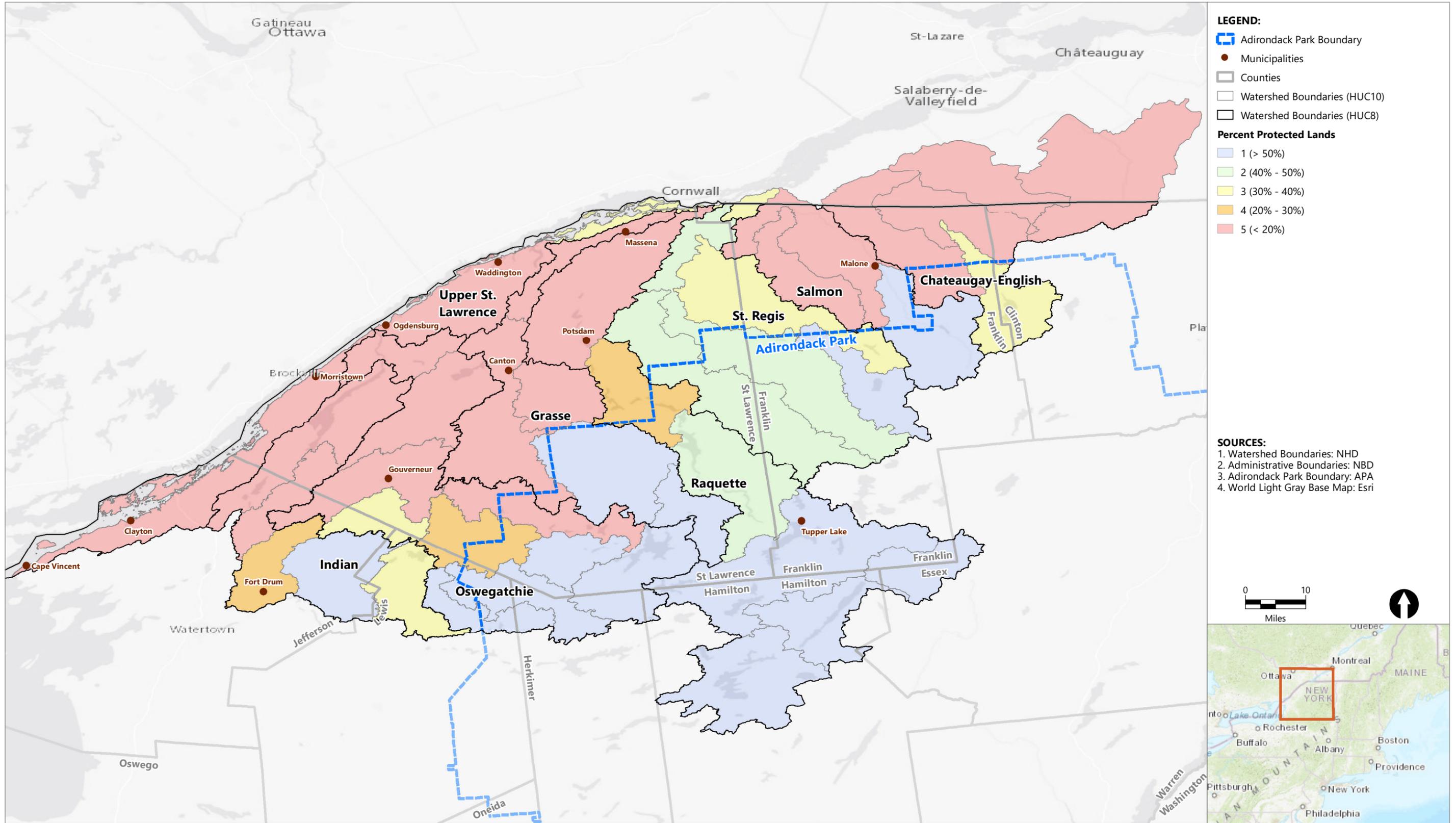


Map 10
Indicator Score for Livestock Density in St. Lawrence River Watershed in New York State
 St. Lawrence River Watershed Revitalization Plan



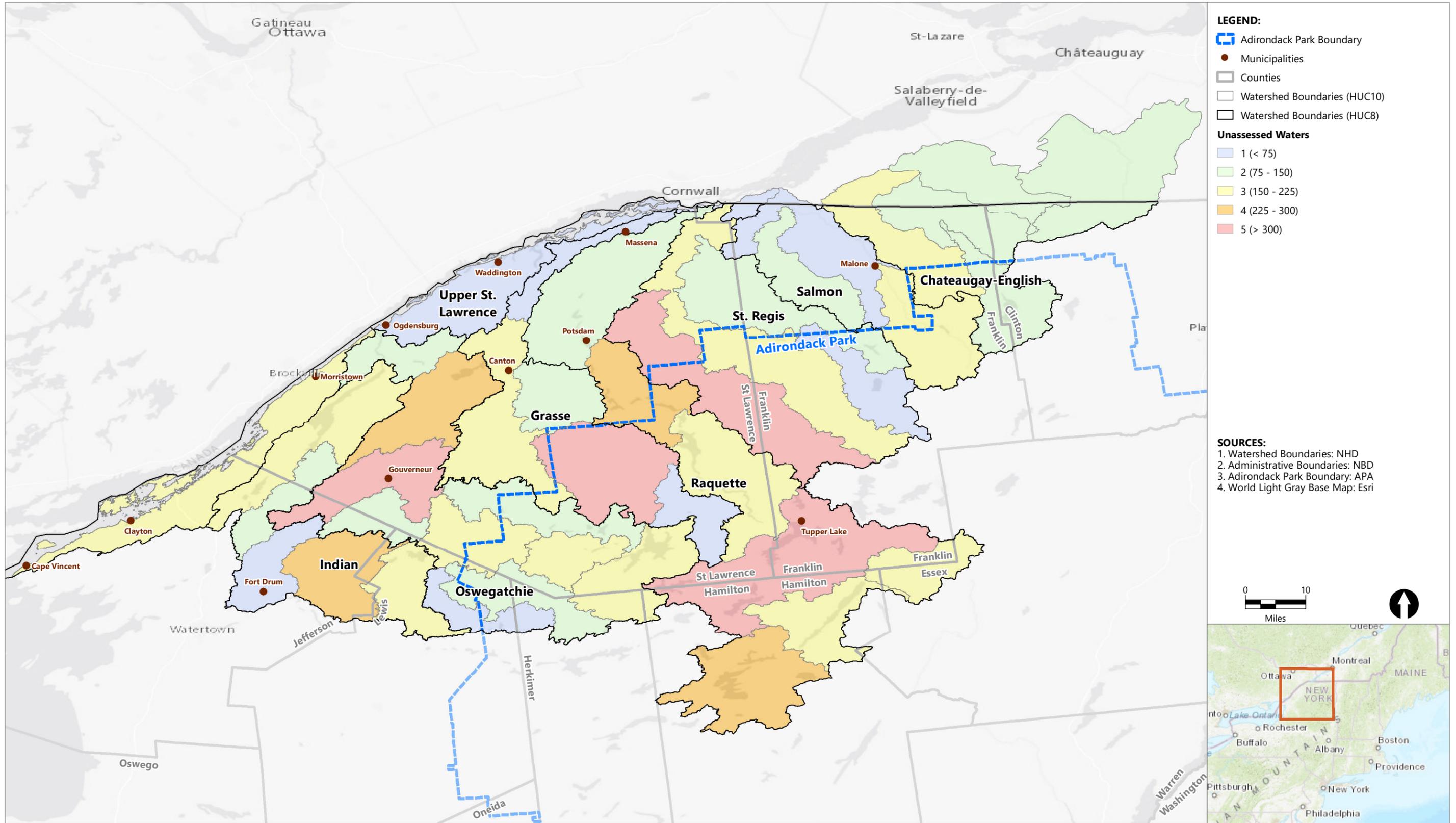
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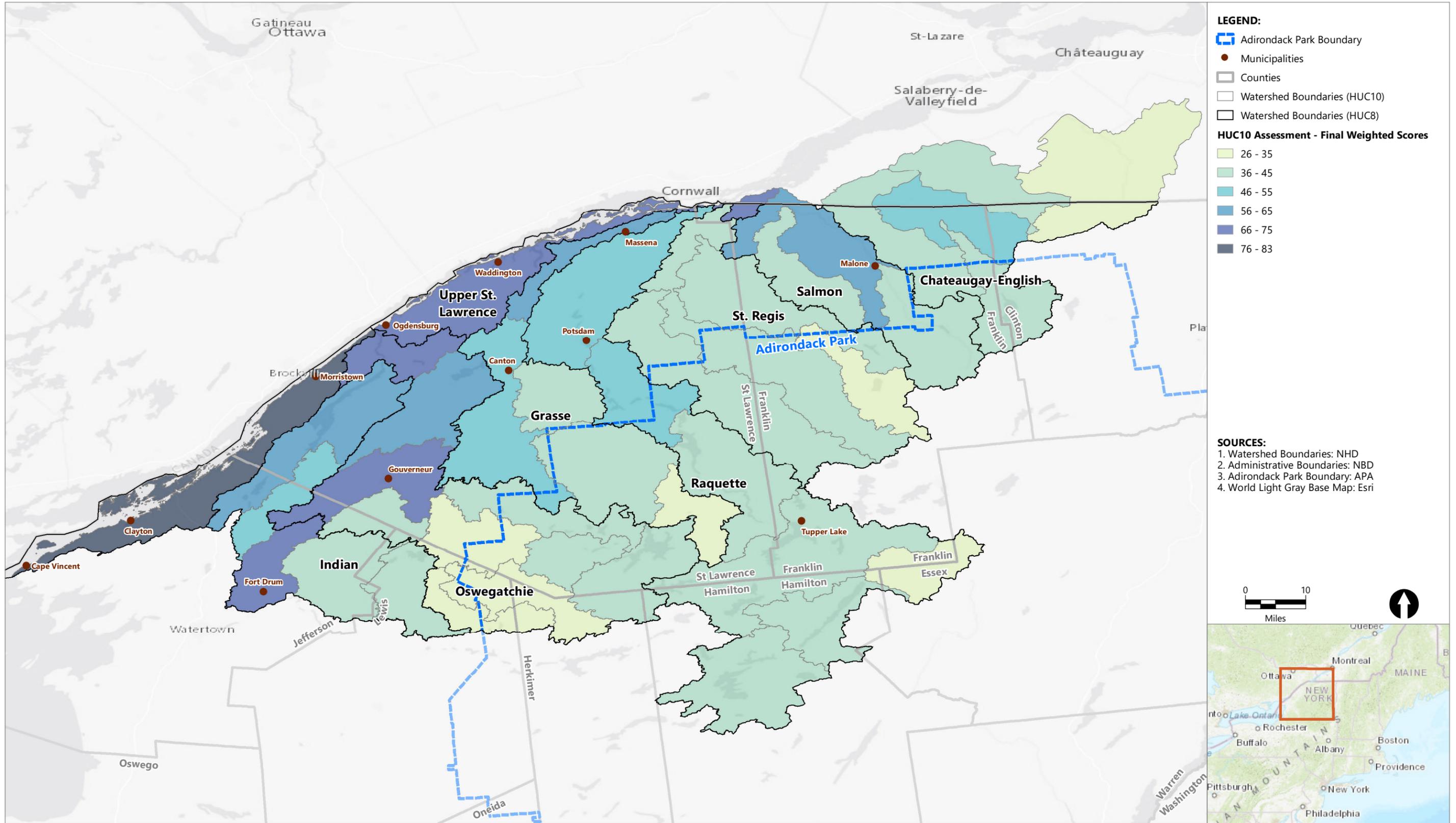
- LEGEND:**
- Adirondack Park Boundary
 - Municipalities
 - Counties
 - Watershed Boundaries (HUC10)
 - Watershed Boundaries (HUC8)
- Unassessed Waters**
- 1 (< 75)
 - 2 (75 - 150)
 - 3 (150 - 225)
 - 4 (225 - 300)
 - 5 (> 300)

- SOURCES:**
1. Watershed Boundaries: NHD
 2. Administrative Boundaries: NBD
 3. Adirondack Park Boundary: APA
 4. World Light Gray Base Map: Esri



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FINAL



November 2020

St. Lawrence River Watershed Recommendations & Implementation Strategy



EcoLogic



Prepared for Franklin County Soil & Water Conservation District

*This plan 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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November 2020

St. Lawrence River Watershed Recommendations & Implementation Strategy

Prepared for

Franklin County Soil & Water Conservation District
151 Finney Blvd.
Malone NY 12953

Prepared by

EcoLogic, LLC
9 Albany St., Suite 3J
Cazenovia, NY 13035

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ACRONYMS

AEM	Agricultural Environmental Management
APA	Adirondack Park Agency
APIPP	Adirondack Park Invasive Plant Program PRISM
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CCE	Cornell Cooperative Extension
CNP	Certified Nutrient Planner
CNMP	Certified Nutrient Management Plan
CSC	Climate Smart Community
CSLAP	Citizens Statewide Lake Assessment Program
CSO	Combined Sewer Overflow
CSLAP	Citizens Statewide Lake Assessment Program
DANC	Development Authority of the North Country
DOW	Division of Water
DPW	Department of Public Works
FEMA	Federal Emergency Management Agency
GIS	Geographical Information Systems
HAB	Harmful Algal Bloom
HUC	Hydrologic Unit Code
IJC	International Joint Commission
IRLC	Indian River Lakes Conservancy
MS4	Municipal Separate Storm Sewer System
NCREDC	North Country Regional Economic Development Council
NMP	Nutrient Management Plan
NRCS	Natural Resources Conservation Service
NYSERDA	NYS Energy Research & Development Authority
NYSDEC	NYS Department of Environmental Conservation
NYSDOH	NYS Department of Health
NYSDOS	NYS Department of State
NYSDOT	NYS Department of Transportation
NYNHP	NY Natural Heritage Program
NYSOPRHP	NYS Office of Parks, Recreation, and Historic Preservation
PEERS	Professional External Evaluations of Rivers and Streams
POTW	Publicly Owned Treatment Works
PRISM	Partnership for Regional Invasive Species Management
SLELO	St. Lawrence/Eastern Lake Ontario PRISM

SLRWP	St. Lawrence River Watershed Project
SPDES	State Pollution Discharge Elimination System
SRMT	Saint Regis Mohawk Tribe
SWCD	Soil & Water Conservation District
TILT	Thousand Islands Land Trust
TNC	The Nature Conservancy
USACE	United States Army Core of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAVE	Water Assessments by Volunteer Evaluators
WI/PWL	Waterbody Inventory/ Priority Waterbodies List (NYSDEC compendium)
WWTP	Wastewater Treatment Plant

1 Introduction

This chapter of the Watershed Revitalization Plan sets forth recommendations designed to protect and restore the lands and waters draining to the St. Lawrence River in northern New York. These recommended actions focus on measures to enhance water quality and the natural environment while protecting quality of life for residents and aligning with the community's vision for a sustainable future. Achieving the community's vision will require balancing multiple factors; these factors include economic development, water quality and habitat protection, recreation, food security, and building resilience to a changing climate. Implementing the recommendations will require a coordinated effort across multiple levels, including federal, state, and local governments, educational institutions, resource management agencies, not-for-profit organizations, and community residents.

The recommendations reflect a watershed-specific analysis of the natural and built environment, current water quality conditions, key sources of pollution, and the existing institutional framework. Some recommendations address improving land conditions and water resources while others are oriented toward long-term protection.

Recommendations are grouped into eight broad categories:

- Agricultural Practices and Management
- Floodplain and Stormwater Management
- Forest Management
- Invasive Species Management
- Infrastructure and Development
- Water and Wastewater Management
- Water Quality Research & Monitoring
- Watershed Planning, Management, & Outreach

Each recommendation includes discussion of the need for action, benefit, and potential leadership. Some of the recommended actions apply broadly across the entire watershed. As outlined in **Section 3**, general recommendations are grouped into three categories: restoration and protection actions; collaboration, partnership, and outreach; and municipal and programmatic actions.

However, the large and diverse watershed area also requires tailored recommendations to reflect regional differences. Each HUC10 subwatershed within the St. Lawrence River watershed has its own set of factors that influence water quality and offer unique opportunities for protection and restoration. Priority focus areas for each subwatershed are identified in **Section 4**.

Finally, **Appendix D: Implementation Strategy & Project Matrix** presents a summary matrix of specific measures for watershed revitalization. The inventory connects recommendations to strategy components to be advanced and watershed goals to be achieved.

2 Role of Municipalities in Watershed Protection

The purpose of this Watershed Revitalization Plan is to identify water resource management issues facing the St. Lawrence River watershed and recommend potentially effective strategies for their resolution. Due to the size and diversity of the landscape draining into the St. Lawrence River from New York State, the Plan offers a range of strategies for consideration. The 5,600 square-mile watershed encompasses all or portions of eight counties and 100 municipalities, each with its own governance and local laws, resource base, population and demographics, economic drivers, and water resource management priorities.

The primary authority for guiding community planning and development is vested in cities, towns, and villages according to the Home Rule provision of the New York State Constitution. This provision empowers local municipalities to define their community’s vision and manage important elements of growth and development. Because land use decisions can have a direct effect on the quality and quantity of water, local planning and zoning laws are valuable tools to address the opportunities and challenges of development in the context of water resources management.

Municipalities within the St. Lawrence River watershed differ widely in the extent to which effective planning and zoning tools have been adopted. While some have comprehensive land use regulations and guidelines, others lack essential tools needed to guide growth in a manner that considers community character and environmental quality. As summarized in **Table 1**, there is diversity among the eight watershed counties with respect to some key land use planning tools.

Table 1
Summary of Land Use Regulations, County-Level

County	Planning Board / Commission	Written Comprehensive Plan	Farmland Protection Board	Farmland Protection Plan	Right-To-Farm Law
St. Lawrence	Yes	Yes	Yes	Yes	Yes
Jefferson	Yes	No	Yes	Yes	Yes
Franklin	No	No	Yes	Yes	Yes
Lewis	Yes	No	Yes	Yes	Yes
Essex	Yes	Yes	Yes	Yes	Yes
Hamilton	No	No	No	No	No
Clinton	Yes	Yes	Yes	Yes	No
Herkimer	Yes	No	Yes	Yes	No

Source: New York Land Use Tools: A 2008 Survey of Land Use Planning & Regulations in NYS (NYS Legislative Commission on Rural Resources)

An earlier section of this Plan, the **St. Lawrence River Watershed: Local Laws and Programs Affecting Water Quality**, includes an inventory and assessment of local laws for water resource protection at the municipal level. To meet a shared vision for sustaining St. Lawrence River watershed

resources, communities are strongly recommended to review the current municipal analysis and perform a gap analysis to identify opportunities to address water quality concerns. Based on the recent inventory, many areas will benefit from adoption of the following tools:

- compliance with SPDES stormwater construction permit requirements,
- lakeshore/riparian overlay districts,
- floodplain protection,
- sediment and erosion control,
- limitations on impervious cover,
- steep slope development restrictions, and
- riparian setbacks.

Although there are significant differences amongst watershed municipalities in regard to land use, population, and current local laws, municipalities would benefit from working together to improve consistency throughout the watershed and address water quality. New York State has recently (2019) completed a major project to support communities with planning tools. The [NYS DOS Model Local Laws to Increase Resilience](#) supports local communities in watersheds vulnerable to flooding that have limited access to legal and planning resources, as well offer an effective means to reduce flooding impacts and enhance public health and safety. The model laws target water quantity (e.g., flood risk) as well as quality (e.g., sources of sediment and nutrients).

Recommendations concerning municipal actions are included in the general watershed recommendations under municipal and programmatic actions for each category. All these actions are recommended for implementation. However, it is recognized that there is a disparity in resources that affects the potential for the measures to be implemented. For example, Franklin County lacks a Planning Department, which limits their capacity to work with their communities to revise local laws. One approach to increasing capacity is to add regional planning professionals as “circuit riders” to work with local leaders as they incorporate water resources protection provisions into their codes. Therefore, **it is highly recommended that elected officials and other local leaders utilize the Watershed Revitalization Plan and plan to build the necessary capacity in terms of staffing and resources to ensure the Plan’s effective implementation.**

3 General Recommendations for Watershed Health

3.1 Introduction

General recommendations are appropriate across the watershed to advance the community's vision for the future. The actions are grouped into three broad categories: (1) restoration and protection actions to minimize adverse impacts of human activities on lands and waters; (2) collaborations, partnerships and outreach to maximize effectiveness of actions and build local support; and (3) opportunities for local officials to strengthen communities and environmental protections.

Restoration and protection actions are designed to minimize nonpoint source pollution and protect and restore the quality and ecological functioning of water resources; these actions are often referred to as "best management practices" or BMPs. A management practice is considered "best" in context of a specific land use and environmental setting. What works in one area may not be feasible or cost-effective in another due to site-specific factors. BMPs can have a broad, generic application or can be highly specific to certain geographic, hydrologic, and chemical conditions. BMPs are often most effective when combined with other practices in a system that reduces sources, minimizes edge-of-field losses, and prevents transport to receiving waters.

Recommendations also center around opportunities for *collaboration, partnerships, and outreach* to advance the recommendations of the St. Lawrence River Watershed Revitalization Plan. The SLRWP coalition brought together multiple levels of government, resource management agencies, and volunteer organizations to develop the Revitalization Plan. Continued collaboration among these partners will be essential. Outreach to watershed communities on resource management issues will be needed to build local support for actions such as modifications to local laws, enhanced investment in staffing resource management agencies, and participation in citizen monitoring programs.

The third category of recommendation encompasses *municipal and programmatic actions* for watershed municipalities. As the New York State Constitution provides for home rule, the primary authority for guiding community planning and development is vested in cities, towns, and villages. This provides local municipalities with the power to direct a community's vision and growth. Local planning and zoning laws are valuable tools to confront both opportunities and challenges of development and watershed planning. Strong local leadership is essential to promoting sustainability, reducing the risk of flood damage, and revitalizing communities through the adoption of appropriate zoning and land use policies. The **St. Lawrence River Watershed Revitalization Plan: Local Laws and Programs Affecting Water Quality** is a comprehensive overview of relevant planning tools and their use across the watershed. This document is appended to the **St. Lawrence River Watershed Characterization Report (2020)**.

3.2 Agricultural Practices and Management

Agriculture is a leading industry and land use in the St. Lawrence River watershed, particularly along the St. Lawrence River floodplain where rich soils and relatively flat elevation provide excellent conditions for farming. Not only does agriculture play a significant role in the economy, the agricultural landscape reinforces the rural character of the north country, retains valued open space and scenic vistas, and supports wildlife habitat. An estimated 620,700 acres (approximately 17%) of the lands within the St. Lawrence River watershed were dedicated to agriculture in 2017 (USDA Census of Agriculture, 2017).

New York strives to balance the essential services of agricultural production with environmental protection. Larger livestock farms are classified as Concentrated Animal Feeding Operations (CAFOs) and regulated by NYSDEC through State Pollutant Discharge Elimination System (SPDES) permits. CAFOs are required to complete nutrient management plans, emergency response plans, and other information related to resource management. For smaller farms below the CAFO thresholds (AFOs), the focus is on voluntary incentive-based adoption of BMPs. The tiered Agricultural Environmental Management (AEM) program is a voluntary program managed by county Soil and Water Conservation Districts. AEM provides customized technical advice and support to producers tailored to their individual circumstances. The tiered approach begins with inventory and planning and progresses through implementation and assessment. An adaptive management approach ensures that the technical advice and support is responsive to changing circumstances and new information.

Despite these efforts, agricultural land use practices are a significant contributor to nutrient and sediment inputs to waterbodies in the St. Lawrence River drainage; agriculture adversely affects 26% of assessed stream miles and 15% of assessed lake acres. The NYSDEC 2016 Waterbody Inventory/Priority Waterbodies List for the watershed cites the following agricultural conditions and practices for their adverse impact on water quality and aquatic habitat:

- Increased siltation/sedimentation and nutrient inputs from agricultural runoff
- High rates of erosion from row crop production, most commonly corn grown for silage
- Crop production on steep slopes and erosive soils adjacent to the river
- Improper manure storage and handling, e.g., daily manure spreading, stockpiling of manure along streambanks throughout winter and loss to the stream during spring runoff, winter manure spreading on frozen ground
- Large numbers of cattle with access to streams resulting in streambank erosion and pathogen inputs

Recommended practices to mitigate these impacts and control nonpoint source pollution from agricultural lands are tabulated below.

3.2.1 Restoration & Protection Actions

1. Increase Implementation of Best Management Practices (BMPs)

Description Erosion control practices include both operational and vegetative practices designed to retain, divert, or collect runoff. Examples include but are not limited to:

- Conservation tillage (no till, strip-till, reduced-till)
- Contour farming
- Cover crops and winter cover crops
- Manure injection fertilization
- Strip-cropping
- Vegetative covers
 - » Buffer strips
 - » Riparian buffers
 - » Vegetative treatment areas
- Waterways/water drainage systems



Cereal rye is an excellent winter cover crop because it rapidly produces a ground cover that holds soil in place against the forces of wind and water.

Photo source: Joseph Murphy, Soybean Association

Benefit These practices reduce pollutant transport in surface runoff by decreasing soil erosion and surface runoff volumes by increasing the soil's infiltration capacity. Plant residue on the soil surface reduces soil and nutrient loss during storm events and decreases runoff volumes by increasing the soil's infiltration capacity. In addition, conservation tillage reduces compaction, saves time, fuel and labor costs, increases soil organic matter and moisture-holding capacity, and lowers soil loss due to wind erosion. By targeting these actions in watersheds identified as impacted by agriculture within the NYSDEC WI/PWL, communities will achieve the greatest benefits towards improved water quality.

Partners SWCDs, NYS Ag & Markets, USDA-NRCS, NYSDEC, CCE, Cornell Pro-Dairy, Farmers

Resources [NYS Soil & Water Conservation Committee's Agricultural Best Management Practices System Catalogue](#)

2. Provide Adequate Manure Storage and Management

Description A manure management system includes a plan for the collection, transport, and storage of manure. The design is dependent on livestock operation, site location, and management considerations. A manure storage system controls the loss of nutrients and pathogens by safely storing manure when the potential for erosion and surface runoff is high.



Covered concrete manure storage facility provides increased storage capacity to prevent spreading on sensitive or inaccessible winter-time fields.

Photo source: USDA-NRCS

Benefits Adequate manure storage systems reduce nutrient loss when runoff and erosion potential is high, allow manure to be treated as a resource rather than a waste, and improve herd health, aesthetics, and relations with neighbors. Without adequate storage facilities in the north country, farmers must resort to winter manure spreading on frozen ground.

Partners SWCDs, NYS Ag & Markets, USDA-NRCS, NYSDEC, CCE, Cornell Pro-Dairy, Farmers

Resources [NRCS Standards for Waste Storage Facilities](#)

3. Promote Pasture Management

Description Prescribed grazing involves subdividing pastures and hayfields into 5 or more paddocks for a grazing season. The size and number of paddocks is dependent on the level of pasture productivity, livestock density, and residence time. The frequent rotation of livestock allows forage to recover from grazing, permitting vegetative productivity and re-growth.



Fencing plays a role in effective pasture management.
Photo Source: USDA-NRCS

Benefits Overgrazing of pastures reduces ground cover and total forage yields. When a prescribed grazing management system is in place, forage is improved and ground cover is increased thereby preventing soil erosion, reducing surface runoff, and distributing animal manure. Infiltration is increased. Critical resources including riparian buffers, streambanks, and shorelines are at lower risk of damage.

Partners SWCDs, NYS Ag & Markets, USDA-NRCS, NYSDEC, CCE, Cornell Pro-Dairy, Farmers

Resources [USDA-NRCS National Range and Pasture Handbook](#)

4. Develop and Implement AEM Tier III Management Plans

Description Nutrient management is an integrated approach to maximize economic production of soil, crops, animal feeds and products, and commercial fertilizer. Management incorporates soil testing, manure nutrient analysis, and timing, placement, and method of nutrient application. AEM Tier III Management Plans evaluate all aspects of farm production and prescribe conservation practices to advance production and natural resource conservation goals. Practices are selected based on site-specific conditions of soil, topography, drainage, cropping practices, and livestock density. Comprehensive Nutrient Management Plans (CNMPs) are the foundation for the NYSDEC regulatory program to control potential water pollution from Concentrated Animal Feeding Operations (CAFOs) under state General Permit GP-04-04. CNMPs are also required for farms seeking federal or state cost-sharing to construct manure storage structures. Any livestock farm seeking to maximize production while efficiently managing their natural resources and protecting the environment is also encouraged to develop and implement a CNMP.

Benefits AEM Tier III Management Plans address elements such as manure and wastewater, feed, and nutrient management, record keeping, and emergency action planning.

These plans help farmers achieve sustainability goals, protect water quality, and make them more competitive when applying for cost-sharing funds.

Partners SWCDs, NYS Ag & Markets, private sector planning consultants, farmers

Resources Contact County Soil and Water Conservation District (SWCD) at www.nys-soilandwater.org/contacts

3.2.2 Collaboration, Partnerships, & Outreach

5. Increase Engagement with Agricultural Environmental Management (AEM)

Description AEM is a cooperative interagency program led by SWCDs that provides one-on-one help to farmers to inventory existing environmental stewardship practices, address those that contribute to soil and nutrient loss, identify opportunities for mitigation, and enhance farm viability. By participating in AEM, farmers can document their environmental stewardship and advance their positive contributions to their communities, food systems, economy, and the environment. Farmers work with local AEM resource professionals to develop comprehensive farm plans using a tiered process:

- Tier 1 – Inventory current activities, future plans, and potential environmental conservation interests
- Tier 2 – Document current land stewardship while assessing and prioritizing potential environmental concerns
- Tier 3 – Develop farm plans to address concerns and opportunities identified in Tier 1 and 2
- Tier 4 – Implement plans utilizing available financial, educational, and technical assistance
- Tier 5 – Evaluate and update plans to ensure continued environmental conservation and farm viability

Benefits AEM is a resource for farmers to help identify effective BMPs for their operations to improve water quality. Farmers are more-eligible for cost-share projects, ability to prioritize and implement projects/practices that can reduce soil erosion and runoff. For qualifying operations, engagement in AEM may help promote farm products through New York State Grown & Certified.

Partners SWCDs, NYS Ag and Markets, Cornell Cooperative Extension, Farmers

Resources Contact your local Soil and Water Conservation District at www.nys-soilandwater.org/contacts or visit the AEM website at www.nys-soilandwater.org/aem to learn more.

6. Inventory Current Agricultural Practices and Improve GIS Data

Description Inventory the location (HUC12 level, GIS data) and implementation of BMPs within the watershed. This would help to track existing practices and identify opportunities for improvement.

Benefit A long-term database of implemented projects, together with water quality monitoring, would help determine the efficacy of a particular BMP. In addition, it would provide data to determine which practices are most appropriate or popular for a region.

Partners SWCDs, NYS Ag & Markets, USDA-NRCS, NYSDEC, Farmers

7. Encourage “Ag in the Classroom” Programs and Agriculture Related Career Exploration

Description The “Ag in the Classroom” program is delivered through Cornell Cooperative Extension to local schools that aims to foster awareness, understanding, and appreciation of how we produce the food and fiber that depend on in our daily lives.



Cornell Cooperative Extension Franklin County’s Connie Gerow looks on as 2nd graders work as “farmers” and “market goers”.
Photo source: CCE Franklin County

Benefit This program helps students engage with agriculture and food systems and plant the seed to learn about agriculture related careers.

Partners NYS Ag & Markets, Cornell University, NYS Education Department, Cornell Cooperative Extension, New York Farm Bureau, Agriculture and Farmland Protection Boards, local schools, and farmers

Resources [New York Agriculture in the Classroom](#)

8. Build Rapport Between Agricultural Community and the Public

Description Coordinate and improve communications between the agricultural community, municipalities, and other watershed stakeholders in topics such as:

- Right to farm laws
- The need for public and private funds to help advance installation of BMPs within the watershed

- Water quality impacts of certain agricultural practices
- Steps farmers take to mitigate water quality impacts of agriculture

Benefit Developing relationships between farmers, the public, and municipalities could potentially increase BMP implementation by removing barriers to adoption.

Partners NYSDEC, SWCDs, NY Farm Bureau, County Planning, CCE, Agricultural and Farmland Protection Boards, Farmers

Resources An example of an organization with this goal is [Partners for Healthy Watersheds](#) within Cayuga County

3.2.3 Municipal & Programmatic Actions

9. Seek Additional Support for Agricultural Services

Description Seek additional sources of support for agricultural programs and services provided by SWCDs, private-sector planning professionals, and Cornell Cooperative Extension (CCE). Encourage enrollment in Agriculture Districts.

Benefits Funding support is critical to fulfilling goals for the watershed, implementation efforts would result in reduced nutrient and sediment loss.

Partners NYSDEC, SWCDs, County Planning, CCE, private sector planning consultants, farmers

Resources [NYS DAM Funding Opportunities](#)

10. Support Soil & Water Conservation Districts and Planners in Obtaining Certification to Develop Comprehensive Nutrient Management Plans

Description Qualified, certified planners are needed to develop Comprehensive Nutrient Management Plans (CNMPs), which evaluate all aspects of farm production and offer conservation practices that help achieve production and natural resource conservation goals for farm businesses. NMPs are the foundation of the NYSDEC regulatory program to control potential water pollution from CAFOs under state General Permit GP-04-04. Use of CNPs is a requirement for farms seeking federal or state cost-sharing for manure storage structures.

Benefits Having in-house certified planners at SWCDs would expand the agencies' capacity to serve the agricultural community and increase the funding stream for developing AEM Tier III Plans.

Partners NYS Ag & Markets, SWCDs, Private Nutrient Management Planners, Municipalities

Resources To find planners in your County, visit [Agricultural Environmental Management: Certified Planner Directory 2020](#). For more information on certification requirements

visit [NYS DAM Comprehensive Nutrient Management Planning](#) and [Certified Crop Adviser: Become Certified](#).

3.3 Floodplain and Stormwater Management

The St. Lawrence River watershed is experiencing increased frequency and intensity of flooding events, particularly along the St. Lawrence River shoreline. Localized flooding can result from minor to heavy storms, prolonged precipitation events, or river flow management decisions. Runoff can overload drainageways, send flows into streets and low-lying areas, back up sewers, cause areas to be inundated, wreak havoc on municipal water systems, cause safety hazards, be detrimental to affected residents and business owners, damage habitat, erode streambanks, and allow for transport of sediment, nutrients, oils and other chemicals.

To adapt to this new normal, watershed communities need to build resiliency through proactive management of development, infrastructure, and stormwater. Examples of strategies for floodplain and stormwater management include:

- Use planning tools to restrict development in flood-prone areas such as floodplains and wetlands
- Protect existing buildings, facilities, and people in vulnerable areas and reduce future flooding risk
- Actively manage stormwater to maximize storage, slow velocity, and encourage infiltration.

Below is a list of best management practices, management strategies, and opportunities for growth to protect and enhance floodplain and stormwater management.

3.3.1 Restoration & Protection Actions

1. Complete Streambank Assessments and Restoration

Description Conduct surveys and field inspections of streams within the basin to assess their stability and propensity to contribute to soil erosion and hydrological problems. Develop an inventory and assessment protocol to prioritize efforts of streambanks in need of restoration. Design and implement stream restoration to restore (or mimic) natural hydrologic and biological processes using soft or vegetative engineering.



Streambank stabilization reduces the amount of sediment and nutrients from reaching streams.
Photo source: Franklin County SWCD

Benefits Assessment efforts will allow for the prioritization of restoration efforts and increased resilience to flooding and erosion after restoration.

Partners SWCDs, NYSDEC, Trout Unlimited, Nonprofits

Resources The [NYS Riparian Restoration Opportunity Assessment](#) has a soil erosion layer at the HUC12 scale that can help prioritize areas for assessment and restoration.

2. Wetland Restoration, Rehabilitation, Enhancement and Creation

Description Wetlands can be physically, chemically, or biologically manipulated to enhance/restore their natural functions. Wetlands help reduce the frequency and intensity of floods by slowing velocity and promoting infiltration and evapotranspiration.

Benefits Reduce frequency and intensity of flooding, filter nutrients, slow runoff, and reduce transport of sediment and nutrients

Partners NYSDEC, USEPA, USDA-NRCS, SWCD, TILT, IRLC

Resources The [NYSDEC Environmental Resource Mapper](#) identifies state and federally regulated wetlands.

3. Implement Stormwater Best Management Practices and Green Infrastructure

Description Effective stormwater management involves implementation of structural, vegetative, and institutional best management practices. Examples include bioretention ponds, bioswales, permeable pavement, filter strips, open space conservation, spill prevention, and waste reduction practices.



A bioswale collects stormwater runoff while removing debris and pollution.
Photo Source: Chesapeake Stormwater Network

Benefits Flood control, pollution prevention, and recreation and environmental amenities.

Partners NYSDEC, SWCDs, Municipalities

Resources [USEPA's National Menu of Best Management Practices \(BMPs\) for Stormwater](#)

3.3.2 Collaboration, Partnerships, & Outreach

4. Develop an Educational Program on Stormwater and Floodplain Protection

Description Initiate an educational program and instruction for planners, highway departments, and local elected and appointed officials, with the goal of increasing knowledge of the critical need for healthy sustainable wetlands and develop methods to incorporate this awareness into their decision making and planning processes.

Benefits Strengthen local capacity for successful management and protection by empowering decision-makers.

Partners County Planning, NYSDOS, NYSDEC, DANC, SWCD, SLRWP

5. Implement a Formal Drainage Maintenance Program

Description Inspection and maintenance program for ditches, culverts, and storm sewers. Inspections scheduled at least annually and following large rain events. This program could potentially engage the public where a local resident “adopts” a drainage area and reports its status after a large rain event. GIS tools and smart phones offer low-cost and efficient ways to support community awareness and participation.

Benefits Identify and repair areas that are damaged, blocked, or lack capacity to handle flow

Partners County Planning, DANC, SWCD, County Highway Departments

6. Complete Mapping of Flood-Prone Areas

Description Flood maps across much of the St. Lawrence River watershed are incomplete, out of date, or not available in digital format. FEMA’s flood hazard mapping program identifies flood hazards, assesses flood risks and partners with states and communities to provide accurate flood hazard and risk data to guide them to mitigation actions.

Benefits Mapping of areas would allow smarter decisions to be made concerning development

Partners FEMA, County Planning, DANC, SWCD, County Highway Departments, County Emergency Management Programs

7. Expand Participation in the NYSDEC Trees for Tribs Program

Description Trees for Tribs is a statewide program that works to reforest New York State’s tributaries by planting trees and shrubs to create riparian buffers. Through the “buffer in a bag” program, free seedlings are provided to residents to plant along waterways.



Volunteers plant trees along tributaries as part of the NYSDEC Trees for Tribs Grant Program.
Photo source: NYSDEC

Benefits Riparian buffers help slow runoff, decrease erosion, reduce flood damage, improve habitat, and protect water quality.

Partners NYSDEC, SLRWP, County SWCDs, Municipalities, Land Trusts, Not-for-profit Agencies

Resources Learn more about [NYSDEC’s Trees for Tribs grant program](#).

3.3.3 Municipal & Programmatic Actions

8. Reserve Open Space and Floodplain Property Through Property Acquisition

Description Allow communities to purchase flood-prone properties and reserve them for floodplain protection and open-space.

Benefits Restoration of open space and natural land cover will reduce flood hazard and provide recreational amenities.

Partners Municipalities, FEMA, Land Trusts, The Nature Conservancy, TILT, IRLC

9. Adopt Local Measures to Limit Activity on Floodplains

Description Municipalities without adequate floodplain protections should modify comprehensive plans and zoning laws to limit development in floodplains.

Benefits Reduced loss caused by floods and protection of floodplains

Partners State, regional, and county planning agencies; APA, elected and appointed local officials

Resources [NYSDOS, 2019. Model Local Laws to Increase Resilience.](#)

10. Incorporate Shorelines in the Definitions Section of Municipal Zoning Ordinances

Description Definitions should include shorelines of lakes, streams, creeks, ponds, wetlands, and other waterbodies.

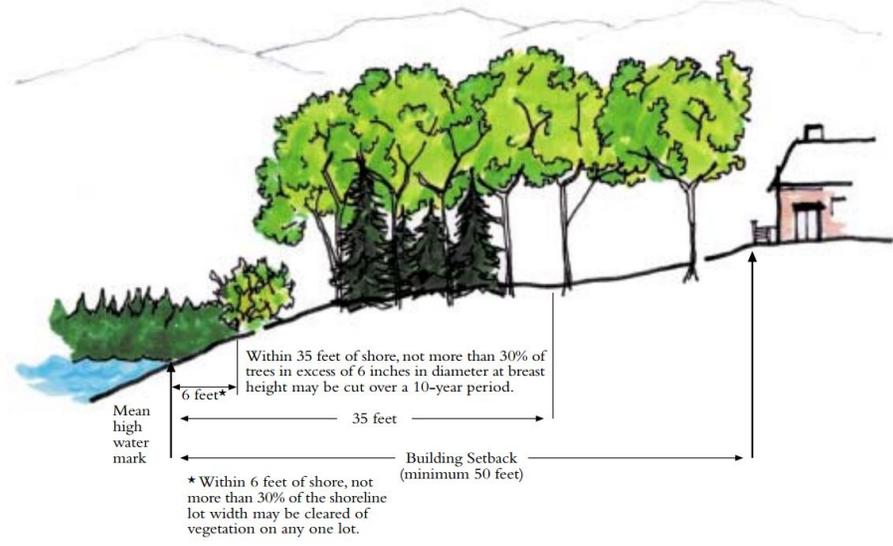
Benefits A clear definition (indexed to an elevation or mean high water level) allows maximum efficacy of the local law or zoning ordinance question.

Partners Municipalities, County Planning, NYSDOS

Resource [NYSDOS, 2019. Model Local Laws for Resilience.](#)

11. Adopt Watercourse Setback and Protection Regulations

Description Extend buffer areas along streams, lakes, ponds, creeks, waterways, channels (e.g., 35 ft each side) and wetlands (e.g., 100 ft). These areas should prohibit placement of impervious surfaces and require natural vegetation. The recommended buffer width is 100 ft, with a 35 ft minimum.



Example of building and vegetative buffer setbacks within the Adirondack Park.
 Photo Source: Adirondack Park Agency

Benefits Forest and grass buffers help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from groundwater.

Partners DANC, County Planning, Municipal Planning Boards, Agricultural Protection Boards

Resources [NYS DOS, 2019. Model Local Laws to Increase Resilience.](#)

12. Revise Land Use Laws to Limit Development on Slopes

Description Steep slopes (> 10%) typically are more prone to erosion; consequently, communities should regulate development of these areas to reduce erosion, property damage, and risk of landslides. Options include adoption of a local law, designation of an overlay district, and enhanced requirements for erosion and sediment controls during construction.

Benefits Reduced erosion and sedimentation.

Partners County Planning, APA, DANC, municipal planning boards

Resources [NYS DOS, 2019. Model Local Laws to Increase Resilience.](#)

13. Create and Adopt Stormwater Pollution Prevention Plans

Description Secure funding for non-MS4 municipalities to create and adopt stormwater management plans. Stormwater programs traditionally regulate stormwater discharges from three potential sources: municipal separate storm sewer systems

(MS4s), construction activities, and industrial activities. MS4 communities are required to develop Stormwater Pollution Prevention Plans (SPPP) that aim to prevent and reduce pollutant runoff through pollution prevention measures. Although not wholly within the watershed, Fort Drum and LeRay are MS4 communities. These communities must implement a 6-point management program that includes public education and outreach, public participation and involvement, illicit discharge detection and elimination, construction site runoff, post-construction controls, and good housekeeping and pollution prevention. This includes the implementation of BMPs such as street sweeping, road salt reduction, and incorporation of adaptive landscape features called green infrastructure. Extending the requirement to non-MS4 communities to develop SPPP's would further reduce runoff and contamination to waterbodies.

- Benefits** Reduce runoff contamination and slow the transport of water.
- Partners** NYSDEC, municipalities
- Resources** [Green Infrastructure Modeling Toolkit \(USEPA\)](#)
[Community Solutions for Stormwater Management \(USEPA, 2016\)](#)

3.4 Forest Management

The St. Lawrence River watershed includes a considerable forestry base. Forests are environmental and economic assets that provide a range of ecosystem services: habitat, scenic vistas, recreation, wood products, carbon sequestration, and improved watershed health. Forest management is necessary to keep large tracts intact, protect habitat and migration corridors, provide resilience and value to an area. Forests are managed for a variety of purposes including commercial logging, habitat protection, recreation and aesthetics, and watershed protection.

When properly managed, tree harvesting has minimal impacts on the forest and can improve forest conditions by making way for new growth. However, unsustainable harvesting practices can weaken growing stock and contribute to erosion and sedimentation. Selective cutting of mature trees may leave a less diverse and lower-quality forest behind. Fragmentation of forests due to land use changes and development have degraded habitat, decreased biodiversity and recreational value, and jeopardized forest-related businesses. Logging roads are an additional source of sediment, particularly when abandoned without reseeded.

Much of the forested lands in the St. Lawrence River watershed are under the jurisdiction of the Adirondack Park Agency (APA) and NYSDEC and are therefore subject to their management guidelines. These lands consist of Forest Preserve, Forever Wild Areas, State Forests, and Wildlife Management Areas. Creation of the Forest Preserve was largely motivated by a desire to protect

water resources; Forest Preserve and Forever Wild Areas do not allow timber harvesting. State Forests and Wildlife Management Areas do allow managed timber harvesting. Forest operations within the Adirondack Park boundary affecting more than 25 acres require a permit from the APA.

Outside of the APA boundary, local government has the potential to play a role in forestry management. Within the St. Lawrence River watershed, few municipalities have enacted forestry-related local laws. The SWCDs provide support to landowners to manage their forested areas to meet multiple objectives and protect water resources. Strategies for forest management focus on:

- Ensuring continued viability of forestry and timber production
- Protecting water quality by utilizing BMPs during timber production
- Minimizing forest fragmentation

The following recommendations help meet these objectives.

3.4.1 Restoration & Protection Actions

1. Utilize Erosion and Sediment Control Mechanisms

Description BMPs should minimize impacts of logging roads and harvesting practices on streams, lakes, and wetlands. Methods include silt fencing, rolled erosion products, water bars to control runoff flow direction, proper placement of skid trails, bridges, and haul roads, incorporating buffers, selective cutting, and replanting.



A silt fence helps filter surface water runoff from a truck road, skid trail, or landing.
Photo Source: NYSDEC

Benefits Reduce erosion and sedimentation

Partners APA, SWCD, CCE, Timber harvesters

2. Implement Forest Management Plans

Description	Community and forest management plans provide guidance to managing and caring for the forest.
Benefits	Increase and preserve canopy cover and green infrastructure, protect forests from damage and loss, and monitor and manage invasive species (emerald ash borer).
Partners	County Planning, SWCDs, NYSDEC, St. Regis Mohawk Tribe, USFS, USDA Animal and Plant Health Inspection Service, CCE, SLELO PRISM
Resources	Akwesasne Community Forest Management Plan (2018) Massena Tree Management Plan (2018) Ogdensburg Inventory Management Plan Part 1 Ogdensburg Management Plan Part 2

3.4.2 Collaboration, Partnerships, & Outreach

3. Promote Sustainable Forestry Practices and Management

Description	Discourage clearcutting and encourage selective harvesting, which removes certain trees and improves forest health, vigor, and future growth by making way for natural regeneration. It is recommended to not remove more than 10% of the total forest area during any one harvest to maintain adequate canopy cover.
Benefits	Responsible forest management and stewardship allows a forest to provide sustainable ecosystem services, whether managed for timber harvesting, recreation, or wildlife habitat.
Partners	NYSDEC (Forest Stewardship Program), SWCD, CCE (Forestry Extension Program, Master Forest Owner Program), APA

3.4.3 Municipal & Programmatic Actions

4. Adopt Appropriate Zoning

Description	Zoning ordinances that assure that the land can be managed for multiple forest uses, including harvesting, while potentially conflicting uses such as residential subdivisions are discouraged. Municipalities should also review existing regulations to identify any “forestry unfriendly” language that may create obstacles to generally accepted forest management.
Benefits	Prevent fragmentation and conversion of forest land to other uses.
Partners	APA, municipalities

5. Require Buffer Strips Along Sensitive Areas

Description	Buffer strips along streams, steep slopes, scenic byways, recreational trails, and where rare, threatened, or endangered species are present.
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Benefits	Reduce erosion and sedimentation, preserve sensitive habitats and scenic beauty, improve water quality
Partners	APA, municipalities, SWCD

3.5 Invasive Species Management

The St. Lawrence River watershed is vulnerable to invasive species because of its high recreation usage and proximity to a major shipping corridor. Invasive species can affect forests, agricultural crops, and the recreational quality and food webs of aquatic resources. The risk of damage to public health, native ecosystems, food supply, and economics is very high. Disturbed landscapes and areas affected by nonpoint source pollution may be even more at risk.

It is essential that residents are aware of the risks of invasive species and understand the immense value of prevention, early detection, and rapid response. While it is not possible to eliminate invasive species from reaching the lands and waters, aggressive actions can help reduce the risk of these species becoming established.

The Adirondack Park Invasive Plant Program (APIPP), the St. Lawrence-Eastern Lake Ontario (SLELO) PRISM, NYSDEC, SWCDs, and local nonprofit organizations have developed robust invasive species management programs. Collaborative efforts within the watershed should focus on the following strategies:

- Education on invasive species, their impact, best practices, and what to look for
- Monitoring, early detection, and rapid response to prevent establishment of new invasive species
- Manage established infestations
- Develop a prioritization tool to focus invasive species management efforts

The following recommendations support these strategies.

3.5.1 Restoration & Protection Actions

- 1. Expand Watershed Steward Programs and Install Informational Kiosks at Public Boat Launches**

Description Expand the number and locations of volunteer and paid stewards at water access sites to inspect recreational watercraft and gear for invasive species, provide boat washes (clean-drain-dry) and educate the public.



Stewards inspect boats and educate boaters throughout the Adirondacks, helping to prevent the spread of invasive species.

Photo source: Adirondack Explorer

High-use lakes within the Adirondack Park are already included in the Adirondack Watershed Institute's Stewardship Program; therefore, new programs should focus on high-use waterbodies outside of the Park. Watershed steward programs will require ongoing support, including adequate funding to attract students to serve in remote areas. Informational kiosks educate the public on what invasive species are, their impact, and which ones to look out for.

Benefits Reduced risk of invasive species introduction and establishment

Partners PRISMs, residents, NYSDEC, CCE Invasive Species Program, Adirondack Watershed Institute, Save the River, Indian River Land Trust, Indian River Lakes Conservancy

2. Provide Signage at Marinas and Water Access Points

Description Development of standard signage with information at marinas and boat launches that inform the public with descriptions of local invasive species, watch species, proper decontamination methods and reporting contact information.

Benefits Informs and allows the community with knowledge to reduce the spread of invasive species.

Partners PRISMs, residents, NYSDEC, CCE Invasive Species Program

3. Manage Established Infestations

Description There are three main methods used for control of invasive species – biological, mechanical, and chemical. Biological control is the intentional manipulation of natural enemies by humans for the purpose of controlling pests. Mechanical control includes mowing, hoeing, cultivation, and hand pulling. Chemical control is the use

of herbicides. These methods can be used in combination for an integrated management approach.

Benefits Managing established invasive infestations will restore the ecological, recreational, and economic value of the region’s lakes, rivers, and ponds, particularly those with public access.

Partners SLELO, APIPP, NYSDEC, SWCDs, non-profits, lake associations, municipalities

3.5.2 Collaboration, Partnerships, & Outreach

4. Advance the Capabilities of iMapInvasives

Description New York has adopted a management framework that includes both centralized and regional organizations and partnerships. These sites provide extensive information; however, the scattered array of online resources has a high potential for conflicting or outdated information and risks duplication of effort. The current iMapInvasives mapping resource provides outstanding opportunities for geographic analysis of invasive species challenges and empowering citizen science, however, its current platform limits usage. This site should be established by concentrating on fulfilling the needs of end-users, with an information architecture and design that make key information readily accessible. iMapInvasives staff should engage with Soil and Water Conservation Districts (SWCDs), NYSDEC, Cornell Cooperative Extension, NYSDAM, etc., to evaluate opportunities for data sharing and ongoing software updates that facilitate shared goals.

Benefits Encourages collaborative efforts, informs the public

Partners iMapInvasives, APIPP, SLELO, NYSDEC, CCE, SWCDs, NYSIPM Program, NYS OPRHP, NYNHP, SUNY ESF

References Adirondack Partnership for Regional Invasive Species Management Strategic Plan (2013-2017), [NYS Invasive Species Comprehensive Management Plan](#) (2018).

3.5.3 Municipal & Programmatic Actions

5. Support and Expand Education and Monitoring to Improve Early Detection and Rapid Response

Description Recruit, train, and coordinate scientists and citizens to assist in monitoring program and provide associated coordination, training, data management, and quality control. Efforts should focus on educating all field crews, cooperators, resource managers, volunteers, and visitors on invasive species identification. Through these efforts, priorities will be established to allow greater focus on species that pose the most significant threat.



SLELO volunteer inspecting hemlock for hemlock woolly adelgid.
Photo source: SLELOinvasives.org

Benefits Public engagement, early detection of species may prevent full invasion, ability to set priorities

Partners PRISMs, citizens, NYSDEC, CCE Invasive Species Program, Adirondack Watershed Institute, Save the River, Indian River Lakes Conservancy

6. Support Watershed Stewardship Programs throughout the Watershed

Description Municipalities and lake associations are encouraged to seek support and grant opportunities to finance the expansion of watershed steward programs, boat wash stations, and necessary staff on high-use lakes.

Benefits Reduce invasive species spread, prevention and education are most important for invasive species prevention

Partners Paul Smith’s College Watershed Stewardship Program, Adirondack Regional Watershed Stewardship Program, Lake Associations, NYS OPRHP, NYSDEC, SLELO, APIPP

References NYS Aquatic Invasive Species Management Plan (2015), Adirondack Partnership for Regional Invasive Species Management Strategic Plan (2013-2017)

7. Provide Support for Certified Pesticide Applicator Trainings and Equipment

Description Federal law requires any person who applies or supervises the use of restricted use pesticides to be certified in accordance with USEPA, state, and tribal laws. Many invasive species management strategies include pesticide application which requires trained and certified applicators as well as special-use equipment.

- Benefits** Removes barriers to rapid response and early detection management strategies.
- Partners** NYSDEC, SWCDs, CCE
- Resources** Visit the [NYS Pesticide Administration Database](#) to find information regarding certified applicators and technicians within your region, training courses, and certification/recertification exams.
- References** [NYS Invasive Species Comprehensive Management Plan](#) (2018).

8. Support Post-IS Management Monitoring

- Description** Post-management documentation and evaluation is necessary to determine the effectiveness of management efforts. For example, number of native plants emerging, number of plants that do not appear after 3 years are useful metrics.
- Benefits** Evaluate the effectiveness of invasive species management efforts, helps to determine the best and most effective projects to fund.
- Partners** NYSDEC, SWCDs, CCE
- References** [NYS Invasive Species Comprehensive Management Plan](#) (2018).

9. Support Research and Use of Emerging Technology to Monitor Invasive Species

- Description** Invest in research and technology tools to advance knowledge on invasive species interactions, mechanism of control and eradication. Some examples include eDNA, ballast water treatment, and innovative barriers.
- Benefits** Allows for a rapid and coordinated response to new detections.
- Partners** iMapInvasives, APIPP, SLELO, NYSDEC, CCE, SWCDs, NYSIPM Program, NYS OPRHP, NYNHP
- References** [NYS Invasive Species Comprehensive Management Plan](#) (2018).

10. Support Efforts to Mitigate Established Aquatic Invasive Species Infestations Through Expanded Local and State Funding

- Description** Funding support to control invasive species infestations is not currently adequately recognized, yet there is a substantial need.
- Benefits** Funding aids in the implementation of control efforts that will restore the use of lakes, rivers, and streams in the watershed.
- Partners** NYS, PRISMs, NYSDEC, SWCDs, lake associations

3.6 Infrastructure and Development

Municipal activities and development contribute to nonpoint source pollution. Construction, streambank erosion, changes in land use, and impervious surfaces have the potential to alter hydrological processes and contribute to sediment, nutrient and salt pollution.

Roadways and roadway ditches are designed to move water off the road as quickly as possible. As a result, road installation and maintenance activities can affect local hydrology and increase the risk that stormwater runoff will increase pollutant transport to waterways.

Deicing practices are a concern in the St. Lawrence River watershed. When considering the adverse effects, effectiveness, and economic reasons for sustaining current winter road management strategies, hidden, chronic, and cumulative costs should be considered. Road salt has contaminated residential drinking wells and increased the salinity of adjacent waterbodies.

The recommendations seek to minimize potentially adverse water quality impacts of municipal activities. Strategies include:

- work with municipalities to identify gaps in local laws relevant to reducing nonpoint source pollution
- ditch management,
- implementing stormwater, erosion control, and de-icing BMPs
- preparing for a changing climate.

3.6.1 Restoration & Protection Actions

1. Implement Road Deicing BMPs

Description Highway and road maintenance crews spread salt to de-ice roads, which ultimately moves into nearby road ditches and streams, leaches into groundwater, and may reach drinking water wells. Example BMPs to minimize the impacts and maximize the effectiveness of road salt include:



Salt truck out on route to service winter roads.
Photo source: Adirondack Watershed Institute

- Apply salt at lowest reasonable truck/applicator speeds (MDOT, 2012)
- Utilize pre-wetting (brine added to salt prior to being road applied)
- Apply anti-icing treatments (pretreatment of pavement with de-icing chemicals intended to prevent snow and ice from sticking to surface)
- Calibrate spreaders and produce a calibration chart to be used as a guideline for operators to determine how many pounds per lane mile should be applied at any given spreader setting
- Explore alternative deicers
- Build salt/sand storage facilities

Benefits Increased efficiency of road salt use, reduced salt contamination of adjacent waterbodies. BMPs implementation should prioritize source water areas where surface and groundwater resources used for drinking water need to be protected.

Partners NYSDOT, County Highway Departments, Municipal Highway Departments, Local Public Works Departments

2. Identify Areas Most at Risk of Adverse Impacts from Road Salt

Description Map sensitive areas using knowledge of landscape conditions, drinking water sources, and known problem areas (e.g., increasing concentrations in soils, groundwater, streams, wetlands, and water supply wells). Areas identified as sensitive and targeted for lower rates of deicing materials should have signage warning drivers of potentially icy conditions.

Benefits Identifies vulnerable areas to road salt and develops a strategy to reduce impacts.

Partners NYSDOT, NYSDEC, APA

3. Invest in Improved Technology and Equipment

Description Standardized and automated systems including pavement temperature sensors, bucket scales, GPS/automated vehicle location systems, plow trucks with segmented plow blade, alternative blade technologies, closed loop ground speed controllers, and automated spreaders

Benefits Advanced technology can improve winter road maintenance operations, saving municipalities money and reducing environmental impacts.

Partners Municipalities, NYSDOT, County Highway Departments, Municipal Highway Departments, Local Public Works Departments, Cornell Local Roads Program

4. Implement Erosion Control Mechanisms

Description Methods for roadside erosion remediation include installation of sediment basins, hydroseeding of road ditches, ditch stabilization, rolled erosion products, bank toe stabilization, and check dam installation.



SWCD hydroseeder was used to vegetate a recently cleaned ditch.
Photo source: NYS Conservation District Employee's Association

Benefits Reduce roadside erosion and allow space for stormwater runoff infiltration and slow.

Partners County Highway Departments, Municipal Highway Departments, NYSDOT, SWCD, NYSDEC, Cornell Local Roads Program

5. Streambank Assessment and Restoration

Description Design and implement streambank assessment and restoration programs that restore (or mimic) natural hydrologic and biological processes. Maximize the use of bioengineering approaches and design for projected impacts of climate change on rainfall frequency and intensity.

Benefits Reduce erosion, improve habitat and water clarity, provide source water protection for water supply intakes.

Partners SWCDs, NYSDEC, nonprofits

6. Continue Surveying and Assessing Road-Stream Crossings

Description Assess culverts and bridges using the North Atlantic Aquatic Connectivity Collaborative (NAACC) protocol. This protocol identifies road-stream crossings that impede aquatic connectivity and are at risk to flooding impacts. Malfunctioning or inappropriately-sized culverts can lead to flooding, erosion, sedimentation, and wash-out. NAACC certified surveyors are necessary to conduct culvert assessments.



Scientists with the U.S. Fish and Wildlife Service inventorying and assessing barriers for fish passage removal. Photo source: USFWS

Benefits Identify culverts in need of replacement to increase habitat connectivity and reduce risk of flooding and sedimentation.

Partners NAACC, SWCD, NYSDEC, Trout Unlimited, USFWS

Resources Tools and regional collaboratives focused on aquatic organism passage and fragmentation of river and stream ecosystems can be found at the [Aquatic Connectivity Portal](#), maintained by the North Atlantic Connectivity Collaborative (NAACC). This includes an aquatic barrier prioritization tool and HUC12 prioritization tool to identify subwatersheds that may have priority for field survey of crossing assessments.

3.6.2 Collaboration, Partnerships, & Outreach

7. Expand Training Programs for Local and County Highway Departments

Description The training program should utilize classroom, shop, and on-the-road components to train operators on proper plowing, salting techniques, ditch and culvert design, streambank stabilization, hydroseeding, and erosion control.

Benefits Allows for a place to introduce new technologies and advances in road deicing, erosion control, and stabilization techniques to allow for proper and appropriate winter road maintenance.

Partners NYSDOT, County Highway Departments, Local Public Works Departments, Cornell Local Roads Program

3.6.3 Municipal & Programmatic Actions

8. Secure Funding for Regional Culvert Replacement Program

Description Secure continuous funding to address undersized, shallow, and culverts facing restricted flow that causes ponding and flooding or impedes habitat and connectivity. Replacing culverts with properly installed, sized, and placed culverts should allow for fish, wildlife, and floods to pass so that stream flows and velocities are unaltered. Projects where severe barriers have been identified by NAACC assessments should be prioritized.

Benefits Improved habitat, habitat connectivity, and drainage.

Partners Town and County DPW Budget Committees, NYSDOT, County Highway Departments, Municipal Highway Departments, Local Public Works Departments, SWCD, USACE

9. Create a Road Salt Reduction Task Force

Description Create a task force with NYSDOT, local public works departments, County Highway Departments, and researchers to design and implement a pilot program to reduce the use of salt on state roads in the watershed; monitor and report.

Benefits Reduced impacts environmental, infrastructure, and automobile impacts to road salt contamination and exposure.

Partners NYSDOT, County Highway Departments, Municipal Highway Departments, Municipalities, APA, Adirondack Watershed Institute, Cornell Local Roads Program

10. Assist municipalities with reviewing their local laws to reflect best practices to control nonpoint source pollution

Description Review the **St. Lawrence River Watershed Local Laws and Programs Affecting Water Quality** with municipal representatives to identify gaps and areas for improvement. Specific topics to address water quality concerns may include:

- Compliance with SPDES Stormwater Construction Permit requirements
- Lakeshore/riparian overlay districts
- Sediment and erosion control
- Limitations on impervious cover
- Steep slope development restrictions
- Riparian setbacks

Despite the significant differences among watershed municipalities in land use, population, and local laws, a consistent approach to addressing nonpoint source pollution would benefit the watershed.

- Benefits** Adoption of appropriate tools and ordinances to reduce risk of nonpoint source pollution from development activities.
- Partners** Municipalities, County Planning, NYSDOS, Development Authority of the North Country (DANC), North Country Regional Economic Development Council (NCREDC)
- Resource** NYSDOS, 2019. Model Local Laws for Resilience.

11. Support Community Participation in the Climate Smart Communities Program

- Description** Climate Smart Communities (CSC) is a NY program that helps local governments inventory and reduce greenhouse gas emissions and adapt to a changing climate.
- Benefits** Altering the built and natural environment will help alleviate the adverse impacts of climate change
- Partners** Municipalities, NYSERDA, NYSDEC, NYSDOS

3.7 Water and Wastewater Management

Adequate water and wastewater infrastructure play an essential role in water quality. Drinking water and wastewater infrastructure are in constant need of maintenance, repair, and updating to protect the health of our streams, rivers, and lakes. Infrastructure must also be resilient to the impacts of climate change, including increased precipitation, sea level rise, stronger and more frequent storms, flooding, and periods of little precipitation.

Household water must undergo treatment to remove nutrients and pathogens prior to being released back into the environment to avoid negative impacts on receiving water quality. Municipal wastewater is either treated at a municipal treatment facility or is subject to on-site treatment (i.e., septic systems). On-site septic systems can provide adequate treatment and disinfection of wastewater when subject to regular inspection and maintenance. These systems are governed under Title 10 of NYS Codes, Rules, and Regulations, Public Health Law 201(1)(1). At present, onsite septic systems are managed at the municipal level within this watershed, with on-site inspections occurring if a problem occurs and/or is reported.

On-site septic systems are cited as a contributor of pathogens and nutrient loads to adjacent waterbodies, particularly around lakes that have experienced a transition from seasonal camps to full time residences.

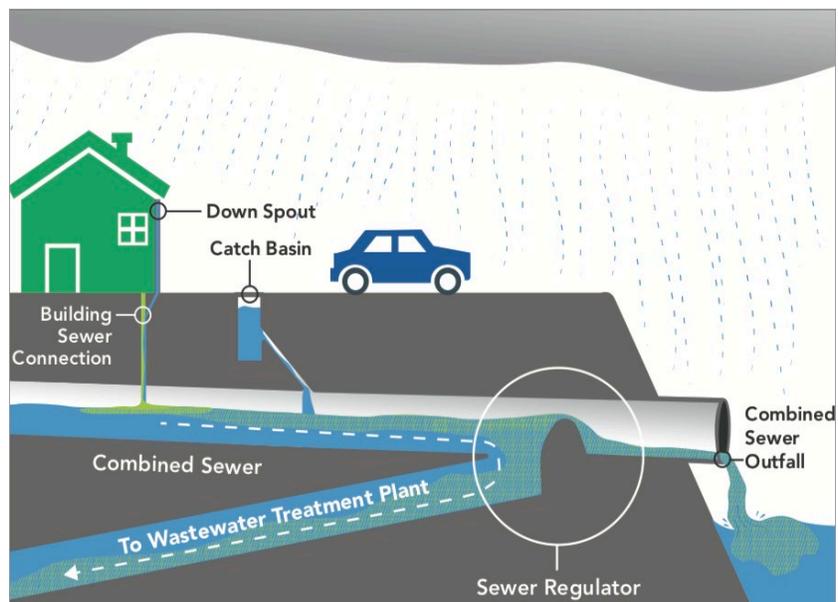
Recommendations for improved wastewater management to reduce nutrient and pathogen inputs to receiving waters include the following strategies:

- address combined sewer overflows
- address on-site septic systems,
- prepare infrastructure to meet climate change needs and flooding, and
- protect drinking water source waters as identified by the [NY water mapper](#) (current water systems in the St. Lawrence River watershed include the St. Lawrence River (main stem) which serves as the source for Alexandria Bay, Massena, and Ogdensburg, the Oswegatchie River which serves Gouverneur, the Raquette River which serves Potsdam, Tupper Lake, Little Simon Pond, and groundwater serve the Village of Tupper Lake, and groundwater wells at Fort Drum).

3.7.1 Restoration & Protection Actions

1. Address Combined Sewer Overflows (CSO)

Description Some older sewerage systems were designed to carry both wastewater from commercial, industrial, and residential properties and stormwater in a single pipe, and direct the combined flow to a wastewater treatment plant. In events of intense rainfall and runoff, the capacity of these collection systems is exceeded, and a mixture of stormwater and wastewater is discharged to waterways through relief points called combined sewer overflows (CSOs). Measures should continue to minimize discharge from CSOs through development and implementation of a facility's Long-Term Control Plan.



Wet weather conditions in a combined sewer system.
Photo source: NYCDEP

Where Municipalities with CSOs (City of Ogdensburg, Villages of Massena, Clayton, Tupper Lake, Gouverneur, and Potsdam)

- Benefits** Reduce pollution to waterways and protect public health.
- Partners** City and Village WWTPs, NYSDEC, County Planning Departments
- Resources** The Sewage Pollution Right to Know Law requires that publicly owned treatment works report sewage spills to the public within four hours of discovery. Enroll in the [NY-alert system](#) to receive sewage discharge alerts. Information on wastewater discharges to waterways and compliance with Clean Water Act permitting is available from [USEPA's Enforcement and Compliance History Online \(ECHO\)](#) database.

2. Improve Existing Municipal Wastewater Treatment Systems

- Description** Make necessary improvements to existing municipal wastewater treatment systems to ensure compliance with SPDES permits, accommodate populations served, and remove nutrients. Encourage municipalities to secure adequate funding for infrastructure maintenance and asset management.
- Benefits** Compliance with SPDES permits, minimize nutrient and pathogen discharge.
- Partners** County Planning, Municipalities, Citizens, POTWs

3. Develop a Septic Management & Monitoring Program

- Description** Work with County and local municipalities to develop funding options and an active program for identifying failing septic systems. The program should include incentives to induce residents and/or commercial establishments with substandard onsite septic systems to upgrade and/or consolidate to meet current standards of design and operation. The program could also aid homeowners in testing septic leaks making decisions regarding their septic systems.
- Benefits** Identify and address failing septic systems
- Partners** County Planning/SWCD/DOH, NYSDEC, Municipalities, Development Authority of the North Country (DANC), Lake Associations, local Housing Councils, Not-for-profits

3.7.2 Collaboration, Partnerships, & Outreach

4. Educate Local Elected Officials

- Description** Develop and deliver to all local governments in the watershed, education and training to all planning boards and code enforcement officials to raise the level of understanding of the local authority and responsibility for onsite septic system monitoring.

Benefits Increase awareness of existing issues and develop strategies and funding to address wastewater management.

Partners NYSDEC, County Planning/SWCD/DOH, Municipalities, DANC.

5. Educate Homeowners

Description Implement community based educational programs for homeowners and others on septic system maintenance and to reduce the introduction of contaminants to storm sewer systems (pet waste, lawn clippings and landscaping, solid waste management)

Benefits Increase awareness of existing issues and increase adoption of efforts to minimize pollution.

Partners NYSDEC, County Planning/SWCD/DOH, Municipalities, Lake associations

6. Initiate and Advertise Pharmaceutical Take-Back Programs

Description Programs to collect old, unused, unneeded, or expired medicines. These locations safely and securely gather and dispose of pharmaceuticals, including controlled substances. Drug Take Back Days, temporary drug collection sites should be set up in communities for safe disposal of prescription drugs.

Benefits Reduce the input of Contaminants of Emerging Concern into water systems

Partners NYSDOH, County Planning/SWCD/DOH, USDOJ Drug Enforcement Administration, local law enforcement

Resources [US Food and Drug Administration: Where and How to Dispose of Unused Medicines](#)

7. GIS Mapping of Sewered Areas

Description Develop a GIS map showing sewered and non-sewered areas, areas that are being contemplated to receive new sewer service through improvement or extension projects. Use this map to communicate updates of added connections and improvements to the sewer district.

Benefits Useful for watershed planning efforts and when considering extending public sewer systems.

Partners DANC, County Planning, NYSDEC

3.7.3 Municipal & Programmatic Actions

8. Adopt Uniform Sewer Ordinances/Sanitary Law

Description Currently, septic system regulation is dependent on township with most towns within the Adirondack Park adopting some septic system regulations for new development involving depth to groundwater table and bedrock, slope, waterbody

setback, and percolation rate. Municipalities should update, or enact, sewer ordinances to protect water quality from private treatment systems (e.g., distance to waterbody, maintenance, provisions to allow alternative wastewater disposal methods). Residences within 500 ft of a lake and/or 150 ft from tributaries should be considered in a “critical environmental zone” and subject to more frequent inspection.

Benefits Reduce nutrient and pathogen input to groundwater and surface waters

Partners NYSDOH, SWCDs, Water Quality Coordinating Committees, County Health Department, County Planning, Municipalities, Lake associations

Resource NYSDOS, 2019. Model Local Laws to Increase Resilience

9. Consider Extending Public Sewers or Alternatives

Description There are areas within the St. Lawrence River watershed where individual on-site wastewater treatment systems are at a higher risk of failure. Where density allows, increase the number of residences served by the existing municipal systems. Encourage the use of alternative treatment systems such as cluster/community-based septic systems, especially in areas where lot sizes do not meet minimum on-site septic system requirements.

Benefits Extended sewer systems will reduce the risk to public health and the environment of inadequately treated wastewater reaching downgradient receiving waters.

Partners County Planning Departments, Municipalities, Citizens

10. Engage in and Support Cost-Share Programs to Replace Failing Septic Systems

Description



Wet patches and patches of lush green grass are signs of a failing leach field.
Photo source: Septic Installation Pros

Foster a cost-share program to repair or replace failing septic systems. All counties should continue to support the acquisition of NYS Statewide Septic System Replacement program administered through NYS EFC for high priority ranking watersheds/sub-basins. For the Counties that have an allocation from this program, the Counties should continue to work to replace failing septic systems. In addition to engagement, support for the development of administrative funds to support the NYS Statewide Septic System Replacement Program funding. Due to the program structuring, the grant outreach/education, a current-system evaluation, and project oversight performed are not covered by grant funds. There is a significant need for these funds to assist in the process of identifying the septic systems that need repair or replacement.

- Benefits** Incentivize repairs by assisting homeowners and counties with the cost of replacement and administration of the program.
- Partners** NYSDEC, County Planning/SWCD/DOH, Municipalities, Development Authority of the North Country (DANC), NYS Environmental Facilities Corporation Septic System Replacement Program
- Resources** USHUD - [Community Development Block Grant Program](#)
NYSEFC – [State Septic System Replacement Program](#)

11. Develop Source Water Protection Plans

- Description** Work with stakeholders to develop source water protection plans based on the [NYS Drinking Water Source Protection Program \(DWSP2\)](#) Framework. DWSP2 is a four-agency initiative co-led by NYSDEC and NYSDOH in collaboration with NYSDAM and NYSDOS.
- Benefits** Drinking water source protection plans help communities develop a long-term protection plan for source water(s) that protect public health and safety, and the environment. The plan helps municipalities make informed decisions to avoid preventable drinking water treatment costs, prevent pollutants from entering a drinking water supply, increase community confidence in their local water supply, create partnerships that support implementation, and utilize a broad array of existing funding sources to aid with project implementation costs.
- Partners** NYSDEC, NYSDOH, NYSDAM, NYSDOS, state-hired consultants, regional planning boards, New York Rural Water Association (NYRWA), local municipalities, local stakeholders
- Resource** [NYSDEC Drinking Water Source Protection Program Website](#), includes recommended framework and template for creating a Drinking Water Source Protection Program Plan and data summary sheets to assist in plan development.

3.8 Water Quality Research & Monitoring

There are numerous and diverse pollutants and sources affecting water quality in the St. Lawrence River watershed. Coordinated efforts are essential to successful monitoring and research programs. Therefore, recommendations for water quality research and monitoring include elements to leverage existing stakeholders, encourage citizen science, and foster collaboration to gain better understanding of the existing conditions and develop innovative techniques and technologies to restore the watershed. Key elements include:

- monitoring trends in water quality,
- encouraging participation in citizen science programs, and
- supporting research to inform future watershed management.

3.8.1 Restoration & Protection Actions

1. Monitor Legacy Contamination Remediation Efforts

- Description** Continue tracking implementation plans and status of legacy contaminated sites (Superfund, Brownfield). Superfund sites fall under jurisdiction of an USEPA program intended to restore the nation's worst hazardous waste sites. Brownfield sites, which

are typically former industrial areas where chemical pollutants have infiltrated the soil, fall under NYS jurisdiction. These sites are remediated to reduce the risk of contamination reaching environmental receptors.

- Where** Superfund and Brownfield sites
- Benefits** Improved environmental quality.
- Partners** NYSDEC, Municipalities, SRMT, Responsible Parties

3.8.2 Collaboration, Partnerships, & Outreach

2. Develop a Water Quality Data Repository and Collaborative

- Description** Develop or engage with a centralized public water quality data repository.
- Benefits** A central platform for water quality data will inform watershed projects, modeling, planning, implementation, and tracking efforts. Over time, the information will provide new insights into changing conditions across the watershed.
- Partners** River Network, Izaak Walton League of America-Water Data Collaborative, SWCDs, NYSDEC, USGS, USDA-NRCS

3. Encourage Citizen Engagement and Citizen Science

- Description** Citizen volunteers are invaluable resources for tracking water quality trends, sharing information, engaging others, and making projects happen. Citizen engagement in NYSDEC water quality programs such as CSLAP, PEERS, and WAVE allows residents and scientists to observe water quality status and trends. Continue and increase engagement in the Adirondacks Lake Assessment Program. Volunteers can target and map invasive species, assist in HABs monitoring, plant trees for riparian buffers, and much more.



CSLAP volunteer measuring the depth of water clarity with a secchi disk.
Photo source: NYSDEC

- Benefits** Volunteer watershed monitoring help reduce costs, provide site-specific information on the status of emerging issues, and contribute to science literacy.
- Partners** NYSDEC, Adirondack Watershed Institute, Lake Associations, citizens, students, high-school science programs, Indian River Lakes Conservancy, Save the River, APIPP, SLELO, CCE, iMap Invasives, River Institute

3.8.3 Municipal & Programmatic Actions

4. Continue Funding for USGS Gauges

- Description** Continue financial support for all stream gauges within the St. Lawrence River watershed.
- Benefits** These gauges and resulting data are essential for tracking water levels and flow rates. Ultimately these data can support calculations of water residence time and pollutant loading rates that can provide a more quantitative basis for setting priorities and tracking progress.
- Partners** USGS, Municipalities, NYS

5. Secure Funding for Drinking Water Testing Program

- Description** Secure funding to establish and advertise a water testing program for residential wells, particularly in areas considered vulnerable to salt contamination from road applications or bacteriological contamination from wastewater or manure handling.
- Benefits** Gives homeowners access to water testing to warn them of risks to health of people and livestock.
- Partners** SWCDs, Adirondack Watershed Institute

3.9 Watershed Planning, Management, & Outreach

The success of this plan depends on an ongoing commitment of funding, planning and other resources to support protection and restoration initiatives. Therefore, recommendations for watershed management and outreach include elements of adaptive management to measure and track effectiveness of implementation efforts and adjust as needed. In addition, public awareness of the importance of water resources are necessary to build public support to fund implementation. Key strategies include:

- identifying effective collaborations and funding sources to implement recommendations,
- developing mechanisms to track and evaluate implementation efforts, and
- engaging stakeholders and the public to foster appreciation of watershed resources and support for the plan.

3.9.1 Restoration & Protection Actions

1. Designate and Support a Circuit Rider for the St. Lawrence River Watershed

- Description** A circuit rider will work with municipalities to identify gaps in local land use tools and regulations that aid in protecting water quality and natural resources. The circuit

rider will aid municipalities in adopting and writing needed measures to guide development and protect natural resources and assist with grant applications and implementation.

Benefits Directs resources and capacity to priority areas or those in need of aid to implement the Plan.

Partners SLRWP, DANC, NCREDC, Planning Departments, SWCD, NYSDEC, NYSDOS

2. Enforce Existing Regulations Impacting Water Quality and Protection

Description Despite local laws to protect water quality and flood-prone areas, enforcement varies widely across the watershed. Improved training of Codes Enforcement Officers and Planning Boards is needed.

Benefits Protect public health, environmental quality, and infrastructure.

Partners Code Enforcement Officers, County Planning Departments, Local Municipal Planning and Zoning Boards, NYSDEC, NYSDOH

3. Develop an Implementation Reporting and Tracking System

Description Establish an online, public inventory to record implemented BMPs, their status, and effectiveness with periodic reviews. A responsible party should be identified to review and update data annually.

Benefits Result in the development of subsequent strategic plans to focus institutional energies and priorities to benefit the entire watershed.

Partners County Planning, SWCDs, County DOH, NYSDEC, Municipalities

4. Use Media to Relay Information and Engage the Public on Plan Implementation Efforts

Description Utilize the St. Lawrence River Watershed Project website, social media, and traditional news outlets to communicate progress and issues across the watershed. An annual report on implemented projects and outcomes related to the Revitalization Plan can be shared through these networks.

Benefits Public outreach builds community support for actions and investments to implement the recommended actions.

Partners SLRWP, SWCD, NYSDEC, North Country Public Radio, North Country Now

5. Initiate a St. Lawrence River Watershed Annual Conference

Description An annual conference with municipalities, researchers, lake and river organizations and other not-for-profits, NYS state agencies, agricultural support agencies, planners, federal partners such as USGS and IJC, and other interested parties. The goal would be to update progress toward recommended actions, promote water

quality monitoring efforts, describe relevant research findings, and foster collaboration. Partnering with a University or College to host the annual conference should be considered; this model is used for the Mohawk River and Black River watersheds, which also encompass a broad area with multiple resource management issues.

Benefits Encourage data sharing, public outreach, and form collaborative partnerships within the watershed.

Partners NYSDEC, County Planning/SWCD/DOH, Municipal departments, lake associations, NYSDOS, Adirondack Watershed Institute, Universities, Environmental Organizations, APIPP, SLELO, USGS, IJC

6. Develop Watershed Curriculum and Associated Teacher Training

Description Support development of a watershed-based curriculum and teacher training that encompasses pollution prevention and watershed protection. Expand participation of Cornell in the Classroom (CCE program) and encourage other types of classroom education on natural resources.



Save The River has teamed up with North Country school districts to develop a program that connects students directly to the St. Lawrence River to better understand through hands-on curriculum activities and educational "On-the-Water" field trips.

Photo source: Save The River

Benefits Expand opportunities for students to gain local knowledge of watershed-related issues, encourage STEM education, and improve scientific literacy.

Partners Cornell Cooperative Extension, Adirondack Watershed Institute, Indian River Lakes Conservancy, The Nature Conservancy

3.9.2 Municipal & Programmatic Actions

7. Coordinate Funding and Other Resources to Implement Watershed Priorities

- Description** A subcommittee of the watershed collaborative should be established to tap existing resources and pursue new sources of funding to implement watershed priorities. Members should represent each geographic area of the watershed and have a range of affiliations to provide insight on priorities and knowledge of funding sources.
- Benefits** Additional funding sources would improve and speed up restoration efforts and could support implementation of best management practices.
- Partners** SLRWP, County Planning Departments, County DOH, SWCDs, NYSDEC, NYSDOS

8. Establish an Ongoing Collaborative for Plan Implementation

- Description** Establish a central hub for collaboration on water resource issues throughout the watershed. Representatives from watershed municipalities and agencies responsible for land and water management should be active participants. The group should develop annual work plans and an organizational structure that allows for efficient implementation of the recommendations provided in this *St. Lawrence River Watershed Revitalization Plan*. A standard communication protocol for all organizations involved should be developed. The collaborative should provide an annual report to share information with the public regarding trends in resource management and ongoing progress with implementing the Plan's recommendations.
- Benefits** A coordinated effort is necessary for the Plan to be implemented, tracked, and evaluated.
- Partners** SLRWP, County Planning/SWCD/DOH, NYSDEC, Municipalities

9. Increase County Soil and Water Conservation Districts and Planning Departments Staffing to Implement Projects

- Description** SWCDs, Planning Departments, and associated technical staff are the boots-on-the-ground agency focusing on many issues related to resource management. SWCD staff communicate with farmers, collaborate on development and implementation of AEM programs and CNMPs, survey and restore streambanks and roadway drainage, obtain funding for water quality projects, and lead coordination efforts on many water quality-related issues. Planning Departments help communities plan and manage development and mitigate environmental impacts.
- Benefits** Increased capacity to implement projects that reduce soil erosion and nutrient pollution.
- Partners** Municipalities, SWCDs, County Planning Departments

4 Subwatershed Priority Focus Areas

Although implementing all the recommendations will improve conditions, resources of time, funding, staff, and local match are finite. This section outlines specific focus areas to implement the recommendations tabulated above. The NYSDEC Waterbody Inventory and Priority Waterbodies List (WI/PWL) was used to identify stresses and associated sources for each HUC10. Recommendation priorities were determined for each HUC10 based on the current watershed issues, existing partnerships, and vulnerabilities.

Tables 2 and 3 provide an overview of the key issues (stressors and sources) and priority recommendations for each HUC10. This section identifies high, medium, and low priority subwatersheds within each HUC8 watershed, and their respective key issues and priority recommendations. Subwatershed priority was assigned according to the result of the overall weighted score; high priority is assigned to subwatersheds with scores 56-85, medium priority subwatersheds represent those scoring 36-55 and lower priority subwatersheds had scores below 35.

4.1 Summary of Subwatershed Stressors and Sources

Table 2
Summary of Subwatershed Stressors and Sources

	Unassessed Streams ¹	Unassessed Lakes ¹	Priority Organics	Acidification	Mercury	Nutrients	Sediment	Algal/Plant	Pathogens	Atmospheric Deposition	Industrial Contamination	Agriculture	Septic Systems	Municipal WWTPs	Storm Runoff	Streambank Erosion
HUC10	Assessment	NYSDEC WI/PWL Cited Stressors							NYSDEC WI/PWL Suspected Sources							
Upper St. Lawrence River																
0415030101		●	●			●	●	●	●		●	●	●			
0415030102			●			●	●				●	●	●			
0415030103			●								●					
Oswegatchie River																
0415030201				●	●					●						
0415030202		●	●	●					●	●	●		●			
0415030203				●						●						
0415030204				●	●					●						
0415030205				●						●						
0415030206		●				●			●			●	●			
0415030207						●	●					●				●
0415030208	●	●				●	●	●	●			●	●	●	●	●
0415030209	●		●			●					●	●		●	●	
0415030210	●		●			●	●				●	●			●	
Indian River																
0415030301					●			●		●						

	Unassessed Streams ¹	Unassessed Lakes ¹	Priority Organics	Acidification	Mercury	Nutrients	Sediment	Algal/Plant	Pathogens	Atmospheric Deposition	Industrial Contamination	Agriculture	Septic Systems	Municipal WWTPs	Storm Runoff	Streambank Erosion
HUC10	Assessment	NYSDEC WI/PWL Cited Stressors								NYSDEC WI/PWL Suspected Sources						
0415030302	●					●	●					●			●	
0415030303						●	●					●			●	●
0415030304					●					●						
0415030305	●					●		●	●			●	●	●		
Grasse River																
0415030401				●						●						
0415030402	●															
0415030403						●	●					●			●	
0415030404						●						●			●	
0415030405			●			●	●				●	●	●	●		●
Raquette River																
0415030501				●	●					●						
0415030502				●						●						
0415030503				●	●	●			●	●			●		●	
0415030504	●	●		●	●				●	●			●			
0415030505	●			●	●					●						
0415030506	●	●				●	●					●				
0415030507			●			●			●		●	●	●	●		
Saint Regis River																
0415030601				●	●					●						
0415030602	●	●		●		●				●						

	Unassessed Streams ¹	Unassessed Lakes ¹	Priority Organics	Acidification	Mercury	Nutrients	Sediment	Algal/Plant	Pathogens	Atmospheric Deposition	Industrial Contamination	Agriculture	Septic Systems	Municipal WWTPs	Storm Runoff	Streambank Erosion
HUC10	Assessment	NYSDEC WI/PWL Cited Stressors								NYSDEC WI/PWL Suspected Sources						
0415030603		●		●		●		●		●		●				
0415030604	●		●	●		●		●	●	●	●	●	●			
Salmon River																
0415030701				●			●	●		●						
0415030702																
0415030703						●	●	●	●			●	●		●	●
Chateaugay-English River																
0415030801	●				●					●						
0415030802																
0415030803	●															

Notes:

1. A dot in the unassessed streams or lakes column is used to designate HUC10s with greater than 50% unassessed waters, covering over 100 miles or 1000 acres, respectively.
2. Source: NYSDEC, WI/PWL

4.2 Subwatershed Specific Recommendations

Table 3
Specific Subwatershed Priority Recommendations

HUC10	Agricultural BMPs	Manure Storage & Pasture Management	Engage with AEM	Stormwater BMPs	Address CSOs	Create & Restore Wetlands	Shoreline & Floodplain Protection	Streambank Assessment & Restoration	Road Salt BMPs	Culvert Assessment & Restoration	Protect & Restore Habitats	Invasive Species	Improve WWTP Infrastructure	Address Septics	Consider Clustering / Expanding Connections	Address Development through Local Laws	Water Quality Assessment
Upper St. Lawrence																	
0415030101	●	●	●	●	●	●	●	●	●		●	●	●	●		●	●
0415030102	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	
0415030103	●		●	●		●	●	●	●			●				●	●
Oswegatchie River																	
0415030201												●	●				
0415030202														●			●
0415030203											●						
0415030204											●						
0415030205											●						
0415030206														●			●
0415030207	●		●					●									
0415030208	●	●	●	●	●	●		●	●	●		●	●	●			●
0415030209	●	●	●	●		●	●	●			●	●	●		●	●	●
0415030210	●	●	●	●	●	●	●	●	●		●		●			●	●
Indian River																	
0415030301												●					
0415030302				●					●	●			●				●

HUC10	Agricultural BMPs	Manure Storage & Pasture Management	Engage with AEM	Stormwater BMPs	Address CSOs	Create & Restore Wetlands	Shoreline & Floodplain Protection	Streambank Assessment & Restoration	Road Salt BMPs	Culvert Assessment & Restoration	Protect & Restore Habitats	Invasive Species	Improve WWTP Infrastructure	Address Septics	Consider Clustering / Expanding Connections	Address Development through Local Laws	Water Quality Assessment
0415030303	●	●	●	●		●		●	●		●		●		●	●	
0415030304	●		●				●					●	●				
0415030305	●	●	●			●					●	●	●	●	●		●
Grasse River																	
0415030401								●									
0415030402								●									●
0415030403	●		●	●				●	●	●	●					●	
0415030404	●	●	●	●		●		●	●		●		●				
0415030405	●		●	●	●		●	●	●		●		●	●	●	●	
Raquette River																	
0415030501								●				●					
0415030502								●									
0415030503				●		●		●				●					
0415030504				●	●				●	●		●	●	●			●
0415030505							●					●					●
0415030506							●	●				●	●			●	●
0415030507	●	●	●	●	●		●	●	●		●	●	●	●	●	●	
Saint Regis River																	
0415030601												●					
0415030602									●	●							●
0415030603	●		●						●	●		●	●				●
0415030604									●	●		●	●	●			●

HUC10	Agricultural BMPs	Manure Storage & Pasture Management	Engage with AEM	Stormwater BMPs	Address CSOs	Create & Restore Wetlands	Shoreline & Floodplain Protection	Streambank Assessment & Restoration	Road Salt BMPs	Culvert Assessment & Restoration	Protect & Restore Habitats	Invasive Species	Improve WWTP Infrastructure	Address Septics	Consider Clustering / Expanding Connections	Address Development through Local Laws	Water Quality Assessment
Salmon River																	
0415030701								●				●					
0415030702	●	●	●			●											
0415030703	●	●	●	●		●		●	●	●		●	●	●	●	●	
Chateaugay-English River																	
0415030801								●	●	●	●	●	●	●		●	●
0415030802	●	●	●			●			●	●	●		●				
0415030803	●		●			●			●	●							●

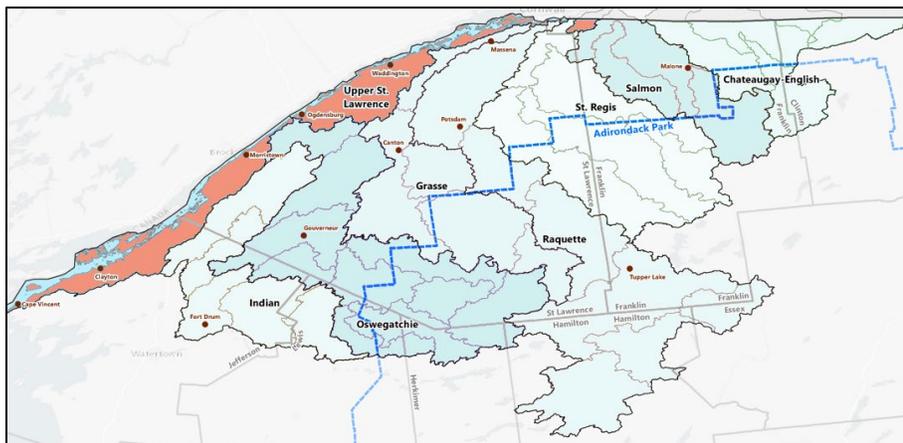
4.3 Upper St. Lawrence (04150301)

The Upper St. Lawrence River watershed is located at the most northern portion of the basin along the St. Lawrence River.

Municipalities wholly or partially within this subwatershed include:

City of Ogdensburg,
Villages of Cape Vincent,
Clayton, Alexandria Bay,

Morristown, Waddington, and Towns of Cape Vincent, Orleans, Alexandria, Hammond, Morristown, Clayton, Lisbon, and Waddington. The subwatershed consists largely of agricultural lands, forests, wetlands, and developed areas. The area is home to the largest cattle population present within the St. Lawrence River watershed, estimated at 22,500 head. The St. Lawrence River is an important economic asset for the community, drawing residents and tourists to the area.



Upper St. Lawrence River watershed highlighted in pink.

High Priority Subwatersheds and Key Issues:

- Chippewa Creek (0415030101)
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Excessive algal and weed growth
 - » Water levels, flooding risk, and stormwater management
 - » Pathogens and nutrients from failing septic systems
 - » Contaminated migratory fish
- Sucker Brook (0415030102)
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Water levels, flooding risk, and stormwater management
 - » High livestock density
 - » Contaminated migratory fish
- Robinson Creek (0415030103)
 - » Contaminated sediment (Massena-Akwesasne Area of Concern)
 - » Water levels and flooding risk
 - » Hydromodification and streambank erosion

Priority Recommendations: see **Table 2, Table 3, and Appendix D** for more detailed recommendations for each HUC10.

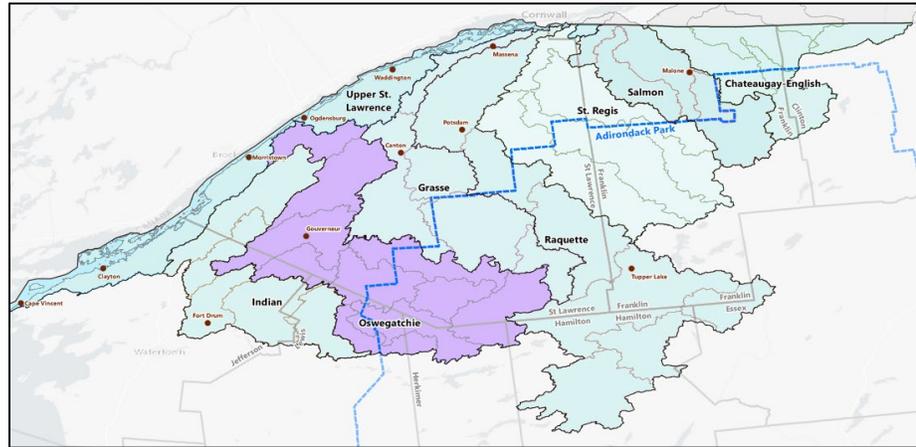
- Implement agricultural BMPs in watersheds impaired by agriculture that enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Install manure storage facilities (that meet NRCS standards) to prevent winter spreading and allow for optimal timing of manure application
- Increase engagement with AEM and work with SWCDs to implement Tier III management plans
- Survey streambanks and restore unstable streambanks to preserve natural hydrology and reduce erosion
- Limit or restrict development in flood-prone areas and adopt shoreline setback regulations
- Review and update floodplain and/or flood damage protection regulations to increase resiliency to rising water levels, storm surge, and flooding
- Perform a detailed assessment of flood-prone tributaries, including critical culverts and bridges
- Participate in the National Flood Insurance Program's (NFIP) Community Rating System to enforce floodplain management activities
- Map areas at risk of flooding using topographic survey, hydrological assessments, and GIS mapping in collaboration with FEMA
- Protect floodplains and wetlands
- Address combined sewer overflows (CSOs)
 - » City of Ogdensburg maintains 17 CSOs and the Village of Clayton maintains 2 CSOs. The City of Ogdensburg has recently experienced several overflow events. Efforts should be made to separate stormwater and sewer lines, implement green infrastructure to reduce runoff into the combined system, or construct/expand storage capacity.
- Address failing septic systems
- Prepare public water and wastewater infrastructure to meet needs for a changing climate and extreme weather events
- Consider expanding connections to public wastewater infrastructure
- Incorporate effective stormwater management practices and programs
- Prepare and adopt stormwater drainage plans and incorporate green infrastructure
- Continue remediation activities and plans in the Massena-Akwesasne Area of Concern

4.4 Oswegatchie River (04150302)

The Oswegatchie River originates in the Adirondack Mountains and flows north to the St. Lawrence River.

Municipalities wholly or partially within the subwatershed include:

City of Ogdensburg,
Villages of Antwerp,
Harrisville, Gouverneur,
Richville, Rensselaer



Oswegatchie River watershed highlighted in purple.

Falls, Huevelton, and Towns of Fine, Clifton, Pitcairn, Edwards, Fowler, Gouverneur, Dekalb, and Oswegatchie. The headwaters are in protected forested lands within the Adirondack Park with few cited impairments, therefore recommendations focus on protection. Downstream segments are used primarily for agriculture with multiple dairy farms and a substantial row-crop production (mainly corn grown for silage). The lowlands scored higher in the subwatershed assessment, meaning that efforts should be focused on restoration of the watershed. Significant lakes within this HUC10 include Cranberry Lake, Crooked Lake, Star Lake, and Moon Lake. The Oswegatchie River is known for excellent fishing

High Priority Subwatersheds and Key Issues:

- Boland Creek (0415030208)
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Excessive algal weed/growth of lakes impairs recreation and aquatic habitat
 - » Invasive species management of recreational, high-use lakes (Eurasian watermilfoil in Moon Lake)
 - » Nutrients and pathogens from failing septic systems
 - » Flooding risk
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Beaver Creek (0415030209)
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Stormwater management
 - » Flooding risk
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Lisbon Creek (0415030210)
 - » Nutrients and sediment from agricultural runoff and streambank erosion

- » Stormwater management
- » Flooding risk

Medium Priority Subwatersheds and Key Issues:

- Headwaters Oswegatchie River (0415030201)
 - » Acidified waters
 - » Road salt pollution
- Little River (0415030202)
 - » Contaminated sediment from improper industrial disposal
 - » Acidified waters
 - » Failing/inadequate septic systems
 - » Road salt pollution
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Stammer Creek (0415030206)
 - » Pathogens and nutrients from failing septic systems
 - » Nutrients from agricultural runoff create eutrophic conditions in streams
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Matoon Creek (0415030207)
 - » Nutrients and sediment from agricultural runoff, streambank erosion, and improper manure management

Lower Priority Subwatersheds and Key Issues:

- Middle Branch (0415030203)
 - » Acidified waters
 - » Road salt pollution
- Upper West Branch (0415030204)
 - » Acidified waters
- Lower West Branch (0415030205)
 - » Acidified waters

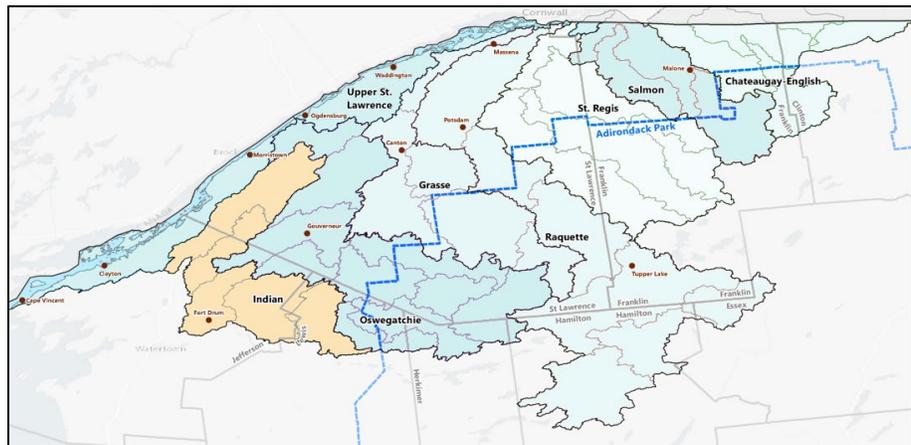
*Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.*

- Implement agricultural BMPs to enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Install manure storage facilities to reduce the need for winter spreading and allow for optimal timing of manure application

- Increase engagement with AEM and work with SWCDs to implement Tier III management plans
- Address agriculture on steep slopes
- Survey streambanks and restore unstable streambanks to preserve natural hydrology and reduce erosion
- Protect floodplains and wetlands
- Incorporate green infrastructure and stormwater management techniques
- Implement road salt BMPs to reduce road salt transport and pollution
- Address failing or inadequate septic systems with a priority on septic systems along shorelines
- Address CSOs by separation, green infrastructure, or enhanced storage
- Invest in upgrades to public water and wastewater infrastructure to prepare for a changing climate and extreme weather events
- Review and update floodplain and/or flood damage protection regulations to increase resiliency to rising water levels, storm surges, and flooding

4.5 Indian River (04150303)

The Indian River watershed supports a mixture of land uses, with dense forest lands at the headwaters, urban areas surrounding the US military base Fort Drum, and agricultural lands within the lowlands. Municipalities wholly or partially within this subwatershed include:



Indian River watershed highlighted in yellow.

Villages of Philadelphia, Evans Mills, Theresa, and Hammond, and Towns of Theresa, Antwerp, Philadelphia, Le Ray, Wilna, Croghan, Diana, Rossie, Macomb, and DePeyster. The subwatershed has 18 lakes; largest are Lake Bonaparte, Narrow Lake, Indian Lake, Red Lake, Millsite Lake, Muskellunge Lake, Butterfield Lake, and Black Lake. The watershed has no land within the Adirondack State Park.

High Priority Subwatersheds and Key Issues:

- Otter Creek (0415030303)

- » Nutrients and sediment from agricultural runoff, streambank erosion, and improper manure management
- » Construction and development
- » Stormwater runoff and hydromodification
- Black Lake (0415030305)
 - » Excessive algal/plant growth impairs recreational use of lakes (Black Lake, Grass Lake, Millsite Lake, Butterfield Lake)
 - » Invasive species management (Eurasian watermilfoil, curly leafed pondweed, European frogbit, common carp, zebra mussels)
 - » Eutrophic conditions and frequent algal blooms
 - » High public access increases vulnerability to invasive species
 - » Nutrient and sediment pollution from agricultural runoff, streambank erosion, and septic systems
 - » Waters are largely unassessed within NYSDEC WI/PWL
 - » Stressed aquatic habitat

Medium Priority Subwatersheds and Key Issues:

- Headwaters Indian River (0415030301)
 - » Invasive species management (Eurasian watermilfoil)
 - » Excessive algal/plant growth impacts recreational use of lakes
- Black Creek (0415030302)
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Stormwater runoff and hydromodification
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Red Lake (0415030304)
 - » Nutrients and sediment from agricultural runoff
 - » Flooding risk

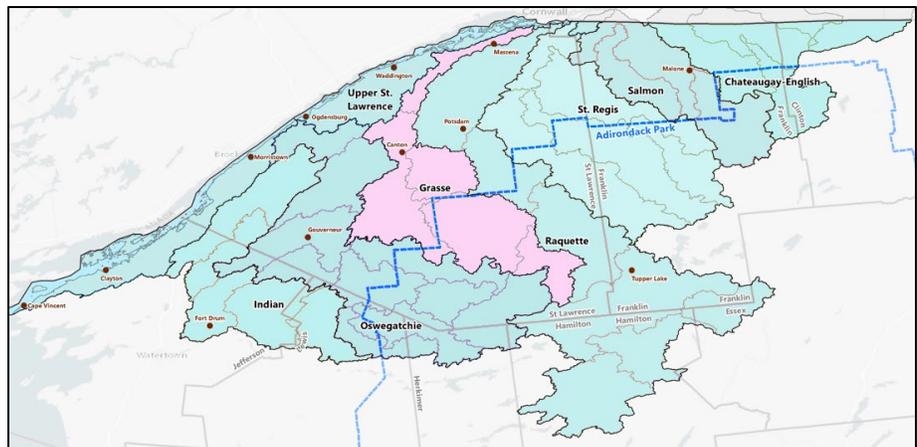
*Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.*

- Incorporate effective stormwater management practices into new construction
- Implement agricultural BMPs to enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Increase engagement with AEM and work with SWCDs to implement Tier III management plans

- Address failing or inadequate septic systems with a priority on septic systems along shorelines by implementing inspection programs and developing educational materials on proper maintenance
- Install boat wash stations and staff with watershed stewards on high-use days to educate the public on invasive species
- Implement aquatic vegetation management (Butterfield Lake, Millsite Lake)
- Encourage all lakes to participate in the Citizens Statewide Lake Assessment Program (CSLAP) to document trends in water quality
- Establish a HABs monitoring network and train the public, especially lakefront homeowners, on HABs identification and reporting to the state NYHABs program.
- Review and update floodplain and/or flood damage protection regulations to increase resiliency to flooding and extreme weather events
- Prepare and adopt stormwater drainage plans and incorporate green infrastructure
- Survey streambanks and restore unstable streambanks to preserve natural hydrology and reduce erosion
- Harden public water and wastewater infrastructure to prepare for a changing climate and extreme weather events
- Incorporate green infrastructure and stormwater management techniques
- Develop and implement a TMDL for Black Lake (NYSDEC 303d List – Part A waterbody) in coordination with communities and organizations in the watershed

4.6 Grasse River (04150304)

The Grasse River consists of two main branches of streams and ponds known as the Upper Branch and the Lower Branch that meet in the Town of Russell and flow north to enter the St. Lawrence River near Massena. Municipalities wholly or partially within this watershed include



Grasse River watershed highlighted in pink.

the Villages of Canton, and Massena and the Towns of Colton, Hermon, Canton, Russell, Clare, Pierrepont, Madrid, and Louisville. The watershed drains urban (3% including Massena and Canton), forested, and agricultural land. About 40% of the watershed is within the Adirondack State Park. Major resource concerns are related to forestry and recreational development in the watershed.

High Priority Subwatersheds and Key Issues:

- Lower Grasse River (0415030405)
 - » Nutrient and sediment pollution from agricultural runoff and streambank erosion
 - » Contaminated sediment from legacy industrial pollution at the Massena-Akwesasne Area of Concern
 - » Flooding risk
 - » Stormwater management

Medium Priority Subwatersheds and Key Issues:

- Upper Grasse River (0415030402)
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Little River (0415030403)
 - » Nutrient and sediment pollution from agricultural runoff
 - » Hydromodification and streambank erosion
 - » Stormwater management
- Middle Grasse River (0415030404)
 - » Nutrient and sediment pollution from agricultural runoff
 - » Hydromodification and streambank erosion
 - » Stormwater management

Lower Priority Subwatersheds and Key Issues:

- Headwaters Grasse River (0415030401)
 - » Acidified waters
 - » Road salt pollution

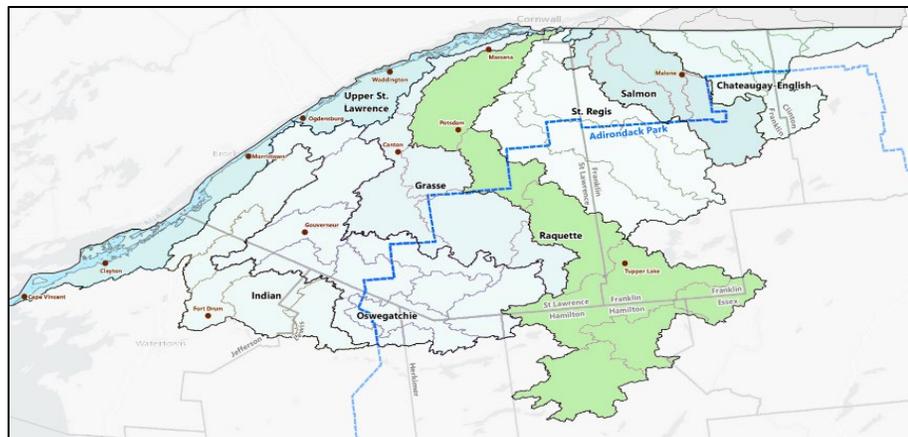
*Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.*

- Implement agricultural BMPs to enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Increase engagement with AEM and work with SWCDs to implement Tier III management plans
- Survey streambanks and restore unstable streambanks to preserve natural hydrology and reduce erosion
- Review and update floodplain and/or flood damage protection regulations to increase resiliency to flooding and extreme weather events

- Protect shorelines and wetlands and preserve open space by incorporating public parks and trails that limit development
- Prepare and adopt stormwater drainage plans and incorporate green infrastructure
- Prepare public water and wastewater infrastructure to prepare for a changing climate and extreme weather events
- Consider extending sewer districts to serve additional properties in critical areas
- Address combined sewer overflows (CSOs) by separation, green infrastructure, and expanded storage.
- Map areas at risk of flooding using topographic survey, hydrological assessments, and GIS mapping in collaboration with FEMA
- Implement road salt BMPs to reduce road salt transport and pollution
- Continue remediation activities and plans in the Massena-Akwesasne Area of Concern
- Collaborate with NYSDEC to update WI/PWL and assess waters

4.7 Raquette River (04150305)

The Raquette River watershed is the largest, most extensively forested, and least agriculturally intensive watershed in the St. Lawrence River basin. Much of the land (75%) resides within the Adirondack State Park offering it some protections.



Raquette River watershed highlighted in green.

Municipalities that are wholly or partially within the watershed include the Villages of Speculator, Tupper Lake, Norwood, and Potsdam and the Towns of Webb, Lake Pleasant, Long Lake, Arietta, Inlet, Indian Lake, Newcomb, North Elba, Harrietstown, Tupper Lake, Piercefield, Parishville, Potsdam, Norfolk, and Massena.

Medium Priority Subwatersheds and Key Issues:

- Raquette Lake (0415030501)
 - » Acidified lakes
 - » Invasive species
 - » High recreational use

- » Nutrients and pathogens from failing/inadequate septic systems
 - » Road salt pollution
- Big Brook (0415030503)
 - » Acidified waters
 - » Nutrients and pathogens from failing/inadequate septic systems
 - » Stormwater management
- - » Road salt pollution
- Tupper Lake (0415030504)
 - » Acidified waters
 - » Invasive species
 - » High recreational use
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Jordan River (0415030505)
 - » Acidified waters
 - » Waters are largely unassessed within NYSDEC WI/PWL
 - » Flooding risk
- Parkhurst Brook (0415030506)
 - » Acidified waters
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Flooding risk
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Raquette River (0415030507)
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Pathogens and nutrients from failing/inadequate septic systems
 - » Flooding risk
 - » Contaminated sediment in the Massena-Akwesasne Area of Concern

Lower Priority Subwatersheds and Key Issues:

- Cold River (0415030502)
 - » Acidified waters

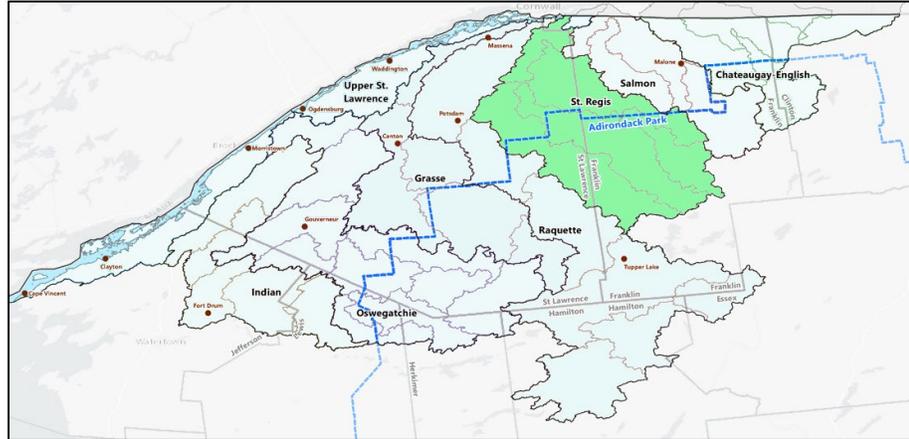
*Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.*

- Protect floodplains and wetlands
- Incorporate smart growth policies that guide development and prevent erosion and nonpoint source pollution

- Address failing or inadequate septic systems with a priority on septic systems along shorelines by implementing inspection programs and developing educational materials on proper maintenance (Long Lake)
- Implement road salt BMPs to reduce off-road transport and pollution of surface and ground waters
- Survey streambanks and restore unstable streambanks to preserve natural hydrology and reduce erosion
- Educate landowners on best forestry management practices
- Install boat wash stations with watershed stewards on high-use lake days to educate the public on invasive species
- Implement aquatic vegetation management at Long Lake
- Encourage all lakes to participate in the Citizens Statewide Lake Assessment Program (CSLAP) to monitor water quality and document trends
- Establish a HABs monitoring network and train the public, especially lakefront homeowners, on HABs identification (Long Lake) in collaboration with the NYHABs reporting program
- Investigate the feasibility of extending public sewers into regions with small lots and inadequate soils for waste disposal (Raquette River)
- Collaborate with NYSDEC to update WI/PWL and assess waters
- Invest in public water and wastewater infrastructure to prepare for a changing climate and extreme weather events
- Prepare and adopt stormwater drainage plans and incorporate green infrastructure
- Consider clustering/expanding connections in sewerred areas
- Protect shorelines and wetlands and preserve open-space by incorporating public parks and trails that limit development
- Review and update floodplain and/or flood damage protection regulations to increase resiliency to flooding and extreme weather events
- Implement Northeast Regional TMDL for mercury and acidification in coordination with northeast states to address local water quality impairments

4.8 St Regis River (04150306)

The St. Regis River watershed drains over 800 miles of extensively forested lands. About 60% of the watershed is within the Adirondack Park. Agriculture tends to be clustered in the northern half of the watershed along the St. Lawrence plains.



St. Regis River highlighted in green.

Municipalities wholly or partially within the watershed include: Towns of Santa Clara, Hopkinton, Waverly, Brighton, Duane, Brandon, Dickinson, Lawrence, Moira, Brasher, and Stockholm.

Medium Priority Subwatersheds and Key Issues:

- West Branch (0415030602)
 - » Nutrients and sediment from streambank erosion
 - » Acidified waters
 - » Waters are largely unassessed within NYSDEC WI/PWL
- Deer River (0415030603)
 - » Nutrients from agricultural runoff and streambank erosion
 - » Invasive species management (Eurasian watermilfoil)
 - » Excessive plant and algal growth impact recreational use and habitat
 - » Occasional shoreline algal blooms
 - » Acidified waters
- St Regis River (0415030604)
 - » Acidified waters
 - » Nutrients and sediment from agricultural runoff and streambank erosion
 - » Contaminated sediment from improper industrial disposal
 - » Nutrients and pathogens from failing/inadequate septic systems
 - » Algal blooms and harmful algal blooms
 - » Excessive plant and algal growth impact recreational use and habitat

Lower Priority Subwatersheds and Key Issues:

- East Branch (0415030601)

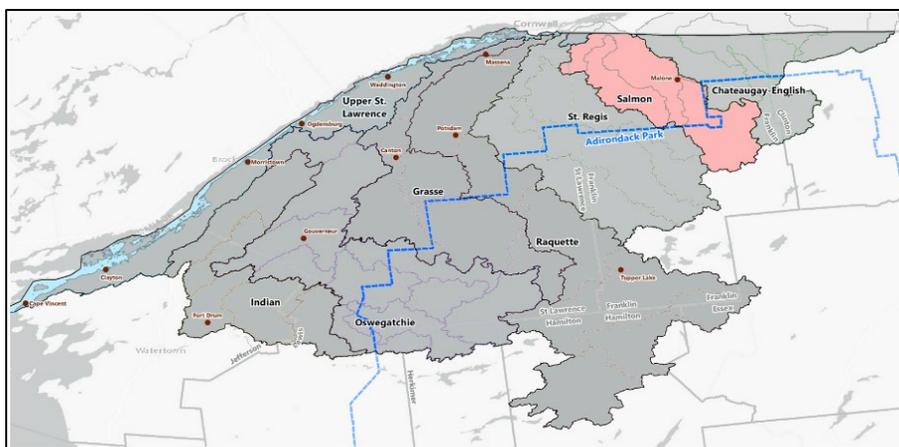
» Acidified waters

Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.

- Implement agricultural BMPs to enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Increase engagement with AEM and work with SWCDs to implement Tier III management plans
- Educate landowners on best forestry management practices
- Survey streambanks/shorelines and restore those in need to preserve natural hydrology and reduce erosion
- Implement road salt BMPs to reduce the risk of pollution of surface water and groundwater
- Encourage participation in the Citizens Statewide Lake Assessment Program (CSLAP) to monitor water quality and document trends
- Address failing or inadequate septic systems with a priority on septic systems along shorelines
- Harden public water and wastewater infrastructure to prepare for a changing climate and extreme weather events
- Install boat wash stations and staff with watershed stewards on high-use days to educate the public on invasive species
- Encourage all lakes to participate in CSLAP to document trends in water quality
- Establish a HABs monitoring network and train the public, especially lakefront homeowners, on HABs identification and reporting to the NYHABs program
- Continue remediation activities and plans in the Massena-Akwesasne Area of Concern
- Collaborate with NYSDEC to update WI/PWL and assess waters

4.9 Salmon River (04150307)

The Salmon River watershed drains approximately 400 miles of forested and agricultural lands from the Adirondack foothills to the international border. The watershed supports a world-class fishery of wild brook and brown trout



Salmon River watershed highlighted in pink.

populations. Municipalities wholly or partially within the watershed include: Villages of Brushton and Malone, and the Towns of Franklin, Malone, Bangor, Bombay, Fort Covington, and Westville.

High Priority Subwatersheds and Key Issues:

- Salmon River (0415030703)
 - » Nutrients and sediment from agricultural runoff, manure spreading, and streambank erosion
 - » Sedimentation and altered habitats due to hydromodification and potential releases from dams
 - » Erosion from new construction in the area
 - » Excessive plant and algal growth
 - » Decreasing riparian vegetation
 - » Nutrients from failing/inadequate septic systems

Medium Priority Subwatersheds and Key Issues:

- Headwaters Salmon River (0415030701)
 - » Sedimentation and altered habitats due to hydromodification and potential releases from dams
 - » Streambank erosion
 - » Nutrient pollution from failing/inadequate septic systems
 - » Acidified waters
 - » Invasive species management
 - » Excessive plant and algal growth in Mountain View and Indian Lakes
- Little Salmon River (0415030702)
 - » Waters are largely unassessed within NYSDEC WI/PWL

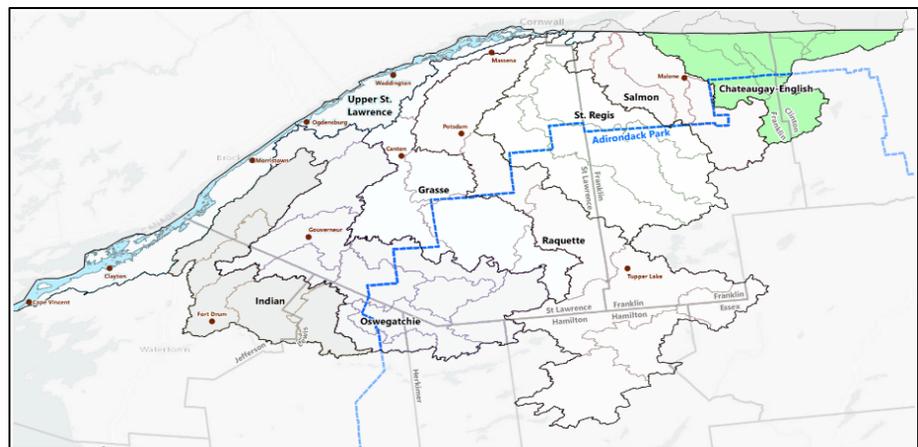
*Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.*

- Implement agricultural BMPs to enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Install manure storage facilities to prevent winter spreading and allow for optimal timing of manure application
- Increase engagement with AEM and work with SWCDs to implement Tier III management plans
- Survey streambanks/shorelines and restore those in need to preserve natural hydrology and reduce erosion

- Assess and identify dams in need of restoration or dredging to prevent sediment release
- Encourage all lakes to participate in CSLAP to monitor water quality and document trends
- Incorporate smart growth and land use policies to guide development and minimize erosion and nonpoint source pollution
- Address failing or inadequate septic systems with a priority on septic systems along shorelines
- Work with landowners to increase riparian buffer areas along streambanks
- Protect shorelines and wetlands and preserve open-space by incorporating public parks and trails that limit development

4.10 Chateaugay-English (04150308)

The Chateaugay-English watershed is located in the northeastern corner of the basin, spanning across Clinton and Franklin counties. This subwatershed includes comparatively small areas of lakes and streams. The southern half of the watershed



Chateaugay-English River watershed highlighted in green.

within the Adirondack Park remains mostly forested, while the northern half supports agricultural uses along the river plain. Municipalities that are wholly or partially within the watershed include the Villages of Chateaugay and Burke, and the Towns of Belmont, Dannemora, Ellenburg, Constable, Burke, Chateaugay, Clinton, and Mooers.

Medium Priority Subwatersheds and Key Issues:

- Headwaters Chateaugay River (0415030801)
 - » Excessive plant growth impacts recreational uses of Chateaugay Lake
 - » Invasive species management (Eurasian watermilfoil)
 - » Road salt pollution
 - » Nutrients and sediment from agricultural runoff, manure spreading, streambank erosion, and stormwater runoff
 - » Culvert assessment and restoration
 - » Protect and restore habitats
 - » Address septic

- » Address development through local laws
- » Waters are largely unassessed within NYSDEC WI/PWL
- Upper Chateaugay River (0415030802)
 - » Waters are largely unassessed within NYSDEC WI/PWL
 - » Nutrients and sediment from agricultural runoff
- Trout River (0415030803)
 - » Waters are largely unassessed within NYSDEC WI/PWL
 - » Nutrients and sediment from agricultural runoff

Lower Priority Subwatersheds and Key Issues:

- English River (0415030804)
 - » Waters are largely unassessed within NYSDEC WI/PWL

*Priority Recommendations: see **Table 2**, **Table 3**, and **Appendix D** for more detailed recommendations for each HUC10.*

- Implement agricultural BMPs to enhance nutrient and sediment retention on agricultural lands and prepare for a changing climate and extreme weather events
- Install manure storage facilities to prevent winter spreading and allow for optimal timing of manure application
- Increase engagement with AEM and work with SWCDs to implement Tier III management plans
- Encourage all lakes to participate in the Citizens Statewide Lake Assessment Program (CSLAP) to document water quality conditions and trends
- Improve public water and wastewater infrastructure to prepare for a changing climate and extreme weather events
- Install boat wash stations staffed with watershed stewards on high-use days to educate the public on invasive species
- Secure funding for invasive species management efforts
- Encourage watershed stewardship and pollution prevention practices
- Collaborate with NYSDEC to update WI/PWL and assess waters

5 Implementation Strategy & Schedule

This chapter connects general recommendations to the identified focus areas for each HUC10 subwatershed by providing greater geographic detail on site-specific projects through an **Implementation Strategy and Project Matrix**.

5.1 Implementation Strategies and Projects

The **Implementation Strategy and Project Matrix (Appendix D)** lists specific strategies and projects needed to protect and restore the watershed. Although each of the recommendations would improve conditions, implementation involves significant resources in terms of time, funding, staff, and support. Therefore, **Table 2** and **Table 3** identify the most significant issues in each HUC10 and give priority to implementation strategies and projects that address those focus areas. At this time, recommended projects focus on restoration and protection actions to reduce erosion and nonpoint source pollution, restore natural hydrology, build resiliency, and provide structure for future planning. Specifically, watershed implementation goals include:

- Control agricultural nonpoint sources
- Reduce nonpoint source pollution from residential property and community landscapes
- Address invasive species issues
- Reduce nonpoint source pollution from municipal activities
- Adopt or amend local regulations designed to reduce nonpoint source pollution
- Provide for ongoing collaboration, implementation, and planning
- Develop an appreciation for watershed services through educational campaigns
- Increase resiliency to flooding, climate change, and emerging threats
- Support community and habitat revitalization

Appendix D: Implementation Strategy and Project Matrix includes recommended actions, strategies/goals, priority subwatersheds, potential partners, implementation timing, and approximate costs. Projects and strategies are presented by category (i.e., agricultural management, invasive species management, etc.). Each recommended action denotes which of the above goal(s) the respective action aims to accomplish. Cost ranges for recommended actions and practices are presented as follows in tables throughout this chapter:

\$	Up to \$25,000
\$\$	\$25,000 - \$50,000
\$\$\$	\$50,000 - \$100,000
\$\$\$\$	\$100,000 - \$500,000
\$\$\$\$\$	Greater than \$500,000

Projects were gathered with input from the Watershed Advisory Committee and watershed stakeholders. High-scoring subwatersheds tend to have projects oriented towards addressing point and nonpoint sources of pollution to improve degraded water quality, habitat, and recreational opportunities. Recommended actions for low-scoring subwatersheds center around protection of waters and related natural resources.

Some recommendations aim to advance collaborations, partnerships, and outreach to enhance opportunities that will maximize capacity and resources needed for implementation. Consequently, *advancing those collaborations and partnerships should be considered amongst the highest of priorities. In addition, advancing municipal and programmatic actions that promote sustainability, reduce risk of flood damage, and revitalize communities should also be adopted as soon as possible by municipalities, with a priority focus on shoreline communities that are frequently impacted by flooding.*

Due to COVID-19, many State, County, and local budgets have taken significant cuts that are expected to put a fiscal restraint on upcoming budget years. Therefore, the project timeline is meant to be used as a guide to implementation, with the understanding that plan implementation and progress is dependent on available funding, capacity, engagement, and interest of local stakeholders, municipalities, and organizations. In times of budgetary constraints, it is important to advance implementation by prioritizing projects that serve multiple benefits, leverage existing investments, and emphasize partnerships and sharing of resources.

5.2 Potential Funding Sources

Many potential funding sources exist to aid in implementation of the St. Lawrence River Watershed Revitalization Plan; most are federal, state, and local (program-specific). An overview of selected funding sources and eligible activities is presented in **Table 4**. Additional information on agricultural conservation funding programs can be found in the [Black River Watershed Management Plan, Part II: Appendices, Section 8.7.1](#) (Bergmann Associates, 2010).

Table 4
Key Programs and Resources to Support Recommendations

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
STATE			
NYS Dept of Agriculture and Markets (NYS DAM)	Agricultural Nonpoint Source Abatement and Control Program (ANSACP)	Financial assistance program for projects led by SWCDs that involve planning, designing, and implementing priority BMPs. The program also provides cost-share funding to farmers to implement BMPs. For more info visit https://www.nys-soilandwater.org/aem/nonpoint.html .	Agricultural Practices and Management

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
	Agricultural Environmental Management (AEM) Program	SWCDs engage local partners such as Cooperative Extension, NRCS, AEM Certified Planners, Certified Crop Advisors, USDA Technical Service Providers, and agri-businesses to assist farmers in farm planning to reduce runoff and erosion.	Agricultural Practices and Management
	Community Resiliency Training Program	Provides community and municipality-based training events to increase resiliency to future flooding and outbreaks of harmful algal blooms in high-risk waterbodies.	Floodplain and Stormwater Management, Pollution Control
	County Agricultural and Farmland Protection Planning Grants	Financial assistance for the development of County Agricultural and Farmland Protection Plans and assist implementation of such plans.	Agricultural Practices and Management, Infrastructure & Development
NYS Dept of Environmental Conservation (NYSDEC)	Water Quality Improvement Project Program (WQIP)	For projects that reduce runoff, improve water quality, and restore habitat. Eligible applicants include municipalities, municipal corporations, and Soil and Water Conservation Districts	Infrastructure and Development, Pollution Control
	Climate Smart Communities (CSC) Grants	Provides 50/50 matching grants to municipalities for eligible climate mitigation and adaptation projects. This includes projects aimed at reducing flood-risk, increasing natural resiliency, extreme-event preparation, relocation or retrofit of critical infrastructure, and improving emergency preparedness.	Floodplain and Stormwater Management, Infrastructure and Development
	Invasive Species Grant Program	Designed to support projects that target both aquatic and terrestrial invasive species. The program allows applications for two new categories: Lake Management Planning and Aquatic and Terrestrial Invasive Species Research.	Invasive Species
	Trees for Tribes	Provides schools with free trees to plant on school property.	Floodplain and Stormwater Management

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
	Water Quality Management Planning Programs: Clean Water Act, Section 604(b) Funding	Funding is available to implement regional comprehensive water quality management planning activities, including tasks to determine the nature, extent and causes of point and nonpoint source water pollution problems, and to develop plans to resolve these problems.	Infrastructure and Development, Water and Wastewater Management, Pollution Control
NYSDEC, OPRHP, Empire State Development Corporation, NYSDOS, NYSDAM	Environmental Protection Fund	Funds capital projects that protect the environment and enhance communities. Eligible projects include conserving farmland, restoring habitat, controlling invasive species, upgrading municipal sewage treatment plants, cleaning up waterfront property and creating public parks, purchasing land for the NYS Forest Preserve, and restoring historic sites.	Invasive Species, Infrastructure and Development
NYSDEC, NY Sea Grant	NY's Great Lakes Basin Small Grants	Support stakeholder-driven efforts to restore and revitalize the state's Great Lakes region and demonstrate successful application of ecosystem-based management.	Floodplain and Stormwater Management, Invasive Species, Pollution Control
NYSDEC / NYS Environmental Facilities Corporation (NYSEFC)	Clean Water State Revolving Fund	Provides interest-free or low-interest rate financing for wastewater and water quality improvement projects to municipalities. Eligible projects include construction or restoration of sewers and wastewater treatment facilities, stormwater management, landfill closures, as well as habitat restoration and protection projects.	Water and Wastewater Management, Floodplain and Stormwater Management, Infrastructure and Development
NYS Environmental Facilities Corporation (NYSEFC)	Drinking Water State Revolving Fund	Provides market-rate and below market-rate financing for the construction of eligible public water system projects for the protection of public health. Eligible projects include upgrade or replacement infrastructure needed to achieve or maintain compliance with federal or state health standards, and provide the public with safe, affordable drinking water.	Water & Wastewater Management

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
<p>NYS Environmental Facilities Corporation (NYSEFC)</p>	<p>Clean Water Infrastructure Act (CWIA) Grants</p>	<p>Funds municipalities to perform capital projects to upgrade or repair wastewater treatment plants and to abate combined sewer overflows, including projects to install heightened nutrient treatment systems.</p> <p><i>Inter-Municipal Water Infrastructure Grant Program</i> funds municipalities, municipal corporations, and SWCDs for wastewater plant construction, retrofit of outdated stormwater management facilities, and installation of municipal sanitary sewer infrastructure.</p> <p><i>Consolidated Animal Feeding Operation Waste Storage and Transfer Program Grant</i> funds SWCDs to implement comprehensive nutrient management plans through the completion of agricultural waste storage and transfer systems on larger livestock farms.</p> <p><i>CWIA Source Water Protection Land Acquisition Grant Program</i> funds municipalities, municipal corporations, SWCDs and not-for-profits (land trusts) for land acquisition projects providing source water protection. This program is administered as an important part of the WQIP program.</p>	<p>Water and Wastewater Management, Agricultural Practices and Management, Infrastructure and Development, Pollution Control</p>
	<p>Integrated Solutions Construction Grant Program</p>	<p>Provides funding for projects that incorporate green infrastructure into Clean Water State Revolving Fund (CWSRF) projects that remove stormwater from combined, sanitary, or storm sewers. This funding is available only in conjunction with CWSRF financing.</p>	<p>Floodplain and Stormwater Management, Water and Wastewater Management</p>
	<p>Green Innovation Grant Program (GIGP)</p>	<p>Provides municipalities, state agencies, private entities, as well as SWCDs with funds to install transformative green stormwater infrastructure.</p>	<p>Floodplain and Stormwater Management, Infrastructure and Development</p>

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
	Wastewater Infrastructure Engineering Planning Grant	Available to municipalities with median household income equal to or less than \$65,000 according to the United States Census. Priority is usually given to smaller grants to support initial engineering reports and plans for wastewater treatment repairs.	Water and Wastewater Management
	Septic Replacement Fund	Provides participating counties with funds to reimburse a property owner for up to 50% of the costs (up to a max of \$10,000) of their eligible septic system project. Eligible projects include replacement of a cesspool with a septic system; installation, replacement or upgrade of a septic system or components; installation of enhance treatment technologies.	Water and Wastewater Management
NYS Environmental Facilities Corporation (NYSEFC) and USFWS	Clean Vessel Assistance Program (CVAP)	A reimbursement grant program that aids marinas in the installation, renovation, and replacement of pump-out stations for the removal and disposal of recreational boater septic waste.	Pollution Control
NYS Dept of State (NYSDOS)	Local Waterfront Revitalization Program (LWRP)	Funded projects match grants to revitalize communities and waterfronts. These projects may include green infrastructure components.	Floodplain and Stormwater Management, Infrastructure and Development, Water Quality Research, Waterbody Assessments, Habitat Restoration, Watershed Stewardship Programs, Planning and Monitoring
NYS Dept of Transportation (NYSDOT)	Transportation Alternatives Program	Provides funding for roadway improvements and culvert and bridge replacements, as well as pedestrian and bicycle paths.	Infrastructure and Development
NYS Office of Parks, Recreation and Historic Preservation (NYSOPHRP)	Environmental Protection Fund Municipal Grants Program	Provides funding for acquisition, preservation, planning, development, and improvement of parks, historic properties, and heritage areas. Funding is available through the following grant categories: Park Acquisition, Development and Planning Program; Historic Property Acquisition, Preservation and Planning Program; Heritage Areas System Acquisition, Development and Planning Program.	Infrastructure and Development

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
NYS Office of Homes and Community Renewal	Community Development Block Grant (CDBG) Program – Small Cities	Funds may be utilized to address construction or renovation of various infrastructure projects such as water, wastewater and solid waste facilities, streets, and flood control projects.	Water and Wastewater Management, Floodplain and Stormwater Management, Infrastructure and Development
FEDERAL			
Federal Emergency Management Agency (FEMA)	Hazard Mitigation Grant Program	Helps communities implement hazard mitigation measures to protect against life and property damages.	Floodplain & Stormwater Management
US Dept of Agriculture, Farm Service Agency (FSA)	Conservation Reserve Program (CRP)	A voluntary program for agricultural landowners that provides farmers with annual rental payments and cost-share assistance to establish long-term, resource covers on eligible farmland.	Agricultural Practices & Management
	Conservation Reserve Enhancement Program (CREP)	In exchange for removing environmentally sensitive land from production and introducing conservation practices, farmers, ranchers, and agricultural landowners are paid an annual rental rate and incentive payments.	Agricultural Practices & Management
	Farmable Wetlands Program	Voluntary program designed to restore previously farmed wetlands and wetland buffer to improve both vegetation and water flow.	Agricultural Practices & Management, Floodplain & Stormwater Management
US Dept of Agriculture, Natural Resources Conservation Service (USDA-NRCS)	Agricultural Conservation Easement Program (ACEP)	Provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits.	Agricultural Practices & Management, Floodplain & Stormwater Management
	Agricultural Management Assistance (AMA) Program	Provides financial and technical assistance to agricultural producers to voluntarily address issues such as water management, water quality, and erosion control by incorporating conservation into their farming operations.	Agricultural Practices & Management. Pollution Control
	Conservation Stewardship Program (CSP)	Voluntary program that provides financial and technical assistance to implement conservation practices on agricultural and forested lands.	Agricultural Practices & Management, Forestry Management

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
	Environmental Quality Incentives Program (EQIP)	Voluntary program that provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land.	Agricultural Practices & Management, Forestry Management
	Wildlife Habitat Incentive Program (WHIP)	Voluntary program that provides financial and technical assistance to help participants develop fish and wildlife habitat on private agricultural land, non-industrial private forest land, and Indian land.	Invasive Species
US Dept of Agriculture, Rural Development	Water & Waste Disposal Loan & Grant Program	Provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas.	Water and Wastewater Management
	Community Facilities Direct Loan & Grant Program	Provides funding to develop essential community facilities in rural areas.	Water and Wastewater Management
US Environmental Protection Agency (USEPA) and US Forest Service	Great Lakes Restoration Initiative	Funding to implement green infrastructure projects that improve habitat and other ecosystem function in the Great Lakes are eligible for funding.	Floodplain and Stormwater Management, Infrastructure and Development
US Fish and Wildlife Service (USFWS)	Partners for Fish and Wildlife Program	Assists landowners with technical and financial assistance to help protect, enhance, and restore wildlife habitat on privately owned lands. Activities include restoring wetlands, grasslands, in-stream habitats, stream banks, riparian and floodplain areas.	Floodplain and Stormwater Management, Infrastructure and Development
	National Fish Passage Program	Restore aquatic organism passage at man-made barriers including dams and culverts; priorities include projects restoring habitat to freshwater mussels, brook trout, lake sturgeon, Atlantic salmon, and American eel.	Infrastructure and Development

Funding Source	Program	Description	Related St Lawrence River Watershed Recommendations
US Environmental Protection Agency (USEPA)	Clean Water Act Section 319 Nonpoint Source Management Program	Funding to support a variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects.	Water Quality Research, Planning and Monitoring, Pollution Control; Collaboration, Partnerships and Outreach
	EPA Environmental Education Grants	Supports environmental education projects and promote environmental awareness and stewardship.	Collaboration, Partnerships, and Outreach
LOCAL			
Municipalities	Municipal budgets	Provide labor and equipment from Departments of Highways and/or Public Works to do tasks such as clean debris from streams, culverts, storm drains, etc.	All

Note: See [USEPA's Water Finance Clearinghouse](#) for more information.

6 Ongoing Implementation Framework

Once appropriate restoration and protection measures are identified (see **sections 2, 3, and 4**), the next step is to develop an implementation framework to ensure that these recommendations are put into place. An effective implementation strategy provides the framework to accomplish these four primary activities:

- establish an implementation team,
- develop an implementation tracking and evaluation framework,
- prepare a work plan, and
- communicate efforts and achievements.

Implementation of the Plan will be an ongoing process that will continue for many years. The St. Lawrence River Watershed Revitalization Plan is envisioned as a “living document”, adaptive to evolving needs and conditions of the watershed. These recommendations represent an initial round. Other projects will be added by the local partners as the Plan is implemented, conditions change, and priorities shift. Periodic re-assessments are essential to reflect changes in water quality, new opportunities for funding and partnerships, and emerging issues within the watershed. Future actions should continue to be prioritized and implemented in a manner consistent with the watershed vision and goals.

6.1 Implementation Team

To manage ongoing implementation, the St. Lawrence River Watershed Project will establish a Steering Team comprised of representatives of the watershed’s Soil & Water Conservation Districts, regional and county planning departments, NYSDOS and NYSDEC representatives, and state and local stakeholders as appropriate. The Steering Team will meet on an “as needed” basis to accomplish the following:

- develop and maintain a comprehensive planning and implementation program,
- coordinate activities and funding opportunities among stakeholders, counties, and local municipalities,
- provide public outreach and education to develop support for watershed management, and
- track plan implementation, evaluate progress, and determine future priorities.

In addition, the Steering Committee is responsible for identifying key focus groups to harness local expertise around priority issues facing the watershed. Potential focus areas include groups to address the following issues: agricultural nonpoint source pollution, non-agricultural nonpoint source pollution, invasive species, and flooding/water levels. These groups will include local watershed experts on the respective issue and be responsible for the development of annual work plans, further discussed in **Section 6.3**.

6.2 Mechanisms for Tracking Implementation and Evaluating Progress

Tracking progress of implementation efforts and watershed conditions is essential to watershed management. Periodic reviews allow managers to document progress and adjust to changing water resource issues. The subwatershed assessment used to set priority subwatersheds should also be repeated as new data become available and water quality and community needs change.

An effort should be made to document management efforts into a geographic-based (HUC12-level preferable) tracking and monitoring system for use with the subwatershed assessment scores and environmental data to evaluate the implement strategy. Eventually, GIS could capture this information and document progress. Another important metric is the amount of funding directed to the watershed projects. Tracking progress using a tool capable of visualization will help stakeholders evaluate progress, both in number and types of projects, measurable results, and geographic locations. Recent developments in watershed planning rely more heavily on watershed modeling and site-specific management, therefore integrating this knowledge into a GIS-based system would be a proactive step toward future watershed planning efforts.

Implementation strategy activities will be monitored and tracked through an **Implementation Strategy Tracking Template** that includes details such as action, project HUC10, goal, responsible party, funding sources, estimated cost, project status/progress, and project outcomes. It is also important to incorporate in-water or land-based metrics that allows the implementation effort to be easily communicated and evaluated. Therefore, these elements should be quantifiable and directly related to the management goal it is aiming to accomplish. Examples include:

- Percent of farms implementing respective BMP (i.e., reduced tillage, cover crops)
- Percent of farms engaged with AEM
- Linear feet of restored streambanks,
- Acres of restored/created riparian buffer
- Lake acres treated with herbicide
- Number of boat wash stations
- Number of failing septic systems repaired or replaced
- In-lake or in-stream water quality metrics
- Number of municipalities that adopt shoreline buffer setbacks

This effort should be made in coordination with other sampling and data collection efforts to build upon and enhance existing datasets. Some examples include the Citizens Statewide Lake Assessment Program, Trees for Tribs program, and the Adirondack Lake Assessment Program. Stakeholders are encouraged to work NYSDEC's Water Quality Monitoring and Assessment Program to evaluate changing water quality conditions over time and outcomes of implemented projects. Like the

neighboring Black River Watershed, the St. Lawrence River Watershed should plan to evaluate implementation and identify new recommendations 10-years post finalization of this plan.

6.3 Developing Work Plans

As discussed in **Section 6.1**, focus groups will be responsible for developing annual work plans. These work plans will provide a short-term management plan to implement recommendations within this Plan by detailing more specific objectives and determining how the objectives can be achieved through programs and activities. In addition to providing an effective way to measure progress, work plans can be especially helpful templates for preparing grant applications to fund watershed management plan implementation activities.

The annual work plans should be consistent with the format used to present general recommendations by categorizing recommendations into 1) restoration and protection actions, 2) collaboration, partnerships, and outreach, and 3) municipal and programmatic actions. The work plan should identify the planned activity, lead and supporting agencies, and indicate how results of the activities can be measured to assess program success. The chair of each group, whenever possible, should be a member of the Steering Committee. All work plans should be reviewed by the Steering Committee.

6.4 Communicating Efforts and Achievements

Equally important to developing, implementing, and tracking watershed management efforts is communicating those efforts to the public. Communication is essential for building trust, public support, and buy-in from local stakeholders; all are essential components.

Most stakeholders are interested in two questions: 1) what actions are being taken to mitigate an issue, and 2) is it working? Results of implementation efforts can be presented in various ways, including press releases, annual newsletters, radio broadcasts, and community meetings or conferences. Annual reports are useful in detailing efforts, typically providing a copy of the current work plan, achievements, resources used for implementation, future plans, and an estimate of future resources needed. Among the key stakeholders are municipal and County officials, elected local and state officials, and other local decision-makers who have garnered support and local resources for implementation. Efforts should be made to engage these stakeholders routinely through watershed education and progress updates. As communication of the Plan, its progress, and achievements increase, the amount of stakeholder engagement will increase as more people become aware and involved to ensure the plan is a success.

7 References

Bergmann and Associates. 2010. Black River Watershed Management Plan.

Kelting, D.L., & Laxson, C.L. 2010. *Review of effects and costs of road de-icing with recommendations for winter road management in the Adirondack Park*. Adirondack Watershed Institute.

MDOT (Michigan Department of Transportation). 2012. Salt Bounce and Scatter Study: Project Summary Report. MDOT Operations Field Services Division.

Appendix A
Survey and Responses

1 Survey

The following is a copy of the St. Lawrence River Watershed Revitalization Survey. The survey was distributed to several stakeholder groups who were asked to share the opportunity with group members, neighbors, friends, and any of those who utilize the St. Lawrence River watershed to live, work, or play. The survey was also promoted via social media, newspapers, meetings, and NYSDEC's email blast. Ultimately, the survey received input from 1,447 recipients.

St. Lawrence River Watershed Revitalization Survey

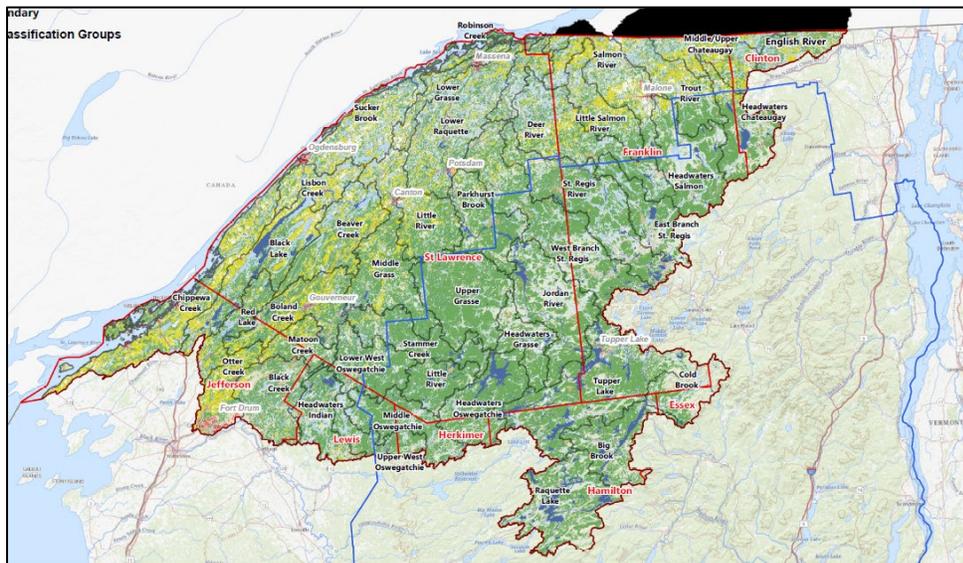
The St. Lawrence River Watershed Project is developing the *St. Lawrence River Watershed Revitalization Plan* and seeks your input in identifying concerns in the watershed and prioritizing steps that can be taken to advance a community vision for a thriving and sustainable future. The watershed planning process will give communities in the watershed a chance to consider projects that could spark economic investment, natural resource protection, regional sustainability, and community revitalization.

Please complete this survey to share your thoughts on:

- Recreation and waterfront revitalization
- Water quality conditions
- Economic issues related to waterways
- Plant and animal habitats
- Agriculture and forestry practices
- Flood-related issues



The survey should take less than 10 minutes of your time. All responses will be strictly confidential and presented only as aggregated information.



The St. Lawrence River watershed covers nearly 5,600 square miles of land area in northern New York State in eight counties, as well as 185 miles of St. Lawrence River shoreline.

BACKGROUND: The following questions will help us understand a little bit about where and how you use the watershed.

1	In what county or tribal area do you reside within the watershed? <input type="checkbox"/> Clinton County <input type="checkbox"/> Essex County <input type="checkbox"/> Franklin County <input type="checkbox"/> Hamilton County <input type="checkbox"/> Herkimer County <input type="checkbox"/> Jefferson County <input type="checkbox"/> Lewis County <input type="checkbox"/> St. Lawrence County <input type="checkbox"/> Mohawk Nation at Akwesasne <input type="checkbox"/> I do not live in the watershed
2	How long have you been living in and/or visiting the St. Lawrence River watershed area? <input type="checkbox"/> Less than 5 years <input type="checkbox"/> 5-10 years <input type="checkbox"/> 10-20 years <input type="checkbox"/> More than 20 years
3	I am (check all that apply): <input type="checkbox"/> A year-round watershed resident <input type="checkbox"/> A seasonal watershed resident <input type="checkbox"/> A watershed business owner <input type="checkbox"/> A farmland owner/manager in the watershed <input type="checkbox"/> A woodland owner/manager in the watershed <input type="checkbox"/> Manager of public lands within the watershed <input type="checkbox"/> Active with a watershed-related advocacy group <input type="checkbox"/> A student in the watershed
4	Do you reside within the Adirondack Park? <input type="checkbox"/> Yes <input type="checkbox"/> No

RECREATION AND WATER USE: The questions below will help us understand how you use water and recreational areas in the watershed.

5	Which lakes do you and your family use for recreation? (Check all that apply) <input type="checkbox"/> Black Lake <input type="checkbox"/> Blue Mountain Lake <input type="checkbox"/> Butternut Lake <input type="checkbox"/> Lake Bonaparte <input type="checkbox"/> Long Lake <input type="checkbox"/> Raquette Lake <input type="checkbox"/> Tupper Lake <input type="checkbox"/> Upper Chateaugay <input type="checkbox"/> None <input type="checkbox"/> Other ____ (please specify)
---	---

6	<p>Which rivers do you and your family use for recreation? (Check all that apply)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Chateaugay River <input type="checkbox"/> Grasse River <input type="checkbox"/> Indian River <input type="checkbox"/> Oswegatchie River <input type="checkbox"/> Raquette River <input type="checkbox"/> Salmon River <input type="checkbox"/> St. Lawrence River <input type="checkbox"/> St. Regis River <input type="checkbox"/> None <input type="checkbox"/> Other ____ (please specify)
7	<p>How often do you visit a lake, stream, or river within the St. Lawrence River Watershed?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Daily <input type="checkbox"/> At least once a week <input type="checkbox"/> At least once a month <input type="checkbox"/> At least once a year <input type="checkbox"/> Never
8	<p>How do you use these waterbodies? (Check all that apply):</p> <ul style="list-style-type: none"> <input type="checkbox"/> Drinking water <input type="checkbox"/> Aesthetic enjoyment <input type="checkbox"/> Canoeing/Kayaking/Paddling <input type="checkbox"/> Motorized boating <input type="checkbox"/> Sailing <input type="checkbox"/> Fishing <input type="checkbox"/> Ice fishing <input type="checkbox"/> Swimming <input type="checkbox"/> Wildlife viewing <input type="checkbox"/> Other (please explain)
9	<p>Do you perceive the watershed's lakes, rivers and streams as an asset to your community?</p> <p><input type="checkbox"/> Definitely <input type="checkbox"/> Somewhat <input type="checkbox"/> A little <input type="checkbox"/> Not at all</p>
WATER QUALITY	
10	<p>How would you describe the water quality of the waterbody(ies) you use?</p> <p><input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</p>
11	<p>What is the biggest <i>challenge</i> to protecting the future uses of lakes, streams, and rivers in the watershed? (Rank 1-9, where 1 is the biggest challenge and 9 is the smallest.)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Nutrient enrichment and Harmful Algal Blooms (HABs) <input type="checkbox"/> Erosion and sedimentation from land use practices <input type="checkbox"/> Climate change <input type="checkbox"/> Development <input type="checkbox"/> Water level management and flooding <input type="checkbox"/> Municipal wastewater and private septic systems <input type="checkbox"/> Invasive species <input type="checkbox"/> Operation of dams <input type="checkbox"/> Contaminated sediment from industrial uses

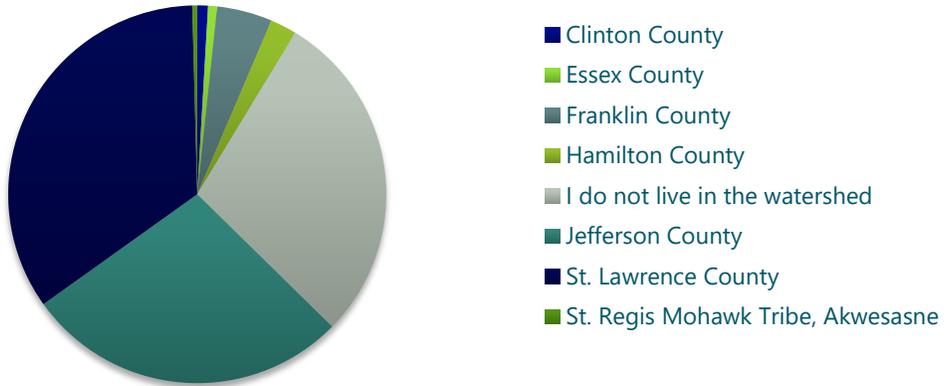
12	<p>What <i>types of pollutants</i> do you think pose the biggest threat to water quality? (Rank 1 to 10, where 1 is the biggest threat and 10 is the smallest.)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Plastics and other solid waste <input type="checkbox"/> Heavy metals from atmospheric deposition (lead, mercury) <input type="checkbox"/> Oil, gas, and grease (from leaking vehicles and car maintenance facilities) <input type="checkbox"/> Pesticides/herbicides (used for agriculture and lawn care) <input type="checkbox"/> Pharmaceuticals and personal care projects (prescription pills and soaps) <input type="checkbox"/> Phosphorus and nitrogen (from wastewater/septic systems or agricultural/lawn fertilizer) <input type="checkbox"/> Road salt and sand (used for winter road maintenance) <input type="checkbox"/> Sediment (sand, gravel, clay from construction sites and erosion) <input type="checkbox"/> Toxic chemicals (from industrial operations) <input type="checkbox"/> Viruses and bacteria (from municipal/septic system wastewater discharges) 																																
13	<p>Which uses of the lakes, streams, and rivers do you think are most at risk in the watershed? (Rank 1 to 6, where 1 is most at risk and 6 is least at risk.)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Aesthetic enjoyment <input type="checkbox"/> Aquatic life protection <input type="checkbox"/> Drinking water supply <input type="checkbox"/> Fishing <input type="checkbox"/> Habitat/hydrology <input type="checkbox"/> Recreation 																																
LAND USE PRIORITIES																																	
14	<p>There are various types of land uses in the St. Lawrence River watershed. For each of the following, indicate whether you would like to see less, more, or about the same of each in the watershed. (Check all that apply):</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 16.6%; text-align: center;">More</th> <th style="width: 16.6%; text-align: center;">About the same</th> <th style="width: 16.6%; text-align: center;">Less</th> </tr> </thead> <tbody> <tr> <td>Open space that is protected from development</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>River corridors in their natural condition</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Outdoor recreational areas</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Wildlife habitat</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Urban development</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Actively farmed agricultural land</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Managed forest lands</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table>		More	About the same	Less	Open space that is protected from development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	River corridors in their natural condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outdoor recreational areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wildlife habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Urban development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Actively farmed agricultural land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Managed forest lands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Managed forest lands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																														
15	<p>Please share any additional comments about the St. Lawrence River watershed: _____</p>																																

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

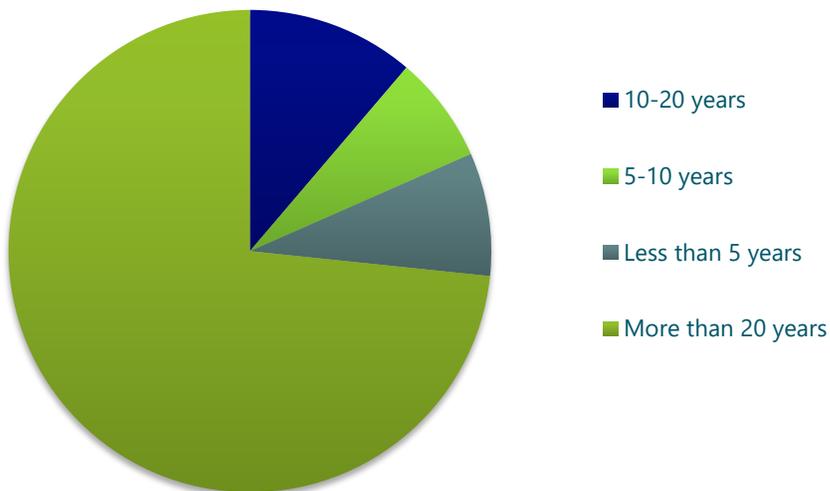
2 Survey Responses

2.1 Background

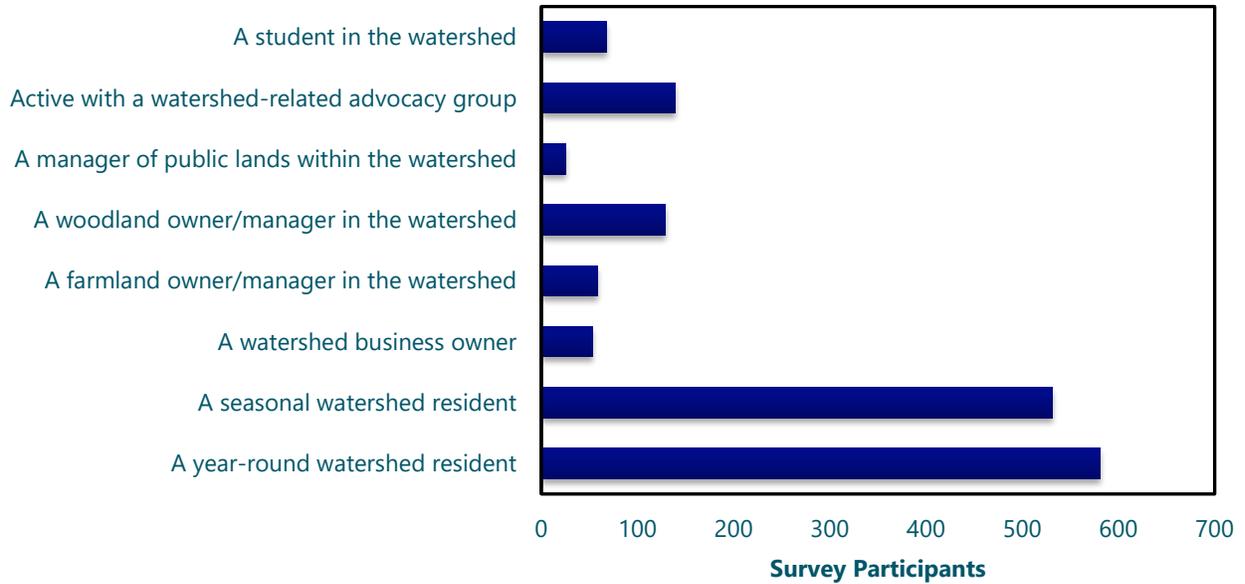
1. In what county or tribal area do you reside within the watershed?



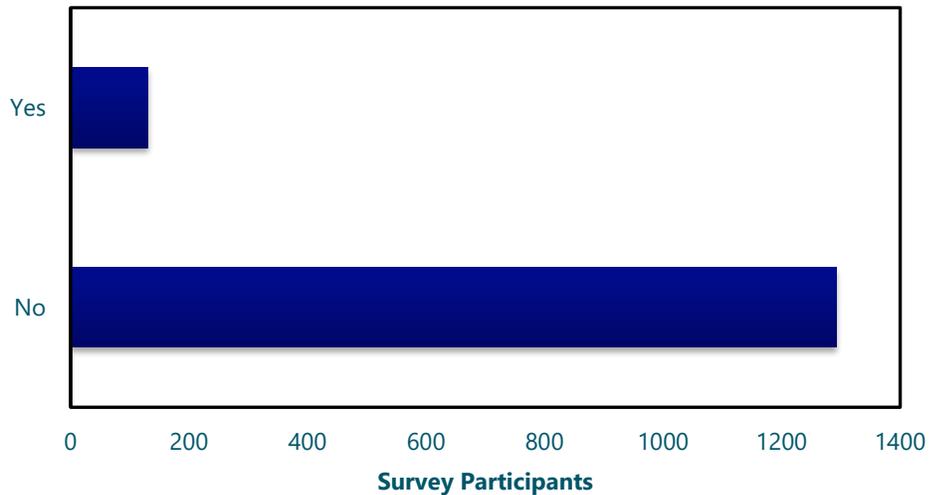
2. How long have you been living in and/or visiting the St. Lawrence River watershed area?



3. I am (check all that apply):

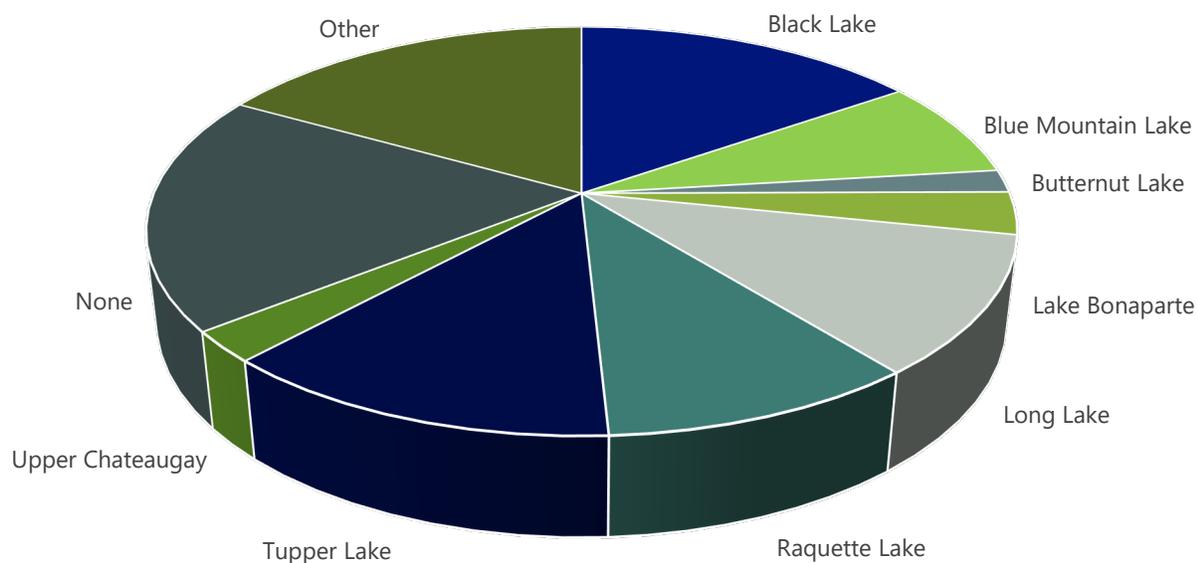


4. Do you reside within the Adirondack Park?

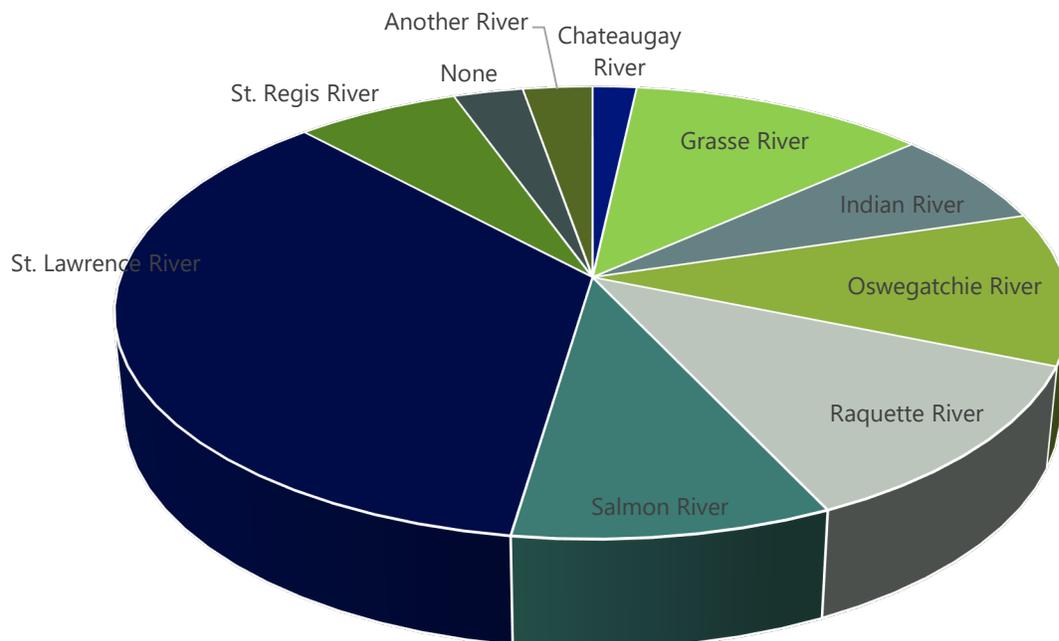


2.2 Recreation and Water Use

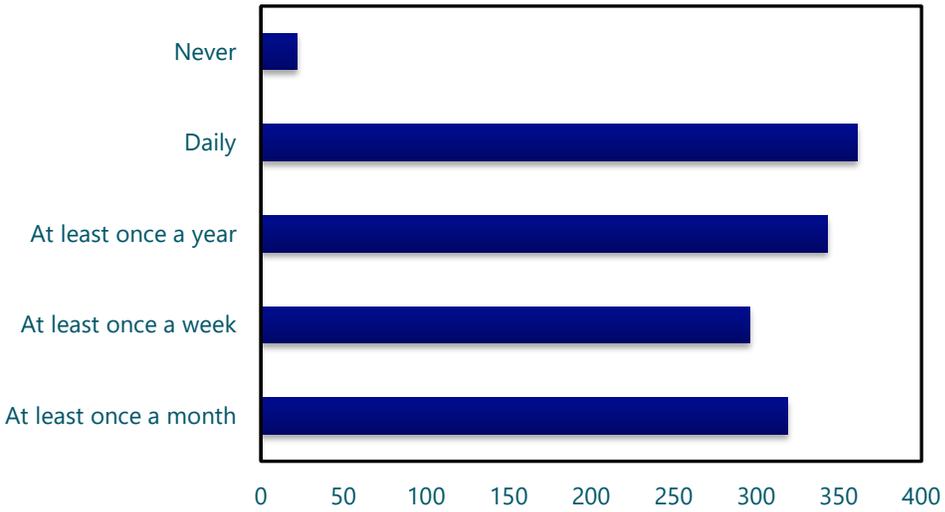
5. Which lakes do you and your family use for recreation? (Check all that apply.)



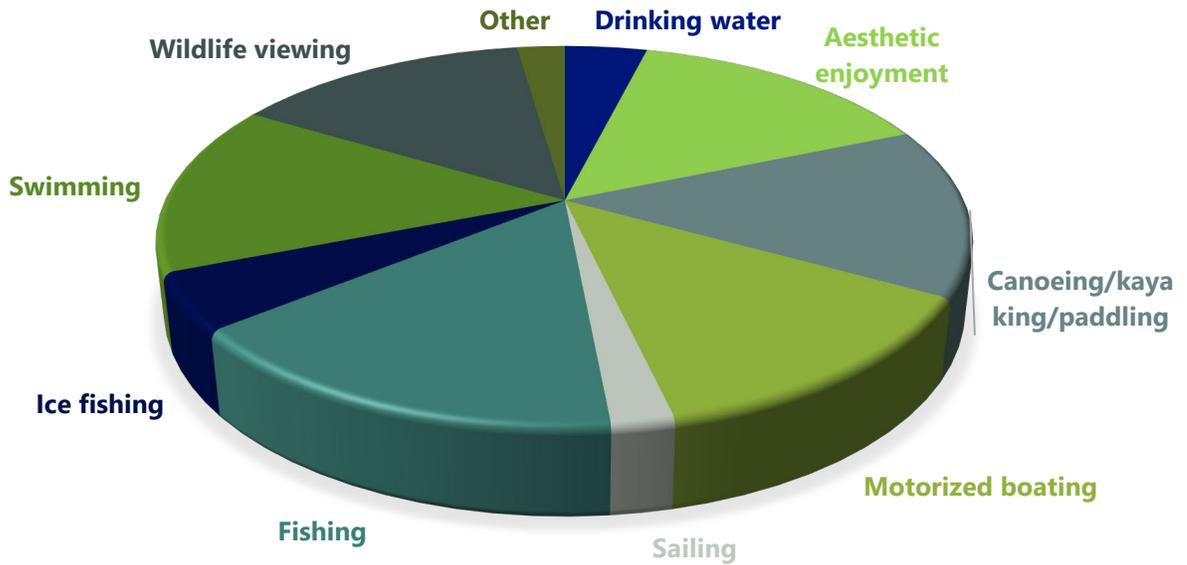
6. Which rivers do you and your family use for recreation? (Check all that apply.)



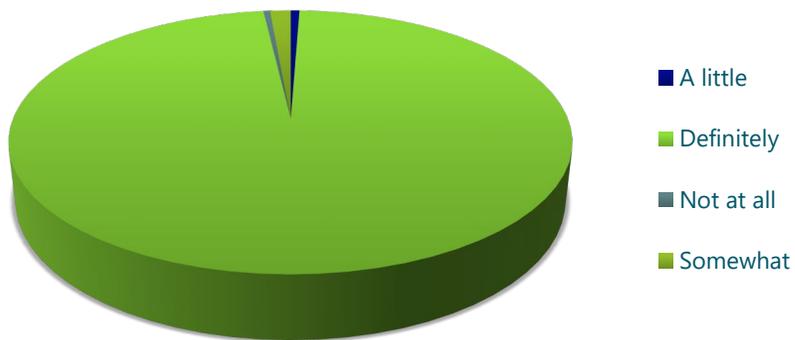
7. How often do you visit a lake, stream, or river within the St. Lawrence River watershed?



8. How do you use these waterbodies? (Check all that apply.)

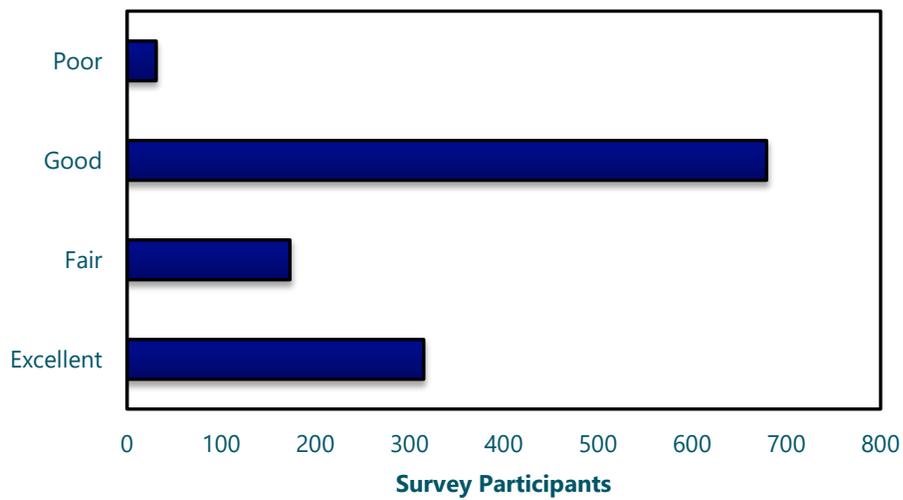


9. Do you perceive the watershed's lakes, rivers, and streams as an asset to your community?

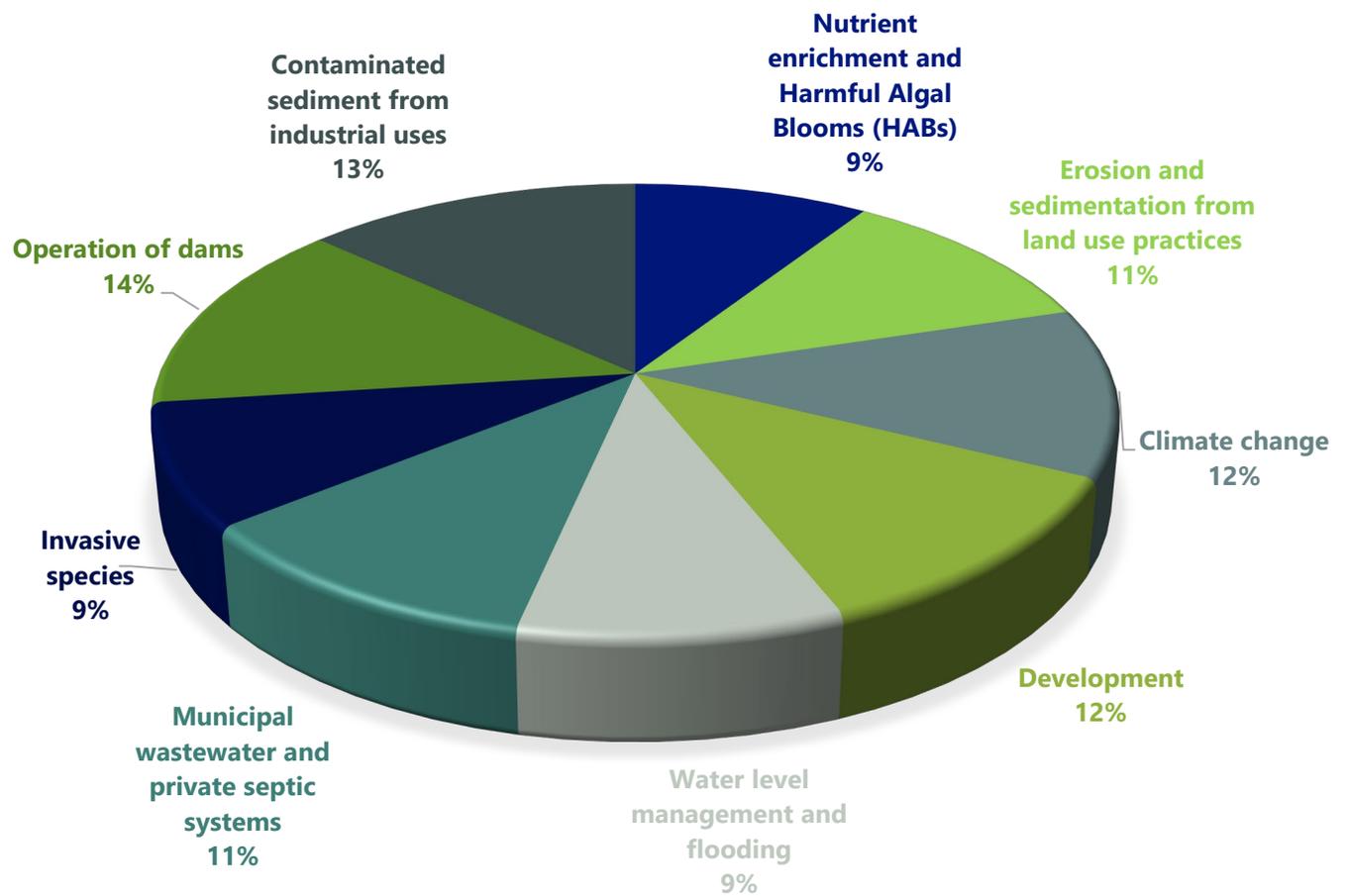


2.3 Water Quality

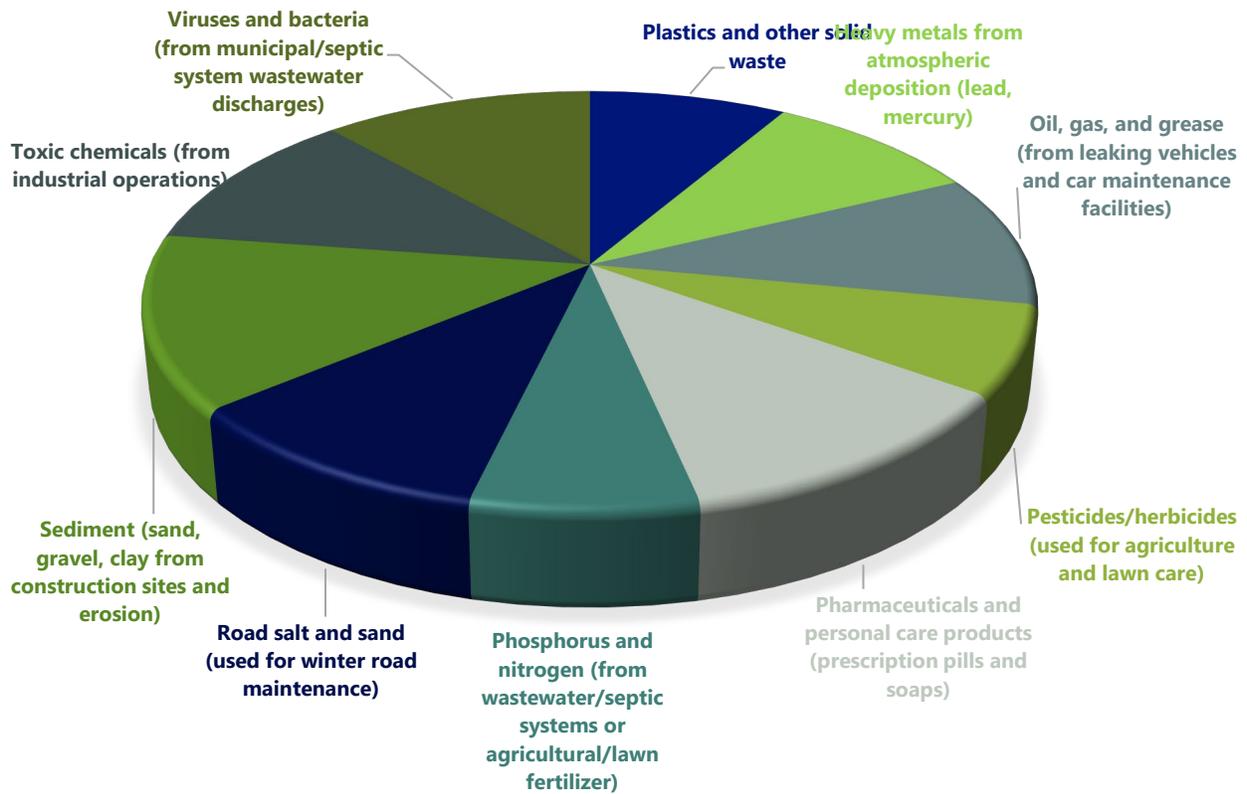
10. How would you describe the water quality of the waterbody(ies) you use?



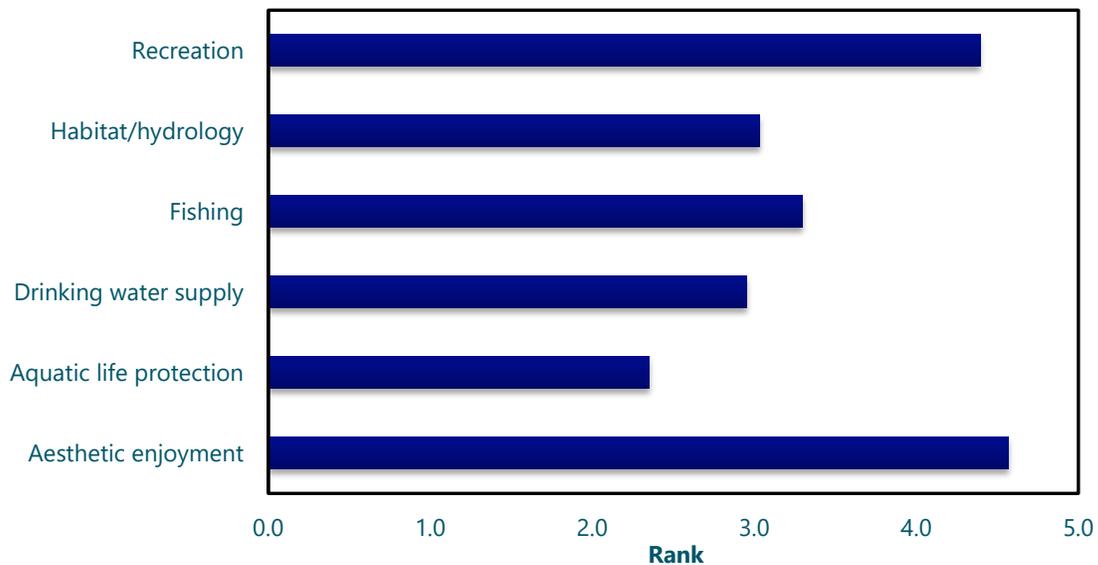
11. What is the biggest challenge to protecting the future uses of lakes, streams, and rivers in the watershed? (Rank 1-9, where 1 is the biggest challenge and 9 is the smallest.)



12. What type of pollutants do you think pose the biggest threat to water quality? (Rank 1 to 10, where 1 is the biggest threat and 10 is the smallest.)

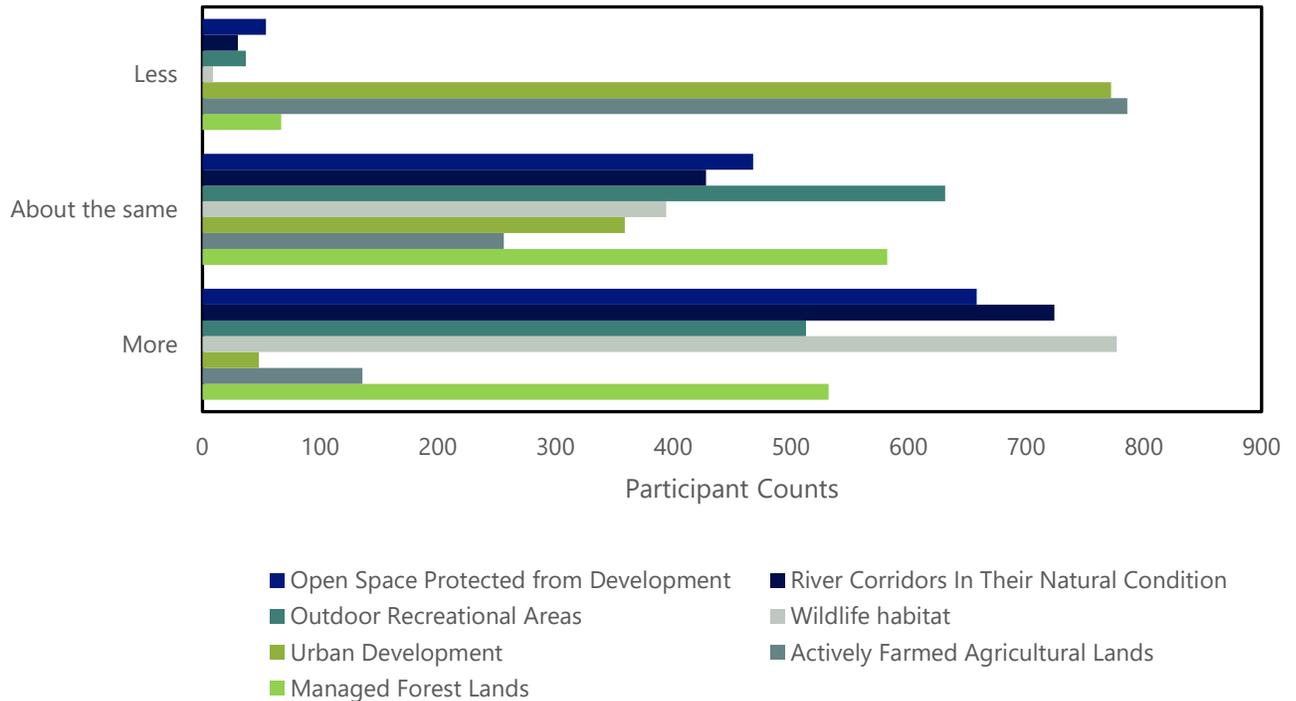


13. Which uses of the lakes, streams and rivers do you think are most at risk in the watershed?
 (Rank 1 to 6, where 1 is the most at risk and 6 is least at risk.)



2.4 Land Use Priorities

14. There are various types of land uses in the St. Lawrence River watershed. For each of the following, indicate whether you would like to see less, more, or about the same of each in the watershed. (Check all that apply.)



15. Please share any additional comments about the St. Lawrence River watershed.

Topic	Comment
Agriculture	BMPs for small ag operations - fence out the waterways & increase buffer zones
	the large CAFO farms need to be policed more as they are spreading manure in violation of the rules which is a major polluter to our resources in general.
	I live on the Grasse River. Would like to know more about impacts of large scale farming operations on the rivers of St. Lawrence County.
	Farmers get away with too much pollution. They need to be inspected more often and informed before it becomes a crime.
	small tributaries have little life downstream of any large farm due to run off.
	I'd love to see more active farming in the watershed, IF I believed that the farmers could afford to utilize sustainable practices without chemical fertilizer and weed killers.
Climate Change	Better water level control. I've lived on this River for more than 50 years 3 of those years we suffered from high water making docks and therefore watercraft unusable. In 2020 the forecast is for higher water than 1919 which set a record. Better control must be provider to insure continued use of this valuable shoreline.
	concerned about effects of acid precipitation deposition (not listed in your survey)

Topic	Comment
	<p>Overall, from information and studies being presented to the general public from Governmental and research groups it appears that overall, the greatest threat to the whole area is global warming. It would be helpful to hear more specifics about how the community, local agencies and state bodies are working together to counter this threat.</p> <p>one important issue, especially w regard to climate change, is to see how the SL watershed also serves to connect habitats separated by different land-use practices. check out the work of the A2A consortium (google it) for an important example. Also, forests are at particular, if not visually obvious, threat due to invasives, lack of regeneration, climate change, etc. we need \$ from the DEC for Local scientists (e.g. Clarkson, SLU, PSC) to study issues such as forest health, corridor development, etc.</p>
Collaborative Planning	<p>More comprehensive resource planning regionally, and updated resource planning at the township level</p> <p>Better management of Moses Dam. Upper St. Lawrence is flooding because of poor management of this dam.</p>
Cormorant	<p>cormorants are a real problem as well as HAB</p> <p>We need to start managing the Cormorant population in a responsible manner.</p> <p>Cormorants need to be either killed by the DEC or have a hunting season for them.</p> <p>We have a Cormorant problem, over population, destroying fishing and killing shoreline vegetation.</p> <p>We must get rid of the emerging Cormorant population on Black Lake or they will destroy the lake in a matter of a few years. The state must allow citizens to protect these vital areas from this destructive invasive species. They are a menace</p>
Development	<p>Currently management of the water levels in the St Lawrence are out of control. More attention needs to be taken by residents building close to the river and expecting not to have flooding conditions. Recreational river usage, that effects the economy of the area, is suffering due to high water levels. .</p> <p>I live on Chippewa point @ 15 Chippewa point Road East. A cottage directly upriver from my home used for personal and rental have been discharging their septic waste for many years into the river. Past response from the DEC have been extremely poor. Sewage on shoreline and dock, they depend on river ice etc. to remove. I have been a resident for 24 yrs., and this is getting out of control. Hopefully someone will read and help resolve. Girard Baechle</p> <p>Many acres in the Adirondacks are going to waste, not keeping up with use needs by growing populations. To many use restrictions.</p> <p>We are originally from the Allentown area but vacationed up here. We moved here 15 years ago to a less stressful area that is home to all sorts of wildlife. we noticed more and more people building on some of the lakes. It seems you don't realize what you have until it's gone. I would hate to see that happen here!</p> <p>Interior streams are still in pretty good shape, St. Lawrence River itself is at peril from invasives and development></p>
Economy	<p>the largest asset this region has is its natural beauty, Our very survival depends on improving the economy here while also protecting our open space and waters. For a poor area, it is crushingly expensive to live here and we need visitors to enjoy our area and spend money here that can help our long term situation improve and even thrive.</p> <p>The surrounding towns are killing existing homes and communities with ever increasing taxes. Abandoned homes are a bad sign and blight and environmental degradation soon follows.</p>

Topic	Comment
	<p>probably wondering why Urban development would be something I'd like to see more of? It's because I recognize how economically challenged some of these areas are and how difficult it is for local municipalities to mount resources. MAN is a critical part of the ST Lawrence solution - MAN could be doing better</p> <p>I am concerned about increase cost for recreational land/water use. My wife and I are recent retirees and like a lot of waterfront owners, we are concerned about being able to afford it. It should not be for the land of the rich.</p> <p>I would like to see more urban development in the form of economic stimulation without increasing the urban footprint or amount of untreated waste.</p>
Education	<p>Seaway shipping is important to the economy, but we need to preserve that which cannot be easily repaired. Namely the Environment.</p> <p>Educate watershed users, e.g., fishers, boaters, shoreline landowners, etc. re: ethical enjoyment and use lands and waters.</p>
Erosion	<p>The flooding and erosion need to be better controlled</p> <p>I believe the Power Authority has done more harm than anything else especially with their management of river levels. They also don't do enough to pay for septic system upgrades for property that exists along the St. Lawrence river and erosion management behind private property that existed in those locations prior to the dams existing but are now considered waterfront.</p> <p>In the last five years high water and erosion [lake view preserve] has caused 72 years of dune sand build up protection destroyed that I have seen. I am 77 years old and have lived there since age five.</p> <p>Control the lake level with a new regulation plan that stops erosion and flooding. If you want to recover wetlands than change the building codes.</p>
Fishing	<p>The St. Lawrence river is about to go to hell with all the major fishing tournaments they are bringing here, way too many fish killed and taken off their spawning beds to never return or just be killed</p> <p>Removal of dams is important for managing a healthy fishery.</p> <p>Muskellunge and Northern Pike habitat and protection in the St. Lawrence and Black Lake would be a great thing for the area. The Muskie fishing could be a major asset and destination. This would greatly improve tourism and dollars spent. I firmly believe slot limits on both species would be a fantastic thing.</p> <p>For years, I enjoyed fishing in the St. Lawrence River and the Salmon River. I no longer feel safe eating fish from any of our rivers and lakes.</p> <p>Upgrading fish hatcheries to improve trout rearing</p> <p>Lower the water Repeal plan 2014</p> <p>I love the River and miss the river quality from pre-zebra mussel times. I am very concerned over Asian carp and wish that the Great Lakes could be fully severed from the Mississippi rather than just an electric fence. The flood levels, which I believe we have more control of due to the dam system, cause a lot of extra pollutants to enter the river. At what point do we need to let Montreal flood vs. all the other communities upriver and on Lake Ontario? I have watched the flood levels break off pieces of wetland and redistribute them, per the water level environment plan. But by the end of the season they end up dried up and dead. I miss the river being a fishing wonderland. There isn't enough natural sediment anymore for the smaller fish to feed on and grow the larger fish too. More and more I hear fishermen getting skunked</p>

Topic	Comment
	<p>(no fish). More aggressive erosion control at state parks and campgrounds could prove useful. If grass won't grow, consider an alternative site cover option? Thanks for asking about the watershed. We love the river.</p> <p>Open catch and release</p> <p>Open up black bass season to include a catch and release season</p> <p>Greater use of wastewater facilities, in the area Southside of the villages along the River.</p>
Habitat	<p>I am very concerned about how water levels are being managed. Wildlife was flourishing before they changed the water level program. Why do they need to change it?</p> <p>Swan Bay, Alexandria Bay, is being allowed to fill in (sediment deposition). It used to have a natural flow outlet to downriver, and productive Pike and Bass spawning grounds. Bull heads now. Please return Swan Bay to its natural flow through and its quality fishery.</p> <p>Something needs to be done about all the native weed die off in Chippewa Bay Area there is large bare spots throughout and pike fishing in the area has suffered greatly over the years discussing to see this happen</p> <p>As a scuba diver, I've seen the growth of algae blooms and the death of fish during the spring runoff from chemicals. This has occurred throughout the water in NYS and is becoming more present in the St. Lawrence River. I'm unsure what to do about it. However, I'm willing to help preserve it in any way I can.</p> <p>The state should purchase properties that are on the lake/river shore that chronically flood, destroy the structures, and make riparian zones. Pay landowners to relocate. No more shoreline development.</p> <p>Aquatic weeds in Lake of the isles and other areas of the river is not even close to what it was in the 1990's.</p> <p>NYS Law needs to be amended to allow for forest management on state lands inside the ADK park. If you are looking at everything that effects the watershed you need to take a holistic approach at everything. The state forest lands inside the park are void of a healthy functioning ecosystem. Management of state lands inside the park is needed which in turn will have an effect (positive) on the overall St. Lawrence River watershed as well.</p> <p>Flooding/climate change is #1 concern</p>
Industry	<p>This survey wasn't little messed up. Some items would all be 6's. I live in St. Lawrence County, my camp is at loon lake Franklin County. The plants of Massena ruined our land, air and water in the 1950's onward. Barnhart isle, ruined. The dam at the Power Authority has also ruined a lot of natural habitat. Money and greed and nepotism are all to blame. Shameful.</p> <p>The St. Lawrence River is very contaminated. The lakes and rivers less so except for areas of high use in industrial, urban and agricultural concentrations.</p> <p>I have lived on the Raquette River for my whole life (30 years) I pay very close attention to the river since the activities that I participate in rely heavily on the water conditions. I have noticed since Brookfield Power has taken control of the power generation, there is significantly less consistency with the water conditions. The levels are 8-10" higher on average, and there have been two occurrences of significant flooding. Beforehand the water level was always consistent and there were never any significant flooding events. I believe these folks are creating many issues in regard to the pollution as a result of erosion, and also issues with allowing people to recreate on the water.</p> <p>I live on the Raquette River flow in Hannawa Falls and our biggest issue is Brookfield Power. They have surveyors coming down to our waterfronts right now and in our neighborhood...</p>

Topic	Comment
	<p>and it seems like whatever they're doing is going to lead to nefarious ends. The water is often strong and high, we've lost quite a bit of waterfront because of their practices.</p> <p>forests ought to be professionally managed to provide natural wood products in an environmentally sustainable manner</p> <p>Lake Ontario watershed is being destroyed owing to shipping. This has been the root cause of destruction for the last 70 yrs. Salmon industry permitting related to marina development destroyed acres of wetland. Lack of enforcement of ballast waters has wreaked havoc with the entire ecosystem. It is disheartening that shore owners have been targeted as sole cause of habitat destruction by some environmental groups. It has had the opposite effect of loss of support, specifically Nature Conservancy. Thank you.</p> <p>Please keep the watershed pristine with no further large industrial development.</p>
Invasive species	<p>We need to watch the invasives because the waterways are clean and vibrant, and they could destroy it.</p> <p>Need to get tanker ships to filter out ballast tanks to limit pollution and invasive species..</p> <p>invasive species inspections should be increased.</p> <p>Invasive species and flooding are the immediate threats to most of these waterways</p> <p>I would like to see mandatory boat washing and inspection at all lakes and waterways in the watershed area and more funds to fight invasive species brought by unclean boats.</p> <p>This watershed has very high biodiversity which is endangered by inappropriate development and invasive species.</p> <p>Black lake needs weed control, late summer, it is hard to even get off our dock , also the fishing derbies ruined the fishing for me as a Tax payer . have a seasonal home and pay high taxes, those people come in for one day don't spend any money for the economy of the area,</p> <p>Keep a close eye on the ships before they get into the Gulf of the St. Lawrence make sure there is no harmful ballast water.</p>
Municipal water	<p>The water levels two of the last three years have ensured that our septic system has leached into the SLR. This is a major problem that could have been prevented by an improved water management system.</p>
Pollution	<p>Keep cattle out of watershed - agricultural run off</p> <p>With proper management we could have a world class fishery here drawing in people from around the world. The Raquette River could be an unmatched tail water system. Access remains difficult in many of the sections due to odd public private access agreements. Need better parking, trail systems etc. Better information about access is needed as well. The DEC also utilized very outdated approaches to fishery management - rather than habitat improvement - they focus on a put and take fishery which is short sighted and undermines natural reproduction of native fish. Dams need dish passage - unbelievable that we don't have it here since we do have anadromous fish and of course the potential for robust tourism associates with it. Also, fish passage is critical to maintaining the population of those fish.</p> <p>People who release balloons for fun or parties should be fined or prosecuted.</p> <p>I took the best S.W.A.G. (Scientific Wild Ass Guess) at the rankings as I am really not a hard science trained recreational user. Long term pollutants scare me. I know there are many that just pollute because they just don't know what they are doing pollutes. I for one would value an educational effort that explains in layman's terms, just what pollutes and the effect upon the environment. I go back to the days of the pollution education that consisted of the Indian Brave paddling a canoe through polluted waters and shedding a tear. Then to "Woody's Owl" -</p>

Topic	Comment
	Give a hoot, don't pollute... We users need to be CONSTANTLY reminded how little it takes to pollute and how long the effects last. Thank you for your efforts.
Protection	<p data-bbox="391 327 1511 464">We have a responsibility to future generations to protect and enhance the watershed area. For too long it has been used as an industrial, farming, and personal sewer - throw stuff in and it "goes away." Everyone lives downstream from somewhere and someone else and we need to see and protect the big picture.</p> <p data-bbox="391 470 1495 537">I grew up in Massena and didn't realize until after I left what a tremendous area this is. I visit every chance I get.</p> <p data-bbox="391 543 1203 575">An incredible resource that needs all the protection we can provide!</p> <p data-bbox="391 581 1520 758">I have loved the St. Lawrence River and all the water bodies in Upstate NY I've had the good fortune to explore all my life! I KNOW we need to do all we can to ensure future generations can experience recreation and spiritual renewal in these great places too! Thank you for continuing to work towards this and increased community awareness of the treasures we have to protect in our back yards!</p> <p data-bbox="391 764 764 795">beautiful area, keep it that way</p> <p data-bbox="391 802 1487 905">I see boathouses allowed to deteriorate into the river over and over, often with gas and oil filled watercraft allowed to collapse along with the structures. Perhaps landowners allowing pollution should be fined and fines attached to real property taxes.</p> <p data-bbox="391 911 1520 1898">This is one of the last areas of our country with significant freshwater resources. Protecting & preserving this from those who seek to poison or steal them and use them for their own financial gain is paramount. Not allowing the mid-western and western states & entities to tap into the great lakes and drain them for agriculture in the west which is on the brink of "disaster" yet again is a very serious concern. They have already stolen & depleted the Ogallala aquifer to get out of the 1930 dust bowl situation and without ANY real plan to stop depleting it. The west is dying of drought and will soon be looking for more water. Please, please seek protections against this very real threat. Also, keeping fracking water from PA and other states out of our area is a continual battle and another very real threat. The "experiment" done by the wastewater treatment plant on the black river in Watertown should be a clear example of why we do not want that "harmless water" in our systems in northern NY. That stuff wiped out all of the good bacteria in the wastewater treatment system and forced them to have to completely start over by releasing everything into the black river which then flowed into Sackets harbor bay and Lake Ontario. Developing the watershed is not what we should be seeking. Bringing more tourism & big business here will only do three things, raise taxes for the residents (due to tax breaks being given to companies), cause exorbitantly high power bills for the residents (due to bitcoin like companies sucking all the energy from the grid & not paying any tax) and cause overpopulation which will overtax our delicate ecosystem. This is not NYC, it's an agricultural & wildlife refuge area with delicate ecosystems that need protecting, careful management, and defending against the wolves of big business and development interests. Big business rarely spends & invests their money here for the long-term, they strip what they can from the local resources, pocket the profit, and move on like a pack of locusts. Keep the communities small, make them more self-reliant, and teach better green & organic practices to the agricultural community (make this a truly organic hub; outlaw non-organic practices). Some tourism is good but attracting those who wish to preserve and appreciate the area rather than use and abuse the area is a better plan. Stop letting "Big Ag" shove its horrible contaminating products down everyone's throats (literally in our food & ag supply; outlaw it). Think about laws requiring federally funded institutions to source any</p>

Topic	Comment
	<p>locally available food from the local organic sources and only go outside the area for things that are not produced here. Keep milk products local, keep produce local, let cheap power generation be a benefit to all residents instead of giving it away and allowing big business 10 and 20 yr. tax breaks, which go bankrupt and reorganize only to seek another 10 or 20 yr. tax break, or only give temporary jobs or very few long term jobs (like many wind power projects). If we wish to preserve this extensive ecosystem all communities need to band together in unison to protect it, use it responsibly but with a frugal respect, and live within it symbiotically rather than rapaciously. There should be stiff & swift penalties for violators and laws with real teeth to protect our resources.</p>
	<p>I would like to thank you for gathering the thoughts of the local property owners and those that take lake and river management seriously</p>
	<p>We must be pro-active in all aspects of protecting the environment. Here and everywhere.</p>
	<p>THEY NEED TO LOWER THE LAKE ONTARIO WATER LEVEL. WE HAVE LIVED HERE FOR 50 YEARS AND NEVER HAS BEEN THIS HIGH. WE HAVE HAD MAJOR DAMAGE TO OUR SHORE LINE AND BREAKWALL!!!</p>
	<p>I was a full time resident of the North Country for many years during the 1990's and early 2000's. I was actively involved in Bald Eagle, Breeding Bird, Loon and Black Tern Surveys. I love the North Country.</p>
	<p>Please do all you can to protect this</p>
	<p>I think the DEC and New York State is on the right track in protecting this valuable resource.</p>
	<p>I used to spend a lot of time in the St. Lawrence River valley both for work and recreation. I worked with paper mills, landfills, colleges, aluminum plants, milk plants and other producers of wastes. They are all out serious efforts into keeping the river and its tributaries clean.</p>
	<p>A great area for outdoor recreation, Hunting. Fishing, Trapping, Canoeing, Boating. Anything to protect and enhance the watershed for the generations to come is a great idea.</p>
	<p>I just want us to protect nature, water, and air. I think smaller building, more community gardens, less gas powered vehicles and better politics than we have now.</p>
	<p>We love and have lived in or otherwise enjoyed the watershed for almost 80 years. It's worth protecting.</p>
	<p>Those of us living in the watershed tend to take this wonderful resource for granted. The rest of the world looks at this region with great envy. We need to recognize what we have - and PROTECT it.</p>
	<p>I own property in Canada on the St Lawrence River between Rockport and Gananoque since 1972.</p>
	<p>GREAT AREA KEEP IT THAT WAY.</p>
	<p>We have a unique environment, and we must protect it, but we also have to live here too.</p>
	<p>It is our responsibility to take care of our environment we all need to do our part</p>
	<p>I Love NY!</p>
	<p>While more a visitor than an inhabitant, I would be saddened if the area were not available to me or if its quality were severely impacted.</p>
	<p>A treasure that we are duty-bound to protect. The reason I live here and why I want to stay.</p>
	<p>Closure to the public of large private holdings should be studied. Areas need protection but they should be open to non-motorized unexploited access.</p>
	<p>I have always enjoyed that area as well as the rest of New York State. It's a Beautiful State and it should be looked after every day. Dan</p>

Topic	Comment
	Can't wait to move up there permanently, it is a beautiful place
	The big push for tourism is, IMHO, a huge mistake. Having lived in a couple of tourist areas and seen another one (a small village) overwhelmed by tourists on a regular and increasing basis destroy the quality of life of those residing in those spaces like living in a fool's paradise. Keeping the Adirondacks pristine and in its natural state as much as possible is what makes the North Country a treasure. Start building and they will come...with no love/care/concern for the residents.
	One of the most pure and pristine watersheds in the world!
	The St. Lawrence River watershed is a major reason for me staying here. It is a vital and incredible resource that could definitely be better protected and better used.
	I think whether we are seasonal or full time residents - we LOVE THE RIVER- want to see it protected and should have equal access to funding when situations become dire.
	This is such an important resource and needs to be protected and shared!
	A beautiful area we must protect for future generations to enjoy
	Thank you for all you do, you are doing incredibly important work and I just wanted you all to know how grateful I am for what you do. love, an Adirondack semester alum (at SLU)
	This is a slanted study based on your own agenda and very disheartening. I have been on the St. Lawrence river for over 50 years. The recent attempt to control the water level to protect the wildlife has caused irreputable damage to homes, businesses, and livelihoods. It is very shortsighted on the part of the environmentalists. Have you considered all the trees sacrificed? All the lumber used on repairs, or additional manufactured plastics added to the environment. Not to mention, take a look at all the trees toppled over because their roots have been submerged in water for 2 years and cannot withstand a normal windstorm. How much fuel is being generated by the machinery being used to clean up and repair the devastation. Not to mention the now lack of shade lost due to all the fallen trees, let's contribute to global warming some more. It's time you listened to the old timers on the river who predicted this instead of your well-meaning, shortsighted college students. As a longtime member of the Adirondacks, I am offended by this survey which is prejudice and one sided.
Public awareness	The internet is a great place to make folks aware of what the watershed provides. See digthefalls.org. As an example.
	Stiffer fines for polluters and litterers.
	I grew up on the St. Lawrence River and I think too many people take for granted that it will always be the same or that we don't have to actively manage the watershed.
	Smaller lakes such as Pleasant Lake, located in Macomb, NY, could use more signage regarding algae bloom protection, boat washing, etc. (Thank you!)
	Increase educational environmental info to visitors to region.
	Would like to see regulations that do not allow folks to plant grass near water's edge and requirements to leave natural environment.
	I answered many the best I could, but don't feel they were particularly well-informed responses. Which is probably part of the problem....
	The key to saving the watersheds is to also develop urban spaces to enjoy the rivers---create a larger culture of those who care.
	Need to protect spawning bass via a later 'take' season opening. Catch and release, however, could remain open almost year round.
	more user friendly fishing areas

Topic	Comment
Recreation / Public access	Lack of recreational access has deterred people from staying in the area. Low water in 13 mile section of St Lawrence river after Iroquois lowered waterfront home values and deterred recreational opportunities. Extreme low water may cause future problems.
	Jet skis should be banned on all lakes < 1 sq mile.
	I would like to see the DEC coordinate with DOT to ensure that new bridge construction allows for prior recreational boating uses. Specifically, the West Branch of the Oswegatchie on Jerden Falls Rd. The new bridge construction removed and blocks off all access to the river.
	Need more public access places. Heavy fines for polluting.
	I would like to see connecting canoe/kayak portage trails from lake to lake where plausible/possible. Also designated canoe trails along the many slow winding streams that flow into Black Lake and the St. Lawrence River. Designated Parking areas could be lightly developed, and signage erected. And maps developed highlighting where these trails are and where put in and take out locations are. I would like to see common day use areas developed on Black Lake. Where boaters can stop for picnic lunches, swimming and just relaxing. Volunteers would provide simple initial landscape work. And picnic tables and a simple basic dock that would be pulled up on shore for the winter. One of these common areas could be the sandy east side of Indian river just below the rocks. Volunteers could remove the Poison Ivy and brush, put in picnic tables, and develop a swim at risk area along the sandy shore. Another common area would be the point at the northern end of Apple Island. With a dock on the quiet bay side and a picnic table up on the shore in the shade overlooking the lake. This is a shaded breezy rocky point that would make a very nice resting area for boaters. Another possible location could be where the Indian river enters Black lake. There is a nice mound that would be a good picnic area. A simple dock could be put in on the calm north east side. Again, volunteers could develop and supply all materials and manpower for these projects. Landowners could be contacted for possible sale of these parts of their property to the Black Lake association. Who would then oversee their maintenance and usage? Monies for purchase of these sites could be derived through petitioning the lake residents and possible grants. Also, landowners should be offered tax incentives, if possible, should they choose to donate a part of their land for such use. There are many other locations further up the lake that could also be used for such. These areas would allow a break for a day out on the lake and I believe they would enhance the overall quality of our beautiful lake.
	The watershed is under appreciated, despite heavy use. Counties must take a standby implementing water friendly practices and banning harmful ones. Interconnectedness is key. More incentives for citizen wildlife protection should be created, like sponsoring habitat creation and endangered species protection by small landowners. Create corridors and educate. Use public schools and spaces as pilot runs, with informational signs. Make recreational use handicap accessible. Take out all the dams.
Water Levels	Better controls on the water level of the St Lawrence River. IJC is a farce; and the public is aware.
	More stable water levels as in years past
	The high water levels of the last few years were difficult to predict but was a blunder on the part of the commission
	Managing water levels throughout the Great Lakes needs to become a top priority to avoid further damage to landowners' properties.

Topic	Comment
	Management of the river levels the past three years has been a catastrophe for the whole st Lawrence river basin. Anyone involved with the management should be held responsible and punished to the extent of the law
	The implementation of Plan 2014 for water level management of Lake Ontario by the IJC has resulted in devastating flooding of the shoreline of Lake Ontario and The St. Lawrence river in 2017 and 2019 and is poised to do the same in 2020. This has resulting in the destruction of shoreline property, the flooding of septic systems resulting in discharge into the lake and river and the release of sediment into the lake and river.
	Water levels of the St. Lawrence River must be managed better, The high water caused by the IJC's mismanagement cannot continue. It is ruining many homes, camps, fisheries, and recreational uses.
	Repeal Plan 2014 and revert back to the original since 1958.
	Water is way too high!
	I fear that the extra water running through the Robert Moses Dam will ruin fish spawning areas, this might happen at a time that more fishing tournaments are coming to our area that bring in much needed revenue.
	They better get control of the flooding or everything is doomed!
	For people to understand the logistics and facts of the St. Lawrence water flows. How can the dams change water levels when 4 of the Great lakes are 200 feet higher than Lake Ontario
	This survey is a farse!
	Excessive and poorly managed high water in the St. Lawrence and Lake Ontario in particular is destroying habitat and wetlands, causing erosion on formerly beautiful, pristine DEC beaches; The DEC's Black Pond area is/was a hidden gem but high water has caused trees to fall over, dunes to be impacted - ruining the natural beauty that was there for all to enjoy. Having "higher highs" does not help our coastal wetlands -- it erodes and destroys these fragile and precious environments!
	The Oswego River, draining all of CNY, should be on your survey!!! It has significant impact on the St. Lawrence River water quality and levels.
	The winter draw down in lake St. Lawrence is killing the ecosystems of the shore and bays
	Our Dictator Governor has destroyed our fishing ecology with his ridiculous demands of fully opened dams in Massena, NY. We have mud everywhere within a week of opening the dams to so called alleviate Lake Ontario water levels!! We have lost our fishing spots entirely and not to mention the catastrophic loss of fish due to water loss! This is an ecological disaster! Thank you very much for caring!!! It will take a long, long time to recover after this disaster! Are you blind? Have you seen the damage? Drive through Waddington. Check out Coles Creek...Look at Waddington beach, Whalen Park, Louisville, NY is a mud pit that you can literally walk across to reach the shipping channel...all mud pits! The fish are dead when the water freezes, and they have little to no oxygen! I cannot believe that this was allowed to happen! Every single thing a Democrat touches is destroyed! Shame, shame, shame!
	Let nature run its course. Remove some dams from the Raquette. Stop construction along the St. Lawrence shorelines and work to stop the effects of air pollution. The park streams have been returning to normalcy. This should not be reversed by looser pollution standards. Allow water levels in the Great Lakes to rise even if it floods some property.
	St. Lawrence/Lake Ontario River levels are number one concern

Topic	Comment
	You need to lower lake levels to prevent flooding and damages to homes, businesses, and the tourist industry.
	The St. Lawrence River levels have to be stabilized to historic heights as this river is key to the economics of the whole area
	Less water fluctuations on the St. Lawrence
	Fix the flooding problems
	Tired of flooding
	High water and consumer use of the waterways does not get the priority from the landowners of all the great lakes and states. All states should be forcing the outflow to keep levels lower not just state by state
	There is impact all the way to the Lake Ontario watershed up into the lower Niagara River with regard to flooding and management of the water levels in the St Lawrence region. It has been extremely damaging over the past 2 seasons.
	St. Lawrence river water level should not change from historical levels
	Plan 2014 really sucks!
	Remove all dams except at Lowes
	Lower water levels back to what they were
	The 2014 plan is just trying to Saint Lawrence river and tributaries. I do not believe that it is climate change rather it's big business and politics ruining a natural resource.
	Water levels are too high forcing wildlife out of the natural habitat and into harm's way and making septic systems leak into the waters shed!!!!
	I think it is great that the watershed is restoring historic seasonal hydrology to the river to allow for the natural water level fluctuations that are necessary for the life cycles of many native species. No one should have been allowed to build below the historical mean high water line in the first place!
	The joint US/Canada Seaway Commission needs to be changed. They caused the flooding problems!
	Historically, a major threat to the St Lawrence itself was the 1958dd plan for the Moses Saunders Dam. Now that a new plan is in place, I am hopeful that the ecology of the river will rebound.
	Being a full time resident across from the last waterfall on the Indian River. My home was originally built as a doctor's office in the early 1800's. Springtime and heavy rain events have occurred the yard and basement have been effected each year and my home has survived. It gets wet and dries. I understand that management of all the dams and bridges to allow constant flow directly impacts the level of water that covers my backyard and basement and what can and cannot survive high water.
	Flooding and high water levels of the St. Lawrence River are becoming of critical importance.
	We need to get control of the flooding. Very complicated I'm sure. We move billions of gallons of oil by pipeline. Why not water? Even if we just store it.
	I would like lower water levels on the St. Lawrence River, even if that means shortening the shipping season.
	Pls go back controlling the St Lawrence River as it had been years prior to 2017! This high water is killing the area!
	End the poor management practices that resulted in creating flood conditions in the St. Lawrence River

Topic	Comment
	I don't think there should be any attempt to control the level of the river.
	Water level mismanagement is currently a disaster. I am an avid environmentalist, but high water is destroying the entire resort economy of the river.
	To prevent damage to property, environment, and wildlife. The IJC needs to stop immediately with Plan 2014 and revert to the prior limits for controlling water levels on the manmade St Lawrence River. Mismanagement is being labeled as climate change and is causing the greatest threat to the ecosystem of the river.
	The level of the River has been way too high in two of the last three years. This has resulted in loss of 7 trees, erosion, and damage to sea walls and some property.
	Minimize commercial shipping calendar somewhat so water levels can be managed more effectively during non-shipping timeframes.
	Needs better control of water levels year-round throughout the system. Seeing more algae blooms when levels are low and erosion when high.
	Reduce Lake Ontario water levels.
	It's hard to concentrate on the above issues, when the end product affects an entity (i.e. St. Lawrence River and Lake Ontario) that is under siege from mis-management of said water levels.
	Open the Dam and let water out - you are destroying people's dreams and homes and the shoreline; this is not yours to destroy. Do the right thing and help us
	I don't understand why all of the watersheds are negatively affected by the water level controls on the St. Lawrence and why it cannot go back to the way it was in the past. The high waters are economically devastating to the area in the watershed.
	The greatest risk is that of flooding and erosion due to Plan 2014 and the IJC. Every effort possible MUST be applied right now to get the upper river and Lake Ontario level down to manageable levels.
	Thank you!
	Terminate IJC Plan 2014!
	Engineers changed water ways not right. Example Jacques Cartier State Park they closed off flow of water through so now is dirty. Changed flow of water back, it's not right, they were trying to do good but did not work. This needs to be fixed
	Help control Lake Ontario levels
	Get water flowing in black lake. Allow it to be navigable from the St. Lawrence.
	Water levels on Lake Ontario and the St. Lawrence River are causing serious environmental, property, and recreational issues. Water levels (Plan 2014) need to be addressed ASAP.
	High water levels were caused by excessive rain and snow. However, don't exacerbate the situation by not lowering water levels to seasonal lows before ice forms. If shipping must be suspended or terminated early, then do so.
	Being a property owner on the St. Lawrence, flooding is my chief concern. After that, the invasive species such as zebra mussels and goby are out of control.
	GO BACK TO ORIGINAL WATER LEVELS THAT HAS KEPT FLOODING TO A MINIMUM
	The water levels must be stabilized on Lake Ontario and the St Lawrence River. The damage to property owners after decades of stable water levels is unacceptable.
	My wife and I own a seasonal camp on Black Lake; it's our only real exposure to the SLR watershed. I know the lake is constantly murky; it's a fecund lake, shallow and warm. It's never, by its nature, going to be anything else. I know there are seasonal algae blooms, but I

Topic	Comment
	do not see these as being brought about by man-made pollutants or farm run-offs or septic/wastewater issues; I see them as being natural. My only issue is the constantly varying levels of the lake. It would be nice to see it managed, somehow, if possible, so it stays at a somewhat constant level.
	Better control of water levels. More public boat launches needed with ample parking.

Appendix B

Local Laws and Programs Affecting Water Quality

FINAL



October 2020

Appendix B: Local Laws and Programs Affecting Water Quality

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

Prepared for Franklin County Soil & Water Conservation District

Prepared by:



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St. Lawrence River Watershed Revitalization Plan: Local Laws and Programs Affecting Water Quality

Prepared for

Franklin County Soil & Water Conservation District
151 Finney Center
Malone, NY 12953

Prepared by

EcoLogic, LLC
9 Albany St., Suite 3J
Cazenovia, NY 13035

Rootz, LLC

PO Box 452
Chaumont, NY 13622

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ABBREVIATIONS

ACEP	Agricultural Conservation Easement Program
AEM	Agricultural Environmental Management
ALA	Adirondack Lake Association
ANSCAP	Agricultural Nonpoint Source Abatement and Control Program
APA	Adirondack Park Agency
APIPP	Adirondack Park Invasive Plant Program
AWI	Adirondack Watershed Institute
CAFO	Concentrated Animal Feeding Operation
CCE	Cornell Cooperative Extension
CEA	Critical Environmental Area
CFA	Consolidated Funding Application
CNMP	Comprehensive Nutrient Management Plan
CRP	Conservation Reserve Program
CSC	Climate Smart Community
CTA	Conservation Technical Assistance
DANC	Development Authority of the North Country
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
GIS	Geographic Information System
GLAM	Great Lakes-St. Lawrence River Adaptive Management
IJC	International Joint Commission
IRLC	Indian River Lakes Conservancy
LCLGRPBA	Lake Champlain-Lake George Regional Planning Board
LWRP	Local Waterfront Revitalization Plan
MS4	Municipal Separate Storm Sewer System
NCREDC	North Country Regional Economic Development Council
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NYSEFC	New York State Environmental Facilities Corporation
NYSERDA	New York State Energy Research and Development Authority
NYS DAM	New York State Department of Agriculture and Markets
NYS DEC	New York State Department of Environmental Conservation
NYS DOH	New York State Department of Health
NYS DOS	New York State Department of State
NYS DOT	New York State Department of Transportation
OPD	Office of Planning and Development

PRISM	Partnership for Regional Invasive Species Management
SLELO	St. Lawrence-Eastern Lake Ontario
SLRWP	St. Lawrence River Watershed Partnership
SPDES	State Pollution Discharge Elimination System
SRMT	St. Regis Mohawk Tribe
SWCD	Soil and Water Conservation District
TILT	Thousand Island Land Trust
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

1 Introduction

New York State has adopted a wide variety of laws and programs designed to help protect and maintain water quality and aquatic habitat. The purpose of this component of the St. Lawrence River Watershed Revitalization Plan is to examine the regulatory environment affecting water resources and identify opportunities for improvement, with a focus on local municipal actions. To accomplish this, the project team collaborated with County representatives to inventory and assess each watershed municipality's regulatory programs (e.g., zoning ordinances, site plan review regulations, comprehensive plans) as they relate to nonpoint source pollution. The findings of the analysis support recommendations for specific measures to improve resilience, water quality, and aquatic habitat.

This report includes the following sections:

- Description and analysis of the broad institutional framework that guides decision making and activities in the watershed, including the roles and responsibilities of federal, state, and county governments, as well as initiatives and collaborations involving regional entities, nonprofit organizations, and academic institutions (Chapter 2);
- Overview and analysis of the roles and responsibilities of local governments in the watershed (Chapter 2);
- Inventory of specific local laws and programs, and a gap analysis regarding local laws for municipalities in the St. Lawrence River watershed (Chapter 3); and
- Preliminary recommendations for municipal governments focusing primarily on developing local laws and programs as well as opportunities for best management practices that positively affect the quality of water resources (Chapter 3).

The St. Lawrence watershed planning effort is led by the St. Lawrence River Watershed Project and the Franklin County Soil and Water Conservation District and is funded through a Title 11 Environmental Protection Fund grant from the New York State Department of State. This document was prepared following a modified approach described in the guidebook *Protecting Water Resources through Local Controls and Practices* (Genesee/Finger Lakes Regional Planning Council, 2006).

2 Institutional Framework

The St. Lawrence River watershed is affected by regulations, plans, and programs at the federal, state, regional, county, and local level, as well as by collaborations involving nonprofit organizations and academic institutions. This chapter presents an overview of the broad institutional framework guiding decisions and actions in the watershed.

2.1 Federal Agency and Watershed-Related Resources

The federal government maintains various programs associated with the conservation and protection of water and natural resources. These programs monitor and report on a vast array of issues related to hydrology, water quality, terrestrial and aquatic habitat, soil health, economic activities, transportation, energy generation and much more. Federal agencies can also provide technical and financial assistance to stakeholders within the watershed. In addition to these federal resources, the online Catalog of Federal Domestic Assistance (www.cfda.gov) provides access to a comprehensive database of federal programs.

2.1.1 International Joint Commission (IJC)

Website: www.ijc.org/en

Description: The United States and Canada created the International Joint Commission (IJC) in recognition of the many ways the two nations are affected by management decisions related to the Great Lakes system. The IJC is guided by the 1909 Boundary Waters Treaty; Canada and the United States agreed that neither country would pollute boundary waters, or waters that flow across the boundary, to an extent that could cause injury to public health or damage property in the other country.

The IJC has two main responsibilities: approving projects that affect water levels and flows across the boundary and investigating transboundary issues and recommending solutions. The IJC's recommendations and decisions consider the needs of a wide range of water uses, including drinking water, commercial shipping, hydroelectric power generation, agriculture, ecosystem health, industry, fishing, recreational boating and shoreline property.

In December 2016, the IJC approved 'Plan 2014'- a new plan for managing water levels and flows in Lake Ontario and the St. Lawrence River. Before the IJC took this action, the Governments of Canada and the United States concurred on amendments to the IJC's Order of Approval, which specifies conditions and criteria for setting the

flow through the Moses-Saunders Dam, located between Cornwall, Ontario and Massena, New York.

Relevant programs and committees:

The Great Lakes Science Advisory Board provides advice on research to the IJC and to the Great Lakes Water Quality Board. It also provides advice on scientific matters referred to it by the Commission, or by the Great Lakes Water Quality Board in consultation with the Commission.

The Great Lakes Water Quality Board is the principal advisor to the IJC under the Great Lakes Water Quality Agreement. The Board assists the Commission by reviewing and assessing the progress of the governments of Canada and the United States in implementing the Agreement, identifying emerging issues and recommending strategies and approaches for preventing and resolving complex challenges facing the Great Lakes, and providing advice on the role of relevant jurisdictions to implement these strategies and approaches.

The Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee will undertake the monitoring, modeling and assessment needed to support ongoing evaluation of the regulation of water levels and flows.

The International Lake Ontario - St. Lawrence River Board is responsible for ensuring that outflows from Lake Ontario meet the requirements of the IJC order. The Board also has responsibilities to communicate with the public about water levels and flow regulation, and work with the GLAM Committee to monitor and assess performance of the Plan 2014 water level regulations.

2.1.2 United States Environmental Protection Agency (USEPA)

Website: www.epa.gov

Description: The USEPA protects environmental quality through a variety of air, water, pollution, and toxics and chemicals management programs, primarily through its Office of Water. USEPA provides information on water quality programs and assistance with planning and managing watersheds (www.epa.gov/hwp), source water protection (www.epa.gov/sourcewaterprotection), water quality, wetlands (water.epa.gov/), groundwater and surface water supplies (www.epa.gov/ccr), and septic systems (www.epa.gov/septic) and wastewater treatment (www.epa.gov/npdes/municipal-wastewater). The agency's watershed-related responsibilities include defining and ensuring compliance with basic water programs; developing national standards and tools; providing funds to support state and tribal programs; and assessing national

progress toward meeting goals and standards. The Great Lakes Restoration Initiative (<https://www.epa.gov/great-lakes-funding/great-lakes-restoration-initiative-glri>) is a major program of EPA that provides federal funds to strategically target the most significant threats to the Great Lakes ecosystem. The major focus areas include restoration of legacy contaminants in identified Areas of Concern, invasive species, nonpoint sources of pollution and impacts on nearshore health, and habitat protection and restoration.

Relevant programs: Great Lakes Restoration Initiative (GLRI)
 Environmental Monitoring and Assessment Program (EMAP)
 Healthy Watersheds Program
 National Aquatic Resource Surveys (NARS) Program
 National Nonpoint Source Program
 National Pollutant Discharge Elimination Systems (NPDES) Programs
 Great Lakes National Program Office Lake Ontario Lakewide Management Plan Acid Rain Program
 Office of Standards (supports Clean Water Act and Safe Drinking Water Act) Research and Development

2.1.3 U.S. Fish and Wildlife Service (USFWS)

Website: www.fws.gov

Description: The USFWS administers most of the nation's fish and wildlife management programs, including terrestrial and freshwater endangered species protection and migratory bird management. USFWS manages public lands and outdoor recreation (www.recreation.gov) as part of the National Wildlife Refuge system. USFWS also offers several funding programs (see below). The field office in Cortland, New York can provide state and regional information (www.fws.gov/northeast/nyfo).

Relevant programs: Partners for Fish and Wildlife
 Wildlife and Sport Fish Restoration Programs
 North American Wetlands Conservation Act (NAWCA) grants
 Conservation Planning Assistance (through Habitat Resource and Conservation)
 Great Lakes Restoration Initiative grants

2.1.4 U.S. Geological Survey (USGS)

Website: www.usgs.gov

Description: The USGS is a primary source of information on stream flow, water quality, water quantity, maps, and application software. The agency has real time data, surface water

data, and groundwater information. USGS also provides historic topographic maps that can be helpful in delineating watersheds. The New York office of USGS (<https://www.usgs.gov/centers/ny-water>), in partnership with collaborating agencies, has conducted assessments of streams in several of New York’s physiographic regions to develop regional stream rating curves, which illustrate the relationship between watershed size, stream form, and discharge. These relationships are useful in guiding stream restoration activities. USGS publications, including site specific investigations and circulars, provide information and training on watershed processes.

Relevant programs: Water Availability and

2.1.5 U.S. Army Corps of Engineers (USACE)

Website: www.usace.army.mil

Description: The USACE’s Civil Works programs focus on water resource development activities including flood risk management, navigation, recreation, and infrastructure and environmental stewardship. USACE provides technical guidance for managing water levels in the Great Lakes System, including the Lake Ontario- St. Lawrence River System through collaboration with the International Joint Commission.

Relevant programs: Section 10 of the Rivers & Harbors Act of 1899 (33 U.S.C. 403)
Section 404 of the Clean Water Act (33 U.S.C. 1344)
Flood Risk Management Program

2.1.6 U.S. Department of Agriculture (USDA): Natural Resources Conservation Service (NRCS), Forest Service

Website: www.usda.gov ; www.nrcs.usda.gov ; www.fs.fed.us

Description: The USDA supports rural development and helps communities with natural resource concerns, such as erosion control, watershed protection, and sustainable forestry practices. The USDA’s Natural Resources Conservation Service (NRCS) is the major federal agency responsible for addressing nonpoint sources of pollution. Its county-based Soil and Water Conservation Districts provide conservation planning and technical assistance to landowners and managers to benefit the soil, water, and related natural resources for productive lands and healthy ecosystems.

Relevant programs: Agricultural Conservation Easement Program (ACEP)
Agricultural Environmental Management (AEM) Plans
Conservation Technical Assistance (CTA)
Conservation Reserve Program (CRP)

Environmental Quality Incentives Program (EQIP)
National Conservation Practice Standards (e.g., Nutrient Management Code 590)

2.1.7 Fort Drum

Website: home.army.mil/drum/

Description: Fort Drum is the home of the 10th Mountain Division, located in northern New York. The installation is in the middle of one of the most historically unique and geographically beautiful areas of the United States. Fort Drum is approximately 30 miles south of Canada, with the Great Lakes to the west, the Adirondack Mountains to the east, and the St. Lawrence River and the Thousand Islands in between. The installation covers about 107,265 acres, or 168 square miles. Fort Drum provides full-spectrum training and base operations support to the United States Army service branches, 11 states, and parts of Canada.

Relevant activities: *Environmental Division:* The Environmental Division mission is to support Fort Drum and the 10th Mountain Division (LI) by protecting land, air and water; preserving history and cultural heritage; conserving natural resources; restoring land impacted by historical oil and chemical releases; and keeping the Fort Drum community informed about innovative environmental programs and accomplishments.

Natural Resources Branch: The Natural Resources Branch provide quality sustainable natural resources as a critical training asset upon which to accomplish the military mission of Fort Drum. Natural resource managers proactively manage natural resources on Fort Drum to ensure sound sustainable stewardship of public lands entrusted to the care of the Army. The Natural Resources Branch also delivers an extensive environmental outreach program that is critical to maintaining effective relationships with other professionals, neighbors, and the public for the benefit of both natural resources and military mission.

Compliance Branch: Although protecting the environment is the responsibility of everyone on post, the Environmental Compliance Branch has the unique role of coordinating the installation's overall pollution control programs. As one of the largest industrial facilities in the state, Fort Drum's operations have the potential to pollute soil, water, and air. To prevent this, the Compliance Branch oversees a comprehensive Environmental Management System (EMS) that provides specific procedures for minimizing or eliminating releases of contaminants into the natural environment. The Environmental Compliance Branch implements both legally mandated as well as best management practices related to hazardous waste, solid waste, recyclables, wastewater, stormwater, drinking water, toxic substances, spill

prevention, petroleum storage tanks, and air emissions. Pollution prevention efforts that reduce the toxicity or quantity of pollutants generated by industrial processes is an integral part of the branch's mission. Finally, the branch ensures conformance with pollution control standards by implementing a comprehensive training and inspection program.

Restoration Section: The Fort Drum Installation Restoration Program, more commonly called the Fort Drum Cleanup Program, addresses hazardous substances, pollutants, and contaminants released to the environment from historical activities that have occurred on the installation. The Cleanup Program mission, along with protecting human health and the environment, is to enable readiness by returning Army lands to usable condition. Fort Drum accomplishes the cleanup mission by performing appropriate, cost-effective remediation of contaminated sites. The Cleanup Program is executed in close coordination with New York State Department of Environmental Conservation in accordance with environmental regulations, consent orders, and decision documents that are applicable to hazardous waste sites across the installation.

2.2 State Agencies and Watershed-Related Resources

Many New York State agencies provide an array of technical and financial assistance that can support the watershed planning process.

2.2.1 NYS Department of State (NYSDOS)

Website: www.dos.ny.gov

Description: The NYSDOS Office of Planning and Development (OPD) (www.dos.ny.gov/opd/) increases resilience and sustainable growth of communities by advancing progressive land use solutions, community-based development, and building standards and codes. OPD provides technical and financial assistance to help communities integrate watershed planning with efforts to expand public access, reinvigorate urban waterfronts, restore habitats, protect scenic resources, preserve historic resources, manage water uses, improve water quality, protect against flooding and erosion, plan for storm resiliency, and strengthen local economies. OPD provides financial assistance to eligible waterfront communities on a competitive basis, through Title 11 of the Environmental Protection Fund-Local Waterfront Revitalization Program, as well as guidance and training for the revitalization of communities, protecting and improving the environment, and strengthening local economies.

The NYSDOS Division of Local Government Services (LGS) (www.dos.state.ny.us/lgss/) provides training and technical assistance to local governments and community organizations throughout the state, helping local officials solve problems involving basic powers and duties, public works, municipal organization, planning, land use and regulatory controls, and community development. It also provides training assistance to municipalities related to zoning procedures, identifying opportunities for cost savings and other practical legal and technical advice.

Relevant programs: Local Waterfront Revitalization Program (through Title 11 of Environmental Protection Fund)
 Local Government Efficient (LGe) Program
 Local Government Training (LGt) Programs
 Local Planning Clean Vessel Act
 Coastal erosion, flooding, dredging, nonpoint sources
 Coastal resources information
 Remote sensing, GIS Watershed Planning

2.2.2 NYS Department of Environmental Conservation (NYSDEC)

Website: www.dec.ny.gov

Description: The NYSDEC's Division of Water uses a watershed management approach to guide many of its programs. Water quality protection is central to the mission of NYSDEC, which regulates wastewater and thermal discharges and has responsibilities for monitoring waterbodies, controlling surface runoff, managing water availability, preventing flood damage and beach erosion, and promoting stewardship and education. A variety of funds are available for municipal wastewater treatment improvement, pollution prevention, and agricultural and nonagricultural nonpoint source abatement and control. Significant support is available to acquire open space that protects water resources, and to acquire public parklands and protect farmland.

Relevant programs: Priority Waterbodies List (PWL), NYS Section 303(d)
 Rotating Intensive Basin Surveys (RIBS)
 Citizens' Statewide Lake Assessment Program
 Water Quality Improvement Program
 Nonpoint Source Management Program, NYS Section 319
 Natural Heritage Program
 Protection of Waters Program (implements Article 15 of Environmental Conservation Law)
 Stormwater Phase II Program

Environmental Conservation Laws:

- State Environmental Quality Review Act (SEQR) (Article 8): SEQR requires investigation into alternative actions and the mitigation of harmful effects of proposed development. Potential nonpoint source pollution can be remediated through revised design or other measures.
- Water Resources Law: Water withdrawals; permit (§ 15-0501)
- State Pollution Discharge Elimination System (SPDES) (Article 17). This water pollution control law is modeled after the National Pollution Discharge Elimination System approved by the Environmental Protection Agency for the control of wastewater and stormwater discharges in accordance with the Clean Water Act. Through SPDES, NYSDEC reviews permit applications to develop the limits for types and quantities of pollutants in the effluent. The permit also includes the schedules and conditions under which discharges are allowed. Owners or operators of facilities must treat wastewater in order to meet the limits listed in their SPDES permit. □ Prohibition against pollution (§ 17-0501)
- Concentrated Animal Feeding Operations (CAFOs) Permitting (§ 17-0105) 6: The NYSDEC created and enforces regulations regarding CAFOs, which apply to dairy farms and other farms where animals are stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period. CAFOs are categorized as either “large” or “medium” based on the numbers of animals confined. The federal Clean Water Act (33 USC 1251) is the overarching authority governing discharges to waterways, and each state adopts its own related laws regarding permits required for operations that might discharge to waterways within that state.
- Stormwater permitting (§ 17-0808)
- Discharge of sewage into waters (§§ 17-1701, 1704, 1710,)
- Nutrient runoff, phosphorus fertilizer (§§ 17-2101-2105)
- Freshwater Wetlands Act (Article 24): Preserves, protects and conserves freshwater wetlands and their benefits, consistent with the general welfare and beneficial economic, social and agricultural development of the state. Protected under the Freshwater Wetlands Act are wetlands 12.4 acres or larger, and wetlands smaller than 12.4 acres if they are considered of unusual

local importance. Around every wetland is an “adjacent area” of 100 feet that is also regulated to provide protection for the wetland. A permit is required to conduct any regulated activity in a protected wetland or its adjacent area; however, certain activities are exempt from regulation. The permit standards in the regulations require that impacts to wetlands be avoided and minimized. Compensatory mitigation often is required for significant impacts to wetlands. This may include creating or restoring wetlands to replace the benefits lost by the proposed project.

- Septic System Replacement Program: Established as part of the Clean Water Infrastructure Act of 2017 (L. 2017, c. 57, Part T), the Septic System Replacement Fund provides a source of funding for the replacement of cesspools and septic systems in New York State and seeks to reduce the environmental and public-health impacts associated with the discharge of effluent cesspools and septic systems on groundwater used as drinking water, as well as threatened or impaired water bodies.

2.2.3 NYS Department of Health (NYSDOH)

Website: www.health.state.ny.us

Description: The NYSDOH provides information and technical assistance related to financing mechanisms, preventing drinking water contamination, and additional public health related water protection programs including publications outlining the regulatory framework. NYSDOH’s Bureau of Public Water Supply Protection is responsible for ensuring that source water assessments are completed for all of New York’s public water systems and made available to the public. New York’s Final Source Water Assessment Program Plan and a list of contacts by county can be viewed at www.health.state.ny.us/nysdoh/water/swap.htm .

Relevant programs: Contaminant monitoring and fish advisories
Source Water Assessment Program (SWAP)
Drinking Water Protection Program
Septic System Standards
Bathing Beach rules and regulations (10 NYCRR 6-2)

2.2.4 NYS Department of Agriculture and Markets (NYSDAM)

Website: www.agmkt.state.ny.us

Description: NYSDAM administers funding programs including the Agricultural and Farmland Protection Implementation Grant, the Farmland Protection Planning Grant, and Land Trust Grant programs. The Soil and Water Conservation Committee of New York's Department of Agriculture and Markets develops and oversees implementation of Soil and Water Conservation District programs and AEM programs, which provide technical assistance, including comprehensive nutrient management planning, streamside conservation, and community conservation. Financial assistance is also provided through the New York State Agricultural Nonpoint Source Abatement and Control Program (ANSCAP). The NYS Conservation Reserve Enhancement Program (NYS CREP) also aims to reduce pollution in streams by helping agricultural landowners to voluntarily plant trees, shrubs, and grasses on streambanks to trap sediment, pesticides, and fertilizers in runoff. In addition, New York's Agricultural Districts law states that the Agriculture and Markets commissioner can intervene when local governments enact laws that unreasonably restrict farm operations in agricultural districts; this power places limits on the municipalities to regulate land uses in agricultural areas.

Relevant programs: NYS Agricultural Nonpoint Source Abatement and Control Program (SWCD law §11-B): Competitive grant fund for County Soil and Water Conservation Districts (source is Environmental Protection Fund and Clean Air/Clean Water Bond Fund).

Specialty Crop Block Grant Program: Funding to enhance the competitiveness of specialty crops, defined as "fruits, vegetables, tree nuts, dried fruits, horticulture, and nursery crops (including floriculture)."

Organic Farming Development/Assistance: Guidance in locating resources on organic agriculture and organically produced foods.

NYS Agriculture and Markets law:

- Agricultural Environmental Management (AEM) (Article 11-A).
- Agricultural Districts Law (Article 25-AA, §305-a). This law authorizes the creation of local agricultural districts in order to encourage the continued use of farmland for agricultural production. Agricultural districting provides a combination of landowner incentives and protections that are designed to

forestall the conversion of farmland to nonagricultural uses. Included in these benefits are preferential real property tax treatments, tools such as the purchase of development rights, and grant programs aimed at assisting local governments and land trusts with farmland protection efforts. State agricultural laws also offer protections against overly restrictive local laws.

2.2.5 NYS Environmental Facilities Corporation (NYSEFC)

Website: www.nysefc.org

Description: The NYSEFC’s mission is to promote environmental quality by providing low-cost capital and expert technical assistance to municipalities, businesses, and State agencies for environmental projects in New York State. Its purpose is to help public and private entities comply with federal and State environmental requirements. NYSEFC’s primary activities are the State Revolving Funds (SRF), the Industrial Finance Program (IFP), and Technical Advisory Services (TAS). The EFC is among the partner agencies on the Lake Ontario Resiliency and Economic Development Initiative (REDI) and is responsible for administering funds to communities and homeowners affected by flooding in 2017 and 2019 in affected areas, including shoreline areas of Jefferson and St. Lawrence counties.

Relevant programs: NYSEFC Green Innovation Grant Program
REDI

2.2.6 NYS Soil and Water Conservation

Website: www.nys-soilandwater.gov

Description: Soil and Water Conservation Districts (SWCDs) were established throughout the United States in response to the Dust Bowl of the 1930s. In 1940, the New York State Soil Conservation District Law was passed, which created the State Soil and Water Conservation Committee (State Committee). The mission of State Committee is to advance comprehensive natural resource management through the support of local Soil and Water Conservation Districts (see section 2.7.1). The Conservation District Law also gave counties authority to create local Soil and Water Conservation Districts; whereby, District successes soon led counties to fully recognize their value and designate them as the lead local water quality agency. The State Committee and the Department of Agriculture and Markets, support Conservation Districts by establishing policies to guide local programs, providing technical and administrative support, and administering State grant programs.

Relevant programs: Agricultural Environmental Management (AEM)
 Agricultural Non-point Source Abatement and Control (AgNPS)
 Climate Resilient Farming (CRF)
 Ecosystem Based Management (EBM)

2.2.7 NYS Department of Transportation

Website: www.nysdot.gov

Description: The NYSDOT provides design and guidance documents, standard specifications, and procedural manuals (Highway Design Manual, Environmental Procedures Manual, Maintenance Guidelines, etc.) that can be incorporated into local laws and highway department operating procedures. The NYSDOT also funds and implements environmental benefit projects that improve water quality, manage salt storage and application, restore wetlands, promote eco-tourism, protect fish and wildlife habitat, and enhance transportation corridors through its Environmental Initiative.

Relevant programs:

GreenLITES
 Stormwater Management
 Roadside Vegetation Management
 Culvert Sizing and Connectivity
 Coastal Management

2.2.8 NYS Energy Research and Development Authority

Website: www.nyserda.ny.gov

Description: The NYS Energy Research and Development Authority (NYSERDA) promotes energy efficiency and the use of renewable energy sources. Collectively, NYSERDA's efforts aim to reduce greenhouse gas emissions, accelerate economic growth, and reduce customer energy bills. These efforts are key to developing a less polluting and more reliable and affordable energy system for all New Yorkers.

NYSERDA works with stakeholders throughout New York including residents, business owners, developers, community leaders, local government officials, university

researchers, utility representatives, investors, and entrepreneurs. NYSERDA partners develop, invest, and foster the conditions that:

- Attract private sector capital investment needed expand New York's clean energy economy
- Overcome barriers to large-scale adoption of renewable energy
- Enable the state's communities and residents to benefit from energy efficiency and renewable energy

Relevant programs: The Climate Smart Communities Program
Agriculture Energy Audit Program

2.3 Tribal Community

2.3.1 Saint Regis Mohawk Tribe

Website: www.srmt-nsn.gov/

Description: The Saint Regis Mohawk Tribe (SRMT) resides on the St. Regis Reservation in Franklin County, New York. It is also known by its Mohawk name, Akwesasne. As a sovereign nation, the tribal nation shares jurisdiction with the state of New York and the United States. The elected tribal governments on the New York and Canadian sides and the traditional chiefs of Akwesasne work together as a "Tri-Council" concerning areas of shared interest. The SRMT has one of the most advanced environment divisions of any Tribe in the country. The efforts of the Environment Division are directed toward preventing disease and injury, while at the same time, promoting lifestyles that respect, protect and enhance the environment for the next seven generations at Akwesasne.

Relevant programs: Ecological Restoration: The SRMT has performed a variety of ecological restoration projects, including restoration and/or enhancement of wetlands, streambanks, native grasslands, bird nesting and roosting habitat, fisheries and fish habitat and acquisition of unique habitat under threat of development.

Fisheries: The SRMT works to preserve existing fish species and re-establish their presence in the St. Lawrence River basin and Akwesasne territory by locating populations of rare, threatened and endangered species; estimating their abundances and assessing habitat conditions; identifying threats and prioritizing areas for protection; and restoring species populations. Example projects include the reintroduction of Atlantic salmon (extirpated from the St. Lawrence River), lake sturgeon habitat rehabilitation in the St. Regis River, and the assessment of threatened and endangered species in the St Lawrence River.

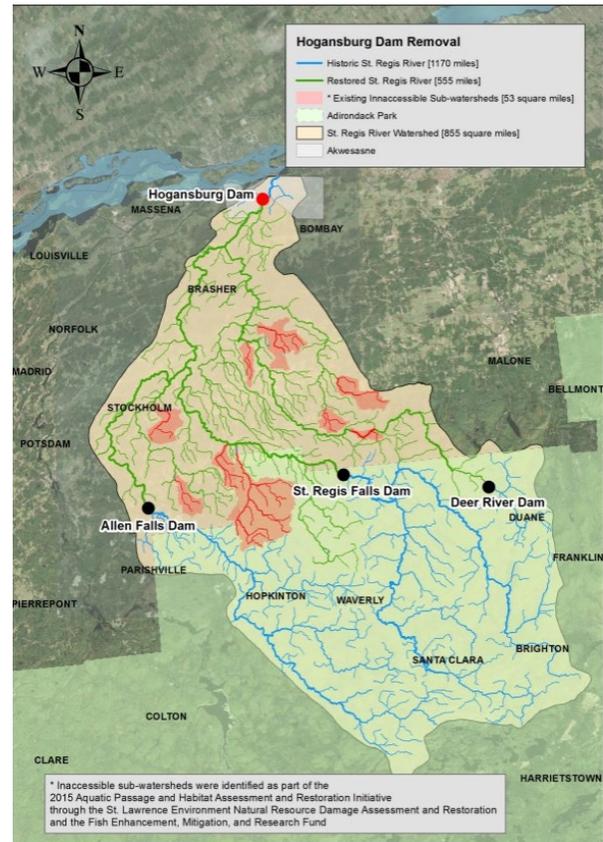
Habitat Improvement: The SRMT, in collaboration with USFWS, demolished a hydroelectric dam in Hogansburg, NY. Removal of the dam has restored up to 275 river and stream miles of habitat for migratory fish.

Source is <https://www.srmt-nsn.gov/environment>

Wetlands Protection: The SRMT has developed a Wetlands Protection Plan which committed the Tribe to implementation of a "no net loss - future net gain" policy. This program identifies an area that would support the establishment of a Mohawk Wetlands Sanctuary.

River Health: The SRMT has implemented EPA approved water quality standards under the Clean Water Act. The tribe is enabled to administer the various sections of the act to manage ambient water quality, non-point source pollutants, construction activities, and direct discharges to waters of the reservation.

Environmental Remediation: The SRMT ensures protective and sustainable cleanup of polluted lands and waters under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); including, involvement with remedial actions at Areas of Concern associated with the Grass River and St. Lawrence River.



Habitat connectivity efforts and progress in the St. Regis watershed area.

2.4 Regional Agencies and Initiatives

2.4.1 St. Lawrence River Watershed Partnership (SLRWP)

Website: www.fcsxcd.org/partnerships.orgst-lawrence-river-water-partnership-slrwp

Description: The SLRWP is a coalition formed to encourage watershed partnerships and the implementation of conservation projects that promote, enhance and protect natural resources and water quality. Partners include Soil & Water Conservation Districts, Black River St. Lawrence RC&D, New York State Department of Environmental Conservation, St. Regis Mohawk Tribe, United States Department of Agriculture-NRCS, Paul Smiths College, Adirondack Watershed Institute, New York State Department of Ag and Markets, North Country Community College, Mountain View Association, and Malone Revitalization Foundation. The organizational purpose is to promote the sharing of information, data, ideas and resources to foster a dynamic and collaborative watershed management program with an ecosystem-based approach to support water quality improvement and protection.

Relevant programs: The SLRWP led preparation of the St. Lawrence River Watershed Revitalization Plan, to which this Local Laws and Programs is appended.

2.4.2 Adirondack Park Agency (APA)

Website: www.apa.ny.gov

Description: The APA is a governmental agency created in 1971 by the New York State Legislature to develop long-range land use plans for both public and private lands within the boundary of the Park. The APA is responsible for maintaining protection of the forest preserve and overseeing development proposals of the privately-owned lands. The Agency prepared the State Land Master Plan, which was signed into law in 1972, followed by the Adirondack Park Land Use and Development Plan in 1973. Both plans are periodically revised to reflect the changes and current trends and conditions of the Park. The mission of the APA is to protect the public and private resources of the Park through the exercise of the powers and duties provided by law.

Relevant acts: APA's mission is rooted in three statutes administered by the Agency, they are:

- The Adirondack Park Agency Act
- The New York State Freshwater Wetlands Act and
- The New York State Wild, Scenic, and Recreational Rivers System Act.

2.4.3 Great Lakes Commission

Website: www.glc.org

Description: The Great Lakes Commission is a binational leader and a trusted voice ensuring the Great Lakes and St. Lawrence River support a healthy environment, vibrant economy and high quality of life for current and future generations. The

Commission represents, advises and assists its member states and provinces by fostering dialogue, developing consensus, facilitating collaboration and speaking with a unified voice to advance collective interests and responsibilities to promote economic prosperity and environmental protection and to achieve the balanced and sustainable use of Great Lakes – St. Lawrence River basin water resources.

2.4.4 Lake Champlain – Lake George Regional Planning Board (LCLGRP)

Website: www.lclgrpb.org

Description: The LCLGRP is one of nine regional planning and development organizations operating in New York State. The LCLGRP's service area contains portions of the watersheds of Lake Champlain, the Upper Hudson River, the Mohawk River, the Black River and the St. Lawrence River. The LCLGRP service area in the St. Lawrence River watershed lies in northern Hamilton County, and small parts of western Essex and Clinton Counties. The LCLGRP works with communities and organizations to develop plans and programs to ensure the long-term health of the region's waterbodies. Because actions upland from a waterbody have a direct impact on the waterbody itself, many water quality plans take a broader approach and are based around the entire watershed.

2.4.5 North Country Regional Economic Development Council (NCREDC)

Website: www.regionalcouncils.ny.gov/north-country

Description: The NCREDC is dedicated to economic development in Clinton, Essex, Franklin, Hamilton, Jefferson, Lewis, and St. Lawrence counties. The NCREDC is comprised of public-private partnerships made up of local experts and stakeholders from business, academia, local government, and non-governmental organizations. The NCREDC has embraced the power of regional partnership and welcomed historic new levels of support from NYS. Just as it represents historic advancements in areas such as destination tourism and value-added agriculture, the NCREDC is focused on technology related investments such as broadband access, a growing Transportation Equipment and Aerospace Cluster, emerging biotech opportunities, and the Innovation Hot Spot at Clarkson.

Relevant programs: Consolidated Funding Application (CFA): The CFA has been designed to give economic development project applicants expedited and streamlined access to a combined pool of grant funds and tax credits from dozens of existing programs. The CFA is a modern and easy-to-use online application that allows businesses and other entities to apply for multiple agency funding sources through a single, web-based

application. It is the primary portal for businesses to access state agency resources, including resources for community development, direct assistance to business, waterfront revitalization, energy and environmental improvements, government efficiency, sustainability, workforce development, and low-cost financing.

2.4.6 Development Authority of the North Country (DANC)

Website: www.danc.org

Description: The Development Authority was created in 1985 by the New York State Legislature to develop and manage infrastructure to support the reactivation of the 10th Mountain Division at Fort Drum, and to serve the common interests of Jefferson, Lewis and St. Lawrence counties. The Authority operates as a revenue-based public benefit corporation, independent of state operational funding.

Since the Authority was created, the coinciding needs of Fort Drum and the region have resulted in benefits for both. The Development Authority of the North Country is unique among public authorities in New York State in its scope of activities. Unlike other single-purpose state authorities, the Development Authority owns and operates numerous revenue-based infrastructure facilities including water and wastewater facilities, an extensive fiber optic network, and a regional landfill.

Due to its geographic scope, the Authority has evolved into a problem-solving partner in regional development and is the region's largest provider of shared services. Staff manages a wide range of business and housing loan programs that encourage growth and contribute to the prosperity of communities. Authority staff with a wide range of expertise provide fee-based technical services to municipalities including consolidation studies, Geographic Information System (GIS) hosting, and the management of water and wastewater facilities.

Relevant programs: Water Quality: Water and sewer infrastructure were the foundation of the Development Authority, with initial projects built to serve the wastewater and drinking water needs of a growing Fort Drum. The Water Quality Division emerged as the Authority evolved to assist an ever-growing number of communities struggling to meet their water and wastewater needs. The Authority's technical expertise and ability to implement solutions that cross municipal boundaries has made it a valuable partner in helping communities across the region develop cost-effective methods of meeting their water and wastewater needs as well as providing the capacity for growth.

2.4.7 Partnership for Regional Invasive Species Management

Website: www.dec.ny.gov/animals/47433.html; www.sleloinvasives.org; www.adkinvasives.com

Description: Partnerships for Regional Invasive Species Management (PRISMs), comprising diverse stakeholder groups, were created to address threats posed by invasive species across New York State. PRISMs are key to New York’s integrated approach to invasive species management. Partners include federal and state agencies, resource managers, non-governmental organizations, industry, recreationists, and interested citizens. The NYS DEC provides financial support, via the Environmental Protection Fund, to the host organizations that coordinate each of the eight PRISMs, resulting in statewide coverage. Two PRISMs exist within the St. Lawrence River watershed: St. Lawrence-Eastern Lake Ontario (SLELO) and Adirondack Park Invasive Program (APIPP).

Relevant programs:

- Boat inspections, decontamination stations, and education and outreach to prevent aquatic invasive species
- iMapInvasives, GIS-based data management system
- Rapid Response Program
- Regional Invasive Species Management Strategic Plan
- Vulnerability Assessments Utilizing C-Map BioBase
- NYS Invasive Species Awareness Week

2.5 Initiatives associated with Academic Institutions

2.5.1 Paul Smith’s College, Adirondack Watershed Institute (AWI)

Website: www.ecommunitypaulsmiths.edu/awi

Description: The AWI is a component of Paul Smith’s College that conducts work broadly focused on conserving and protecting natural resources in the Adirondack region. They offer a range of services to the public, including invasive species management, water quality monitoring, recreational use studies, ecological studies, educational programs and publications. AWI also provides jobs and research experiences to undergraduate students.

Relevant programs:

Adirondack Lake Assessment Program
 Lake & Stream Monitoring
 Aquatic Invasive Management
 Stewardship Program (Boat Wash Stations, Public Education, Field Monitoring)

2.5.2 Clarkson University, Center of Excellence in Healthy Water Solutions

Website: <https://www.clarkson.edu/news/clarkson-university-esf-partner-new-center-excellence-healthy-water-solutions>

Description: Clarkson was recently designated along with SUNY College of Environmental Science and Forestry (ESF) to launch the state's new Center of Excellence in Healthy Water Solutions. There are now 13 Centers of Excellence managed by NYSTAR, a program of Empire State Development. These partnerships between the academic research community and the business sector are created to develop and commercialize new products and technologies, promote critical private sector investment in emerging high-technology fields, and create and expand technology-related businesses and employment. Clarkson and ESF will deploy experts and students to deliver technology innovations and research-based solutions on watershed and water quality challenges. The Center of Excellence plans to work with industry, government, and regional academic collaborators to develop early-warning systems to monitor, model, predict and avoid threats before they become issues. The Center will also work on management practices and ecosystem design to improve the resilience of the state's aquatic resources.

2.5.3 Cornell University Cooperative Extension

Website: www.cce.cornell.edu

Description: Cornell Cooperative Extension (CCE) extends Cornell's land-grant programs to every county in the state. CCE staff serve on committees and working groups related to agriculture and water quality and are involved in the development of recent agricultural plans. While each county CCE office has a unique focus depending on the specific needs, CCE offers access to a range of important services related to food systems. Some examples include: support to beginning farmers and those expanding into new crops or animal products; food safety issues; connecting to agricultural developments and innovative technologies from faculty and staff from Cornell University and other research institutions; and youth development programs to connect generations of producers.

Relevant programs

- Local Roads Program
- Agricultural Experiment Station
- Cornell AgriTech
- Pesticide Management Education Program
- Recycling Agricultural Plastics Program
- PRO-Dairy

Cornell University Nutrient Management Spear Program
NYS Integrated Pest Management Program

2.6 Nonprofit Organizations

2.6.1 Indian River Lakes Conservancy (IRLC)

Website: www.indianriverlakes.org

Description: The IRLC is a 501 (c)(3) not-for-profit and an accredited New York State Land Trust through The Land Trust Alliance. IRLC was created to preserve the unique natural resources of the Indian River Lakes Region in Northern New York State. The Indian River Lakes system, located on the St. Lawrence River plain in Jefferson and St. Lawrence Counties, consists of the Indian River and 18 natural lakes. The watershed occupies an extraordinary landscape of rocky, wooded uplands and teeming wetlands, lakes, and streams. Sitting astride the rugged, geologic backbone of the Frontenac Arch connecting the Adirondacks to Algonquin Park in Canada, the Indian River Lakes and neighboring Thousand Islands share a vital confluence of pathways for migratory birds and one of the most diverse habitats for wildlife in the northeast. The IRLC is committed to preserving, protecting, and encouraging the sustainable management of this uniquely valuable watershed for the benefit and the enrichment of the future generations.

Relevant programs: Water Quality: IRLC, in partnership with Research, Applied Technology, Education and Services (RATES) has implemented a water quality monitoring program in the Indian River Lakes and Indian River watershed. Water quality sensors, known as Real Time Hydrologic Stations (RTHS), have been installed to monitor water temperature, meteorological data, turbidity, salinity, and other water quality parameters. The data are used to assess climate and water quality conditions that precede and contribute to impairments, such as harmful algal blooms.

Septic Program: IRLC's Water Project involved contacting residents, lake associations and other stakeholders to share information about water quality issues in the lakes and river and to find ways to improve septic systems so as to preserve water quality, protect property values and the local tax base, and benefit the quality of life on the lakes for future generations. This initiative has been supported by a New York State Conservation Partnership Program Grant to provide cottage owners with a professional assessment of their wastewater systems and options for improvement.

Education & Outreach: IRLC hosts a 1,000-square foot Trailside Learning Center at their Redwood Hill Preserve. IRLC hosts a Kids' Camp Summer STEAM Extravaganza

that focuses getting children connected with nature by teaching them the basic tenants of protecting water quality and preventing spread of invasive species. In addition, IRLC launched a new education program titled Protectors of Water and Habitat on the Indian River Lakes (Project WHIRL), which environmental professionals and college level mentors lead high school students in action oriented programs that connect the students with the environment and local community in the tracks of invasive species, aquatic resources, and watershed management.

Lake Management: IRLC has provided financial assistance to lake associations that have committed to the engagement of SUNY Oneonta's Biological Field Station Graduate Student Program to support development of specific lake management plans.

Habitat Restoration: IRLC partnered with Audubon New York, Cornell Lab of Ornithology, Clarkson University, the Thousand Islands Land Trust, and NYS Department of Environmental Conservation to restore endangered bird (i.e., Golden-winged Warbler) habitat at the Grand Lake Reserve.

Public Access: The organization conserves nearly 2,500 acres and land within the Indian River Lakes subwatershed, including Redwood Hill Preserve, Baker Woods Preserve, Grand Lake Reserve, Indian River Preserve, and Oxbow Tract. In 2019, IRLC constructed a wheelchair accessible trail on its Redwood Hill Preserve in the hamlet of Redwood, NY. The trail provides a unique woodland experience for people of all ages and abilities, including veterans and active duty soldiers suffering from the effects of post-traumatic stress disorder. Trail construction represented a coalition of community support, including the Town of Alexandria, the NNY Association of the US Army, the River Hospital Community Wellness Program, the Jefferson County Office of the Aging, the Northern Regional Center for Independent Living, and the Thousand Islands Regional Tourism Development Corporation.

2.6.2 Thousand Island Land Trust (TILT)

Website: www.tilandtrust.org

Description: The TILT has been working to conserve the natural beauty, diverse wildlife habitats, water quality and outdoor recreation opportunities of the Thousand Islands region since 1985. TILT has been Land Trust Alliance Accredited since 2009. The organization now conserves over 10,000 acres within the Thousand Islands region through preserve lands that are owned by TILT, and through conservation easements that TILT holds on private land. TILT actively stewards these lands, conducting habitat

restoration projects and invasive species control in an effort to strengthen the resiliency of the natural resources in the coastal environment.

Relevant programs: Education and Outreach: TILTreks and Talks, TeenTreks, KidsTreks and TILTKids Camp programs promote living, learning and conserving in the 1000 Islands.

2.6.3 Save The River

Website: www.savetheriver.org

Description: Save The River has been the leading grassroots advocacy organization working to protect and preserve the ecological integrity of the Upper St. Lawrence River through advocacy, education, and research. Save The River is a member-based organization representing more than 4,500 individuals, followers and families who live, work and play along the St. Lawrence River. Save The River is designated as the Upper St. Lawrence Riverkeeper and is a member of the international Waterkeeper Alliance. Over the years, Save The River has fought to stop winter navigation, expansion of the St. Lawrence Seaway infrastructure, pressed for better spill response planning and sought public accounting of shipping accidents, and campaigned for better water level management.

2.6.4 Mountain View Association

Website: www.mountainviewassn.com

Description: The Mountain View Association was founded in 1907 as a nonprofit organization. It's one of the oldest lake associations in the Adirondack Park. The Association is dedicated to preserving and protecting Mountain View Lake, Indian Lake and the Channel. Their mission is to promote and improve the beauty, navigation, purity and safety; promote, preserve and improve the environmental quality; and conserve and promote the common good and general welfare of persons owning or occupying camps and other properties on the shores.

2.6.5 Adirondack Lake Association

Website: www.adirondacklakesalliance.org /

Description: The Adirondack Lakes Alliance (ALA) representing lake and river associations within the Adirondacks, has as its primary mission the protection and preservation of our Adirondack waters. The ALA provides a forum for lake and river associations to share information and resources and to make recommendations to appropriate state, county and local agencies, and educational and other relevant non-profit

organizations, regarding environmental and ecological issues threatening Adirondack lakes and rivers.

2.6.6 Other Nonprofit Organizations

There are many other nonprofit organizations within the St. Lawrence River watershed, including but not limited to, the following:

- Black Lake Association
- Butterfield Lake Association
- Chateaugay Lake Foundation
- Historical Society of Lake Pleasant
- Indian Lake Community Development Corporation
- Indian Lake Garden Club
- Lake Abanakee Civic Association
- Lake Pleasant Sacandaga Association
- Long Lake Association
- Nature up North
- New York Federation of Lake Associations (NYSFOLA)
- Nicandri Nature Center
- Piseco Lake Association
- Research, Applied Technology, Education and Services (RATES)
- Raquette R. Advisory Council & West Branch St. Regis R. Advisory Council
- Sixth and Seventh Lake Improvement Association
- St. Lawrence Land Trust
- The Nature Conservancy
- Tug Hill Tomorrow

2.7 County-Level Agencies and Initiatives

2.7.1 Soil and Water Conservation Districts (SWCD)

Website: <https://www.nys-soilandwater.org/>

Description: Each County government maintains a SWCD, which provide technical assistance and education to their residents to ensure the wise use of soil, water, and other natural resources. SWCD activities are guided by the state’s Soil and Water Conservation Committee, which works closely with the NYS Department of Agriculture and Markets. SWCD have authority to work with private landowners on

non-agricultural projects. As urban centers and suburban development have grown, Conservation Districts have broadened to have expertise in stormwater management, stream degradation and repair, invasive species management, green infrastructure, outreach and education, and other fields to meet local needs. Typical programs conducted by SWCDs are listed below.

Agricultural Programs:

Agricultural Environmental Management (AEM): AEM is a voluntary, incentive-based program that supports agriculture of all types and sizes, i.e. dairy, beef, sheep, etc., in their efforts to be environmentally sound and economically viable. AEM planning commonly addresses barnyard runoff and management, manure and nutrient management, grazing systems, milk-house wastewater, stream crossings, and waste storage facilities. AEM participation allows farms to be considered for State and Federal Cost Sharing programs (NYS Agricultural Non-point Source Grant, Environmental Quality Incentives Program) that support environmental management projects on local agricultural related operations. The AEM planning approach utilizes a tiered process, as described below:

- Tier 1 - Inventory current activities, future plans and potential environmental concerns
- Tier 2 - Document current land stewardship; assess and prioritize areas of concern
- Tier 3 - Develop conservation plans addressing concerns and opportunities tailored to farm goals
- Tier 4 - Implement plans utilizing available financial, educational and technical assistance
- Tier 5 - Evaluate to ensure the protection of the environment and farm viability

By using this approach, farmers can document their environmental stewardship and further advance their positive contributions to their communities, our food systems, the economy, and the environment.

Comprehensive Nutrient Management Planning (CNMP): Unique to animal feeding operations, CNMPs evaluate aspects of farm production and offer conservation practices that help achieve production and natural resource conservation goals. CNMPs are the foundation for the NYSDEC's regulatory program to control potential water pollution from concentrated animal feeding operations (CAFOs) under State General Permit GP-04-04, and are also a

requirement for farms seeking federal or state cost-sharing to construct manure storage facilities.

Ag Value Assessment: The SWCD assists landowners filing for an Agricultural Assessment for their taxes by creating “soil group worksheets” that are required for the program.

Soil Testing: tests agricultural soils to define optimal fertilization rates and amendments

Agricultural Non-point Source Abatement and Control Program: provides cost-share funding to correct and prevent water pollution from farms and farming activities. The program is a competitive grant program, with funds applied for and awarded through county Soil and Water Conservation Districts.

GRAZE NY: assists farmers with prescribed grazing efforts by providing pasture quality assessments, stocking rate recommendations, infrastructure improvements, and planning guidance. Among the potential benefits of these practices is a reduction of soil erosion, increase in plant diversity, and water quality improvements.

Tile Drain Layout: Subsurface tile or artificial drainage is the practice of placing slotted drain tubes beneath the soil surface well below tillage depth to help lower the water table of poorly drained fields and/or wet areas within fields. Though the concepts and benefits of artificial drainage are ancient, it continues to be an important crop production practice for modern agriculture and changes in input prices and crop values has made subsurface drainage an even more valuable investment.

Rental Equipment: offers specialty equipment. Examples include: hydroseeding equipment to municipalities (to help stabilize soil and reduce sediment loss); no-till grain drills for farmers to use seeding or pasture renovations (to reduce compaction, improve soil health, and conserve water for plant growth).

Forest Management Programs

Forest Management Plans: SWCD staff assist landowners with developing a forest management plan. A forest management plan is written based the goals and desires of the landowner and includes actions to be taken to achieve these. The plan itself is a document that landowners and foresters can refer to for guidance while a property is being managed. Forest management includes following short-term and long-term plans for: site preparation, weeding and/or timber stand improvement practices, harvesting timber, maintaining wildlife management, tree planting, natural regeneration, enhancing aesthetics, recreational use, etc. All

efforts are made with conservation in mind and maintaining water quality protection.

Invasive Species: SWCD are involved in many regional and local efforts related to early detection and rapid response to invasive species (including terrestrial and aquatic organisms that affect agriculture, forests, wetlands, and aquatic ecosystems). For example, Clinton County is involved in a multiyear project to inventory and eradicate high priority areas of Japanese Knotweed.

Water Resource Management Programs

Stormwater is water from rain or melting snow that doesn't soak into the ground but runs off into waterways. As stormwater flows, it picks up a variety of materials on its way including soil, animal waste, salt, pesticides, fertilizers, oil and grease, debris and other potential pollutants. SWCDs provide services to municipalities and landowners to protect our natural resources by implementing stormwater management practices.

Lake and Stream Monitoring: SWCD technicians monitor lake and stream health using a variety of water quality parameters including water levels.

Erosion and Sediment Control: This program offers training on erosion control practices and stormwater pollution prevention to contractors, developers, engineers, highway departments, municipal boards, and code enforcement officers. Site visits are conducted to determine slope, water courses, drainage patterns, and soil types. Streambank and shoreline stabilization assistance is offered to prevent sedimentation and erosion, including bioengineering with live willow stakes and natural channel design. Critical area seeding assistance is offered to landowners and municipalities dealing with disturbed areas in need of seeding.

Aquatic Vegetation Control: This program aims to increase the accessibility and usability of the county's water bodies, while seeking to leave the lakes in the most ecologically intact manner possible.

Invasive Species: The SWCD partners with PRISMs and the federal Animal and Plant Health Inspection Service on invasive species initiatives.

Urban- Development Programs

Drinking water testing: SWCDs provide cost-share for water quality testing to assist landowners with concerns about the quality of their private well water.

Green Infrastructure Demonstration Projects: The Hamilton County SWCD implemented several Green Infrastructure Demonstration Projects at their office building to offer the public and municipalities the chance to see the installation and use of green infrastructure stormwater practices, while capturing and reusing

the stormwater runoff from their facilities. These demonstration projects provide an excellent educational tool to illustrate and promote the numerous benefits of rain gardens, bioswales, and rain barrel systems.

On-site Septic: The SWCD offers site assessments and septic system dye kits. **St. Lawrence and Jefferson Counties** have been designated as a priority geographic area eligible to assist septic system projects by the DEC and DOH. This program provides property owners with funding to replace cesspools and septic systems and reduce the environmental and public-health impacts associated with the discharge of effluent to groundwater used as drinking water, as well as threatened or impaired water bodies.

Culvert Enhancements: The SWCD provides technical assistance to municipalities and landowners to enhance and repair culverts. Adequately sized and properly installed culverts are important to flood prevention and fish passage.

Community Engagement Programs

Recreational Trails: SWCDs maintain multi-use recreational trails throughout County's lands. Proper construction of trails is crucial for forest management and protecting our natural resources.

Arbor Day: SWCDs work with towns, schools, and public groups to promote Arbor Day.

Tree and Shrub Sale: The SWCD offers a wide variety of bare root seedlings and ground covers to be used for erosion control, wildlife habitat improvement, beautification, windbreaks, and wood product production.

Conservation Field Days: This program is to assist and educate the communities about conservation practices.

Envirothon: The Northern Adirondack Regional Envirothon is a hands-on environmental education competition where teams of five high school students work together in hopes of winning scholarships and awards. The teams compete in five different environmental categories (i.e., soils/land use, aquatic ecology, forestry, wildlife and current environmental issues)

Fish Sale: a fish stocking program, including trout, bass, catfish, and minnows, is offered to the residents

Technical Assistance

Information: SWCD offers Technical Assistance to the public as well as private contractors. Topics most often requested for assistance include soils maps and information, USGS Topographic maps, National Wetlands Inventory maps, NYS Freshwater Wetlands maps, and information on pond construction.

Permit Assistance: Technical assistance is provided to landowners, municipalities and farms with many types of permits including stream, wetland, mined land, storm water and bulk petroleum storage permits.

2.7.2 St. Lawrence County

Website: www.stlawco.org; <https://www.stlawco.org/Departments/Planning/>;
<https://www.stlawco.org/Departments/SoilWater/>;
<https://www.stlawco.org/Departments/HighwayDepartment/>;
<https://www.stlawco.org/Departments/PublicHealth/>

Description: All of St. Lawrence County is within the St. Lawrence River watershed; this county also encompasses the majority of the river's shoreline. The County's **Planning Department** is involved in water resource protection activities by providing land use regulations, community zoning maps, and model ordinances. The Planning Department led preparation of the St. Lawrence River Shoreline Resiliency Plan (2019) and participates in many of the related water resource protection activities (e.g., public drinking water supplies, public bathing beaches, septic system installation). The County's Planning Department (2016) prepared an Agricultural Development Plan (2016) to strengthen and diversify its agricultural economy, and to protect and improve farmland. The Department also hosts advisory boards such as the Environmental Management Council and Agriculture and Farmland Protection Board. The **Highway Department** is responsible for road and bridge maintenance, traffic safety, and tree trimming. They are also responsible for winter maintenance of 118 miles of State roads and 144 miles of County roads plus 555 miles of roadside mowing during the summer months. The Public Health Department leads a Public Health Sanitarian Program that conducts investigations of nuisance complaints, collects water samples from private water supplies, and provides technical assistance and evaluations of private sewage disposal systems.

Relevant plans, programs, and laws

- Agricultural Districts Law
- AEM Program (in cooperation with the SWCD)
- Right to Farm Law
- Agricultural Development Plan (December 2016)
- Hammond Joint Comprehensive Plan
- Hermon Comprehensive Plan
- Raquette River Blueway Corridor
- Massena Brownfield Opportunity Area
- Community Development Block Grants
- St. Lawrence River Shoreline Resiliency Plan

Public Health Sanitarian Program
 Agricultural Assessments
 Ag Equipment Rentals
 Grasse River Blueway Trail Plan
 Canton Grasse River Waterfront Revitalization Plan
 Septic System Replacement Program

2.7.3 Franklin County

Website: www.countyfranklin.digitaltowpath.org

Description: Nearly 1,400 square miles of Franklin County are within the St. Lawrence River watershed, with much of that area (60%) lying within the Adirondack Park. Franklin County is home to more than 670 bodies of water. A Water Quality Coordinating Committee convenes regularly to discuss emerging issues and actions affecting the county's waterbodies. Franklin County **Highway Department** maintains 266.28 miles of roads, 188 county owned bridges and is responsible for winter snow and ice removal.

Relevant plans, programs, and laws

St. Lawrence River Watershed Project (SLRWP)
 AEM
 Agricultural Districts Law
 Drinking Water Program (through SWCD)
 Franklin County Water Quality Coordinating Committee
 Emergency Preparedness Program (Public Health Department)

2.7.4 Jefferson County

Website: www.co.jefferson.ny.us

Description: Jefferson County has 256 miles of shoreline on Lake Ontario and the St. Lawrence River; 1800 miles of rivers and streams; over 150 inland ponds, lakes, reservoirs, and rivers; high quality groundwater supplies in the eastern and southern portions of the County; and over 40,000 acres of wetlands, swamps, and marshes. The County **Planning Department** updated their Agricultural and Farmland Protection Plan in 2016. The plan created an Agricultural and Farmland Protection Board and hosts focus group meetings to learn about CAFO farms, agri-business, and farmland protection. A Water Quality Coordinating Committee meets monthly to coordinate efforts to protect and improve the quality of surface and groundwater for their intended uses. The **Highway Department** maintains 555 miles of roads and 450 drainage structures throughout the County.

Relevant plans, programs, and laws	<ul style="list-style-type: none"> Septic System Replacement Program Agricultural and Farmland Protection Plan Agricultural Nonpoint Source Grant Program Comprehensive Nutrient Management Planning Agricultural Assessments Ag Equipment Rentals Jefferson County Agricultural Development Corporation Agricultural Districts Law Comprehensive Economic Development Strategy
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2.7.5 Hamilton County

Website: www.hamiltoncounty.com

Description: Approximately 420 square miles of Hamilton County is located within the St. Lawrence River watershed. Tourism is the most important industry and the whole area is a favorite spot for vacationers and sportsmen. The County **Public Health Department** maintains a septic treatment/septic system inspection program, where staff inspect mechanical household sewage treatment every five years. A Water Quality Coordinating Committee meets regularly to discuss water resources issues; committee members also conduct stream and lake assessments and survey benthic macroinvertebrates.

Relevant plans, programs, and laws	<ul style="list-style-type: none"> Right to Farm Law Safeguard Waters Law Solid Waste and Recycling Law
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2.7.6 Lewis County

Website: www.co.lewiscounty.org

Description: Most of Lewis County drains into the Black River watershed; the northernmost section is part of the St. Lawrence River watershed. The **Highway Department** maintains the roads, drainage ditches, tree removal within the right of way. The **Planning Department** updated the Agricultural and Farmland Protection Plan in 2019; the Plan identifies areas and strategies for promoting continued agricultural use.

Relevant plans,	<ul style="list-style-type: none"> AEM Agricultural Nonpoint Source Abatement and Control Program
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programs, and laws	Agricultural Value Assessments
	Black River Watershed Planning Initiative
	Lewis County Highway Tree Policy
	Agricultural and Farmland Protection Plan
	Central Lewis County Water Study
	Lewis County Comprehensive Plan
	Agricultural Districts Law

2.7.7 Clinton County

Website: www.clintoncountygov.com

Description: Clinton County is in the northeast corner of New York State. Clinton County **Planning Department** serves a source for land development information, including wetlands, floodplains, and aerial photos. The **Highway Department** maintains 351 miles of County highways and 109 County-owned bridges in addition to open and closed drainage systems. The **Health Department** supports a private well testing program.

Relevant plans, programs, and laws	Agricultural Districts Law
	Adopt-A-Highway Program
	Soil Testing Cost Share Program
	Tile Drainage Assistance
	Environmental Quality Review Act

2.7.8 Herkimer County

Website: www.herkimercounty.org

Description: The northern part of Herkimer County is in the Adirondack Park, of which, nearly 100 square miles of the county are located in the St. Lawrence River watershed area. Herkimer County has elected not to participate as part of this Watershed Revitalization Plan because of its relatively minute drainage area within the St. Lawrence River watershed.

Relevant plans, programs, and laws	Agricultural Districts Law
	Agricultural and Farmland Protection Plan (2007)
	Herkimer County Sewer District Sewer Use Law
	Herkimer County NY Rising Countywide Resiliency Plan (2014)
	Herkimer-Oneida Groundwater Monitoring Program (through NYSARC)
	Herkimer-Oneida Local Groundwater and Wellhead Protection Implementation Program (through NYSARC)

2.7.9 Essex County

Website: www.co.essex.ny.us

Description: The county encompasses an area of 1,916 square miles; only a tiny portion (56 square miles) falls within the St. Lawrence River watershed. The **SWCD** has a strong emphasis on forest management and habitat restoration. It has created a culvert inventory which inspects culvert condition, height, width, dry passage, barriers, and more, with the hope to improve wildlife connectivity issues. The **Department of Public Works** maintains 356 miles of roads and 134 bridges throughout the county.

Relevant plans, programs, and laws Agricultural Districts Law
AEM
Essex County Destination Master Plan (2009)

2.8 Local Government

The St. Lawrence River watershed includes 103 municipalities in eight counties (see Section 3.0). While laws and policies at the federal, state, regional, and county levels can influence watershed health, municipal governments play an especially important role in watershed planning in New York State. New York is a “home rule” state, meaning that primary authority for guiding community planning and land development is vested in cities, towns and villages. While this provides local municipalities with the power to define how their community grows, it can also complicate watershed management efforts, particularly related to nonpoint sources of pollution. Differences among local laws can result in inconsistent water resources-related protections within a watershed. Some relevant local planning and zoning tools with significant potential to affect lands and waters include delineation of and protections for areas of local importance, such as:

- Open space
- Scenic resources (natural and built environment)
- Aquifer recharge zones
- Critical environmental areas
- Water resources (shorelines, wetlands)
- Agricultural lands
- Floodplains and flood hazard areas

In addition, local codes can specify required actions and practices related to sources of pollutants:

- Wastewater management, including on-site septic disposal systems
- Erosion and sediment loss from forestry, construction, and other land uses

- Solid wastes and junk yards
- Mining practices
- Stormwater runoff
- Land development (tools include requirements for lot size, setbacks, limits on impervious surfaces, stormwater management, site plan review, etc.)

2.8.1 Comprehensive Planning

Comprehensive plans are strategic documents that define a community's goals and vision for the future. Developed with citizen input and formally adopted by a legislative body, comprehensive plans (or an equivalent set of adopted reports and maps) provide the legal foundation for a community to enact laws such as zoning and subdivision regulation. Comprehensive plans create an opportunity to prioritize watershed-related topics such as stormwater management and erosion and sediment controls; these documents are most useful when they reflect current conditions (i.e., have been updated within the past five to ten years). Comprehensive plans are not legally binding documents; municipalities must adopt local laws consistent with their comprehensive plans in order to ensure that the community's vision and goals are achieved. Once adopted, the local laws must be filed with New York State.

2.8.2 Zoning

Zoning is a regulatory tool that enables communities to make the leap from planning to implementation and enforcement of land-use controls to support their vision and goals. Zoning controls the use, density, siting, and form of development on individual land parcels, and is especially effective in preventing future adverse impacts related to development patterns or uses that can threaten public health and safety, environmental quality, or community character.

To provide additional protections, municipalities can create an overlay zoning district with more stringent regulations for an area that is environmentally sensitive such as an aquifer recharge zone or floodplain.

2.8.3 Site Plan Review

Site Plan Review is a powerful tool when development is planned on a single parcel of land and does not fall within the scope of subdivision regulations. The site plan review process creates an opportunity for municipal decision makers to examine a plan's potential impacts related to erosion, impervious surfaces, vegetation, and stormwater, and to require changes that will protect water quality and promote environmental sustainability. Since site plan review often relies on the expertise and knowledge of the reviewing board, training of decision makers is important to ensuring that this tool is effective. Professional staff can assist the appointed boards. In some rural areas, a professional planner serves multiple communities through shared service arrangements with county or regional planning departments.

2.8.4 Subdivision Regulations

Subdivision regulations come into play when land is divided into smaller parcels. These regulations are intended to ensure that the design of developments supports the municipality's land use objectives. Subdivision ordinances can help mitigate the potential for adverse impacts on waterbodies during and after construction. Some communities include specific provisions to preserve open space and vegetation, protect unique natural areas, minimize impervious surfaces, limit erosion and runoff, cluster buildings, improve resilience to floods and related impacts of climate change, and promote green infrastructure.

2.8.5 Stormwater and Erosion Control Regulations (MS4)

Federal stormwater regulations known as "Stormwater Phase II" require urbanized municipalities and those additionally designated by the NYSDEC to develop a Municipal Separate Storm Sewer System (MS4) management program and obtain a NPDES (National Pollutant Discharge Elimination System) permit. These designated MS4 municipalities are required to enact six minimum control measures as part of an approved stormwater management program. Even communities that are not designated as MS4 can work toward voluntary compliance with MS4 guidelines and adoption of some control measures. The six minimum control measures (MCMs) required of operators of regulated MS4s include:

- MCM 1: Public Education and Outreach
- MCM 2: Public Involvement and Participation
- MCM 3: Illicit Discharge Detection and Elimination
- MCM 4: Construction Site Runoff Control
- MCM 5: Post-Construction Runoff Control
- MCM 6: Pollution Prevention and Good Housekeeping

2.8.6 Local Waterfront Revitalization Program

The Waterfront Revitalization of Coastal Areas and Inland Waterways Act offers local governments the opportunity to participate in the State's Coastal Management Program (CMP) on a voluntary basis by preparing and adopting a Local Waterfront Revitalization Program (LWRP). This St. Lawrence River Watershed Revitalization Plan was prepared under this program. Revitalization Plans may be comprehensive and address all issues that affect a community's entire waterfront, or they may address the most critical issues facing a significant portion of its waterfront. Any village, town, or city located along the State's coast or designated inland waterways can prepare or amend an existing Revitalization Plan. Municipalities are encouraged to address local revitalization issues in alignment with regional economic development strategies and regional resource protection and management programs. However, like comprehensive plans, community plans developed under the LWRP are not laws. Recommendations developed under an LWRP that is formally adopted and accepted by New

York State can provide the legal foundation for municipalities to enact local laws or modify their codes to be consistent with the Plan's recommendations.

2.8.7 Model Local Laws

Model local laws are commonly developed by state governments and regional entities to help guide communities in their local laws and programs. Two guidance documents focused on local laws to enhance floodplain management resiliency were recently developed. In 2018, Genesee/Finger Lakes Regional Planning Council had prepared *Model Intermunicipal Floodplain Overlay District Local Law*. This model local law incorporates intermunicipal project review, such as those commonly found useful in the General Municipal Law §239 Referral Process that promotes the coordination of land use decision-making and enhances consideration of potential intermunicipal and county-wide impacts, to foster a program that is effective in reducing and preventing flood problems. The overlay district aims to create more socially and environmentally responsible development beyond the floodplain; managing development in the watershed where floodwaters originate while still allowing the local government to have significant control over the approval process.

in 2019, NYS DOS's had prepared *Model Local Laws to Increase Resiliency*- a guidance document available to local governments. The model local laws were developed from a variety of sources, including existing models, existing local laws, and a combination of sections from various laws assembled with professional expertise. A range of regulatory choices are provided, with some models consisting of simple changes to enhance resiliency aspects of typical local laws, and others that would constitute a comprehensive approach to a topic that may require more advanced administrative skills to be effective.

2.8.8 Municipal Maintenance Programs and Practices

Both formal and informal programs and practices can have a positive impact on water quality. Municipalities can incorporate NYSDOT design and guidance documents, standard specifications, and procedural manuals into local laws and highway department operating procedures. Towns and villages can also adopt procedures to ensure proper operation and maintenance of runoff management facilities and to ensure application of appropriate solid and hazardous waste generation and disposal practices, including source controls and recycling. In addition, municipalities can take advantage of training programs, such as the Cornell Local Roads Program, or can develop their own training programs targeted at highway officials, contractors, construction workers, inspectors, and zoning and planning officials.

2.8.9 Training Opportunities

In addition to the laws and tools discussed above, towns and villages can take advantage of training opportunities through federal, state, regional and county-level programs. For example, local county and municipal officials around the North Country attend Local Government Conferences, which cover

a variety of topics such as stormwater regulation and protecting sensitive natural features. Also, high school students from Clinton, Essex, Franklin, and St. Lawrence Counties convene at Paul Smith's College each spring to compete in the Annual North Adirondack Regional Envirothon. The Envirothon tests the student's knowledge on topics such as soils, water resources, forestry, wildlife and current environmental issues. Teams compete in an outdoor setting where they learn that cooperation is needed to achieve success. The activities are designed to help students become environmentally aware, action-oriented adults.

Under the NYSDEC's Stormwater Permit (i.e., GP-0-10-001), all developers, contractors, and subcontractors must designate at least one individual from their organization responsible for implementing the required Storm Water Pollution Prevention Plan (SWPPP). The designated individual must be trained and certified; NYSDEC certification extends for a three-year period. A certified professional must be on-site each day when soil is being disturbed as well as conduct regular site inspections in accordance with permit conditions.

2.8.10 Local Government and Agriculture

Although municipalities in New York State have broad powers to enact laws governing land use, there are certain restrictions on government authority related to agriculture. The federal Clean Water Act specifically exempts agricultural runoff from its requirement that discharges of pollutants to surface waters be regulated by permit. In NY, the Agriculture and Markets Law (Article 25-AA, Section 305-a) states that: "Local governments...shall not unreasonably restrict or regulate farm operations within agricultural districts in contravention of the purposes of this article unless it can be shown that the public health or safety is threatened"(Coon 2013). Consequently, most efforts to reduce agricultural pollution are voluntary and incentive-based (e.g., cost sharing and technical support).

One way that municipalities can address watershed-related agricultural issues is through participation in AEM programs, which are overseen by the NYS Department of Agriculture and Markets and implemented through county Soil and Water Conservation Districts (see sections 2.2.6 and 2.5.9). Agriculture is a significant land use and economic activity in the St. Lawrence River watershed, particularly in the eastern lowlands between the River and the Adirondack Park boundary. Consequently numerous governmental and nongovernmental organizations are collaborating on identifying and strengthening the connections between agricultural practices and water quality protection.

Recent agricultural plans and reports include:

- St. Lawrence County Agricultural Development Plan (2016)
- Jefferson County Agricultural and Farmland Protection Plan (2016)
- Herkimer County Agriculture and Farmland Protection Plan (2007)

- Lewis County Agricultural and Farmland Protection Plan (In progress)
- Lewis County Agricultural Enhancement Plan (2004)

Active agencies and groups focused on agriculture in the St. Lawrence River watershed include:

- Harvest NY, Cooperative Extension of Franklin County
- USDA Farm Service Agency
- USDA Natural Resources Conservation Services
- USDA Rural Development
- New York State CAFO Working Group (convenes when reviewing NRCS standards)
- Northern NY Agricultural Development Program
- New York Animal Agriculture Coalition (NYAAC)
- New York Farm Bureau and County chapters
- NY Farm Net
- Cornell Cooperative Extension programs in each county

Municipalities in the St. Lawrence River watershed can review existing plans and identify locally acceptable measures to enhance water quality protections while maintaining agricultural sustainability.

3 Evaluation of Local Laws and Programs

3.1 Introduction

This chapter presents an overview of local municipal laws, programs and practices currently in place for managing water resources across the St. Lawrence River watershed. Opportunities for improving the local laws and programs are identified; this analysis will inform recommendations of the St. Lawrence River Watershed Revitalization Plan, to which this document is appended. Because of the size of the watershed, much of the reported information was gathered from respondents at the county level (planning departments, SWCD).

3.2 Methodology

The inventory and assessment of municipal measures to protect water resources in the SLR watershed was based on a modified version of the process outlined by the Genesee/Finger Lakes Regional Planning Council (2006).

1. Identification of existing local laws and tools that guide land use, with a focus on:
 - » Comprehensive/Land Use Plans
 - » Local Waterfront Revitalization Plan (where appropriate)
 - » Site Plan Review
 - » Zoning Law
 - » Subdivision Regulations

2. Review of existing measures to assess their strength in addressing issues that influence water quality. This review was led by professional staff of County Departments of Planning and/or Soil and Water Conservation Districts. The County staff worked with their individual municipalities to complete a modified Municipal Nonpoint Assessment Form; the form evaluated local laws and practices related to:
 - » Waterbody/Shore Protection
 - » Floodplain/Flood Protection
 - » Waste Management/Junk Yard Regulation
 - » Wastewater/On-site Septic Systems
 - » Stormwater Management
 - » Road and ditch maintenance practices
 - » Agricultural Environmental Management
 - » Other emerging issues (Invasive Species, etc.)

The municipal evaluations, and the primary informants and reviewers, are included in **Appendix C: Local Laws and Programs Assessment Form.**

3. Identification of gaps, or opportunities for improvement, that can form the basis for recommendations in the St. Lawrence River Watershed Revitalization Plan. Staff from the County Planning Departments in collaboration with Project Team members reviewed existing municipal laws to assess their effectiveness in preserving and improving water quality and habitat conditions. The evaluation focused on the ability of the regulatory environment to address these priority issues:

- » Stormwater management and drainage
- » Erosion and sediment control
- » Riparian, wetland, and shoreline protection
- » Forest management
- » Steep slopes
- » Flood prevention/management
- » Invasive species

3.3 Results: Local Laws Inventory and Nonpoint Assessment

3.3.1 Adirondack Park Agency

About 44% of the lands within the NYS portion of the St. Lawrence River Watershed lie within the “blue line”, the boundary of the Adirondack Park (**Map 24**). Given the mission and authority vested within the Adirondack Park Agency (APA) described in this section, it is inevitable that much of the variability in local laws and programs is associated with whether or not a municipality is located within the park boundaries.

The mission of the APA is to protect the public and private resources of the Adirondack Park through the exercise of the powers and duties provided by law. APA’s mission is rooted in three acts:

- The Adirondack Park Agency Act
https://www.apa.ny.gov/Documents/Laws_Regs/APAACT.PDF
- The New York State Freshwater Wetlands Act
http://www.dec.ny.gov/docs/wildlife_pdf/wetart24a.pdf
- The New York State Wild, Scenic, and Recreational Rivers System Act
<http://www.dec.ny.gov/permits/6033.html>

The APA prepared the State Land Master Plan, which was signed into law in 1972, followed by the Adirondack Park Land Use and Development Plan in 1973. Both plans are periodically revised to reflect the changes and current trends and conditions of the Park. The APA developed a Citizen’s Guide to Adirondack Park Agency Land Use Regulations (https://www.apa.ny.gov/Documents/Laws_Regs_Standrds.html) to help familiarize landowners with

the APA's regulations pertaining to private land within the Adirondack Park. The APA uses the collective statutes, planning documents, and a permitting process to regulate land use and development in the Adirondack Park.

The APA Act allows any local government within the Park to develop its own local land use programs which, if approved by the APA, may transfer some permitting authority from the APA to the local government's jurisdiction. The remainder of this chapter provides a summary of key land use regulations and practices within the Adirondack Park that offer protection to watershed resources.

3.3.1.1 *Land Use and Development*

In the Adirondack Park Land Use and Development Plan ("APLUDP"), all private lands in the Park are classified into six categories: hamlet, moderate intensity use, low intensity use, rural use, resource management, and industrial use. The classification of a particular area depends on such factors as:

- existing land use and population growth patterns;
- physical limitations related to soils, slopes and elevations;
- unique features such as gorges and waterfalls;
- biological considerations such as wildlife habitat, rare or endangered plants or animals, wetlands and fragile ecosystems; and
- public considerations such as historic sites, proximity to critical state lands, and the need to preserve the Park's open space character.

The purpose of the land classifications in the APA Act is to channel growth into the areas where it can best be supported and to minimize the spread of development in areas less suited to sustain growth. By setting limits on the amount of building—and accompanying roads, clearing, support services, etc.—the Act contemplates that the Park will retain its natural, open space character while communities in the Park continue to grow in an environmentally sensitive manner. While very few activities are prohibited outright by the Act, some activities are restricted from certain defined areas.

3.3.1.2 *Critical Environmental Areas*

Critical Environmental Areas ("CEAs") are the more sensitive features of the Park's natural environment. They are subcategories of the general land use area classifications and are provided extra protection by the law. Generally, CEAs include wetlands, high elevations, areas around designated wild or scenic rivers, state or federal highways, and lands in proximity to certain classifications of state-owned lands. Under the APA Act and the NYS Freshwater Wetlands Act, almost all land uses, such as draining, dredging, placing fill, structures, and subdivisions in or involving wetlands require an Agency permit.

3.3.1.3 *Shoreline Restrictions*

Among the most valuable resources in the Park is the land along its thousands of streams, rivers, ponds and lakes. The laws the Agency administers provide protection to water quality and aesthetics of Adirondack shorelines by establishing setbacks, lot widths and restrictions on vegetation removal. Shoreline restrictions apply to all lakes and ponds, rivers considered for inclusion in the Wild, Scenic and Recreational Rivers System, and all navigable waterways.

Shoreline setback restrictions apply to all structures greater than 100 square feet in size except docks and boathouses. However, docks and boathouses must comply with specific requirements to be exempt from shoreline setback restrictions. Shoreline restrictions by land use type can be found in **Table 1**.

Table 1
Shoreline Restrictions: Minimum Lot Widths and Setbacks

Land Use Type	Min. Lot Width (ft)	Min. Structure Setback (ft)
Hamlet	50	50
Moderate Intensity Use	100	50
Low Intensity Use	125	75
Rural Use	150	75
Resource Management	200	100
Industrial	NA	NA

Source: Citizen's Guide to Adirondack Park Agency Land Use Regulations.

Note: For sewage disposal systems, the minimum setback for any water body or wetland is 100 ft, measured from the leach field or other absorption components to the closest point on the shoreline or wetland.

3.3.1.4 *Designated Rivers and Adjoining Land*

Many rivers in the Park are subject to special regulations and permit requirements adopted under the New York State Wild, Scenic and Recreational Rivers System Act. APA regulations apply to the designated rivers and lands adjoining them, generally up to 1/4 mile from the edge of the river. The river regulations seek to protect water quality and aesthetics by:

- establishing a 100-foot buffer strip along rivers in which vegetative cutting is highly restricted;
- establishing minimum lot widths and building setbacks (larger than those in the APA Act);
- requiring an Agency rivers project permit for nearly all subdivisions, single family dwellings and mobile homes in river areas;
- restricting motor boating and motorized activities on and adjacent to wild and scenic rivers;

- regulating bridge and road building;
- prohibiting structures (such as dams) and activities (such as dredging) which would alter the river's natural flow;
- allowing continuation of lawfully existing nonconforming uses, but requiring permits or variances for expansion or change in use;
- prohibiting certain "noncompatible" uses; and
- prohibiting new structures in Wild River areas.

Designated rivers within the St. Lawrence River watershed include the Grasse, Indian, Oswegatchie, Raquette, St. Regis, Salmon, and the Chateaugay-English.

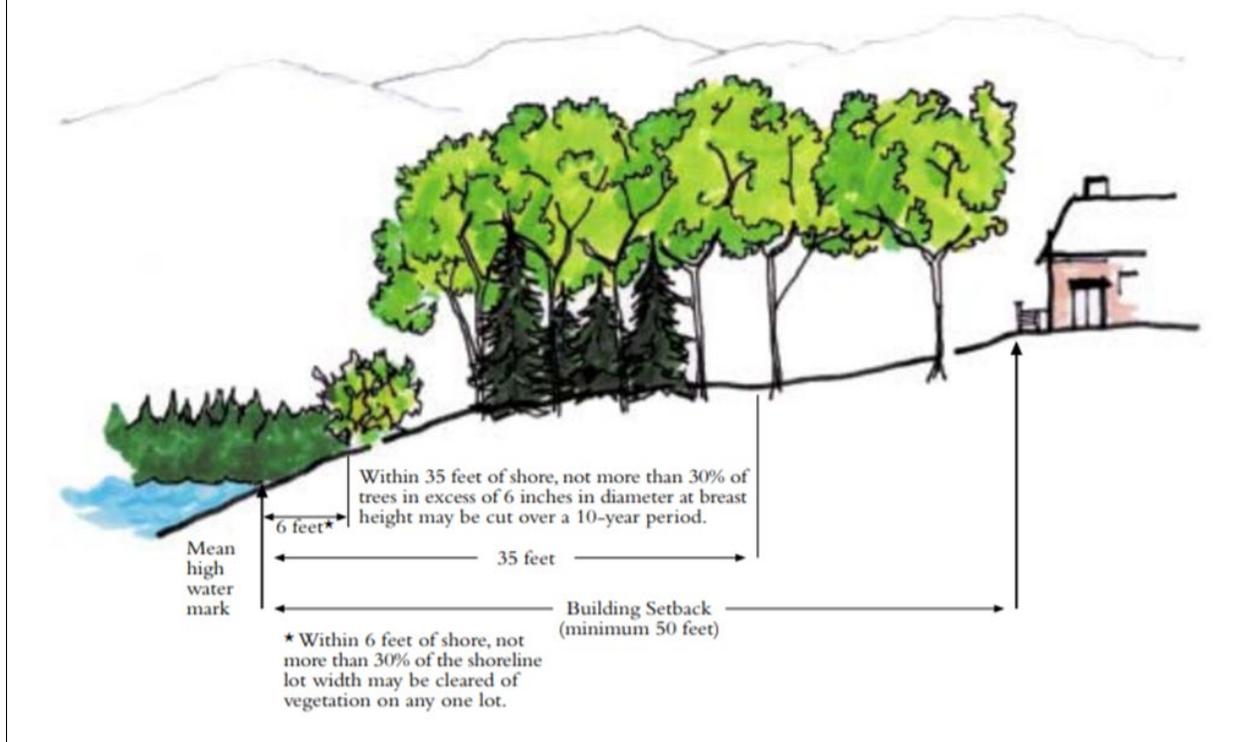
3.3.1.5 *Tree Removal*

Generally, there are no requirements for harvesting trees on non-shoreline parcels unless property owners plan to clear-cut more than 25 upland acres or 3 wetland acres, or if the property is within a Designated River Area. However, tree removal may not begin until all required permits are obtained. Tree removal may also have seasonal restrictions because of the potential presence of the northern long-ear bat. Along shorelines, cutting is limited to the following:

- Within 6 feet of shore, no more than 30 percent of the shoreline may be cleared of vegetation (bushes and trees) on any one lot; and
- within 35 feet of shore, no more than 30 percent of trees in excess of 6 inches in diameter at breast height (i.e., 4.5 feet above the ground) may be cut over a 10-year period.

Figure 1 illustrates these restrictions.

Figure 1
Restrictions That Apply to Cutting Trees and Vegetation along Shorelines



Source: Citizen's Guide to Adirondack Park Agency Land Use Regulations

3.3.2 County Level Assessment

The St. Lawrence River watershed includes 100 municipalities in eight counties, including 74 towns, 24 villages, 1 city and 1 tribal community (see **Table 2** and **Map 24**).

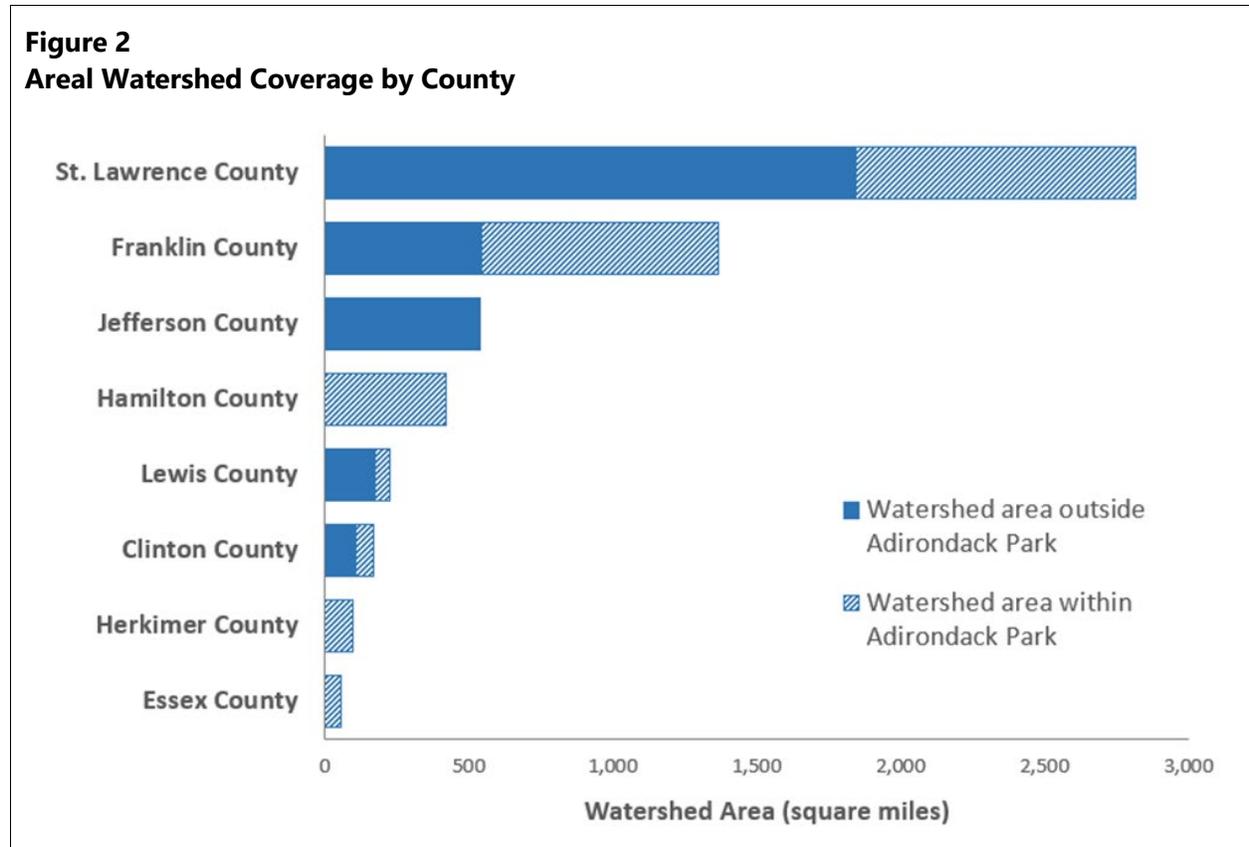
- St. Lawrence County: 32 towns, 11 villages, 1 city, total 2,819 mi²; 49% of watershed.
- Franklin County: 18 towns, 4 villages, 1 tribal area, total 1,368 mi²; 24% of watershed.
- Jefferson County: 9 towns, 7 villages, total 538 mi²; 9% of watershed.
- Hamilton County: 5 towns, 1 village, total 421 mi²; 7% of watershed.
- Lewis County: 3 towns, 1 village, total 226 mi²; 4% of watershed.
- Clinton County: 4 towns, total 168 mi²; 3% of watershed.
- Herkimer County: 1 town, total 100 mi²; 2% of watershed.
- Essex County: 2 towns, total 56 mi²; 1% of watershed.

**Table 2
Municipalities of the St. Lawrence River Watershed**

Clinton	Essex	Franklin	Hamilton	Jefferson	Lewis	St. Lawrence	Herkimer
Towns Clinton *Dannemora Ellenburg Mooers	Towns N. Elba Newcomb	Towns Bangor *Bellmont Bombay Brandon Center Brighton Burke Chateaugay Constable Dickinson Duane Fort Covington Franklin Malone Moira Santa Clara *Tupper Lake Waverly Westville Villages Brushton Chateaugay Malone *Tupper Lake Tribal St. Regis Mohawk Tribe	Towns *Arietta *Indian Lake *Inlet *Lake Pleasant *Long Lake Villages Speculator	Towns Alexandria Antwerp Cape Vincent Clayton Leray Orleans Philadelphia Theresa Wilna Villages Alexandria Bay Antwerp Cape Vincent Clayton Evans Mills Philadelphia Theresa	Towns *Diana Croghan Watson Villages Harrisville	Towns Brasher Canton Clare Clifton Colton Dekalb Depeyster Edwards Fine Fowler Gouverneur Hammond Herman Hopkinton Lawrence Lisbon Louisville Macomb Madrid Massena Morristown Norfolk Oswegatchie Parishville Piercefield Pierrepont Pitcairn *Potsdam Rossie Russell Stockholm Waddington Villages *Canton Gouverneur Hammond Heuvelton Massena Morristown *Norwood *Potsdam Rensselaer Falls Richville Waddington City *Ogdensburg	Towns Webb

Notes: **1. Bold blue=ADK**; Asterisk (*) = registered Climate Smart Community. **2.** Herkimer County elected not to participate as part of the Local Laws and Programs Assessment.

The proportions of the total watershed area covered by each county, including areas within and outside of the Adirondack Park, are shown in Figure 3-1.



The Municipal Nonpoint Assessment results for each County government and each local municipal or tribal government appear in **Table 3** and are summarized in this chapter. The gap analysis derived from this inventory and assessment from responses to the Local Laws and Programs Assessment Forms provide the basis of preliminary recommendations made in this chapter (focused on local laws). Preliminary recommendations in this document focus primarily on laws and programs; these will form the basis of broader recommendations (including best management practices) in the St. Lawrence River Watershed Revitalization Plan.

**Table 3
Local Laws Assessment Summary Chart**

Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
Tribal													
St. Regis Mohawk Tribe (SRMT)		P	●			●	P	●	●	●	●		Solid Waste Management Code in place and Brownfields program deal with abandoned waste sites. SRMT has WQS authority under Clean Water Act. Wetlands Protection Act is Tribal Law and protects wetland resources. Majority of residents have onsite wastewater treatment--limited geographic extent for wastewater collection. Limited stormwater infrastructure is in place on the Territory. Limited agriculture on the Territory.
St. Lawrence													
Towns													
Brasher			●	●			●	●					Planning Board; solar regs; mobile home regs; sign law; junk law
Canton	●	●	●	●	●		●	●					Planning Board; Telecommunication tower regs
Clare				●	●	●	●	●	●	●	●		
Clifton		●		●	●	●	●	●	●	●	●		Planning Board; Adirondack Park Agency has land use regs that govern a portion of the Town
Colton	●		●	●	●	●	●	●	●	●	●		Planning Board; APA regs; solar regs; mobile home regs; sign regs; junk laws; Telecom regs; wind tower regs
Dekalb			●										Planning Board
Depeyster							●						

FINAL													
Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
Edwards	●		●	●	●		●	●					Planning Board; solar regs; mobile home regs; sign law; junk law; telecom regs
Fine	●	●	●			●	●	●					Planning Board
Fowler			●		●		●	●					Planning Board; Freshwater Wetland regs; telecom regs
Gouverneur			●	●	●			●					Planning Board; Freshwater wetland regs; mobile home regs;
Hammond (Joint w Vil.)	●		●		●		●	●					
Hermon	●						R	●					
Hopkinton				●	●	●	●	●	●	●	●		Planning Board; APA regs
Lawrence			●		●	●	R	R					APA regs; telecom regs
Lisbon	●		●				R	●					Planning Board; telecom regs
Louisville	●		●	●	●	●	●	●	●	●	●		Planning Board; mobile home regs; sign law; telecom regs
Macomb	●		●		●		R	●					Planning Board; mobile home regs; sign law; telecom regs
Madrid	●		●	●	●	●	R	●					Planning Board; mobile home regs; sign law; telecom regs
Massena	●	●	●	●	●		●	●					Planning Board; mobile home regs; sign law; telecom regs
Morristown	●	●	●	●	●		●	●					Planning Board; mobile home regs; sign law; telecom regs
Norfolk	●		●	●	●		●	●					Planning Board; mobile home regs; sign law; telecom regs
Oswegatchie			●		●		●	●					Planning Board; mobile home regs; sign law
Parishville	●		●	●	●	●	●	●	●	●	●		Planning Board; APA regs; mobile home regs; sign regs;
Piercefield	●		●	●	●	●	●	●	●	●	●		Planning Board; APA regs; mobile home regs; telecom regs

FINAL													
Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
Pierreport	●		●	●	●		R	●					Planning Board; mobile home regs; sign regs
Pitcairn	●				●	●	●						Planning Board; APA regs
Potsdam	●		●	●	●		●	●					Planning Board; mobile home regs; sign regs; telecom regs
Rossie			●		●		●						Planning Board; telecom regs
Russell							R						Mobile home regs
Stockholm			●	●	●		●						Planning Board; mobile home regs; sign regs; Freshwater wetland regs; telecom regs
Waddington	●	●	●	●	●		●	●					Planning Board; sign regs; telecom regs
Villages													
Canton	●	P	●	●	●		●	●					Planning Board; mobile home regs; sign regs; telecom regs
Gouverneur			●	●	●		●	●					Planning Board; mobile home regs; sign regs; Freshwater wetland regs
Hammond (Joint with Town)	●		●		●		R	●					Planning Board
Huevelton	●		●	●	●		●	●					Planning Board; mobile home regs; sign regs
Massena	●		●	●	●		●	●					Planning Board; solar regs; mobile home regs; sign regs; telecom regs
Morristown	●	●	●	●	●		●	●					Planning Board; solar regs; mobile home regs; sign regs; Freshwater wetland regs
Norwood	●			●	●		●	●					Planning Board; mobile home regs;
Potsdam	●		●	●	●		●	●					Planning board; solar regs; mobile home regs; telecom regs
Resselaer Falls			●	●	●		●	●					Planning Board; mobile home regs;
Richville (Joint with Town)			●					●					Planning Board; mobile home regs;
Waddington	●	●	●	●	●		●	●					Planning Board; mobile home regs;

FINAL													
Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
City													
Ogdensburg	•	•	•	•	•		•	•					Planning Board; solar regs; mobile home regs;
Jefferson													
Towns													
Alexandria	•	•	•	•	•		•	•	•	•	•	•	
Antwerp	•						•	•	•	•	•	•	
Cape Vincent	•		•	•	•		•	•		•	•	•	
Clayton	•	•	•	•	•		•	•	•	•	•	•	
Leray	•		•	•	•		•	•		•	•	•	
Orleans	•		•	•	•		•	•		•	•	•	
Philadelphia	•		•	•	•		•	•		•	•	•	
Theresa			•	•	•		•	•		•	•	•	
Wilna	•		•	•	•		•	•		•	•	•	
Villages													
Alexandria Bay	•		•	•	•	•	•	•		•		•	
Antwerp	•									•		•	
Cape Vincent	•	P	•	•	•	•	•	•		•		•	
Clayton	•		•	•	•		•	•		•		•	
Evans Mills	•			•	•		•	•		•	•	•	
Philadelphia	•			•	•		•	•		•		•	
Theresa				•	•		•	•		•	•		
Franklin													
Towns													

FINAL													
Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
Bangor								•					
Bellmont				•	•	•	•	•	•	•	•		
Bombay								•					
Brandon								•					
Brighton				•	•	•	•	•	•	•	•		
Burke								•					
Chateaugay								•					
Constable								•					
Dickinson				•	•	•	•	•	•	•	•		
Duane				•	•	•	•	•	•	•	•		
Fort Covington								•					
Franklin				•	•	•	•	•	•	•	•		
Harrietstown				•	•	•	•	•	•	•	•		
Malone	P	•	•	•				•					
Moir								•					
Santa Clara				•	•	•	•	•	•	•	•		
Tupper Lake			•	•	•	•	•	•	•	•	•		
Waverly				•	•	•	•	•	•	•	•		
Westville								•					
Villages													
Brushton		•						•					
Malone	•	•	•	•		•	•	•	•	•			

FINAL													
Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
Tupper Lake				•	•	•	•	•	•	•	•		
Lewis													
Towns													
Croghan			•	•				•	•	•	•		Zoning is limited in this area.
Diana			•	•				•	•	•	•		Zoning is limited in this area.
Watson				•	•	•	•	•	•	•	•		
Villages													
Harrisville				•	•	•	•	•	•	•	•		
Essex													
Towns													
North Elba	•		•	•	•	•	•	•	•	•	•		
Newcomb	•		•	•	•	•	•	•	•	•	•		
Clinton													
Towns													
Clinton							•						
Dannemora				•	•	•	•	•	•	•	•		
Ellenbrug	•			•	•	•	•	•	•	•	•	•	
Moers	•			•			•	•				•	
Hamilton													
Towns													
Arietta	•		•	•	•	•	• P	•	•	•	•		Piseco Lake Association (PLA) efforts include dam improvements, invasive species, and water quality. PLA is working with SUNY Oneonta to develop a Lake Management Plan. Green Waste Management Program. Local transport law for invasive species.
Indian Lake	•		•	•	•	•	•	•	•				

FINAL													
Municipality	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/Shore Protection	Floodplain/Flood Protection	Waste Management/Junk Yard	Wastewater/On-site Septic	Stormwater	Agriculture	Special Permit	Others/Comments
Inlet	●	●	●	●	●	●	●	●	●	●	●		Local Lake Associations - also have on shore wastewater inspection local law
Lake Pleasant	●		●	●	●	●	●	●	●	●	●		Town is partner with our local Lake Association (LPSA). Town does not have an A.P.A. approved land use plan but works with A.P.A. on regulations. Floodplain protection under DEC emergency action plan / Wakely Dam.
Long Lake	P			●	●	●	●	●	●	●	●		Active invasive species program that is funded by town and grants from the Adirondack Watershed Institute, two active lake associations.
Villages													
Speculator				●	●	●	●	●	●	●	●		
Herkimer													
Towns													
Webb				●	●	●	●	●	●	●	●		

Legend:

1. | Local regulation in effect
2. P = In progress of being developed
3. R = Rescinded

Note: **Green** municipalities indicate those primarily within the Adirondack Park.

Within the St. Lawrence River watershed, there is significant variation in the degree to which municipal laws address protection of watershed resources, ranging from municipalities with overlay zoning to safeguard vulnerable areas (e.g., lakes, rivers, streams, wetlands) to municipalities that have few local laws to manage water quality matters, such as aquatic buffers, floodplain management, or stormwater and erosion controls. The following subsections present strengths and gaps, or opportunities for improvement, and preliminary recommendations for each County in the St. Lawrence River watershed.

3.3.2.1 *St. Lawrence County*

St. Lawrence County includes 32 towns, 11 villages and 1 city and covers 2,819 square miles (49%) of the St. Lawrence River watershed area. St. Lawrence County has a Planning Department and SWCD as part of its organizational structure. These departments work with local municipalities to provide technical assistance on issues related to land use development and water quality protection. Approximately 35% of St. Lawrence County's watershed area is located within the Adirondack Park. Municipalities located within the Park are governed by APA's laws, regulations and programs. This governance structure influences land use development and water quality protection within St. Lawrence County.

Most municipalities (29/44) within St. Lawrence County have a Comprehensive Plan. In addition, most of the municipalities located along the St. Lawrence River have completed or are in the process of developing a Local Waterfront Revitalization Plan. These strategic land use plans define the community's goals and vision for the future. In addition, most of the municipalities administer general land use controls; including zoning laws, site plan reviews, subdivision regulations, stormwater management, agriculture management and floodplain protections. In addition, municipalities located within the Adirondack Park administer waterbody/shore protection. These land use laws and regulations help guide development practices and improve water quality.

Most municipalities lack local laws related to wastewater/on-site septic systems, stormwater management and agriculture. In addition, municipalities located outside the Adirondack Park lack laws and programs related to waterbody/shore protection. It was also noted that St. Lawrence County has only limited staffing capacity to provide technical support for the vast number of agricultural producers and extent of agricultural lands. These issues are identified as gaps.

St. Lawrence County's municipalities would benefit from adopting applicable model local laws and building on established programs for best management practices (BMPs) related to waterbody/shore protection, wastewater/on-site septic systems, stormwater management and agriculture. APA's laws and programs and NYSDOS model local laws

https://www.dos.ny.gov/opd/programs/resilience/Model_Local_Laws_to_Increase_Resilience.pdf

could serve as a basis for evaluation and adoption. In addition, due to the extent and significance of agriculture, St. Lawrence County municipalities would benefit from enhancing the use of agricultural BMPs, including vegetated buffers and other sustainable agricultural practices that reduce nonpoint source pollution (e.g., stormwater runoff, soil erosion, nutrient and other chemical loading) to watercourses. Focused efforts to expand the use of BMPs would enhance land use development practices and water quality protection measures within the St. Lawrence County portion of the watershed.

3.3.2.2 *Franklin County*

Franklin County includes 18 towns, 4 villages and 1 tribal community, and covers 1,368 square miles (24%) of the St. Lawrence River watershed area. The Adirondack Park encompasses 60% (822 square miles) of the county. Those municipalities within the Park are governed by APA's laws, regulations and programs. This governance structure influences land use development and watershed protection within Franklin County.

The SWCD of Franklin County is a valuable asset to the county's municipalities. The SWCD works closely with local municipalities to develop local laws, programs and practices to protect water quality. Many of the municipalities administer general land use controls, particularly zoning laws, subdivision regulations, waterbody/shore protection, floodplain management/protection, waste management/ junk regulations, wastewater/on-site septic systems, stormwater management, and agriculture environmental management. These land use laws and regulations help protect and improve water quality.

Few municipalities (2-3/21) have developed or are developing a Comprehensive Plan and/or Local Waterfront Revitalization Plan, where applicable. In addition, most of the County's municipalities (17/21) have no site plan review laws. Franklin County does not have a Planning Department, which limits its capacity to assist communities with their planning efforts. These issues are identified as impediments to effective water resources management, especially for areas outside of the Adirondack Park.

Franklin County's municipalities would benefit from adopting Comprehensive Plans and/or Local Waterfront Revitalization Plans as well as local laws for site plan review. These strategic land use plans define the community's goals and vision for the future, including necessary land use practices and water resource protections. In addition, due to the significance and importance of agriculture within the watershed, Franklin County municipalities would benefit from promoting sustainable and resilient agricultural BMPs to reduce nonpoint source pollution (e.g., stormwater runoff, soil erosion, and nutrient and other chemical loading) to watercourses. With more regulatory tools and professional support capacity, Franklin County municipalities could strengthen water quality protection within the St. Lawrence River watershed.

3.3.2.3 *Jefferson County*

Jefferson County includes nine towns and seven villages, covering 538 square miles (9%) of the St. Lawrence River watershed. The entire watershed area is outside of the Adirondack Park boundary. Jefferson County's Planning Department and SWCD work closely with local municipalities in development of local laws, programs, and practices that affect water resources.

Of the 16 towns and villages located within the St. Lawrence River watershed, most (14/16) have adopted Comprehensive Plans. In addition, three of four municipalities along the St. Lawrence River have adopted (or are completing) a Local Waterfront Revitalization Plan. Many Jefferson County municipalities administer general land use controls, including zoning laws, site plan reviews, subdivision regulations, stormwater management, agriculture management, and floodplain protections.

Jefferson County's municipalities have several strengths identified as part of this assessment. The County benefits from established programs involving stormwater management and land conservation. The County has organized a Stormwater Coalition, which includes the City of Watertown, seven surrounding communities, and Jefferson County. The Coalition works collaboratively to meet stormwater management regulations; achieve water quality goals; and promote awareness and stewardship of water resources in the urbanized areas. Additionally, Jefferson County is participating in the NYS Septic System Replacement Program. The purpose of this fund is to replace existing cesspools and septic systems that are having significant and quantifiable environmental and/or public health impacts to groundwater used for drinking water, or a threatened or impaired waterbody. In Jefferson County, the Priority Areas are Moon Lake, Red Lake, and the Indian River near these lakes. In addition, several NYS Land Trust Alliance members, including Tug Hill Tomorrow, Thousand Island Land Trust, and the Indian River Lakes Conservancy, have established land conservation programs or efforts to inventory and conserve undeveloped sensitive areas, open space, or areas of historical or cultural value.

There are weaknesses as well; most of the County's municipalities lack local laws related to waterbody/shore protection and wastewater/on-site septic systems. These deficiencies are identified for gap analysis and recommendations.

In 2016, Jefferson County promulgated a 'Right to Farm' law. The local law includes a legislative finding and intent recognizing agriculture as an important industry in the County that contributes to the economy, maintains open space, enhances the quality of life, promotes environmental quality, and places minimal demands on services provided by local governments. Passage of the Right to Farm law was intended to help maintain and enhance the agricultural industry of the County in several ways: permitting acceptable agricultural practices to continue; protecting the existence and continued operation of farms; encouraging initiation and expansion of agricultural businesses; and promoting new ways to resolve disputes concerning agricultural practices and farm operations. It

accomplishes this by limiting the circumstances under which farming may be deemed to be a nuisance and to allow agricultural practices inherent to and necessary for the business of farming to proceed and be undertaken free of unreasonable and unwarranted interference or restriction.

Jefferson County's Agricultural and Farmland Protection Plan (2016) noted a disconnect between language in adopted plans and the actual laws. The towns with comprehensive plans that include the most expressed support for agriculture may not exhibit the same level of support in their zoning laws. Farm-friendly practices that are most often incorporated into local zoning laws include:

- Many agricultural operations are allowed in most places as a use permitted by right (no planning board review needed).
- Towns do not direct more growth or higher density in core agricultural areas.
- Local agricultural districts or special ag-related districts are established.
- Off-site signs allowed in many places to advertise farm uses.
- Farm stands and farm retail uses are allowed, often without requiring site plan or special use permits.
- Zoning allows for agricultural-related accessory uses.
- Definitions of agriculture are broad and flexible so many different types of agriculture can be included.
- Towns do not usually regulate farms by acreage or number of animals.

Farming-related practices that are not typically addressed in local laws include:

- Use of buffer areas between non-agricultural uses and farms.
- Use of techniques such as conservation subdivisions, transfer of development rights, or other innovative land use practices that allow development as well as preservation of open space.
- Requiring development applications to include information about on-site and adjacent agricultural activities.
- Specific requirement that the reviewing board evaluate impacts of a development proposal on agriculture. This is especially important for both SEQR and when a proposal is within a NYS Agricultural District.
- Lack of design standards directing buildings to be placed in a manner that protects or allows farming to take place.
- Requiring the NYS Agricultural Data Statement.
- Requiring an agricultural disclosure notice when a project is in a NYS Agricultural District to inform future landowners that agricultural activities are taking place nearby.

- Addressing farm worker housing and allowing a variety of housing options for farm workers such as mobile homes.
- Waivers of municipal approvals for on-farm windmills and solar panels.

Jefferson County's municipalities would benefit from adopting applicable model local law and established programs using BMPs related to waterbody/shore protection and wastewater/on-site septic systems. APA's laws and programs and NYSDOS model local laws could serve as a basis for evaluation and adoption. In addition, due to the significance and importance of agriculture within the watershed, Jefferson County municipalities would benefit from supporting adoption of agricultural BMPs to reduce nonpoint source pollution (e.g., soil erosion, nutrients, and chemicals). Additional regulatory tools coupled with technical support and meaningful cost-sharing measures could help mitigate the adverse impacts of land development and land use practices on water resources and ultimately benefit the Sr. Lawrence River watershed.

3.3.2.4 *Lewis County*

Lewis County includes four municipalities that cover 226 square miles (4%) of the St. Lawrence River watershed area. Of the 226 square miles, a majority of the land area (78%) is located outside the Adirondack Park. Town governments administer general land use laws and programs, including site plan review, waste management/junk yard regulations, wastewater/on-site septic systems, stormwater management, and agriculture environmental management. These land use laws and programs help protect and improve water quality. In addition, the SWCD makes their no-till drill 'interseeder' equipment available to local farms. This program has been successful; in 2019, the SWCD equipment covered over 1,000 acres, planting many varieties of seed

Neither of the Lewis County towns within the St. Lawrence River watershed has a Comprehensive Plan, subdivision law, waterbody/shore protection, floodplain management/flood protection. In addition, laws and programs were either absent or overlooked for smaller agricultural parcels. These deficiencies are identified as gaps, or opportunities for improvement.

Lewis County's municipalities would benefit from developing Comprehensive Plans to provide a regulatory framework for adopting local laws designed to protect water resources. Because of the importance of agricultural land uses, continued efforts to expand the use of BMPs that reduce nonpoint source pollution (e.g., soil erosion, nutrients, and chemicals) to watercourses is important. Enhancing these watershed and water resource efforts would ultimately benefit the quality of the St. Lawrence River watershed.

3.3.2.5 *Essex County*

Essex County's portion of the St. Lawrence River watershed is limited to two towns within the Adirondack Park totaling 56 square miles (1% of the total watershed). Consequently, all four

municipalities are governed by APA's laws, regulations and programs; this affects land use development and watershed protection.

Essex County's Community Resources (formerly termed the Planning Department) and SWCD work closely with local municipalities, as well as state and federal funding and regulatory agencies, to develop feasible solutions for local land use and development projects. The concept of feasibility encompasses fiscal and operational criteria, plus environmental sustainability and compliance at the regional and state levels. Essex County's Community Resources has a strong organizational structure and specialized staff resources (i.e., grant writer and environmental engineer) that enable them to successfully apply for and manage federal and state grant funding. Currently, their main focus areas involve assisting municipalities with planning, funding and implementing improvements to water supply and wastewater infrastructure.

Both municipalities within Essex County have a Comprehensive Land Use Plan and administer general land use controls, particularly site plan review, zoning laws, subdivision regulations, waterbody/shore protection, floodplain management/flood protection, waste management/ junk yard regulations, wastewater/on-site septic system regulations, stormwater and erosion control regulations, agriculture environmental management and special permit. These land use laws, regulations and programs help protect and improve water quality.

Overall, very few gaps are identified in the Local Laws and Programs Assessment form. Essex County can provide effective templates for other municipalities within the St. Lawrence River watershed.

3.3.2.6 *Clinton County*

Clinton County includes four municipalities (all towns) that encompass 168 square miles (3%) of the St. Lawrence River watershed area. Of the 168 square miles, 37% of the watershed area (62 square miles) is located within the Adirondack Park and 63% (106 square miles) is located outside the Adirondack Park. Therefore, the towns within the Park are governed by APA's laws, regulations and programs. This governance structure influences land use development and watershed protection within Clinton County.

Most of the municipalities have a Comprehensive Land Use Plan and administer general land use controls; including zoning law, floodplain management/ flood protection, waste management/junk yard regulations and conditional use permit. These land use laws and programs positively influence land use practices and watershed protection. However, gaps remain. The majority of Clinton County towns have not promulgated local laws governing site plan review, subdivisions, waterbody/shore protection, wastewater/on-site septic systems, stormwater management, or agricultural practices.

Clinton County's municipalities would benefit from adopting model local law related to site plan review and subdivision regulations. These planning tools guide development and land use practices

and protections, including water resource protections. In addition, municipalities would benefit from adapting general land use laws and programs to address the gaps cited above. These specific tools and regulations promote sustainable land use practices and watershed protection.

3.3.2.7 *Hamilton County*

Hamilton County includes five towns and one village that cover 421 square miles (or 7%) of the St. Lawrence River watershed area. All (100%) of the watershed area is located within the Adirondack Park. Therefore, these municipalities are governed by APA's laws, regulations and programs. This governance structure influences land use development and watershed protection.

In addition to the APA regulations, Hamilton County has many local laws and programs influencing land use development and watershed protection. This programmatic assessment identified several strengths; all five towns have adopted (or are in the process of adopting) a Comprehensive Land Use Plan and administer general land use controls. Controls include site plan review, zoning, subdivision regulations, waterbody/shore protection, floodplain management/ flood protection, waste management/junk yard regulations, wastewater/on-site septic system, stormwater and erosion control, agriculture practices, and invasive species control. These land use laws and programs positively influence watershed protection.

3.3.3 **Climate Smart Communities (CSC)**

Counties, cities, towns, and villages are best able to assess their own vulnerability to a changing climate, and to initiate adaptive measures. Many adaptive land use measures, such as water quality protection and flood resiliency, are best managed within a watershed context. Any city, town, village, or county in New York State can take the Climate Smart Communities (CSC) pledge. To become a registered CSC, the municipality's governing body must adopt a resolution that includes commitment to the following ten actions:

- Build a climate-smart community
- Inventory emissions, set goals, and plan for climate action
- Decrease energy use
- Transition to clean, renewable sources of energy
- Use climate-smart materials management
- Implement climate-smart land use
- Enhance community resilience to climate change
- Support a green innovation economy
- Inform and inspire the public
- Engage in an evolving process of climate action

Several communities within the St. Lawrence River watershed have adopted the Climate Smart Community pledge, see **Table 2**.

4 Conclusions

The St. Lawrence River watershed includes 100 municipalities in eight counties, covering nearly 5,700 square miles in New York State. Home rule vests the primary authority for community planning and land use regulations with local municipalities. Hence, municipal governments play a significant role in watershed planning in New York State. While this provides municipalities with the power to define how their community grows, it can also complicate water resources management since watershed boundaries rarely conform to municipal boundaries. This governance structure often results in inconsistent regulations within a watershed. Meanwhile, each county-level SWCD plays a significant role with providing guidance and technical assistance in land use and development practices.

Within the St. Lawrence River watershed, there is significant variation in the degree to which municipal laws address protection of watershed resources. Some municipalities have extensive planning and regulatory tools such as overlay zoning to provide additional safeguards to vulnerable areas (e.g., lakes, rivers, streams, wetlands, or aquifer recharge areas). In contrast, other municipalities could benefit from adopting additional laws to manage water quality challenges, such as buffers to reduce the risk of pollutant transport to surface waters, guidelines for construction in sensitive areas such as floodplains or steep slopes, or measures to manage stormwater runoff. In many cases, staff resources and technical ability were identified as limiting factors, particularly within the local municipal and county-level governments.

This variation, in part, was also influenced by the locality inside or outside the Adirondack Park boundary. The APA maintains protection of the forest preserve, which includes 44% of the St. Lawrence watershed area, and oversees development proposals on the privately-owned lands. APA's governance is rooted in three acts which influence land use and development practices in a manner that promotes water quality and resource protection. For example, the APA regulates critical environmental areas, restricts impervious surfaces along shorelines, protects designated Wild, Scenic and Recreational Rivers and adjoining lands, and strictly manages removal of vegetation. Generally, municipalities outside of the Adirondack Park would benefit from adopting land use and development laws and programs that ensure a comparable level of protection of natural resources.

Inventory and assessment have identified specific gaps in local laws; these gaps provide a basis for identifying recommended actions that could strengthen the institutional framework for protecting the St. Lawrence River Watershed. In general, most municipalities would benefit from updating existing and/or adopting model local laws, such as those identified in Model Local Laws to Increase Resiliency (NYS DOS, June 2019). Two additional recommendations noted during the first public meeting on December 3, 2019 are as follows: i) support capacity building for municipalities to review and modify their local laws and programs, similar to a 'circuit rider' at the Tug Hill Commission; and ii) assess Provincial policy statement – Ontario, Canada, whereby provinces adopt policy statements that represent a baseline for local land use laws (can be more protective, cannot be less protective).

This assessment provides the foundation for identifying a suite of 'best practices' for local municipalities as they chart the future of the watershed. The St. Lawrence River Watershed Revitalization Plan will build on these findings to recommend local laws and programs that, with public support, could enhance sustainable land use development and water resource protection.

5 References

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NYS DOT Environmental Manual. Available at

<http://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm>.

USEPA Watershed Approach Framework: Implementing Guiding Principles. Available at

<http://www.epa.gov/owow/watershed/framework/ch6.html>.

Waterbody Inventory/Priority Waterbodies List (NYSDEC) Available at

<http://www.dec.ny.gov/chemical/36730.html>.

Appendix C

Municipal Nonpoint Assessment Forms

County Lewis County
 Author Frank Pace
 Date 7/30/2019

Municipality	Municipal Land Use Planning Tools and Regulations												Comments
	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision Law	Waterbody/ Shore Protection	Floodplain/ Flood Protection	Waste Management/ Junk Yard	Wastewater/ On-site Septic	Stormwater	Agriculture	Others	
TOWNS													
Croghan			X	X				XZ	XZ	XZ	XZ		Zoning is limited in this area.
Diana			x	X				XZ	XZ	XZ	XZ		Zoning is limited in this area.

LEGEND

X= Local Regulation, in effect

P= In Process of Being Developed or Adopted

R= Rescinded

APA= Covered by Adirondack Park Agency Regulations

FW= Covered by Freshwater Wetland Regulations

MS4= Covered by EPA's Phase II Stormwater Rule

Z= Covered by Zoning Law

County St. Lawrence County

Reviewer John Tenbusch

Date September 27, 2019

Municipality	Municipal Land Use Planning Tools and Regulations											
	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/ Shore Protection	Floodplain/ Flood Protection	Waste Management/ Junk Yard	Wastewater/ On-site Septic	Stormwater	Agriculture	Others /Comments
TOWNS												
Brasher			X	X			X	X				Planning Board; solar regs; mobile home regs; sign law; junk law
Canton	X	X	X	X	X		X	X				Planning Board; Telecommunication tower regs
Clare												
Clifton		X				X/APA						Planning Board; Adirondack Park Agency has land use regs that govern a portion of the Town
Colton	X		X	X	X	X	X	X				PLanning Board; APA regs; solar regs; mobile home regs; sign regs; junk laws; Telecom regs; wind tower regs
Dekalb			X									Planning Board
Depeyster							X					
Edwards	X		X	X	X		X	X				Planning Board; solar regs; mobile home regs; sign law; junk law; telecom regs
Fine	X	X	X			X/APA	X	X				Planning Board; APA regs
Fowler			X		X		X	X				Planning Board; Freshwater Wetland regs; telecom regs
Gouverneur			X	X	X			X				Planning Board; Freshwater wetland regs; mobile home regs;
Hammond	Joint with Vill	X	X		X		X	X				
Hermon	X						R	X				
Hopkinton						X/APA	X					Planning Board; APA regs
Lawrence			X		X	X/APA	R	R				APA regs; telecom regs
Lisbon	X		X				R	X				Planning Board; telecom regs
Louisville	X		X	X	X	X	R	X				Planning Board; mobile home regs; sign law; telecom regs

Macomb	X		X		X		R	X				Planning Board; mobile home regs; sign law; telecom regs
Madrid	X		Z	X	X	X	R	X				Planning Board; mobile home regs; sign law; telecom regs
Massena	X	X	Z	X	X		X	X				Planning Board; mobile home regs; sign law; telecom regs
Morristown	X	X	Z	X	X		X	X				Planning Board; mobile home regs; sign law; telecom regs
Norfolk	X		X	X	X		X	X				Planning Board; mobile home regs; sign law; telecom regs
Oswegatchie			X		X		X	X				Planning Board; mobile home regs; sign law
Parishville	X		X	X	X	X/APA	X	X				PLanning Board; APA regs; mobile home regs; sign regs;
Piercefield	X		X	X		X/APA	X					Planning Board; APA regs; mobile home regs; telecom regs
Pierreport	X		Z	X	X		R	X				Planning Board; mobile home regs; sign regs
Pitcairn	X				X	X/APA	X					Planning Board; APA regs
Potsdam	X		Z	X	X		X	Z				Planning Board; mobile home regs; sign regs; telecom regs
Rossie			X		X		X					Planning Board; telecom regs
Russell							R					Mobile home regs
Stockholm			X	X	X		X					Planning Board; mobile home regs; sign regs; Freshwater wetland regs; telecom regs
Waddington	X	X	Z	X	X		X	Z				Planning Board; sign regs; telecom regs
VILLAGES												
Canton	X	P	X	X	X		X	X				Planning Board; mobile home regs; sign regs; telecom regs
Gouverneur			Z	X	X		X	X				Planning Board; mobile home regs; sign regs; Freshwater wetland regs
Hammond	Joint with Town		X		X		R	X				Planning Board
Heuvelton	X		Z	X	X		X	X				Planning Board; mobile home regs; sign regs
Massena	X		X	X	X		X	X				Planning Board; solar regs; mobile home regs; sign regs; telecom regs
Morristown	X	X	X	X	X		X	X				Planning Board; solar regs; mobile home regs; sign regs; Freshwater wetland regs
Norwood	X			X	X		X	X				Planning Board; mobile home regs;
Potsdam	X		Z	X	X		X	X				Planning board; solar regs; mobile home regs; telecom regs
Resselaer Falls			X	X	Z		X	X				Planning Board; mobile home regs;

Richville	Joint with Town		X					X				Planning Board; mobile home regs;
Waddington	X	X	X	X	X		X	X				Planning Board; mobile home regs;
City												
Ogdensburg	X	X	Z	X	X		X	X				Planning Board; solar regs; mobile home regs;

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Z= Covered by Zoning Law

County Jefferson County

Reviewer Erin Zevrah

Date August 29, 2019

Municipality	Municipal Land Use Planning Tools and Regulations												Comments
	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/ Shore Protection	Floodplain/ Flood Protection	Waste Management/ Junk Yard	Wastewater/ On-site Septic	Stormwater	Agriculture	Special Permit	
TOWNS													
Alexandria	X	X	Z	Z	X		X	Z	Building Code	Z	Z	Z	In general, zoning laws have criteria for boards to consider stormwater during reviews.
Antwerp	X						X	Z	X	Z	Z	Z	
Cape Vincent	X		Z	Z	X		X	Z		Z	Z	Z	
Clayton	X	X	Z	Z	Z		X	Z	X	Z	Z	Z	
Leray	X		Z	Z	X		X	Z		MS4	Z	Z	
Orleans	X		Z	Z	X		X	Z		Z	Z	Z	
Philadelphia	X		Z	Z	X		X	Z		Z	Z	Z	
Theresa			Z	Z	X		X	Z		Z	Z	Z	
Wilna	X		Z	Z	X		X	Z		Z	Z	Z	
VILLAGES													
Alexandria Bay	X		Z	Z	X	X	X	Z		Z		Z	
Antwerp	X									Z		Z	
Cape Vincent	X	P	Z	Z	X	X	X	Z		Z			
Clayton	X		Z	Z	X		X	Z		Z		Z	
Evans Mills	X			Z	X		X	Z		Z	Z	Z	
Philadelphia	X			Z	X		X	Z		Z		Z	
Theresa				Z	X		X	Z		Z	Z		

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Fort Covington								X					
Franklin				X	X	X	X	X	X	X	X	X	
Harriestown				X	X	X	X	X	X	X	X	X	
Malone	P	X	X	X				X					
Moira								X					
Santa Clara				X	X	X	X	X	X	X	X	X	
Tupper Lake			X	X	X	X	X	X	X	X	X	X	
Waverly				X	X	X	X	X	X	X	X	X	
Westville								X					
VILLAGES													
Brushton		X						X					
Malone	X	X	X	X		X	X	X	X	X	X		
Tupper Lake				X	X	X	X	X	X	X	X	X	

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Law

County Essex County

Reviewer Jessica DesLauriers

Date Septmber 6, 2019

Municipality	Municipal Land Use Planning Tools and Regulations												Comments
	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/ Shore Protection	Floodplain/ Flood Protection	Waste Management/ Junk Yard	Wastewater/ On-site Septic	Stormwater	Agriculture	Others	
TOWNS													
North Elba	X		X	X	X	X, APA	X	X	X	X	APA		
Newcomb	X		X	X	X	X, APA	X	X	X		APA		
St. Armand						APA			X		APA		
VILLAGES													
Lake Placid	X		X	X	X	X, APA	X	X	X	X	APA		

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County Clinton County

Reviewer Glen Cutter

Date August 27, 2019

Municipality	Municipal Land Use Planning Tools and Regulations													Comments
	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/ Shore Protection	Floodplain/ Flood Protection	Waste Management/ Junk Yard	Wastewater/ On-site Septic	Stormwater	Agriculture	Conditional Use Permit		
TOWNS														
Altona	x			X			X	X				X		
Black Brook	x			X			X	X				X		
Clinton							X							
Dannemora														
Ellenburg	x			X			X	X				X		
Mooers	x			X			X	X				X		

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Notes:

1. Flood Protection only through the requirements of NYS Building Code, which includes same or more restrictive regs on building above floodplain; however mapping and determining whether a structure or building site is within floodplain is still not easy for CEO.
2. 2. Countywide Agriculture and Farmland Protection Plan implemented in 2002.

County Hamilton County

Reviewer Caitlin Stewart,
Hamilton County Soil
and Water
Conservation District

Date July 15, 2019

Municipality	Municipal Land Use Planning Tools and Regulations												
	Comprehensive Plan	Local Waterfront Revitalization Plan	Site Plan Review	Zoning Law	Subdivision	Waterbody/ Shore Protection	Floodplain/ Flood Protection	Waste Management/ Junk Yard	Wastewater/ On-site Septic	Stormwater	Agriculture	Others (invasive species etc.)	Comments
TOWNS													
Arietta	X		X, APA	X, APA	X, APA	X	P. County started one in 2012 after the hurricane, but it was not completed.	X. Leaves, brush, limbs, branches.	XZ	No plan, zoning oversees stormwater, town staff have completed the Erosion, Sediment Control, and Stormwater training in 2018.	XZ. Livestock mentioned / covered in zoning.	Local transport law for invasive species.	Piseco Lake Association efforts include dam improvements, invasive species, and water quality. PLA is working with SUNY Oneonta to develop a Lake Management Plan.
Indian Lake	X		XZ	XZ	XZ APA	APA	X DEC	XZ	XZ				

Inlet	X	X	XZ	X	XZ APA	XAPAF WZ	N/A	XZ	XZ	APA	N/A	X	Local Lake Associations - also have on water wastewater inspection local law
Lake Pleasant	X		XZ	X	XZ APA	LPSA	X DEC	XZ	XZ	XZ			<p>Town of Lake Pleasant Aquatic Invasive Species Prevention Law: Boaters must remove all standing water, and aquatic plants and animals from watercraft before entering and after exiting a town waterbody.</p> <p>Town is partner with our local Lake Association (LPSA). Town does not have an A.P.A. approved land use plan but works with A.P.A. on regulations. Floodplain protection under D.E.C. emergency action plan / Wakely Dam.</p>

Long Lake	P	No plan, but projects have been implemented.		Had 1 subdivision, affordable housing project, DOH approval		X. Code enforcement officer is responsible for waste management. There is a law regarding junk yard.	X. Yes, under code enforcement officer.		Long Lake Association, Raquette Lake Preservation Foundation.	Active invasive species program that is funded by town and grants from the Adirondack Watershed Institute, 2 active lake associations.
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Appendix D

Implementation Strategy & Project Matrix

Table 1, the Implementation Strategy and Project Matrix lists recommended actions while also identifying relevant goal(s), action category, priority subwatersheds, partners, time frame of implementation, and approximate estimated cost of the project. Each action aligns with an implementation goal(s). Intended goals include:

1. Control agricultural and forestry nonpoint sources
2. Reduce nonpoint source pollution from residential property and community landscapes
3. Address invasive species issues
4. Reduce nonpoint source pollution from municipal activities
5. Provide for ongoing collaboration, implementation, and planning
6. Adopt or amend local regulations designed to reduce pollution and increase resiliency
7. Develop an appreciation for watershed services and implement educational campaigns
8. Increase resiliency to flooding, climate change, and changes in land use
9. Enhance community and habitat revitalization

Recommended actions are organized by action category (i.e., agricultural management, floodplain & stormwater management, etc.).

**Table 1
Implementation Strategy and Project Matrix**

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
1	Agricultural Management	Implement ag BMPs to reduce the loss of soil, nutrients, fertilizers, animal wastes, crop residues, and pesticides from the landscape	0415030101 0415030102 0415030103 0415030207 0415030208 0415030209 0415030210 0415030303 0415030304 0415030305 0415030403 0415030404 0415030405 0415030507 0415030603 0415030702 0415030703 0415030801 0415030802 0415030803 0415030804 0415030805	SWCD, NYSDAM, USDA-NRCS, NYSDEC, Farmers	X			\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
1	Agricultural Management	Provide Adequate Manure Storage and Management	0415030101 0415030102 0415030208 0415030209 0415030210 0415030303 0415030305 0415030404 0415030507 0415030702 0415030703 0415030802 0415030805	SWCD, NYSDAM, USDA-NRCS, NYSDEC, Farmers	X			\$\$\$\$
1	Agricultural Management	Promote Pasture Management	0415030101 0415030102 0415030208 0415030209 0415030210 0415030303 0415030305 0415030404 0415030507 0415030702 0415030703 0415030802 0415030805	SWCD, NYSDAM, USDA-NRCS, NYSDEC, CCE, Farmers	X			\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
1, 5	Agricultural Management	Develop and Implement AEM Tier III Management Plans	0415030101 0415030102 0415030103 0415030207 0415030208 0415030209 0415030210 0415030303 0415030304 0415030305 0415030403 0415030404 0415030405 0415030507 0415030603 0415030702 0415030703 0415030802 0415030803 0415030804 0415030805	SWCD, NYSDAM, USDA-NRCS, Farmers		X		\$\$\$\$
1, 5	Agricultural Management	Increase engagement with AEM	041503	SWCD, NYDAM, USDA-NRCS. NYSDEC, CCE, Farmers	X			\$
5	Agricultural Management	Inventory Current Agricultural Practices and Improve GIS Data	041503	SWCD, NYDAM, USDA-NRCS. NYSDEC, DANC, Farmers			X	\$\$\$
1, 7	Agricultural Management	Built rapport amongst agricultural community and the public	041503	SWCD, CCE, Farmers, NYSDEC, County Planning	X			\$\$
1, 5	Agricultural Management	Purchase equipment to implement erosion and sediment control measures on agricultural lands and existing highway ditch maintenance program, including: compost blowers to amend soils and stabilize critical areas; specialized seeders for cover crop applications including independent Highboy seeders or high horsepower tractors for tow behind models; straw mulcher; and hydroseeder.	041503	SWCD, Farmers, Municipalities, County Planning		X		\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
5	Agricultural Management	Seek additional support for agricultural services	041503	SWCD, CCE, USDA-NRCS, County Planning, NYSDEC, Farmers	X			\$
5	Agricultural Management	Support SWCDs and Planners in obtaining certification to develop Comprehensive Nutrient Management Plans (CNMPs)	041503	SWCD, NYSDAM, USDA-NRCS, USEPA, CCE, Municipalities	X			\$\$
2	Floodplain & Stormwater Management	Complete a watershed-wide streambank assessment to identify and rank areas of erosion for remediation	041503		X			
2	Floodplain & Stormwater Management	Complete streambank assessments and restoration	0415030101 0415030102 0415030103 0415030207 0415030208 0415030209 0415030210 0415030303 0415030403 0415030404 0415030405 0415030501 0415030502 0415030503 0415030506 0415030507 0415030701 0415030703 0415030801	SWCD, NYSDEC, Trout Unlimited, Nonprofits	X			\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
2, 10	Floodplain & Stormwater Management	Wetland restoration, rehabilitation, enhancement and creation	0415030101 0415030102 0415030103 0415030208 0415030209 0415030210 0415030304 0415030405 0415030505 0415030506 0415030507	SWCD, NYSDEC, USEPA, USDA-NRCS, TILT, IRLC		X		\$\$\$\$
2, 8	Floodplain & Stormwater Management	Implement stormwater BMPs and green infrastructure	0415030101 0415030102 0415030103 0415030208 0415030209 0415030210 0415030304 0415030405 0415030505 0415030506 0415030507	NYSDEC, SWCD, Municipalities, WWTPs, County Planning		X		\$\$\$\$
5, 7	Floodplain & Stormwater Management	Commence an educational program on stormwater and floodplain protection	041503	SLRWP, SWCD, NYSDEC, NYSDOS, DANC, County Planning		X		\$
2, 8	Floodplain & Stormwater Management	Implement a formal drainage maintenance program	0415030101 0415030102 0415030103 0415030208 0415030209 0415030210 0415030304 0415030405 0415030505 0415030506 0415030507	SWCD, County Highway Departments, NYSDOT, County Planning, DANC, Nonprofits		X		\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
2, 8	Floodplain & Stormwater Management	Complete mapping of flood-prone areas	041503	FEMA, County Planning, DANC, NCREDC, SWCD, County Highway Departments, NYSDOT	X			\$\$\$\$
2	Floodplain & Stormwater Management	Expand participation in the NYSDEC Trees for Tribes Program	041503	NYSDEC, SLRWP, SWCD, Municipalities, Land Trusts, Nonprofits		X		\$
2, 9	Floodplain & Stormwater Management	Conserve wetlands of international importance. Binational RAMSAR Wetland Site (Quebec, Snye, Dundee, and Fort Covington).	0415030103	SRMT Environment			X	\$\$\$\$
2	Floodplain & Stormwater Management	Restore and re-stabilize Salmon River streambank extending from the Main Street Bridge to the Macomb Dam.	0415030703	SWCDs, Municipalities, NYSDEC		X		\$\$\$\$
2	Floodplain & Stormwater Management	Install a catch basin at the junction of Rt 28 and 30 to protect water quality in Blue Mountain Lake	0415030501	NYSDOT, Municipal DOT, Planning Departments, SWCDs, NYSDEC	X			\$
2, 8	Floodplain & Stormwater Management	Implement stormwater control practices at Town Hall of Long Lake	0415030503	Town of Long Lake, Hamilton County SWCD, Hamilton County DPW		X		\$\$\$
2, 6, 8	Floodplain & Stormwater Management	Reserve open space and floodplain property through property acquisition	041503	Municipalities, County Planning, TNC, Land Trusts, Nonprofits			X	\$\$\$
6, 8	Floodplain & Stormwater Management	Adopt local measures to limit activity on floodplains	041503	County Planning, DANC, Municipalities, APA	X			\$
6, 8	Floodplain & Stormwater Management	Incorporate shorelines in the definitions section of municipal zoning ordinances	041503	County Planning, DANC, Municipalities, NYSDOS, APA	X			\$
5, 8	Floodplain & Stormwater Management	Conduct a Salmon River flooding Feasibility Study in the area around the Malone Sewage Treatment Plant (see Malone LWRP, 2012)	04150307	Local Municipalities, SWCD, NYSDEC		X		\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
2, 5	Floodplain & Stormwater Management	Update floodplain and stormwater regulations to incorporate watercourse setbacks, require buffer strips along sensitive areas, and limit development on steep slopes	0415030101 0415030102 0415030103 0415030208 0415030209 0415030210 0415030304 0415030405 0415030501 0415030503 0415030504 0415030505 0415030506 0415030507	County Planning, DANC, Municipalities, Agricultural Protection Boards, APA	X			\$
2, 6, 8	Floodplain & Stormwater Management	Create and adopt stormwater pollution prevention plans (SPPP) in developed areas	041503	NYSDEC, County Planning, Municipalities, DANC			X	\$\$\$\$
1, 2, 4	Forest Management	Utilize erosion and sediment control mechanisms	041503	NYSDEC, SWCD, CCE, APA, timber harvesters	X			\$\$\$\$
1, 2, 7	Forest Management	Promote sustainable forestry practices and management	041503	NYSDEC, SWCD, CCE, APA, timber harvesters	X			\$
1, 2, 3, 7	Forest Management	Implement urban forest management plans	041503	County Planning, SWCDs, NYSDEC, SRMT, USFS, USDA, CCE, SLELO PRISM	X			\$\$
6	Forest Management	Adopt appropriate zoning	041503	APA, NYSDOS, County Planning, DANC, NCREDC, Municipalities		X		\$\$
1, 2, 6	Forest Management	Require buffer strips along sensitive areas	041503	County Planning, DANC, Municipalities, NYSDOS, APA		X		\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
3, 5	Invasive Species Management	Install and support watershed steward programs and informational kiosks or signage at public boat launches, marinas, and water access points	0415030101 0415030102 0415030103 0415030208 0415030209 0415030301 0415030304 0415030305 0415030501 0415030503 0415030504 0415030506 0415030507 0415030601 0415030603 0415030604 0415030701 0415030703 0415030801	SLELO, APIPP, CCE, AWI, Save the River, IRLC, TILT, County Planning		X		\$\$\$
3, 9	Invasive Species Management	Manage established infestations	041503	SLELO, APIPP, NYSDEC, SWCDs, non-profits, lake associations, municipalities	X			\$\$\$
3, 7	Invasive Species Management	Invasive species prevention, assessment, mitigation and education	0415030501 0415030503 0415030504 0415030505 0415030506 0415030507 0415030604	APIPP, SWCDs, NYSDEC, APA, AWI, Raquette Lake Preservation Foundation, SRMT Environment, Lake Associations, Local schools	X			\$\$\$
3	Invasive Species Management	Replace/replant ash trees infected with Emerald Ash Borer (EAB) to stabilize soil and provide vegetative cover	041503	SWCDs, NYSDEC, NYSIPM, NYSOPRHP, SLELO, APIPP, NYSNHP, Planning Departments	X			\$\$
3, 5	Invasive Species Management	Advance the capabilities of iMapInvasives	041503	NYNHP, SUNY ESF, NYSDEC, SWCD, CCE, NYSIPM, NYSOPRHP		X		\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
3, 5, 7	Invasive Species Management	Support and expand education and monitoring to improve early detection and rapid response	041503	SLELO, APIPP, SWCD, CCE, NYSDEC, AWI, Save the River, IRLC				\$\$
3, 5	Invasive Species Management	Support watershed stewardship programs throughout the watershed	041503	SLELO, APIPP, SWCD, CCE, NYSDEC, Lake associations, municipalities	X			\$\$\$
3, 5	Invasive Species Management	Provide support for certified pesticide applicator trainings and equipment	041503	SLELO, APIPP, NYSDEC, SWCD, CCE, NYSNHP, NYSFOLA, Lake associations	X			\$\$\$
3, 5, 7	Invasive Species Management	Invasive species prevention, assessment, mitigation and education (Butterfield Lake, Millsite Lake)	0415030301 0415030304 0415030305	NYSDEC, SLELO, SWCDs, Planning Departments, Lake Associations, Indian River Lakes Conservancy, Local schools, and universities	X			\$\$
3, 5	Invasive Species Management	Provide funding assistance to invasive species impacted lakes for remediation	0415030301 0415030302 0415030303 0415030304 0415030305	NYSDEC, SLELO, SWCDs, Planning Departments, Lake Associations, Indian River Lakes Conservancy		X		\$\$\$
3, 5	Invasive Species Management	Provide funding to purchase a weed cutter/harvester to share amongst lake associations (Butterfield Lake, Millsite Lake, Mud Lake, Clear Lake, Sixberry Lake)	0415030305	Indian River Lakes Conservancy, Lake Associations, Planning Departments, SWCDs		X		\$\$\$\$
3, 5, 9	Invasive Species Management	Implement eradication plan for Eurasian milfoil in Deer River Flow and Horseshoe Pond	0415030603	SWCDs, NYSDEC	X			\$\$\$
3, 5, 9	Invasive Species Management	Develop and implement a Eurasian Milfoil Removal Plan for Mountain View and Indian Lakes	0415030701	Mountain View and Indian Lake Associations, NYSDEC, SWCDs	X			\$\$\$
3, 7	Invasive Species Management	Install a boat launch at Cold Spring Rd with signage to educate boaters on local invasive species and importance of "clean, drain, dry" to preventing invasive species migration	0415030603	SWCDs, NYSDEC	X			\$\$
3, 7	Invasive Species Management	Boat wash station at existing boat launch near the bridge to Canada	0415030507	SRMT Environment, GLRI, SLELO, NYSDEC	X			\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
3, 7	Invasive Species Management	Raquette Lake Boat Wash Station	0415030501	Hamilton County SWCD, NYSDEC, APA, AWI, Lake Associations, Raquette Lake Preservation Foundation	X			\$\$
3, 9	Invasive Species Management	Aquatic vegetation management of Raquette Lake	0415030501	Hamilton County SWCD, Raquette Lake Preservation Foundation, SUNY Cortland	X			\$\$\$
3, 9	Invasive Species Management	Aquatic vegetation management of Long Lake	0415030503	Hamilton County SWCD, Town of Long Lake, Long Lake Association	X			\$\$\$
3, 9	Invasive Species Management	Control and eradicate aquatic invasive species including Eurasian watermilfoil and curly-leaf pondweed in Chateaugay Lake and shoreline waters	0415030801	Chateaugay Lake Foundation, Local Municipalities, SWCDs, NYSDOS, NYSDEC, AWI	X			\$\$
3, 9	Invasive Species Management	Long Lake Boat Wash Station and extend the Lake Steward Program and support to Lake Eaton, South Pond, and Forked Lake	0415030501 0415030502 0415030503	Hamilton County SWCD, Paul Smith's College, AWI, NYSDEC, Long Lake Association, Town of Long Lake	X			\$\$\$
3, 7, 9	Invasive Species Management	Boat inspection and cleaning stations for all lakes with public boating access. Provide funding for boat stewards at public launches to inspect boats and educate boaters on the effects of introducing invasive species.	0415030301 0415030302 0415030303 0415030304 0415030305	NYSDEC, SLELO, SWCDs, Planning Departments, Lake Associations, Indian River Lakes Conservancy, Local schools, and universities		X		\$\$\$
3, 5	Invasive Species Management	Provide funding for post-invasive species management monitoring	041503	SLELO, APIPP, NYSDEC, SWCD, CCE, NYSNHP, NYSFOLA, Lake associations		X		\$\$\$
3, 5	Invasive Species Management	Support research and use of emerging technology to monitor invasive species	041503	SLELO, APIPP, NYSDEC, SWCD, CCE, NYSNHP, NYSFOLA, Lake associations, SUNY Cortland, AWI, SUNY ESF			X	\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
3, 5, 9	Invasive Species Management	Support efforts to mitigate established aquatic invasive species through expanded local and state funding	041503	NYS, SLELO, APIPP, NYSDEC, SWCD, NYSNHP, NYSFOLA, Lake associations		X		\$\$\$\$
4	Infrastructure and Development	Implement road deicing BMPs	0415030101 0415030102 0415030103 0415030208 0415030210 0415030302 0415030303 0415030403 0415030404 0415030405 0415030504 0415030507 0415030602 0415030603 0415030604 0415030703 0415030801	NYSDOT, County Highway Departments, Local Public Works Departments, Municipalities	X			\$
4	Infrastructure and Development	Evaluate condition and runoff potential of all salt storage facilities needed for municipalities	041503	NYSDOT, County Highway Departments, Local Public Works Departments, Municipalities	X			\$
4	Infrastructure and Development	Identify areas most at risk of adverse impacts from road salt	041503	NYSDOT, NYSDEC, APA, County Highway Departments, Local Public Works Departments		X		\$\$\$
4, 6	Infrastructure and Development	Invest in improved technology and equipment for winter road maintenance	041503	NYSDOT, County Highway Departments, Local Public Works Departments, Municipalities			X	\$\$\$\$
4	Infrastructure and Development	Implement roadside erosion control mechanisms	041503	NYSDOT, County Highway Departments, SWCD, NYSDEC, Cornell Local Roads Program	X			\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
4	Infrastructure and Development	Complete roadside ditch assessments and restoration	0415030101 0415030102 0415030103 0415030207 0415030208 0415030303 0415030403 0415030405 0415030506 0415030507 0415030703 0415030801	SWCD, NYSDEC, Nonprofit organizations, municipalities	X			\$\$\$\$
8	Infrastructure and Development	Continue surveying and assessing road-stream crossings for aquatic passage and flood hazards	041503	SWCD, NYSDEC, USFWS, Trout Unlimited, NAACC		X		\$\$\$
5, 7	Infrastructure and Development	Expand training programs for local and county highway departments	041503	NYS DOT, County Highway Departments, Local Public Works Departments, SWCD, Cornell Local Roads Program, Municipalities	X			\$\$
5, 8	Infrastructure and Development	Secure funding for regional culvert replacement program	041503	NYS DOT, County Highway Departments, Local Public Works Departments, SWCD, USACE, Town and County DPW Budget Committees		X		\$\$\$\$
2, 8, 9	Infrastructure and Development	Jennings Pond dam replacement (43.97407217, -74.42425467)	0415030503	Town of Long Lake, Hamilton County SWCD, Hamilton County DPW		X		\$\$\$\$
2, 10, 11	Infrastructure and Development	Shaw Pond dam replacement (43.9693775, -74.407168)	0415030503	Town of Long Lake, Hamilton County SWCD, Hamilton County DPW		X		\$\$\$\$
8, 9	Infrastructure and Development	Lake Eaton Outlet culvert replacement (43.97889633, -74.43799267)	0415030503	Hamilton County SWCD, Hamilton County DPW	X			\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
8, 9	Infrastructure and Development	Maple culvert replacement (43.86660783, -74.43560367)	0415030501	Hamilton County SWCD, Hamilton County DPW	X			\$\$
8, 9	Infrastructure and Development	Water plant culvert replacement (43.86723233, -74.43815867)	0415030501	Hamilton County SWCD, Hamilton County DPW	X			\$\$
8, 9	Infrastructure and Development	Forked Lake Rd culvert replacement (43.90497117, -74.50037383)	0415030501	Hamilton County SWCD, Hamilton County DPW	X			\$\$
8, 9	Infrastructure and Development	North Point Rd culvert replacement (43.90213917, -74.50020033)	0415030501	Hamilton County SWCD, Hamilton County DPW	X			\$\$
8, 9	Infrastructure and Development	Sagamore 1 culvert replacement (43.79840833, -74.65000667)	0415030501	Hamilton County SWCD, Town of Long Lake, Hamilton County DPW	X			\$\$
8, 9	Infrastructure and Development	Sagamore 2 culvert replacement (43.7868264, -74.64269833)	0415030501	Hamilton County SWCD, Town of Long Lake, Hamilton County DPW	X			\$\$
9	Infrastructure and Development	Install a boat launch, fishing pier, and scenic overlook in Akwesasne north of State Route 37. Construct a recreational trail along the Raquette River with signage to explain the historical/cultural significance (trail would be where Mohawk runners historically delivered messages from one Haudenosaunee territory to another).	0415030507	SRMT, SWCDs, NYSDEC		X		\$\$\$
8, 9	Infrastructure and Development	Implement dredging at Recreational Pond in the Town and Village of Malone (10 acres)	04150307	Local Municipalities, SWCDs, NYSDEC		X		\$\$\$\$
8, 9	Infrastructure and Development	Implement dredging and sediment removal of Mountain View and Indian Lakes	0415030701	Local Municipalities, Mountain View Lake Association, SWCDs	X			\$\$\$\$\$
2, 9	Infrastructure and Development	Shoreline and river restoration at the breached weir in the Village of Massena. Plant native, culturally significant species to the Mohawk Tribe	0415030405	SRMT Environment, NYSDEC NYSDOS, Village of Massena, Town of Massena		X		\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
9	Infrastructure and Development	Implement projects documented in the Master Plan for improvement and repair of Recreational Park located on Duane Street in the Town of Malone	0415030703	Municipalities, SWCDs		X		\$\$\$\$
9	Infrastructure and Development	Continue testing and removal of dilapidated buildings in Malone (see Town and Village of Malone LWRP, 2012)	0415030703	Town and Village of Malone		X		\$\$\$\$
9	Infrastructure and Development	Construct a fishing pier and multi-use area/building at the St. Regis River Park (West) that can host activities like farmer markets, yoga, movies, craft shows, parking. In the St. Regis River Park (East), renovate decommissioned powerhouse into an art gallery with indigenous trees and plants and construct a parking area	0415030604	SRMT Environment, Economic Development, P & I		X		\$\$\$\$
9	Infrastructure and Development	Continue development and construction of a public multi-use trail across Franklin County	04150306 04150307 04150308	SWCDs, Franklin County Recreational Trails Association		X		\$\$\$\$
9	Infrastructure and Development	Construct walking trails and provide signage giving recognition to the cultural significance of the Mohawk mill and 1796 treaty, incorporate a fishing pier and bike trail	0415030405	SRMT Environment, NYSDEC, Village of Massena, Town of Massena		X		\$\$\$
9	Infrastructure and Development	Construct a waterway bike trail that connects with the Grasse River boat launch on Rte 37, extending to the Village of Massena footbridge, to Massena Center and Barnhart Island (St. Lawrence River).	0415030405	SRMT Environment, NYSDEC, Village of Massena, Town of Massena		X		\$\$\$\$
4, 5	Infrastructure and Development	Create a road salt reduction task force	041503	NYS DOT, County Highway Departments, Local Public Works Departments, APA, AWI, Cornell Local Roads Program	X			\$\$\$
4, 5	Infrastructure and Development	Implement the St. Lawrence River Watershed Roadside Erosion Assessment	041503	SWCDs	X			\$\$\$\$
4, 5	Infrastructure and Development	Support and implement annual RRAMP Projects	041503	NYS Thruway Authority, SWCDs	X			\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
4, 6	Infrastructure and Development	Assist municipalities with reviewing their local laws to reflect best practices to control nonpoint source pollution	041503	Municipalities, County Planning, NYSDOS, DANC, NCREDC	X			\$\$\$
6, 8	Infrastructure and Development	Support community participation in the climate smart communities' program	041503	Municipalities, County Planning, NYSERDA, NYSDEC		X		\$\$\$\$
9	Infrastructure and Development	Plan and provide low income housing within the watershed	041503	Municipalities, County Planning, NYSDOS, NCREDC		X		\$\$\$\$
9	Infrastructure and Development	Promote the preservation of high quality and unique agricultural areas by guiding non-agricultural development into other areas of the watershed	041503	Municipalities, County Planning, Agricultural Protection Boards		X		\$
4, 8	Water and Wastewater Management	Address combined sewer overflows (CSOs)	0415030101 0415030102 0415030208 0415030210 0415030405 0415030504 0415030507	Municipalities with CSOs (City of Ogdensburg, Villages of Massena, Clayton, Tupper Lake, Gouverneur, and Potsdam), City and Village WWTPs, NYSDEC, County Planning			X	\$\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
4, 8	Water and Wastewater Management	Improve existing municipal wastewater treatment systems	0415030101 0415030102 0415030201 0415030208 0415030209 0415030210 0415030302 0415030303 0415030304 0415030305 0415030404 0415030405 0415030504 0415030506 0415030507 0415030603 0415030604 0415030703 0415030801 0415030802	County Planning, Municipalities, Citizens, POTWs			X	\$\$\$\$
4, 8	Water and Wastewater Management	Planning, design, and construction of improvements to the Village of Clayton's collection and treatment systems	0415030101	Clayton (V) STP, Municipalities		X		\$\$\$\$
4, 8	Water and Wastewater Management	Planning, design, and construction of the Waddington WWTP collection system and wastewater treatment plant improvements	0415030102	Waddington (V) WWTP, Municipalities		X		\$\$\$\$
4, 8	Water and Wastewater Management	Design and construction of upgrades to the Alexandria Bay STP and construction of new BioMag process; general facility improvements, site bioswale, vegetated swale and tree planting, and new disinfection systems.	0415030101	Alexandria Bay WWTP, Municipalities		X		\$\$\$\$
4, 8	Water and Wastewater Management	Design and construction of wastewater treatment plant and pump station improvements to maintain water quality in the Raquette River	0415030506	Colton STP, Municipalities		X		\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
4, 8	Water and Wastewater Management	Design and construction of stormwater sewer improvements to protect water quality in the Raquette River	0415030507	Potsdam (V) WPCP, Municipalities		X		\$\$\$\$
9	Water and Wastewater Management	Install a public bathroom for Raquette Lake	0415030501	Raquette Lake Preservation Foundation, Hamilton County SWCD, Town of Long Lake	X			\$
2, 5	Water and Wastewater Management	Develop a septic system monitoring program	0415030101 0415030102 0415030103 0415030202 0415030206 0415030208 0415030301 0415030302 0415030304 0415030305 0415030405 0415030503 0415030504 0415030507 0415030604 0415030703	County Planning, County DOH, SWCD, Lake associations, NYSDEC, Municipalities, DANC			X	\$\$\$
5, 7	Water and Wastewater Management	Educate local elected officials on wastewater management	041503	County Planning, County DOH, SWCD, NYSDEC, Municipalities, SWCD	X			\$
2, 7	Water and Wastewater Management	Educate homeowners on septic system maintenance	041503	County Planning, County DOH, SWCD, Lake associations, NYSDEC, Municipalities, DANC	X			\$
2	Water and Wastewater Management	Initiate and advertise pharmaceutical take-back programs	041503	NYSDOH, County Planning, County DOH, SWCD, USDOJ Drug Enforcement Administration, Local law enforcement	X			\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
8	Water and Wastewater Management	Complete GIS mapping of sewer areas	041503	DANC, County Planning, NYSDEC		X		\$\$\$
2, 4, 5, 6, 8	Water and Wastewater Management	Adopt uniform sewer ordinances/sanitary law	041503	NYSDOH, County DOH, County Planning, SWCD, Water Quality Coordinating Committees, Municipalities, Lake associations		X		\$\$\$
2. 4	Water and Wastewater Management	Consider extending public sewers or implementing alternatives	0415030102 0415030209 0415030303 0415030305 0415030405 0415030507 0415030703	County Planning, NYSDEC, Municipalities, DOH			X	\$\$\$\$
2, 5	Water and Wastewater Management	Obtain funding support and engage in cost-share program to address failing septic systems	041503	County Planning, SWCD, County DOH, NYSDEC, Municipalities, DANC	X			\$\$\$\$
5	Water Quality Research & Monitoring	Research and document impact of road salt on lake water quality and identify BMPs to mitigate	041503	Local Municipalities, SWCDs, NYSDEC		X		\$\$\$
5	Water Quality Research & Monitoring	Model sediment transport and loading from the Grasse, Raquette, St. Regis, and Salmon Rivers to the main stem of the St. Lawrence River downstream of the Moses-Saunders dam	04150301 04150304 04150305 04150306 04150307	SRMT, NYSDEC, SWCDs			X	\$\$\$\$
5	Water Quality Research & Monitoring	Study sediment inflows into Chateaugay Lake to determine sources	0415030801	Chateaugay Lake Foundation, Chateaugay Lakes Association, Local Municipalities, SWCD, NYSDEC	X			\$\$\$
5	Water Quality Research & Monitoring	Install additional gauging stations throughout the Raquette River Watershed to measure flow on the Raquette River	04150305	USGS, NYSDEC, Hamilton County SWCD, Raquette Lake Preservation Foundation			X	\$\$\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
5	Water Quality Research & Monitoring	Install in-situ real-time water buoys that record climatic and water quality parameters	04150304 04150305 04150306 04150307	SRMT, NYSDEC, RATES, USGS, NOAA		X		\$\$\$\$
5	Water Quality Research & Monitoring	Install a weather station on Raquette Lake	0415030501	USGS, NYSDEC, Hamilton County SWCD, Raquette Lake Preservation Foundation	X			\$
5, 7, 9	Water Quality Research & Monitoring	Harmful algal bloom monitoring program for Long Lake	0415030503	NYSDEC, Hamilton County SWCD, Long Lake Association	X			\$
5, 7, 9	Water Quality Research & Monitoring	Continue and implement water quality monitoring programs for the Salmon River, Branch Brook, and Lake Titus	04150307	Lake Titus Association, NYSDEC, NYSFOLA	X			\$\$\$
9	Water Quality Research & Monitoring	Maintain fisheries balance through fish stocking at Millsite Lake	0415030305	SWCDs, Planning Departments, Indian River Lakes Conservancy, NYSDEC, Lake Associations (MLPOA)		X		\$
5	Water Quality Research & Monitoring	Monitor legacy contamination remediation efforts	0415030101 0415030102 0415030103 0415030202 0415030209 0415030210 0415030405 0415030507 0415030604	NYSDEC, USEPA, SRMT, Responsible landowners, municipalities	X			\$
5	Water Quality Research & Monitoring	Develop a water quality data repository and collaborative	041503	NYSDEC, USGS, USDA-NRCS, USDAM, SWCD			X	\$\$\$\$
5, 7	Water Quality Research & Monitoring	Encourage citizen engagement and citizen science	041503	NYSDEC, AWI, Lake associations, citizens, students, IRLC, Save the River, APIPP, SLELO, CCE, River Institute	X			\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
5	Water Quality Research & Monitoring	Continue funding for USGS gauges	041503	USGS, Municipalities	X			\$\$\$\$
5	Water Quality Research & Monitoring	Secure funding for well drinking water testing program	041503	SWCD, AWI, Municipalities		X		\$\$\$
5	Water Quality Research & Monitoring	All eligible lakes should continue or begin participation in NYSFOLA's Citizen's Statewide Lake Assessment Program (CSLAP)	041503	NYSDEC, NYSFOLA, Municipalities, Lake associations	X			\$\$
5	Water Quality Research & Monitoring	Update the NYSDEC WI/PWL to include new data on water quality in the St. Lawrence River watershed	041503	NYSDEC, SWCD, County DOH, Lake associations, nonprofit agencies		X		\$\$\$
5	Watershed Planning, Management & Outreach	Indian River Watershed Management Plan (potentially a 9 Element Plan)	04150303	SWCDs, Planning Departments, Indian River Lakes Conservancy, NYSDEC, NYSDOS		X		\$\$\$\$
5	Watershed Planning, Management & Outreach	Black Lake TMDL	0415030305	NYSDEC, SWCD, Planning Departments		X		\$\$\$\$
5	Watershed Planning, Management & Outreach	Prepare updated watershed management plan for Chateaugay Lake chain to identify issues and BMPs to mitigate	0415030801	Chateaugay Lake Foundation, Chateaugay Lakes Association, Local Municipalities, SWCD, NYSDOS		X		\$\$\$
5, 6	Watershed Planning, Management & Outreach	Designate and support a circuit writer for the St. Lawrence River watershed to identify gaps in local land use tools and regulation that aid in protecting water quality and natural resources	041503	SLRWP, DANC, NCREDC, County Planning, SWCD, NYSDEC, NYSDOS		X		\$\$\$
1, 2, 4, 6	Watershed Planning, Management & Outreach	Enforce existing regulations impacting water quality and protection	041503	County Planning, NYSDEC, Code enforcement officers, municipalities	X			\$\$

Goal(s)	Category	Action	Priority Subwatersheds	Partners	Time-Frame			Approximate Cost
					1-2 years	3-5 years	5+ years	
5	Watershed Planning, Management & Outreach	Develop an implementation reporting and tracking system	041503	SLRWP, SWCD, County Planning, County DOH, NYSDEC, Municipalities		X		\$\$\$
7	Watershed Planning, Management & Outreach	Use media to relay information and engage the public on plan implementation efforts	041503	SLRWP, SWCD, NYSDEC, North Country Public Radio, North Country Now	X			\$
5, 7	Watershed Planning, Management & Outreach	Initiate a St Lawrence River Watershed Annual Conference	041503	SLRWP, SWCD, County Planning, County DOH, NYSDEC, Municipalities, Lake associations, NYSDOS, AWI, Universities, Nonprofit agencies, APIPP, SLELO, USGS, IJC	X			\$\$
5, 7	Watershed Planning, Management & Outreach	Develop and support a collaborative STEM program which incorporates watershed science and associated teacher training	041503	CCE, AWI, IRLC, TNC, Local schools, Lake Associations (Long Lake Association)			X	\$
5, 7	Watershed Planning, Management & Outreach	Identify resources and avenues to train and educate local representatives and public on invasive species and HABS hazards	041503	State and local government officials, NYSDOH, NYSDEC, Municipal leaders, municipal public works departments	X			\$
5	Watershed Planning, Management & Outreach	Coordinate funding and other resources to implement watershed priorities	041503	SLRWP, County Planning, County DOH, SWCD, NYSDEC, NYSDOS		X		\$
5	Watershed Planning, Management & Outreach	Establish an ongoing collaborative for plan implementation	041503	SLRWP, SWCD, County Planning, County DOH, NYSDEC, Municipalities	X			\$
1, 2, 4, 5	Watershed Planning, Management & Outreach	Increase capacity of County SWCD and Planning Departments to implement projects and track progress	041503	SWCD, County Planning, Municipalities		X		\$\$\$

Appendix E

Relevant Resources

Category	Source	Document	Description
Climate Change Climate Change	Intergovernmental Panel on Climate Change (IPCC) US Global Change Research Program	AR6 Synthesis Report: Climate Change Fourth National Climate Assessment	The IPCC provides reports to policymakers with regular scientific assessments on climate change, its implications, and potential future risks, as well as to put forward adaptation and mitigation options. Assesses the science of climate change and variability and its impacts across the United States, now and throughout this century Framework helps communities discover and document climate hazards, then develop workable solutions to lower climate-related risks. Provides a lot of resources on climate change, resiliency, best management practices and collaboratives. Provides training courses, case studies, and helps communities locate climate science experts and service centers that can help you build resilience.
Climate Change	US Climate Resilience Toolkit	US Climate Resilience Toolkit	Provides decision makers with cutting-edge information on the state's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge.
Climate Change	NYSERDA	Responding to Climate Change in New York State (ClimAID)	The interim report assesses how all economic sectors can reduce GHG emissions and adapt to climate change to meet NYS's 80% below emitted levels in 1990 by the year 2050.
Climate Change	NYSDEC, NYSEKDA, Center for Climate Strategies	NYS Climate Action Plan (2010)	Find data related to climate change that can help inform and prepare America's communities, businesses, and citizens. Includes data, maps, tools, and resources to help a community assess its resilience.
Climate Change Climate Change	Federal Geographic Data Committee USEPA	GeoPlatform Climate Change Adaptation Resource Center	Helps local governments effectively deliver services to their communities even as the climate changes.
Climate Change Climate Change	USEPA USEPA, Office of Water	Planning for Climate Change Adaptation Resource Center Climate Change Adaptation Implementation Plan (2014)	The U.S. Climate Resilience Toolkit provides a useful five-step process that outlines steps that communities can take to identify, assess, and confront their climate vulnerabilities. The site also provides resources (e.g., data, tools, case studies) from across the federal government to help communities put the process into action. Implementation strategies for the water sector to accomplish goals within the EPA Climate Change Adaptation Plan.
Climate Change	Kresge Foundation	Climate Adaptation: the State of Practice in U.S. Communities (2016)	Provides valuable insights into the practice of climate change adaptation in the US, including how to support the many community-based champions working to reduce their communities' vulnerability to climate change impact.

Category	Source	Document	Description
Climate Science Special Report	US Global Change Research Program	Climate Science Special Report (Fourth National Climate Assessment)	Designed to be an authoritative assessment of the science of climate change with a focus on the US to serve as the foundation for efforts to assess climate-related risks and inform decision-making about responses.
Fish Consumption	NYSDOH	New York State Health Advice on Eating Fish You Catch	Health advisories in sport fish and game in NYS by region and provides an alphabetic listing of waterbodies with advisories, and information on chemicals and bacteria in fish and game.
Fish Consumption	USEPA	Fish and Shellfish Advisories and Safe Eating Guidelines	USEPA provides safe eating guidelines and links to advisories issued by federal, state, territorial or tribal agencies.
Invasive Species	Adirondack Park Invasive Plant Program	Adirondack Partnership for Regional Invasive Species Management Strategic Plan, 2013-2017	One of 8 PRISMs across NY that coordinates and communicates needs for invasive species issues affecting the Adirondack region.
Invasive Species	NYSDEC	Rapid Response for Invasive Species: Framework for Response	Provides managers with a defined response system and list of procedures that can be initiated upon discovery of a new invasive species infestation.
Invasive Species	iMap Invasives	NY iMapInvasives Database	NY's on-line, all-taxa invasive species database and mapping tool used to document and share invasive species observation, survey, assessment, and treatment data; coordinate early detection and rapid response efforts; and provide data analysis and summaries
Invasive Species	iMap Invasives	Invasive Plant Management Decision Analysis Tool	Helps natural resource managers to determine if an invasive plant control project is likely to be successful and if it warrants an investment of their agency's or organizations resources
Invasive Species	New York Invasive Species Research Institute at Cornell University	Expert Database, Best Management Practice Guides	Coordinates invasive species research to help prevent and manage the impact of invasive species in NYS. It provides a database where you can search for experts that study invasive species in the selected area. Also provides MBP guides and funding opportunities.
Invasive Species	St. Lawrence - Eastern Lake Ontario (SLELO) PRISM	SLELO Strategic Plan	Protect native habitats, biodiversity, natural areas, and freshwater resources by using a collaborative and integrated approach to invasive species management
Invasive Species	NY Invasive Species Council	NYS Invasive Species Comprehensive Management Plan (2018), NYS Aquatic Invasive Species Management Plan (2015)	The council fosters collaboration and coordination among State agencies, the IS Advisory Committee, and stakeholders across that State to minimize harm caused by invasive species to NY's environment, economy, and human health.
Management	NYSDEC, Great Lakes Watershed Program	Great Lakes Action Agenda (2014, interim)	Blends goals and objectives of current program plans with federal and state initiatives to produce a fully integrated and comprehensive course of action. The agenda seeks to apply ecosystem-based approaches and existing program authorities to achieve sustainable environmental solutions.

Category	Source	Document	Description
Planning	Great Lakes Coastal Resilience	Great Lakes Coastal Resilience Planning Guide	Find hazards and climate change resources that Great Lakes counties and municipalities can use to communicate coastal issues and inform existing and future land use, infrastructure, and natural resource plans and policies to enhance community resiliency.
Policy	NYS Coastal Management Program	NYS Coastal Management Plan The Snowfighter's Handbook: A Practical Guide for Snow and Ice Control	Describes organizational structure to implement the CMP and provides a set of statewide policies enforceable on all State and Federal agencies which manage resources and coordinate actions along the State's coastline.
Road Salt	The Salt Institute		BMPs for Safe and Sustainable Snow-fighting
Septics	Save the River	Homeowner Wastewater Handbook Residential Onsite Wastewater Treatment Design Handbook	Handbook with financial resources, demonstration projects, information on regulations and technology alternatives for updating septic systems
Septics	NYSDOH New York Onsite Wastewater Treatment Training Network, Inc. (OTN)	Educational resource	Design handbook for residential onsite wastewater treatment systems
Septics	DANC, CGC Planning Program	North Country Regional Sustainability Program	Provides training through NYS for the onsite wastewater treatment industry, offers septic inspection training
Sustainability Planning	United Nations	Educational Platform	Provides a framework for a long-term sustainability vision for the North Country region of NYS.
Sustainability Planning	United Nations	Educational Platform	Website provides resources to help governments and stakeholders make sustainable development goals a reality
Wastewater	NYSDEC	News platform	CSO Sewage Discharge Notifications
Youth Education	Save the River	Curriculum resources	In school water related classroom curriculum