



LAKE GEORGE WATERSHED DATA ATLAS

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OCTOBER 2016

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To ensure accuracy, practicality, validity and functionality of the Lake George Watershed Data Atlas, the Lake George Association provided the following municipal leaders advance copies of the Watershed Data Atlas for review and comment:

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A dramatic sunset over a lake with a forested shoreline and a campsite. The sky is filled with large, dark clouds that are illuminated from below by the setting sun, creating a golden glow. The sun is partially obscured by a thick layer of clouds, with rays of light breaking through. The foreground shows a calm body of water reflecting the light. In the middle ground, a dense forest of tall, dark evergreen trees lines the shore. A small campsite is visible on the left side of the shore, with a green and white tent and some people sitting nearby. The overall mood is serene and peaceful.

INTRODUCTION

PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS

INTRODUCTION

The natural environment of the Lake George watershed is unique and complex. This system is impacted by land use activities and other human influences. Each of the twelve communities that call the watershed home have unique histories and built environments. This has played a significant role in how the watershed has been developed, and will continue to develop in the years to come. The watershed is composed of portions of Queensbury, Lake George (Town and Village), Lake Luzerne, Bolton, Warrensburg, Hague, Horicon, Ticonderoga, Putnam, Dresden, and Fort Ann of Warren, Washington, and Essex counties.

While there has been a growing body of research on Lakes George's ecosystem, the watershed's population, land use, and infrastructure characteristics have not been fully evaluated. In order to identify ongoing development patterns and growth trends within the watershed, one must review a variety of local community plans and reports. However, this approach may not provide a comprehensive picture as this information often coincides with political boundaries as opposed to the watershed boundary. Furthermore, several communities in the watershed have done little or no

planning, creating information gaps. A comprehensive approach is needed to conduct better research, planning, and decision-making vital to Lake George's long-term health and sustainability.

Background

With support from participating municipalities, in partnership with the Lake Champlain-Lake George Regional Planning Board (LCLGRP) and Lake George Association (LGA), this report was prepared with the goal of providing a single source of information regarding human influences on the watershed. The intent is that it will be used as a tool for local planners, government officials, researchers, and organizations seeking information in support of planning and water quality related initiatives. This document is also prepared in the interest of starting a dialogue about land use and future growth within the watershed.

The document provides brief narratives introducing key information from the data that was gathered from a variety of public sources. However, this is not intended to be an exhaustive analysis. Rather, it is meant to expose the reader to the material and inspire further research and consideration. The document provides key information on the following topics:

- Population and Housing
- Land Use, Zoning, and the Built Environment
- Water, Sewer, and Roadway Infrastructure
- Residential Development Potential

The appendices provide summary tables cataloging the data collected and a series of maps illustrating this information. More detailed information is available upon request by contacting the Lake George Association (LGA).

A Note About Data Sources

It is important to note that the Lake George watershed boundary does not nicely follow any political boundary and capturing and presenting data unique to the watershed has proven difficult. As an example, select population and housing data is based on US Census geography boundaries that do not perfectly align with the watershed divide. Similarly, the municipalities each collect and report information in a different manner and isolating information specific to the watershed can be problematic.

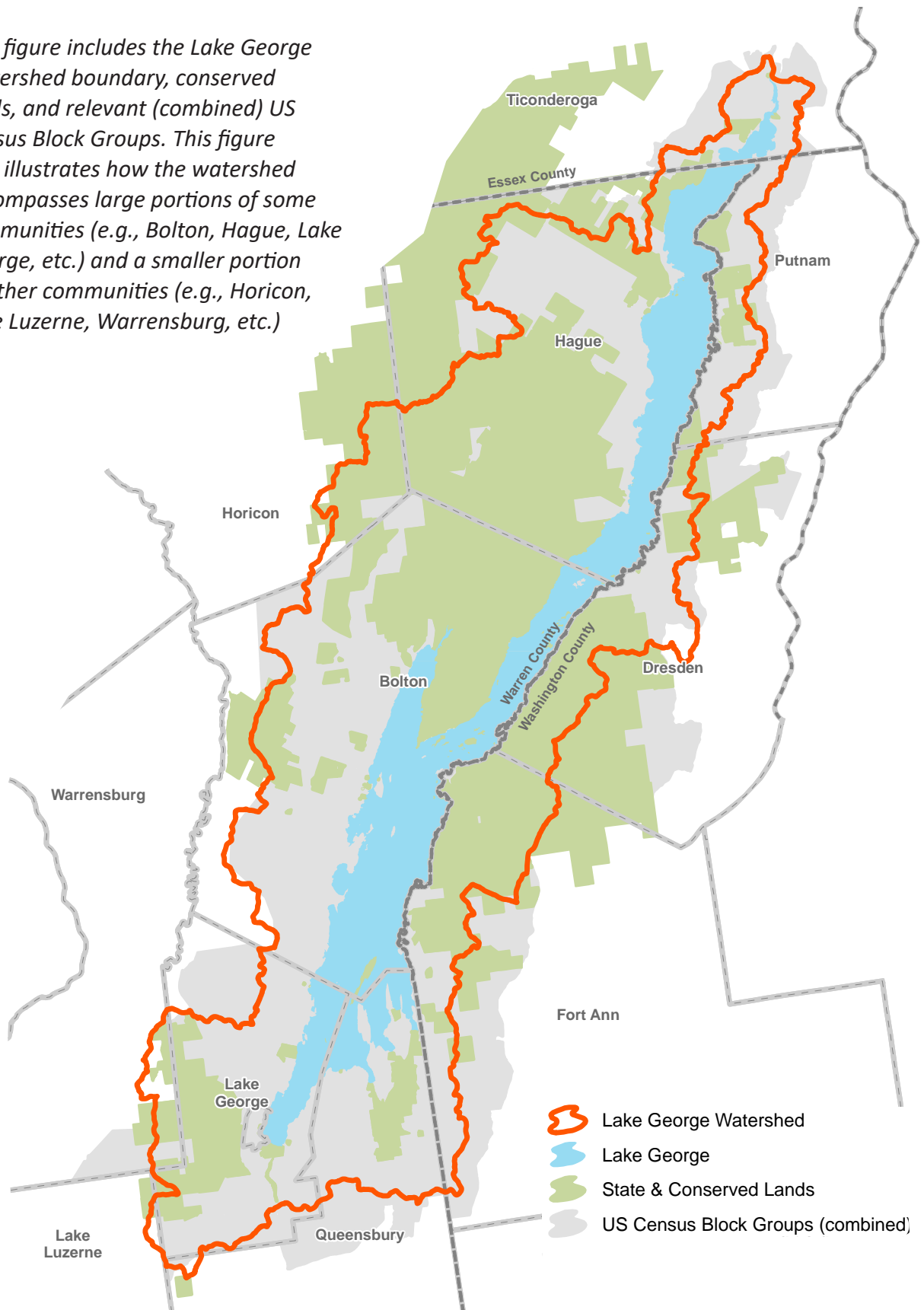
Furthermore, secondary data in this report was generated using a number of different sources. This includes the US Census Bureau, US Geological Survey, US National Archive, NYS Library, NYS GIS Clearinghouse, Adirondack Park Agency, Warren County Tourism, Cornell

University, University of Vermont, Warren, Washington, and Essex Counties real property data, local building permit data, and municipal zoning regulations. As a result, variations in information gathering and reporting can result in minor discrepancies and data gaps. Efforts have been made throughout this document to report comparable information and explain differences between data sources.

Finally, it is important to note that a significant amount of data included in this document was generated using US Census Block Groups and Real Property Tax Service parcel data (particularly population and housing related figures). Using Geographic Information Systems (GIS) software, block groups and parcel boundaries that closely follow the Lake George watershed boundary were selected and reported. Parcel boundaries align relatively well with the watershed boundary. However, US Census Block Groups are larger-scale and therefore tend to deviate from the watershed boundary. The Lake George watershed and US Census Block Group figure (next page) helps illustrate this point. It also depicts the watershed's municipal boundaries. Interestingly, several areas where the watershed and US Census boundaries vary have very low housing and population counts and therefore have negligible impact on the reported data.

Note: The Town of Horicon was omitted from select sections of this report for data consistency purposes. It is worth noting that the portion of Horicon that is within the watershed is principally Adirondack Forest Preserve lands.

This figure includes the Lake George Watershed boundary, conserved lands, and relevant (combined) US Census Block Groups. This figure also illustrates how the watershed encompasses large portions of some communities (e.g., Bolton, Hague, Lake George, etc.) and a smaller portion of other communities (e.g., Horicon, Lake Luzerne, Warrensburg, etc.)



A group of people, including men and women of various ages, are standing on a stone pier overlooking a large body of water. Some are holding cameras, suggesting they are tourists or photographers. In the background, a small boat with several people is visible on the water. The sky is overcast.

POPULATION CHARACTERISTICS

PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS



MODERATE POPULATION GROWTH SINCE THE 1980s ...

Population growth within the Lake George watershed has moderately increased since the 1980s according to US Census data. The watershed's population has grown by approximately 20% from 1980 to 2010 (nearly 1,700 new full-time residents). In comparison, population growth within the 12 Towns (outside of the watershed area) has increased by 30% (almost 10,400 people) during this same period. However, much of this growth can be attributed to the Town of Queensbury and growth along Interstate 87. Regionally, Warren County's population grew by 18%, Washington County nearly 15%, and Essex County nearly 9%

during this timeframe (note these figures include growth within the watershed). Seasonal residents and tourists increase the overall population. Assuming an average family size of 2.5 people per seasonal housing unit and full lodging occupancy (see Housing Characteristics section for more information), the Lake George watershed population has the potential to increase by more than 270% (approximately 36,770) during peak summer months. This figure does not account for the number of people staying at campground facilities or day visitors, which would likely increase the watershed population as well. Recreation studies of the watershed illustrates this point.

9,848 PEOPLE LIVE IN
THE WATERSHED

year-round. More than 54,300 people live in the 12 Towns that adjoin Lake George. The watershed population increased by 1,700 people from 1980 to 2010. Watershed growth is similar to adjoining counties' growth rates (Warren, Washington, Essex).



77%

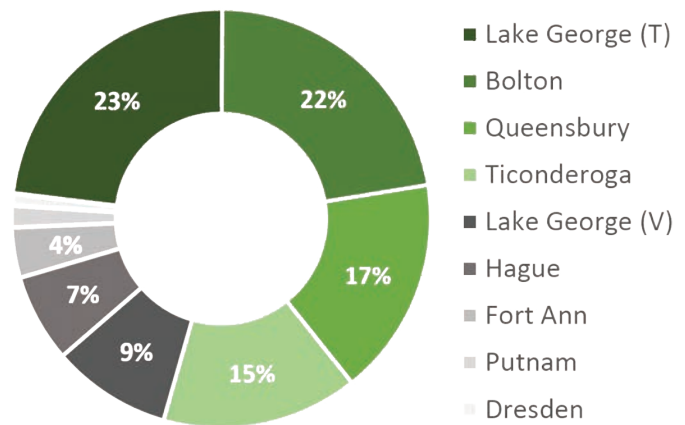
Bolton, Lake George, Queensbury, and Ticonderoga account for 77% of the watershed population

Growth is Not Equally Distributed

While overall growth within the watershed has been low, several communities have experienced significant gains. The Towns of Bolton, Queensbury, and Ticonderoga’s watershed population have increased between 29% and 80% since 1980. In contrast, the Village of Lake George, Dresden and Hague’s watershed populations have decreased during this same period. In real numbers, Ticonderoga and Bolton’s watershed population each increased by more than 600 residents. Lake George and Queensbury watershed populations have increased more than 280 and 370, respectively. It is important to point out that some portion of this population increase may be attributed to retired individuals who have moved into their seasonal residence or built a “year-round” residence, but still spend a significant amount of time elsewhere. Anecdotal evidence of this can be observed by looking at school enrollments. For example, while Bolton’s population has increased since the 1990s, student enrollment at Bolton Central School has declined by nearly 28%. Ticonderoga and Lake George have experienced similar trends.

Community Population

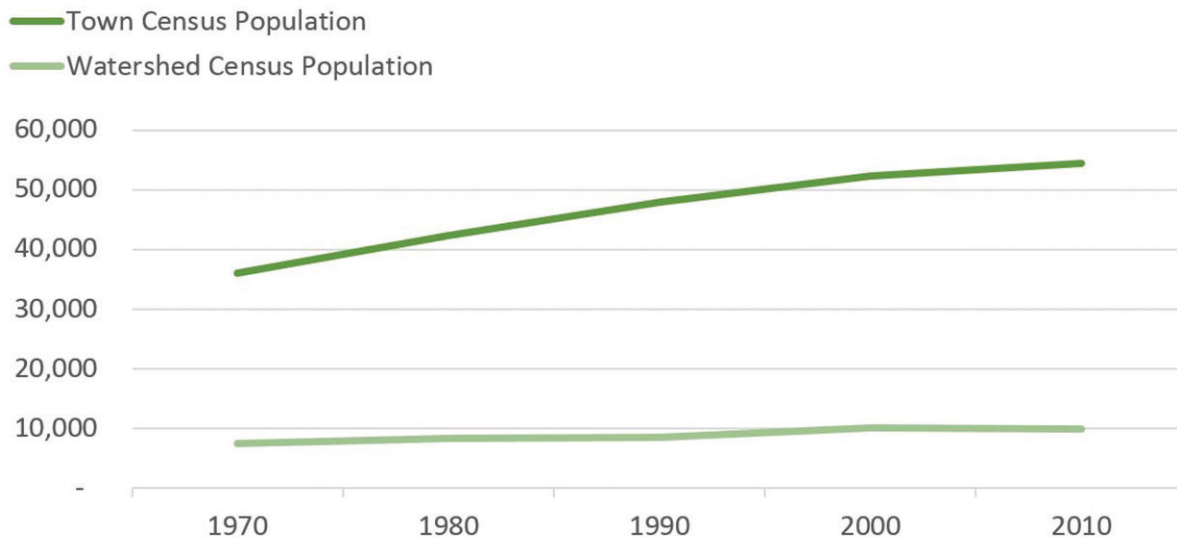
Population is unequally distributed throughout the watershed. Lake Luzerne, Warrensburg, and the Washington County communities are among the least populated portions of the watershed. Together these account for only 6% of total 2010 population. Conversely, Bolton, Lake George, Queensbury, and Ticonderoga together account for 77% of the total watershed population. With 2,292 watershed residents, the Town of Lake George has largest watershed population, followed by Bolton (2,212), Queensbury (1,653), and Ticonderoga (1,500). Conversely, Lake Luzerne and Warrensburg have few or no watershed residents.



Since the 1990s, Bolton (30%), Lake George (12%), and Ticonderoga (69%) have experienced the fastest rates of growth. A closer look at housing and land use mapping (see Housing and Land Use Characteristics section for more information) further reveals where people live. Specifically, housing information

shows concentrations of residential units, including the Village of Lake George and nearby portions of the Town of Lake George, as well as Diamond Point, Bolton Landing, and Queensbury, particularly along the privately owned portions of shoreline and nearby upland areas.

US CENSUS POPULATIONS: TOWN-WIDE VS. WATERSHED





HOUSING CHARACTERISTICS

PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS



HOUSING HAS INCREASED BY ALMOST A THIRD SINCE 1990

According to US Census data, year-round housing units within the watershed increased by over 27% since the 1990s. In real numbers, with 511 new housing units, Ticonderoga experienced the greatest growth during this time, followed by Bolton (442), and Lake George (424). Not including the areas within the watershed, the same 12 Towns experienced a 27% increase over the same period. With over 3,000 new housing units, a significant amount of growth has occurred in the portions of Queensbury that are outside the watershed, which accounts for 72% of the new growth outside the watershed since the 1990s.

Although 1970 or 1980 US Census housing data is not readily available at the watershed level, based on town housing trends (as well as real property year built data), it is estimated that housing within the watershed increased by 140% since 1970. Today, Bolton has the most housing units within the watershed (2,498), followed by Lake George (1,887), Queensbury (1,516), Hague (1,184), and Ticonderoga (1,097). There are over 600 housing units in the Village of Lake George and the Washington County communities range from 266 to 418 housing units. The remaining communities have little or no housing within the watershed.

27% INCREASE IN YEAR-ROUND HOUSING

within the watershed since 1990. Housing within the communities along Lake George, but outside the watershed, has increased 27%. A significant amount of this growth has occurred in Queensbury.



66%

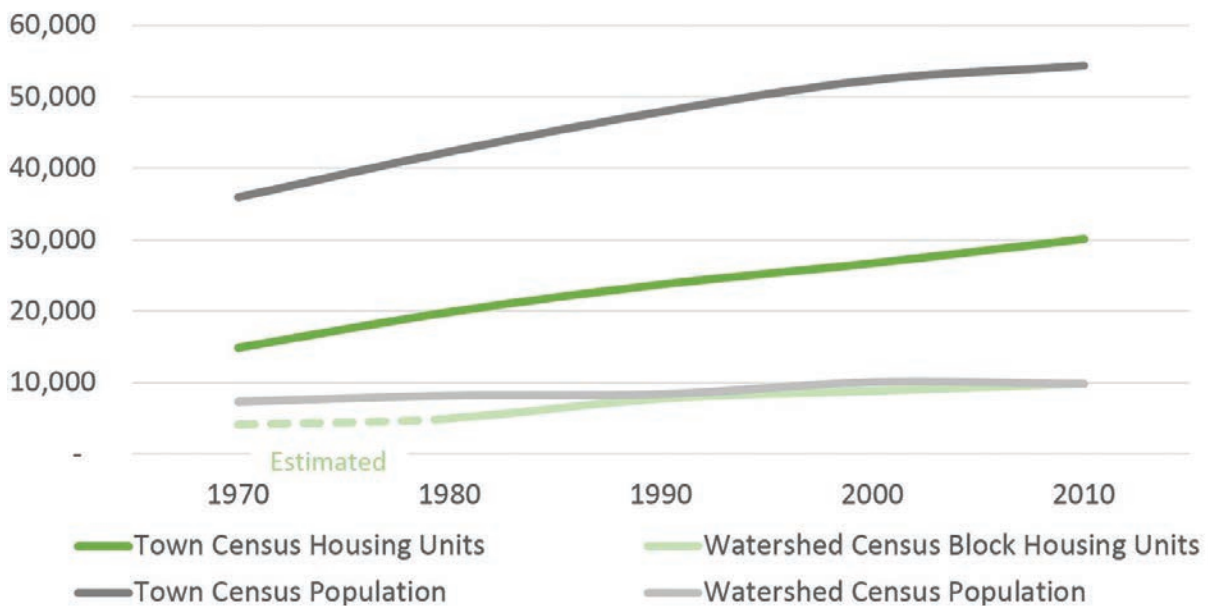
of new housing within the watershed since 1990 is within Bolton, Lake George, and Ticonderoga.

Housing Growth is Somewhat Concentrated in the Southwest

A closer look at growth over the last 20-years within the watershed reveals that 66% of all new housing is within the Towns of Bolton, Lake George, and Ticonderoga. The Towns of Hague and Queensbury account for 25% of the housing growth and the Towns of Dresden, Fort Ann, and Putnam account for the balance of growth. As previously noted, growth has been largely concentrated within the watershed's historical settlement areas (Lake George, Diamond Point, Bolton Landing, Hague, and Huletts Landing). Recent growth has extended beyond

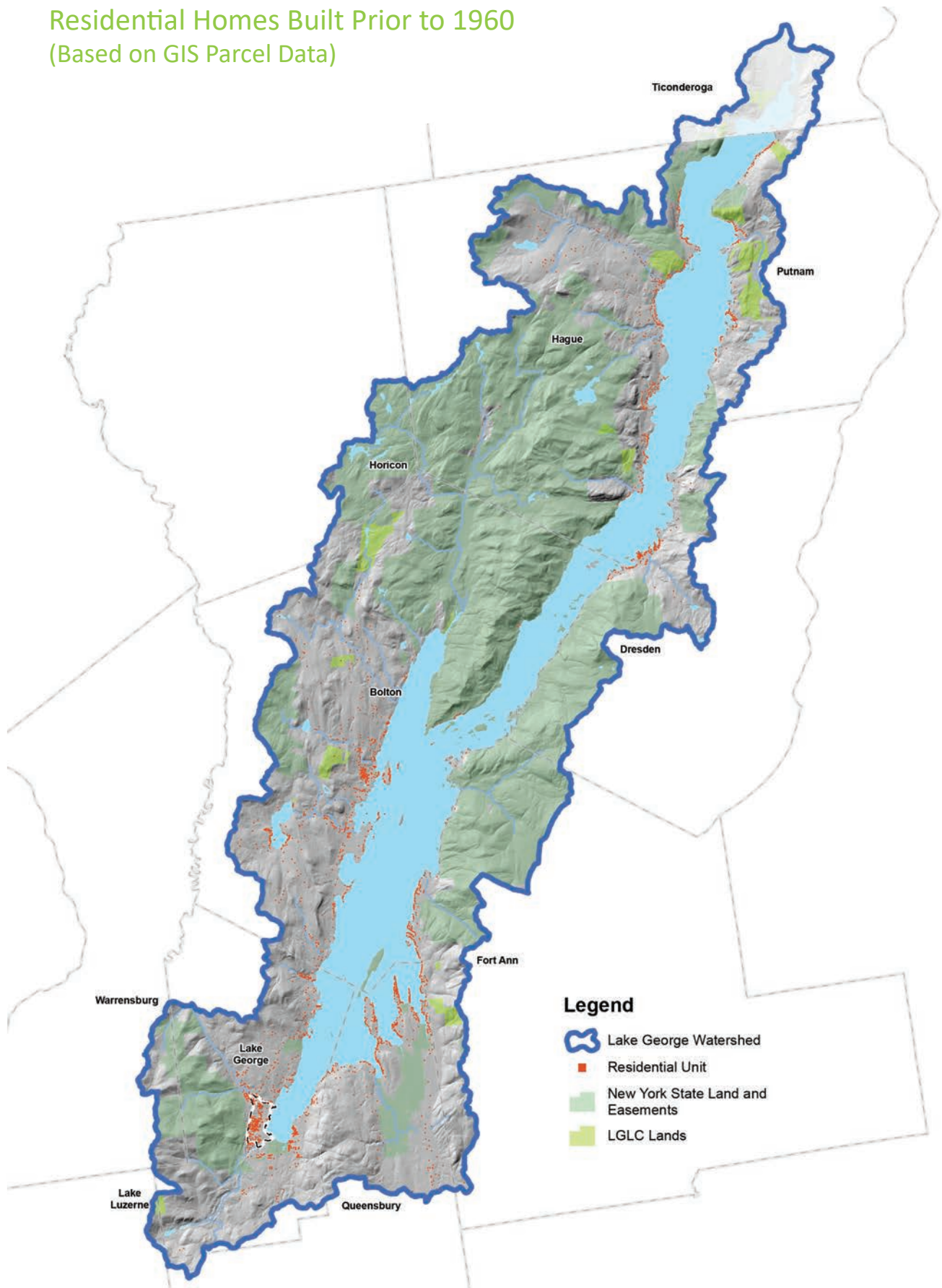
the hamlet areas along county and local roadways, particularly in Bolton and Lake George. The following series of figures illustrates the historic development patterns. Each figure depicts housing units constructed on and prior to the reporting date (1960, 1970, 1980, etc.) up to the year 2015 (note that this data was not available for Ticonderoga). Interestingly, when compared to population figures, the amount of housing in the watershed is comparable, which speaks to the high number of seasonal housing units.

CENSUS HOUSING UNITS & POPULATION: TOWN VS. WATERSHED

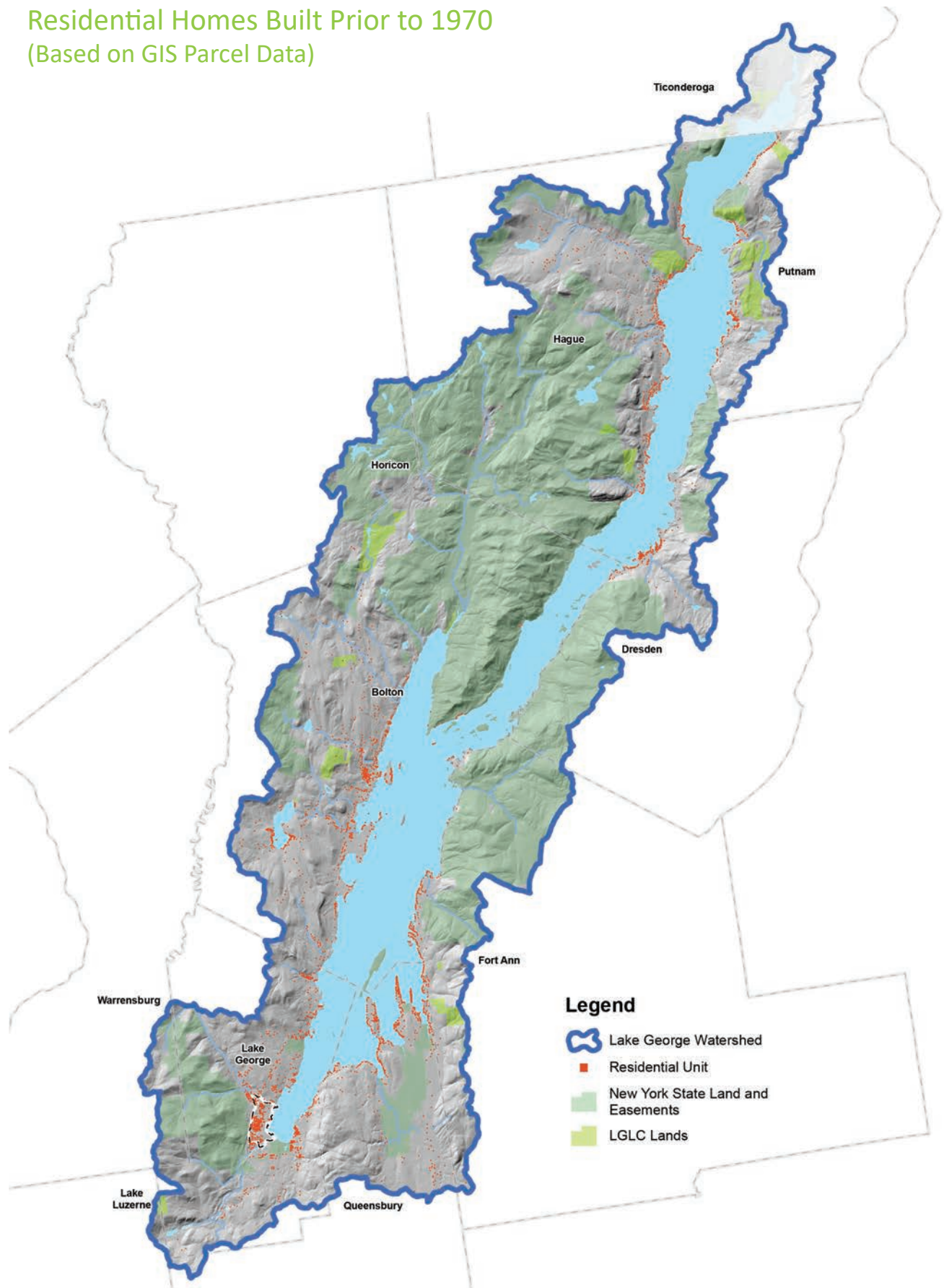


Note: The information reported in this section is primarily derived from two (2) data sources, the US Census Bureau and county-specific real property GIS tax parcel data. The US Census Bureau defines a housing unit as “a house, an apartment, a mobile home or trailer, a group of rooms, or a single room that is occupied, or, if vacant, is intended for occupancy as separate living quarters,” whereas real property data is based on NYS Office of Real Property Service’s property classifications, which may include single- or multi-family housing. Because a majority of housing within the watershed is single-family housing, these two data sets are closely aligned. However, a strict comparison between these data sets should not be made.

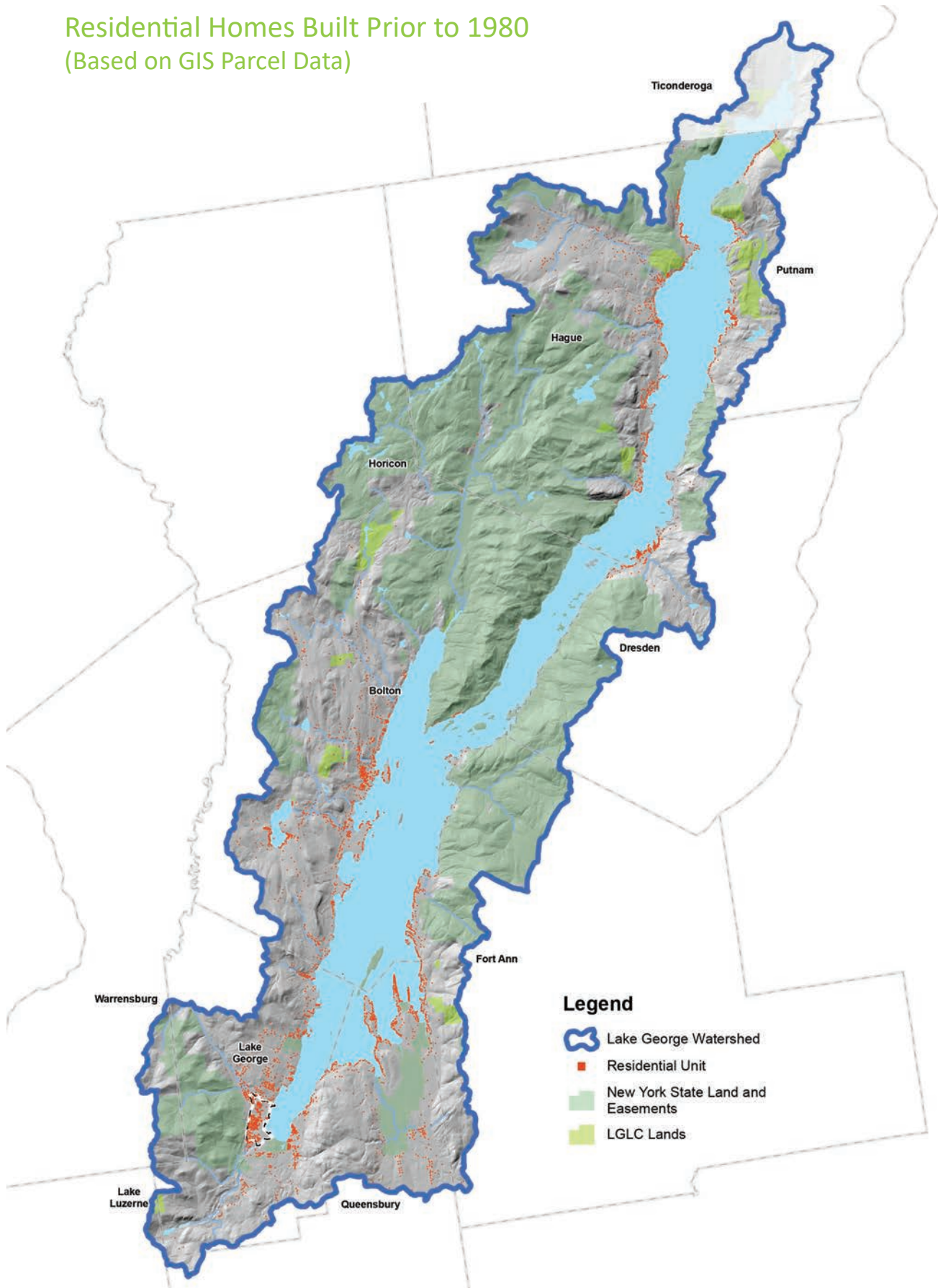
Residential Homes Built Prior to 1960 (Based on GIS Parcel Data)



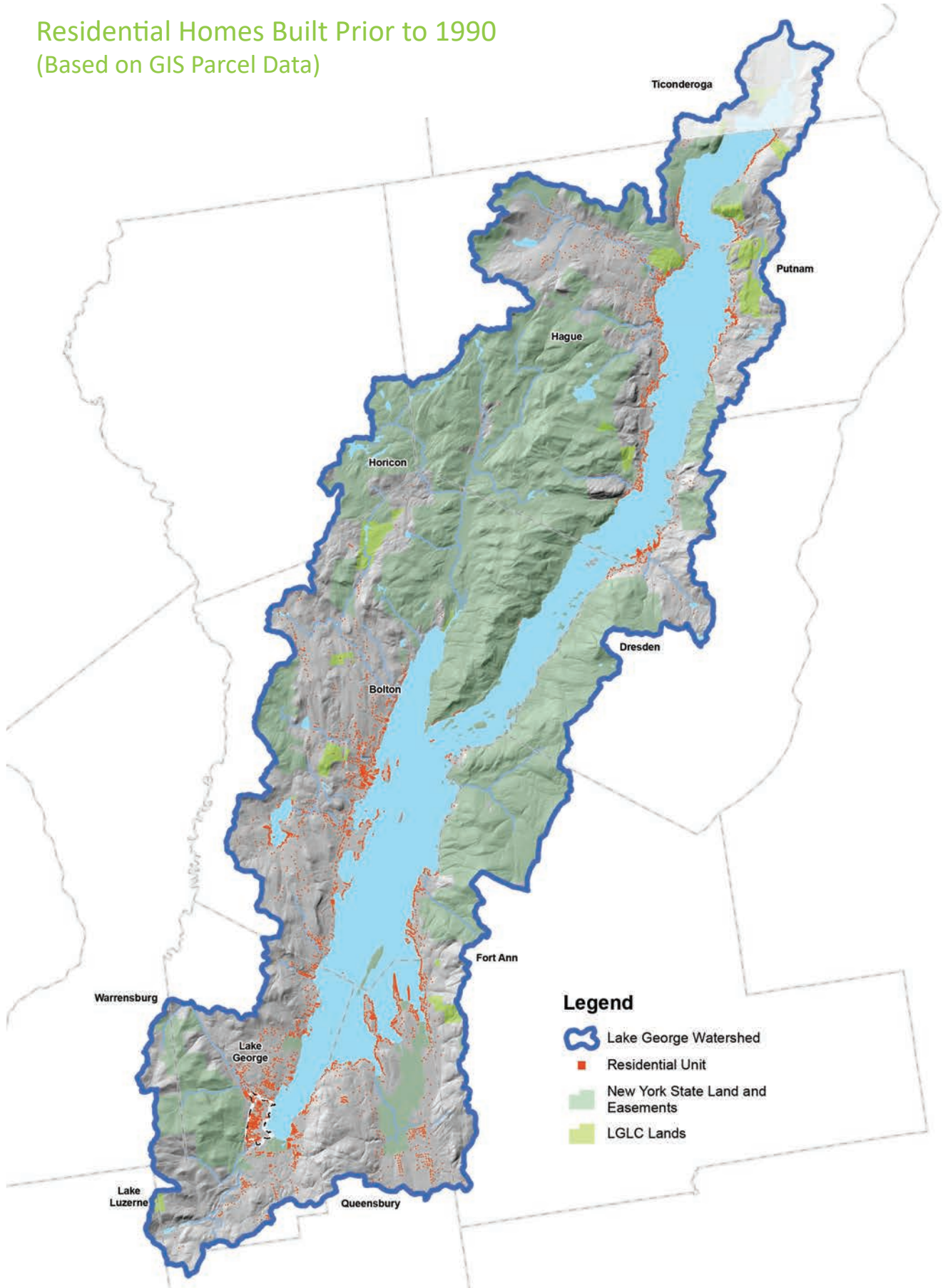
Residential Homes Built Prior to 1970 (Based on GIS Parcel Data)



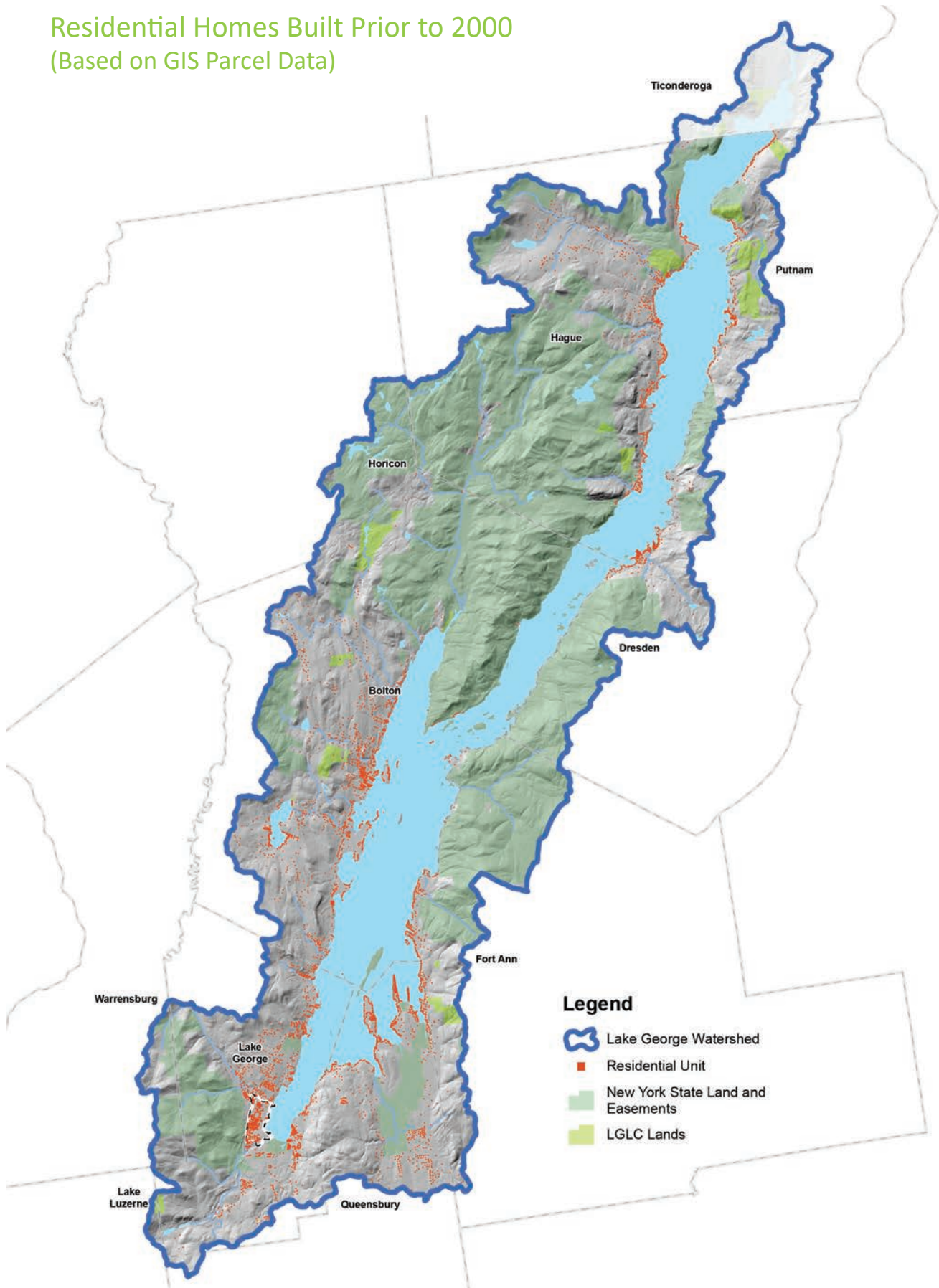
Residential Homes Built Prior to 1980 (Based on GIS Parcel Data)



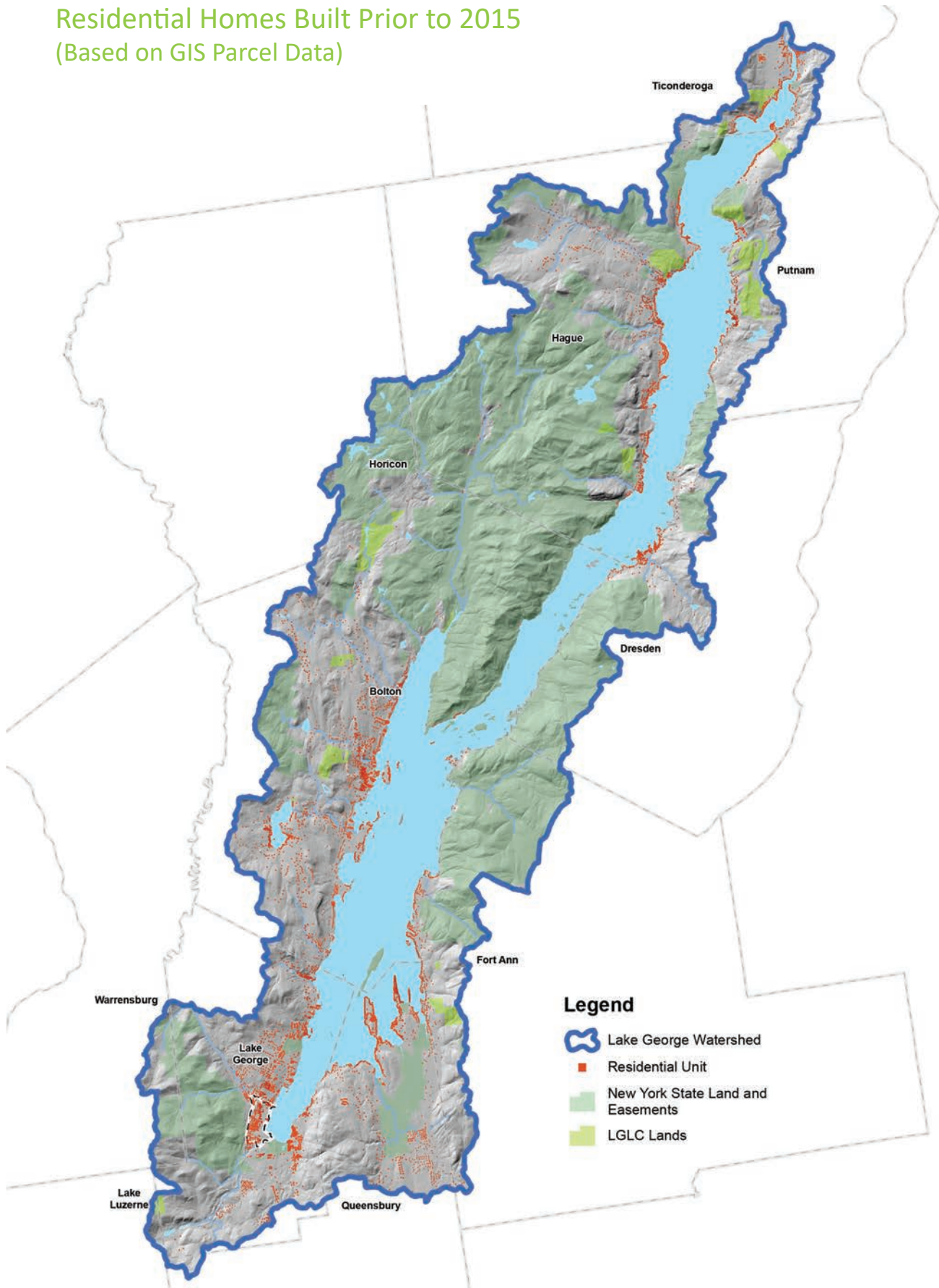
Residential Homes Built Prior to 1990 (Based on GIS Parcel Data)



Residential Homes Built Prior to 2000 (Based on GIS Parcel Data)



Residential Homes Built Prior to 2015 (Based on GIS Parcel Data)



Recent Residential Building Trends

According to real property data, the rate of new residential development within the Lake George watershed has remained low since the 2008 recession. From 2000 to 2008 100 new residential homes on average have been constructed per year. Since 2008, the annual average has been 44, with the rate stabilizing over the most recent 5-year period. Recent data reported by municipalities suggests a modest increase in the rate of new residential development.



Vacationland: Seasonal Housing & Lodging

As expected, a significant portion of housing within the watershed is seasonal. Similarly, a majority of the 12 Towns seasonal housing is located within the watershed as well. According to US Census data, nearly 50% of housing within the watershed is seasonal, and over 70% of all of the 12 Towns seasonal housing is located within the watershed. Since 1990, the number of seasonal housing units within the watershed has increased by nearly 30%. Today, the Towns of Bolton, Hague, Lake George, and Queensbury account

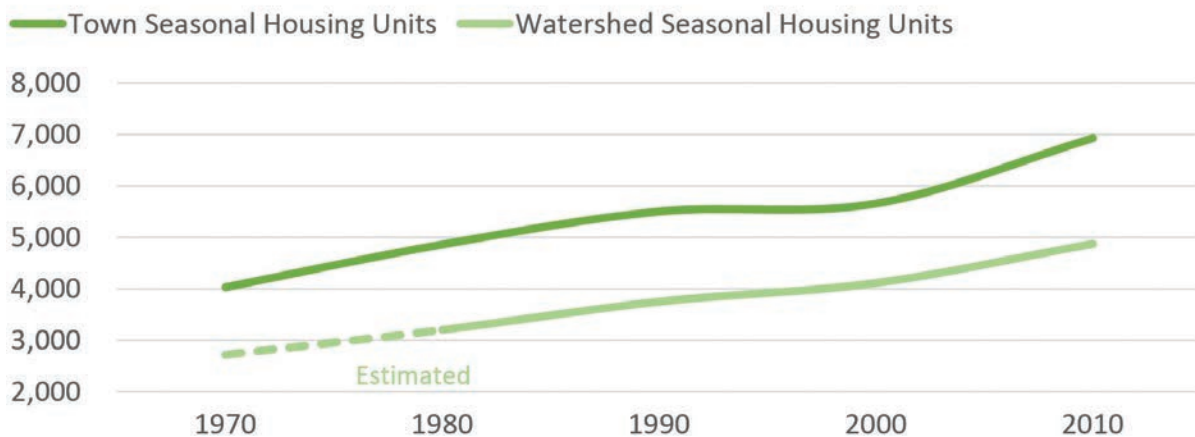
for a majority (75%) of all seasonal housing in the watershed. Lodging and other temporary forms of occupancy play a large role in the region's tourism landscape. According to a variety of data sources (2014 Warren County Tourism, real property, and search engine data) there are approximately 5,500 hotel and motel rooms within the watershed. There are also a significant number of cabins, cottages, and efficiencies (over 1,900). These units are largely concentrated within the Town of Bolton (20%) and the Town and Village of Lake George (70%).

50% of housing within the Lake George watershed is seasonal and over 70% of seasonal housing within the 12 towns along the lake is within the watershed.

The increase in the number of seasonal housing units within the Lake George watershed since the 1990s.

30%

US CENSUS SEASONAL HOUSING: TOWN-WIDE VS. WATERSHED

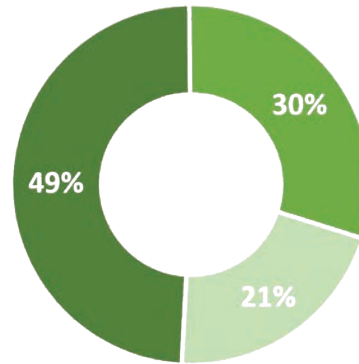


Assessed Value: Location, Location, Location

According to real property data, the total assessed value of all residential properties within the 12 Towns is \$7.76 billion (this includes lands and structures). Approximately 51% (\$3.95 billion) of this total is located within the Lake George watershed. Thirty percent (\$2.34 billion) of the 12 Town's residential assessed value is located in the watershed along the Lake George shoreline. In comparison, the total assessed value of the 12 Towns commercial property is \$1.39 billion. The watershed and shoreline commercial assessed value is \$553 million (40% of Towns totals) and \$277 million (20% of Towns), respectively.

Assessed value of residential shoreline properties accounts for a significant amount of the overall residential value. In Dresden, Hague, and Putnam, shoreline value accounts for 59% to 72% of the overall residential assessed value. This concentration of value is further illustrated in that these lands account for less than 4% to 6% of the Towns' residential land area (acres). In Bolton, Lake George, and Queensbury, residential shoreline properties account for 2% to 4% of the towns' total land area, but represent 23% to 48% of the total residential value.

The average assessed value per acre for residential parcels outside the watershed is \$20,319. Inside the watershed (but not including shoreline properties) it is \$67,644. For shoreline residential properties, the average per acre assessed value is \$719,260. The table below provides more detailed information regarding residential values throughout the watershed.



RESIDENTIAL ASSESSED VALUE
\$7.76 BILLION TOTAL

- Residential Assessed Value Outside of Watershed
- Other Watershed Residential Assessed Value
- Shorline Residential Assessed Value

RESIDENTIAL ASSESSED VALUES BY MUNICIPALITY (IN \$100,000)

	Town		Watershed		Shoreline	
	Acres ¹	Value ²	Acres ³	Value ²	Acres ⁴	Value ²
Bolton	20,310	\$1,261.1	16,611	\$1,236.7	871	\$599.7
Dresden	13,775	\$97.0	4,310	\$78.8	579	\$56.6
Fort Ann	39,477	\$522.1	5,678	\$271.1	226	\$230.9
Hague	7,859	\$391.2	7,011	\$386.5	472	\$259.8
Horicon	26,735	\$604.5	926	\$0.8	-	-
Lake George (T)	8,900	\$672.7	6,463	\$632.5	235	\$213.0
Lake George (V)	130	\$79.1	130	\$79.1	1	\$3.6
Lake Luzerne	16,990	\$302.4	76	\$1.2	-	-
Putnam	16,908	\$261.3	5,199	\$214.8	695	\$186.3
Queensbury	20,680	\$2,895.6	5,336	\$853.8	402	\$639.9
Ticonderoga	19,169	\$397.6	3,133	\$1.9	362	\$140.7
Warrensburg	19,806	\$279.2	1,008	\$1.9	-	-
Total	220,793	\$7,763.9	55,883	\$3,759.2	3,843	\$2,330.5

¹ Total residential assessed acres within municipality (including watershed and shoreline properties)

² Total assessed value of respective residential properties (including land and structures)

³ Total residential assessed acres within watershed (including shoreline properties)

⁴ Total residential assessed acres of shoreline properties



A landscape photograph showing a dense forest of green trees covering a hillside. In the foreground, there is a grassy field with some bushes. A body of water, likely a lake or a wide river, is visible in the middle ground, reflecting the sky and the surrounding greenery. The sky is blue with scattered white clouds. The overall scene is peaceful and natural.

LAND USE CHARACTERISTICS

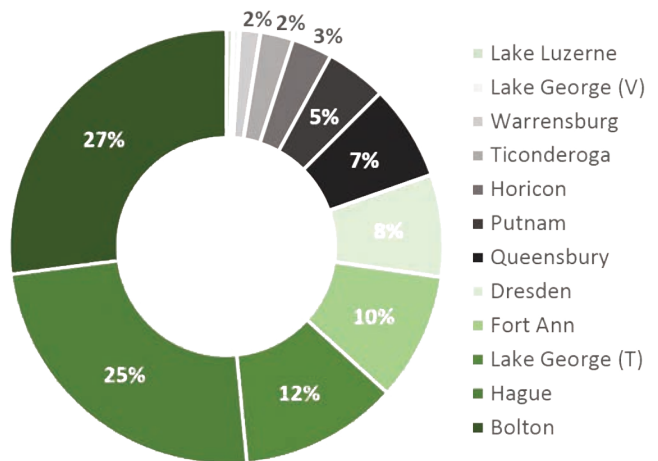
PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS



VARIED LAND USES AND CONTROLS IN WATERSHED ...

Twelve communities are located within the watershed. Their combined area within the watershed (not including Lake George’s surface area) totals approximately 120,000 acres. The Towns of Bolton (27%) and Hague (25%) represent more than half of the watershed acreage. The Towns of Lake George, Dresden, Fort Ann, Putnam, and Queensbury account for 41% of watershed acreage. In descending order, the balance of the watershed resides in Horicon (3%), Ticonderoga (2%), Warrensburg (2%), Village of Lake George (1%), and Lake Luzerne (1%).

MUNICIPAL PORTIONS OF WATERSHED (ACRES)



50%

of Lake George’s 120,000 acre watershed is protected land, including Adirondack Forest Preserve lands and conservation easements.

6

of Lake George’s 12 communities have Adirondack Park Agency (APA) approved land use plans.

9,900 ACRES (8.2%) OF THE WATERSHED

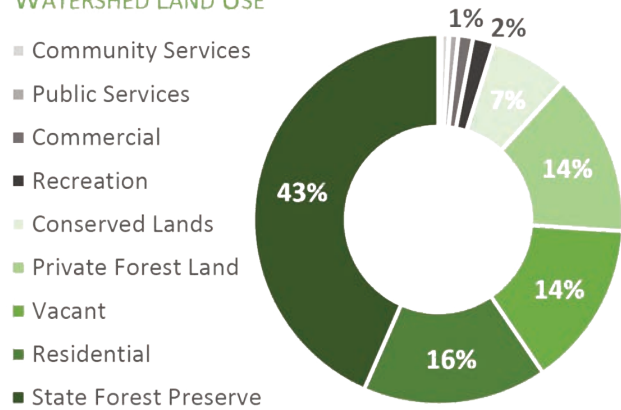
can be described as disturbed or developed. Bolton, Lake George, and Queensbury have the greatest area of disturbance. The Town of Hague and Ticonderoga include substantial disturbance areas as well.

Land Use Types

Land use in the watershed (based on real property parcel classification data) is largely characterized as protected, residential, or undeveloped. State Forest Preserve accounts for 43% of the watershed, followed by residential (16%), vacant (14%), and private forest land (14%). Conserved land uses accounts for 7% of the land area and the balance of the watershed is a mix of the remaining real property land use types (recreation, commercial, etc.).

Land use within the watershed varies by municipality (see Watershed Land Use figure next page). Among the towns with the greatest land area in the watershed (Bolton, Hague, and Lake George); the predominant land uses include NYS Forest Preserve, residential, and vacant properties. Specifically, 41% of Bolton’s 32,235-acre watershed land area is State Forest Preserve, 22% is residential, and 19% is vacant. Approximately 56% of Hague’s 29,513-acre watershed land area is State Forest Preserve and 11% is residential (25% is private forest and conserved lands). Finally, 25% of the Town of Lake George’s 13,156-acre

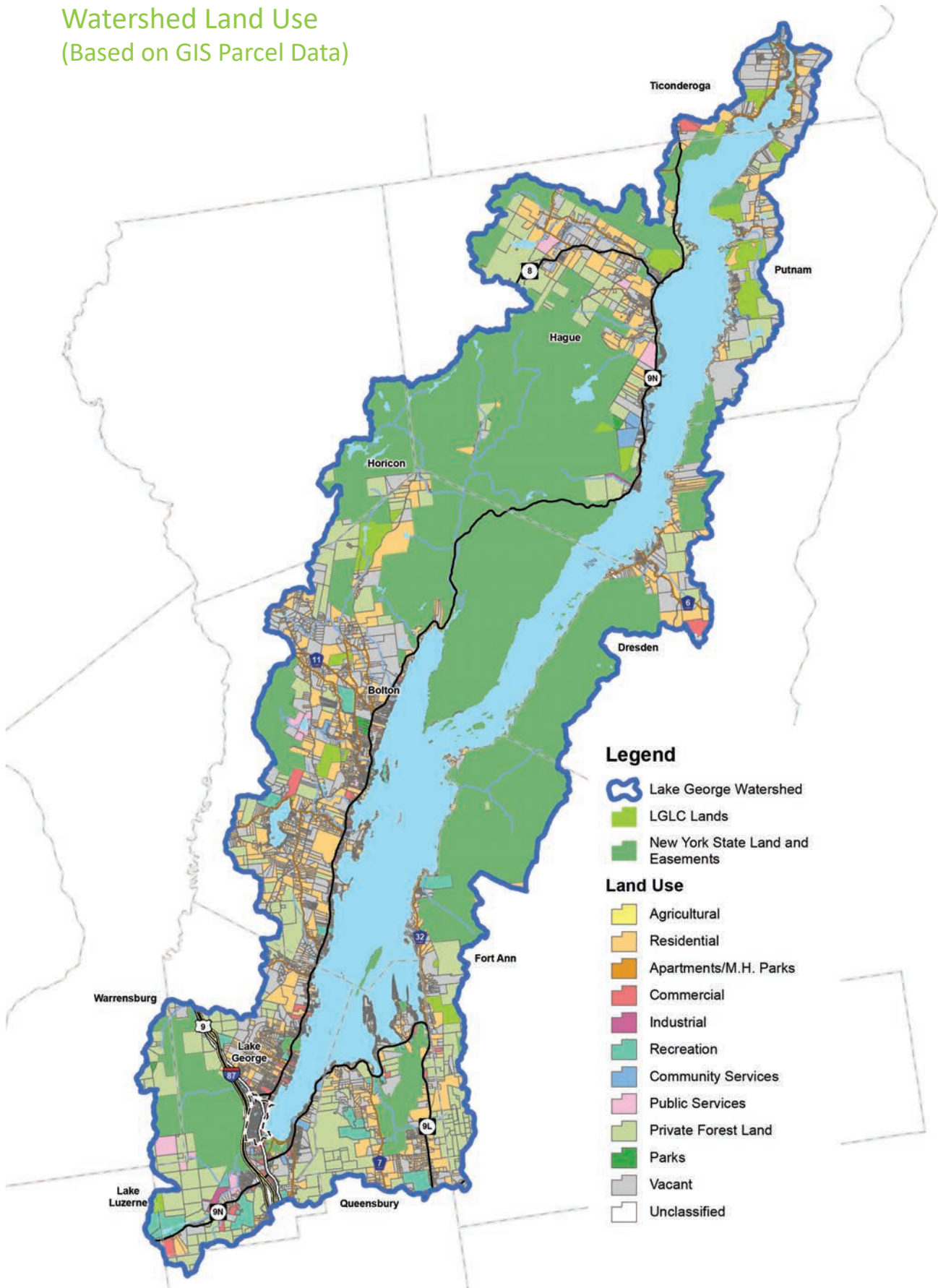
WATERSHED LAND USE



watershed land is State Forest Preserve, 19% is vacant, and 17% is residential.

Dresden, Fort Ann, and Queensbury, which have the next largest watershed areas (ranging from 8,141 to 12,025 acres) have different land use characteristics. For example, 30% of Queensbury’s watershed area is residential, whereas only 7% of Fort Ann’s watershed land area is residential. Dresden and Fort Ann have comparable amounts of State Forest Preserve lands, with 62% and 64%, respectively.

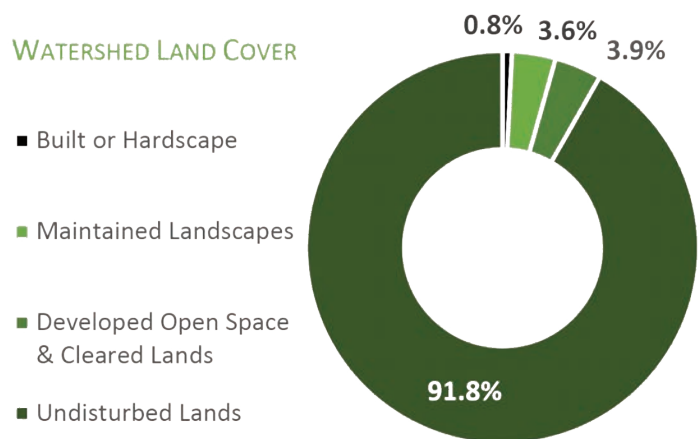
Watershed Land Use (Based on GIS Parcel Data)



Land Disturbance Considerations

Geographic Information System (GIS) data from a variety of sources was used to describe the watershed’s land cover. Adapting information from USGS National Land Cover Data and remote sensing data from the University of Vermont, land cover impacted by human activities was characterized as built or hardscaped (high density buildings, parking lots, driveways, roads), maintained landscapes (moderate development densities, recreation fields, lawns, landscaped areas, golf courses), or developed open spaces and cleared lands (low development densities, some lawn types, fields, croplands). Collectively, these cover types were characterized as “developed or disturbed” (see Representative Land Cover Types next page). This approach is meant to contrast the built environment with the natural landscape. Based on this analysis, approximately 8.2% (over 9,900 acres) of the watershed can be characterized as developed or disturbed. Bolton (2,470 acres), Lake George (2,410 acres), Hague (1,305 acres), and Queensbury (1,198 acres) account for 62% of the watershed’s developed or disturbed cover types.

The balance of the communities range from 0.4% (Warrensburg) to 94% (Village of Lake George) developed or disturbed.



A Closer Look at Land Cover

Water quality in a watershed can be greatly affected by the amount of developed or disturbed land covers. Such surfaces influence the amount of nonpoint source pollution by increasing stormwater runoff, which can carry sediments and pollutants to nearby wetlands, streams, rivers, and lakes. While built and hardscape land covers are most likely to produce stormwater runoff, runoff from maintained landscapes often depends on a number of variables, including soil properties and slopes characteristics. In many instances, such land covers will have a

relatively high rate of infiltration. However, runoff generated from lawns, recreation fields, as well as cultivated lands, may convey fertilizers and pest management chemicals to nearby waterways. While the cumulative amount of built or hardscape land cover may be considered low (0.8%), a look at subwatersheds reveals high rates of development that may impact water quality. A number of studies suggest that water bodies are adversely impacted when 10% or more of its watershed is impervious land cover. Within Lake George's watershed there are six subwatersheds that are more susceptible to growth and development. These include Hague,

Indian, Finkle, Huddle, English, and West Brook watersheds (please see Watershed and Subwatershed Land Cover figure next page). Currently, 5.5% of the West Brook subwatershed is built or hardscape. Approximately 4% of English and Huddle brooks are built or hardscape. Finkle Brook is 3.9%, Indian Brook is 2.8%, and Hague Brook is 4.5% built or hardscape. When maintained landscapes and cultivated or cleared lands are factored in, the rates of overall disturbance in these subwatershed approach or exceed 10%: Hague Brook (4.5%), Indian Brook (5.1%), Huddle Brook (7.4%), English Brook (9.9%), Finkle Brook (10%), and West Brook (11.1%).

REPRESENTATIVE LAND COVER TYPES



BUILT OR
HARDSCAPE



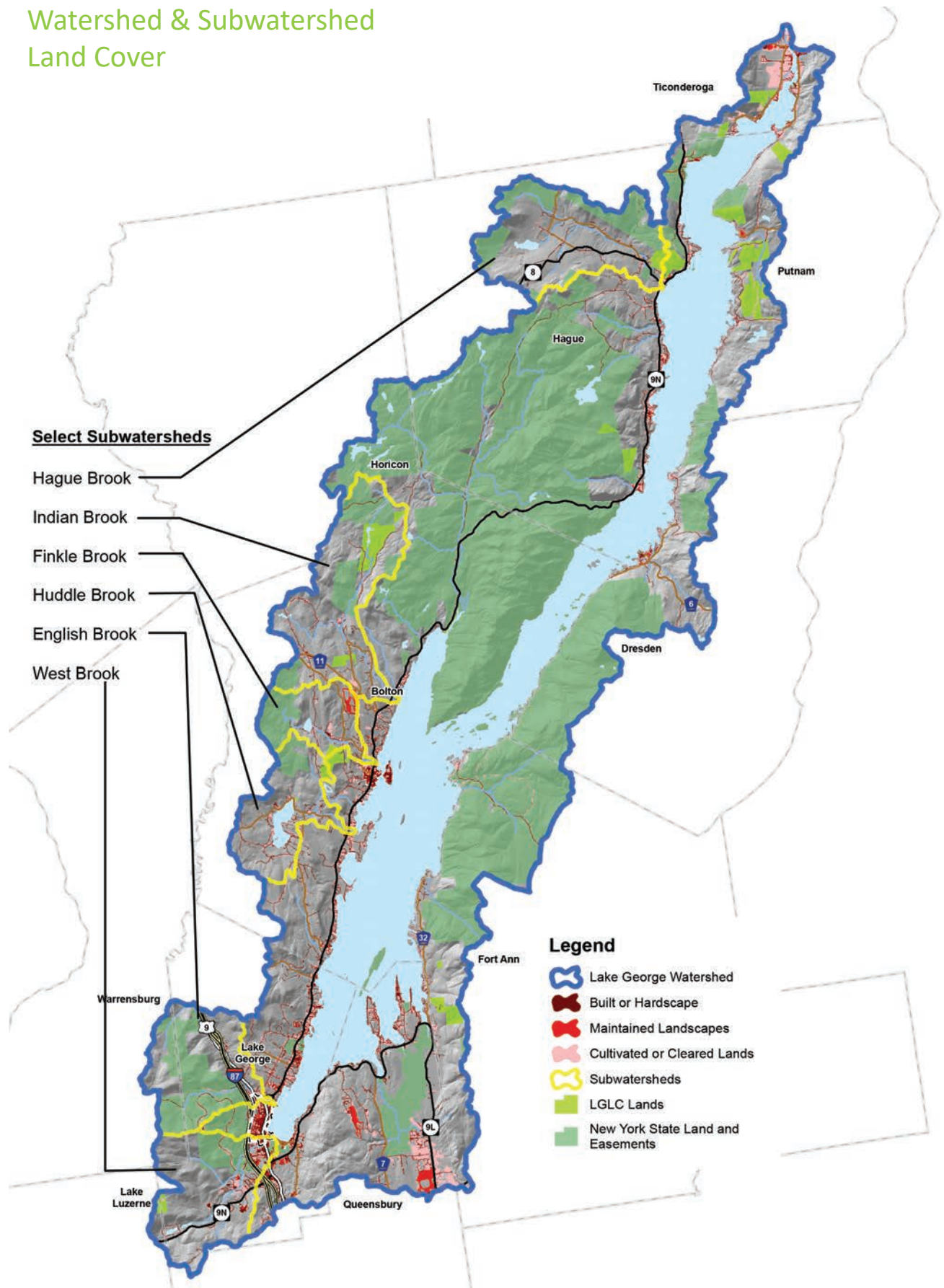
MAINTAINED
LANDSCAPES



DEVELOPED OPEN SPACE
& CLEARED LANDS

IMAGE SOURCE: GOOGLE EARTH

Watershed & Subwatershed Land Cover



Zoning & Land Use Controls

Some portion of the 12 Towns (and all of the watershed) is located within the Adirondack Park and are subject to the jurisdiction of the Adirondack Park Agency (APA). Communities in the Adirondack Park may adopt local land use programs that conform with APA rules, which allows the local community to assume approval authority over a large class of activities. Otherwise, all land use decisions are governed by the APA. Six of the watershed communities (Bolton, Hague, Lake George, Village of Lake George, Horicon, and Queensbury) have APA approved land use programs. Many of the balance have some form of zoning, subdivision, or site plan approval requirements (please see Selected Zoning & Land Use Controls next page).

Nine (9) of the 12 Towns have adopted a local zoning ordinance. The Towns of Putnam, Dresden, and Fort Ann have not adopted local zoning. However, Putnam and Fort Ann have adopted site plan review. Several communities employ some form of conservation or cluster subdivision design, ridgeline, slope, tree clearing, and shoreline protection, and aesthetic and visual quality provisions. There is significant variation in the design,

quality, and implementation of these provisions across the watershed. The technical capacity of local communities to review projects varies as well. Some communities have in-house planning staff and a design professional on retainer, while other communities rely solely on planning board members and intermittent on-call consultation.

In addition to the APA, Lake George watershed communities (excluding Lake Luzerne, Horicon, and Warrensburg) are subject to the Lake George Park Commission's (LGPC) stormwater regulatory program. With approval of the LGPC, communities may adopt and administer a local stormwater regulatory program as long as it conforms with the LGPC's model stormwater ordinance. Currently Bolton, the Town and Village of Lake George, and Queensbury have LGPC approved stormwater regulatory programs. The LGPC administers stormwater regulatory programs for Dresden, Fort Ann, Hague, Putnam, and Ticonderoga. One the most important aspects of the LGPC's stormwater regulatory program is that it requires a stormwater management plan for "major" projects (15,000 square feet or greater in size).

LAKE GEORGE WATERSHED COMMUNITIES: SELECTED ZONING & LAND USE CONTROLS

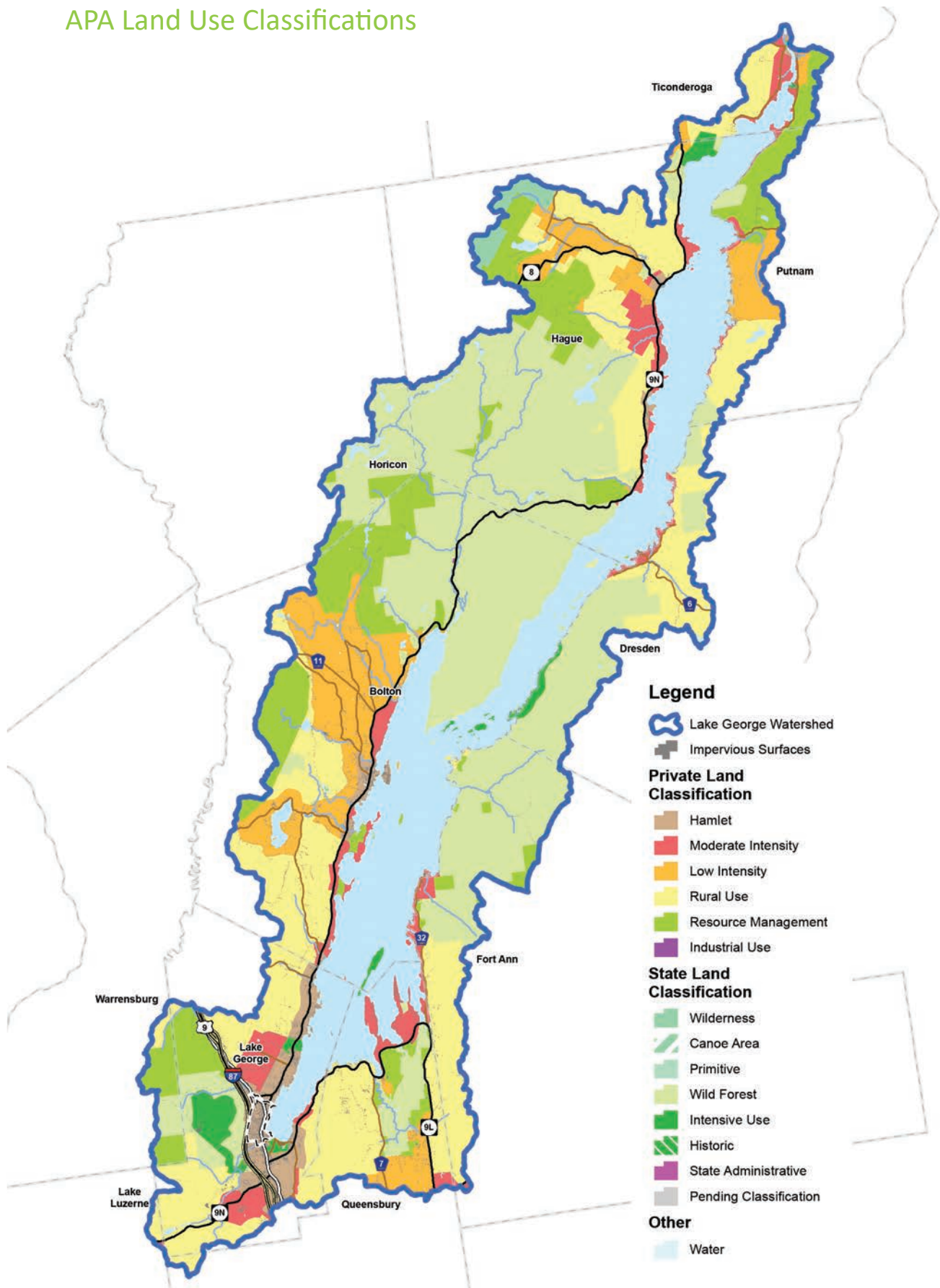
Town	Conservation or Cluster Provisions	Ridgeline or Slope Provisions	Tree Clearing Provisions	Shoreline Provisions	Visual Quality Provisions	Local Stormwater Provisions ²	Stream Protection Provisions
Bolton	◆■	◆●	◆	◆	●	★	◆■
Dresden							
Fort Ann			●■			●■	■
(T) Lake George	◆■	◆●■	◆●■	◆●	◆●■	◆●	◆●
(V) Lake George		◆	◆●	◆	◆	◆●	
Hague	■	●	◆	◆■	◆●	●	◆
Horicon	◆		◆	◆	◆	◆	◆
Lake Luzerne	◆	◆	◆	◆	◆●	◆●	
Putnam	■			●■	●	●	
Queensbury	◆■	◆●■	◆■	◆■	◆●	★◆●	◆●
Ticonderoga				◆■	●		
Warrensburg	■	■	◆	◆■	◆●■	●	■

- ◆ : Regulated by Zoning
- : Regulated by Site Plan Review
- : Regulated by Subdivision
- ★ : Regulated by Other Municipal Code

¹The entire Lake George watershed is subject to Adirondack Park Agency (APA) regulations.

²Lake George watershed communities (excluding Lake Luzerne, Horicon, and Warrensburg) are subject to the Lake George Park Commission’s (LGPC) stormwater regulatory program.

APA Land Use Classifications





TOWN OF
BOLTON
SALT STORAGE
FACILITY

INFRASTRUCTURE CHARACTERISTICS

PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS



WATER & WASTEWATER SERVICE & ROADWAY NETWORKS

Infrastructure significantly influences development patterns within the Lake George watershed. Within the watershed there are 6 areas serviced by municipal sewer and 3 by municipal water. The Towns of Bolton, Dresden, Hague, Putnam and Ticonderoga and the Village of Lake George operate wastewater treatment facilities. None of these directly discharge into Lake George. Service is generally provided to only the most densely populated areas of these communities. Service is also provided to a portion of the Town of Lake George by the Village of Lake George and a portion of Putnam served by Ticonderoga. Land areas outside of defined service areas are served by onsite wastewater systems

or smaller community systems. The age and capacity of the municipal systems varies. Municipal water service is available in the Towns of Lake George, Bolton, and Ticonderoga and the Village of Lake George. The balance of the communities source their water from private onsite wells or from Lake George itself. Approximately 35% of the residential development within the watershed is serviced by public sewer, and approximately 25% is served by public water. Including commercial, with approximately 1,300 connections, Ticonderoga has the largest sewer district. However, less than half of the total connections are located within the watershed.



5,900 PLUS ONSITE
WASTEWATER

systems within the watershed. Bolton, Lake George, and Queensbury have the most. The age and type of systems vary, which may present water quality related questions or concerns.

Sewer Services

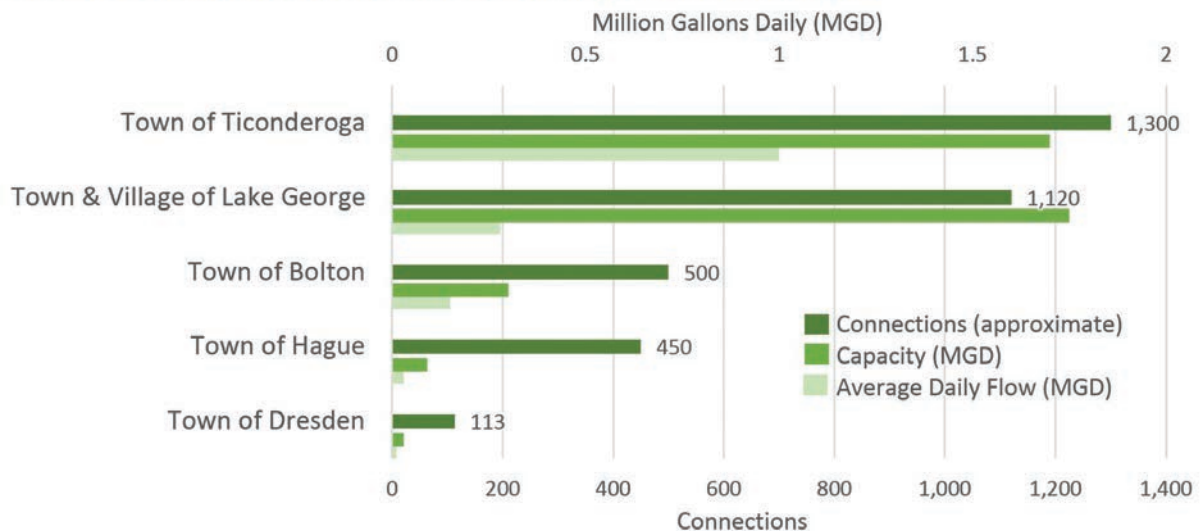
The greatest number of sewer connections within the watershed are in the Town and Village of Lake George, with approximately 1,120-combined connections (this includes residential and commercial). With approximately 3 connections (and only 19 more potential connections), Putnam has the fewest in the watershed, which is followed by Dresden. With respect to flow rates, the Ticonderoga sewer district is the largest with an average daily flow of one million gallons daily (MGD). However, as previously noted, most of the district is located outside of the watershed. Within the watershed, the Town and Village of Lake George handle the most effluent (0.28 MGD).

All of the sewer districts reportedly have some capacity for additional growth. Ticonderoga is near 60% capacity and Bolton is at 50%. While there may be 'reported' capacity, it is important to note that some districts may reach capacity during peak tourist seasons or during significant rainfall events due to infiltration and inflow (I/I) issues (cracked or separated sewer pipes that allow for groundwater infiltration). This results in the unnecessary treatment of rainwater that mixes with wastewater. Furthermore,

the type or age of wastewater treatment facilities may result in an inability to effectively meet permitted effluent standards. While none of the wastewater treatment facilities within the watershed directly discharge into Lake George, there is some concern that inadequate treatment or infiltration may result in effluent entry into nearby water resources and ultimately into the lake itself (please note that this report does not attempt to catalog the effectiveness of treatment systems within the watershed).

The age of and method of wastewater treatment varies throughout the watershed. Bolton and the Town and Village of Lake George use a trickling filter system. Hague uses a sequencing batch reactor. Ticonderoga uses an activated sludge system. Dresden (Huletts Landing) uses a subsurface treatment system. Lake George and Ticonderoga have the oldest facilities, with portions of Ticonderoga's system exceeding 90 years in age and portions of Lake George's between 60-90 years in age. However, it is important to note that communities are continually upgrading their facilities as needed or as funding becomes available.

SEWER DISTRICTS: CONNECTIONS, FLOWRATES, & CAPACITY



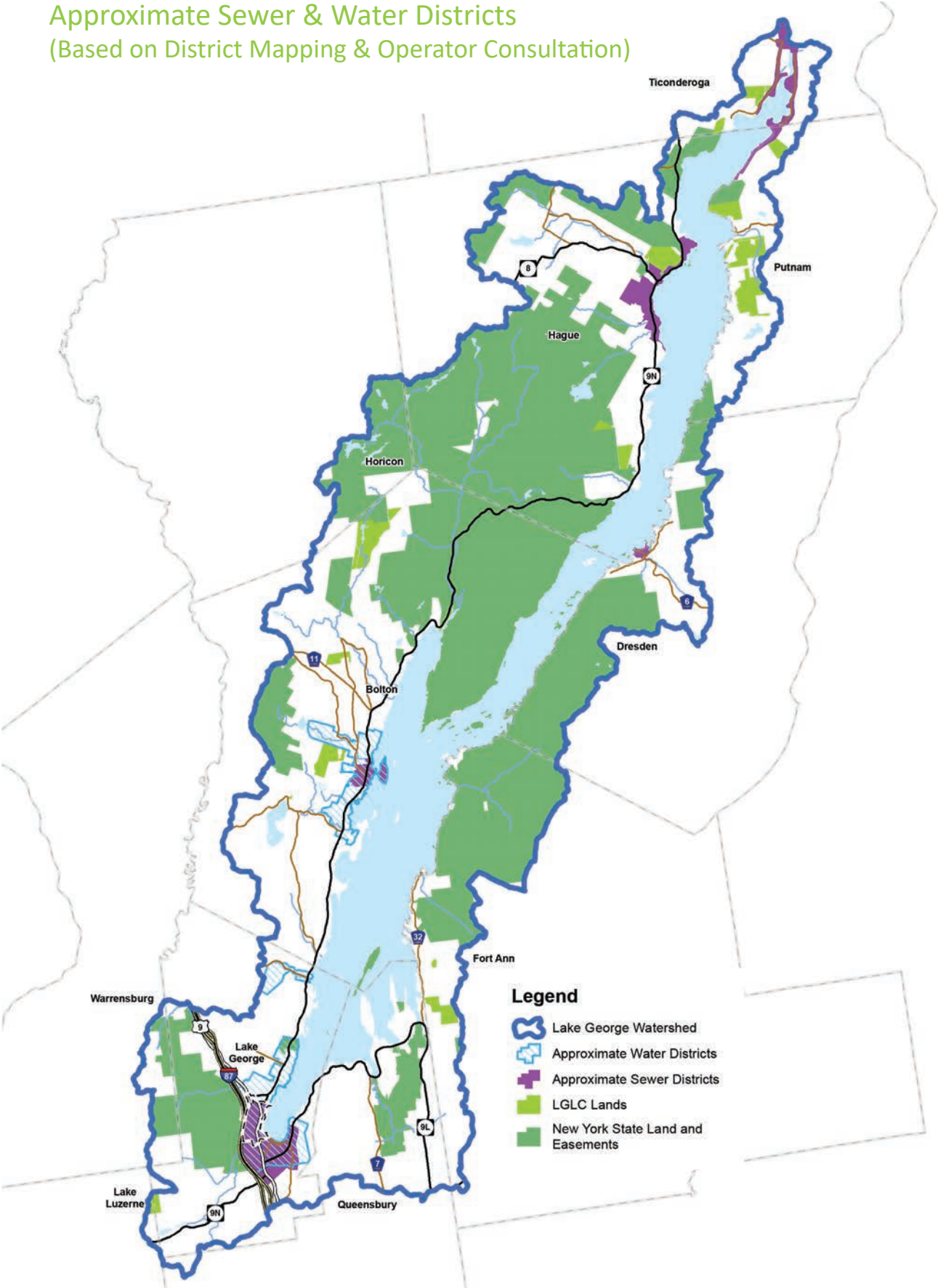
Note: These figures are based on district operator consultation. It includes all land use types (residential, commercial, etc.). Portions of the Ticonderoga sewer district are outside of the watershed. Ticonderoga provides services to portions of Putnam. The Village of Lake George's wastewater treatment plan provides service to the Town of Lake George. Given its relatively small size, the Town of Putnam's sewer district was not included in the above figure.

Onsite Wastewater Systems

In the absence of municipal sewer service, wastewater is treated by onsite or community wastewater systems. Community wastewater systems are often larger versions of conventional onsite systems (septic tank, drain field, etc.). Based on real property data, there are nearly 6,000 residences that use some type of onsite or community wastewater systems. Bolton has the greatest number

of onsite wastewater systems (1,790) within the watershed. Bolton is followed by the Town of Queensbury (1,233), Lake George (1,200), Hague (641), Fort Ann (311), Putnam (275), Dresden (211), and Ticonderoga (190). Lake Luzerne, Horicon, and Warrensburg have a very limited number of residences within the watershed and therefore have few onsite wastewater systems.

Approximate Sewer & Water Districts (Based on District Mapping & Operator Consultation)



There is an interesting trend which may be impacting wastewater treatment. According to real property data, the average number of bathrooms per household has increased from 1.5 prior to 1960 to 2.8 as of 2015. Interestingly, the number of bedrooms has only fluctuated between 2.8 and 2.9 during this same period. At first glance, one may assume that this represents an increase in the volume of wastewater per household. However, given the relatively small increase in population since the 1970s, an increase in the number of bathrooms may not equate to a drastic increase in wastewater production per household. However, an increase in the seasonal population has likely resulted in an increase in onsite wastewater generation throughout the watershed.

Water Services

Similar to wastewater infrastructure, water sources and treatment varies throughout the watershed. Bolton draws water from Edgecomb Pond and uses a rapid sand filter system. Lake George's Diamond Point water district draws water from two wells along Diamond Point Road.

The Village of Lake George withdraws water directly from the lake and uses a rapid sand filter system. This system also provides water service to portions of the Town of Lake George. Ticonderoga draws water from a reservoir and the lake and uses a diatomaceous earth filter for the lake water. Lake George is the largest system at 2.0 MGD, which has an average daily flow of approximately 0.7 MGD. Bolton and Diamond Point have the greatest available capacity (80% and 92%, respectively), while Ticonderoga has the lowest (approximately 22%). In the absence of municipal water service, properties throughout the watershed rely on onsite wells, small community systems, or direct withdrawal from the lake. It is likely these are comparable to the number of onsite wastewater systems due to the relative overlap in service areas.

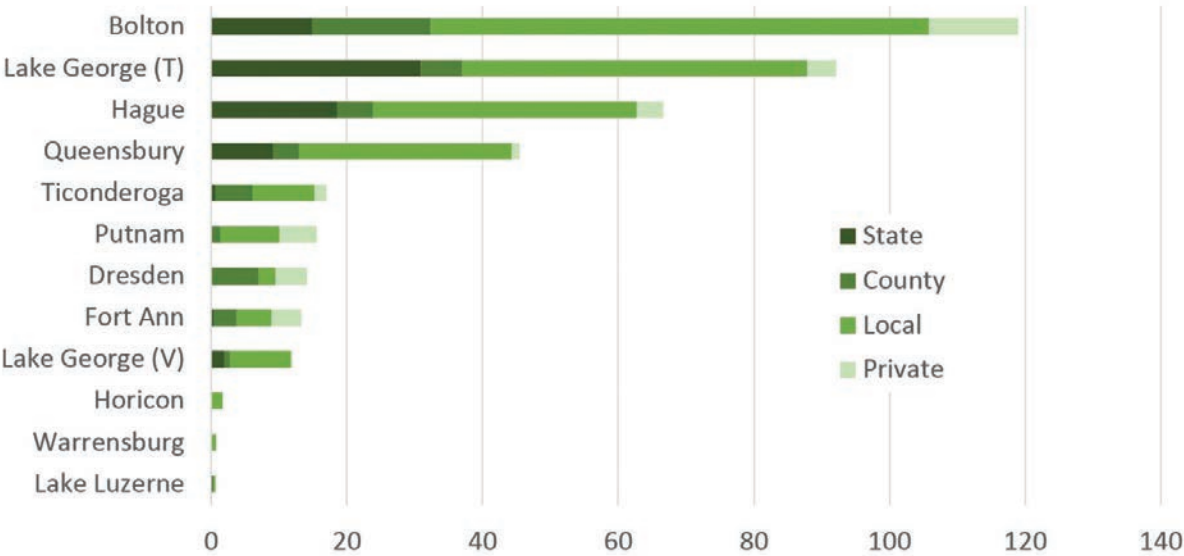
Roadway Network

Sewer and water infrastructure is only one part of the built environment that influences development patterns. The extensive roadway network also plays a significant role in how and where development occurs in the watershed.

Based on NYS Department of Transportation (DOT) GIS roadway data, Bolton has the greatest amount of roadway miles (approximately 118 miles) in the watershed. Over 60% of these miles are local roadways. The Town of Lake George and Hague follow with 92 and 66 miles, respectively. Similar to Bolton, both the Town of Lake George and Hague have a large percentage of local roadways. The Town of Lake George has the most

state roads, both as a percentage (33% of total road miles) and in total miles (30 miles). With respect to local roadway mileage, it is important to note NYSDOT includes most private driveways (both single and shared). It is estimated there are nearly 3,000 acres of roadway surface in the Lake George watershed (largely paved). This is based on assumed typical roadway widths by road type.

WATERSHED ROADWAY NETWORK: MILES OF ROADS BY TYPE



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BUILDOUT ANALYSIS

PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS





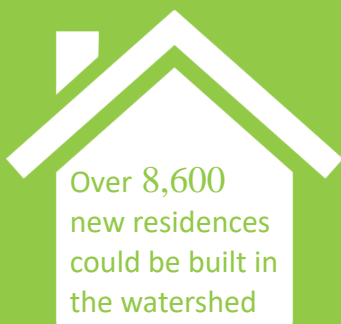
SIGNIFICANT RESIDENTIAL GROWTH POTENTIAL REMAINS

In order to better understand potential growth in the Lake George watershed, a Geographic Information Systems (GIS) buildout analysis of residential housing was conducted. A GIS buildout analysis provides an estimate of the overall residential development potential given a set of assumptions and constraints. It considers local regulations such as minimum lot size requirements, and features that often inhibit development due to cost or construction difficulties (steep slopes, shallow soils, wetlands, access related issues, etc.) regardless of their regulatory status. However, it is important to point out that a buildout analysis is a theoretical

maximum and should not be considered a projection of growth.

Buildout Constraints

Environmental constraints including water bodies, wetlands (and associated buffers), steep slopes (over 25%), hydric soils, and exposed bedrock areas were considered undevelopable. Other parcels were excluded based on existing land use, including conserved lands, government properties, infrastructure and utilities, schools, religious properties, cemeteries, and developed parcels within approved subdivisions. Select parcels that were less than 10,000 square feet in area without



63%

of new residential housing within the watershed could occur in town of Bolton, Hague, and Lake George.

WASHINGTON COUNTY
RESIDENTIAL HOUSING
COULD INCREASE BY

154%

sewer (and 5,000 square feet with sewer) were also excluded. The development potential for the balance of the area was determined based on Adirondack Park Agency regulations and local zoning codes, including maximum densities and lot size requirements. Environmental constraints often dictate where development can occur from a practical or regulatory perspective. However, it is worth noting that in the absence of formal land use regulations or other prohibitions, these constraints may not inhibit development if the market is willing to bear the cost to develop in difficult areas. While a GIS buildout analysis provides a hypothetical maximum, it is possible that additional growth and development could occur in locations where there are minimal to no restrictions.

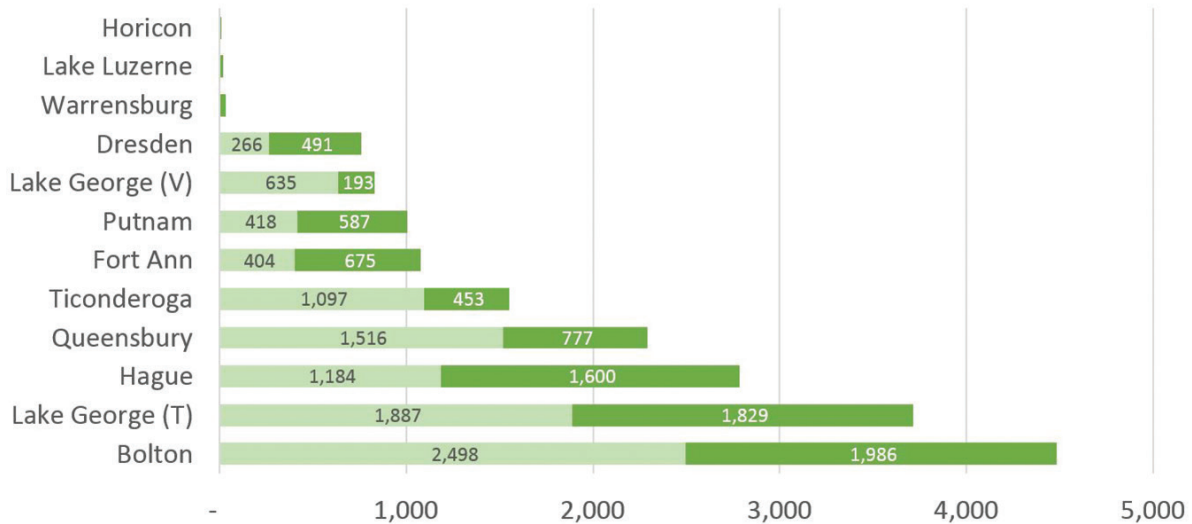
Buildout Analysis Results

Approximately half of the Lake George watershed is protected or conserved land. However, based on the GIS buildout analysis, it was determined that over 8,600 residential units (an 86% increase) could be permitted under

the existing land use regulations and environmental conditions. The analysis indicates that growth would not be evenly distributed within watershed with over half of the potential residential development occurring in the towns of Bolton (80% increase), Lake George (97% increase), and Hague (135% increase) if full buildout was realized. With a possible increase of 51%, Queensbury also still has significant room to grow in the watershed. Washington County towns do not have the same development potential but, as a percentage of current units, these communities could experience the highest increase (approximately 154% when compared to an 83% increase in Warren County, and 41% in Essex County). For comparison purposes, in the absence of environmental constraints, there is potential for over 10,500 new residential units. The communities with largest discrepancies between constrained and unconstrained buildouts include the Towns of Lake George (649 unit difference), Bolton (454), Hague (427), and Queensbury (222).

EXISTING & POTENTIAL NEW RESIDENTIAL UNITS IN WATERSHED

Existing Residential Potential New Residential



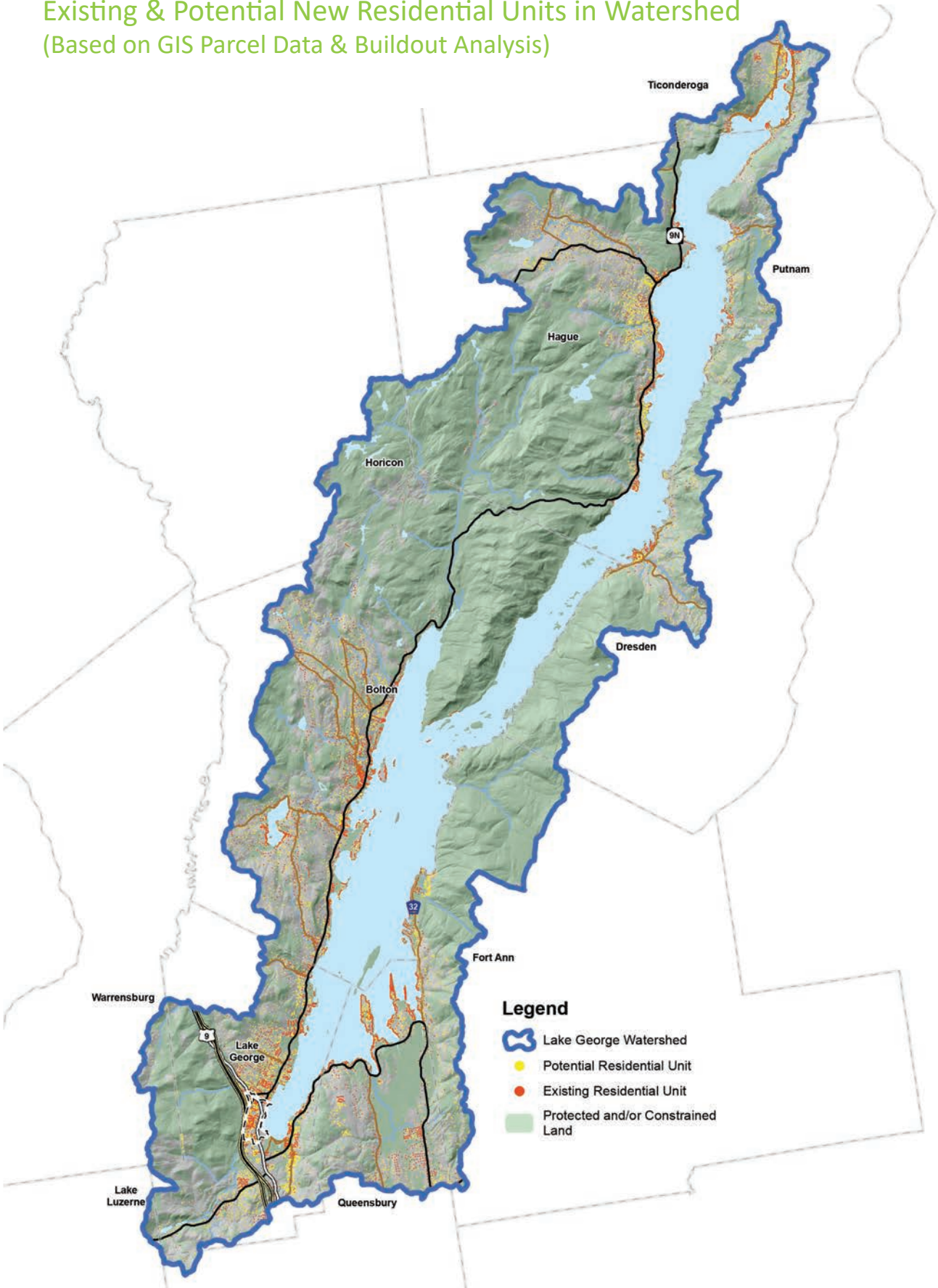
Note: Existing residential figures are based on US Census figures and potential new residential units are based on GIS buildout analysis.

Growth Considerations

Future residential growth within the Lake George watershed will result in increased demand for municipal services. It will also have both a positive and negative impact on the community character and environmental conditions of the watershed. With respect to wastewater treatment services, for example, the Hague sewer district has the potential to increase the number of connections by

approximately 68%. Bolton, based on the GIS buildout analysis, has the potential for only 10 new residences within the sewer district. However, it is important to note there is likely additional buildout capacity for infill, redevelopment, and mixed-use development. Lake George’s potential residential development could increase the number of connections to the Village’s wastewater treatment by 43% (482).

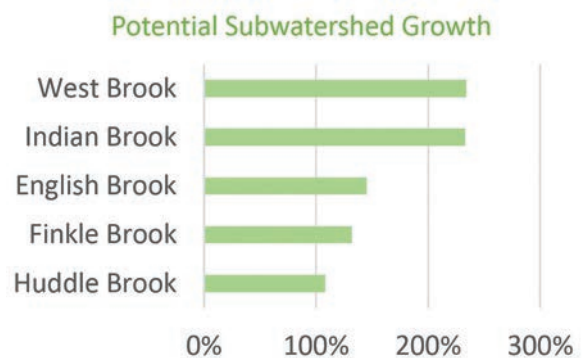
Existing & Potential New Residential Units in Watershed (Based on GIS Parcel Data & Buildout Analysis)



Growth Considerations

Development within the watershed would also increase the amount of impervious cover and disturbed land, which may translate to increases in stormwater runoff. A closer look at five of Lake George's sub-watersheds, including West, English, Huddle, Finkle, and Indian Brooks, reveals that a 166% increase in housing units is possible in these areas. Among these, West Brook and Indian Brook would see the greatest increase at 200% at full buildout. Assuming an average of a half-acre of disturbance per new lot, a 5% increase in the amount of disturbance could occur in the West Brook sub-watershed alone, which already has 5.5% built or hardscape land covers and 11.1% overall disturbances (this does not account for the potential need for new roadways and offsite infrastructure). The Huddle Brook sub-watershed is

another location that could see close to a 5% increase in land disturbance, pushing the total disturbed area to approximately 12%. Of the subwatersheds that were examined, Indian Brook is predicted to have the second largest increase in number of new residential units. Given the potential development in other portions of the watershed, particularly Hague, similar increases in total disturbed acres could be realized.





MUNICIPAL PROFILES

PHOTOGRAPH COURTESY OF DAVID E. CUMMINGS

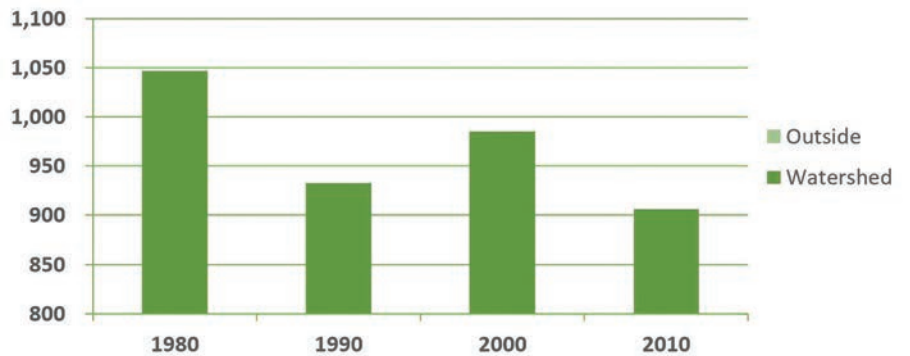
VILLAGE OF LAKE GEORGE

FAST FACTS

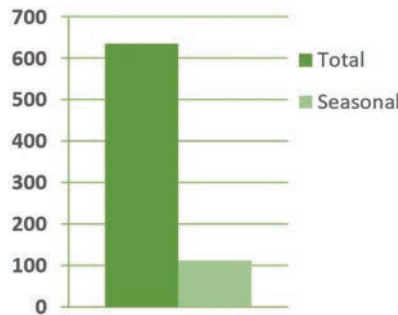
	TOWN	WATERSHED
ACRES:	379	379
POPULATION:	906	906
RESIDENTIAL VALUE:	\$79.1 Million	\$79.1 Million
COMMERCIAL VALUE:	\$139.8 Million	\$139.8 Million
MILES OF SHORELINE:	.84	



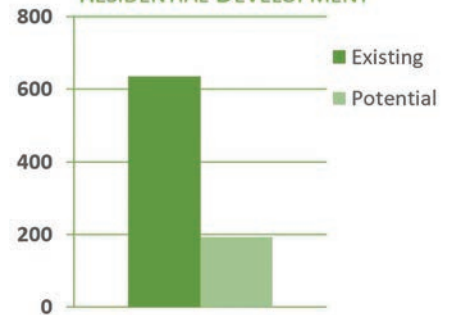
POPULATION CHARACTERISTICS



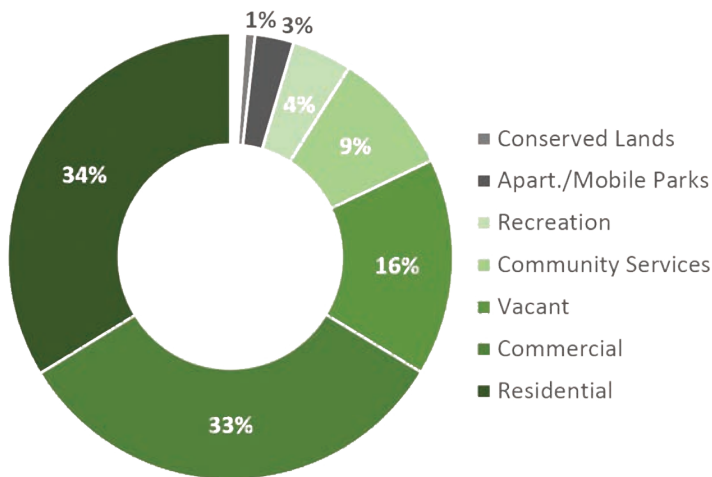
WATERSHED HOUSING



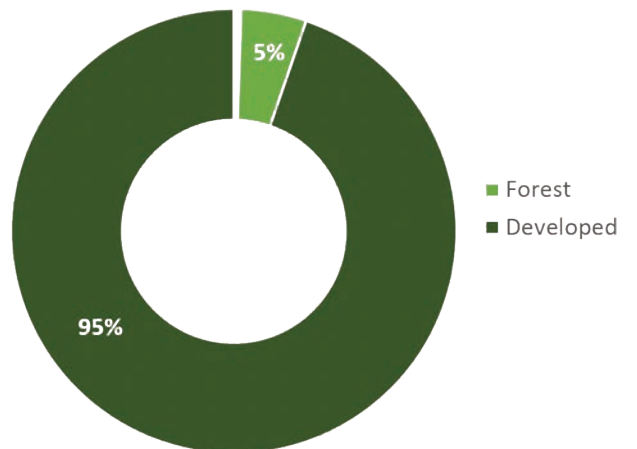
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



Note: Land use and land cover figures are based on total acreages. Municipal profile land cover is based solely on USGS National Land Cover Dataset (NLCD), which may vary slightly from the Land Use Characteristics section of this report due to the consolidation of select land coverages (e.g., developed and disturbed lands, etc.). Land use and land cover figures have been rounded to the nearest whole number for simplification purposes. As such, small percentages of additional land uses and land covers are likely present.

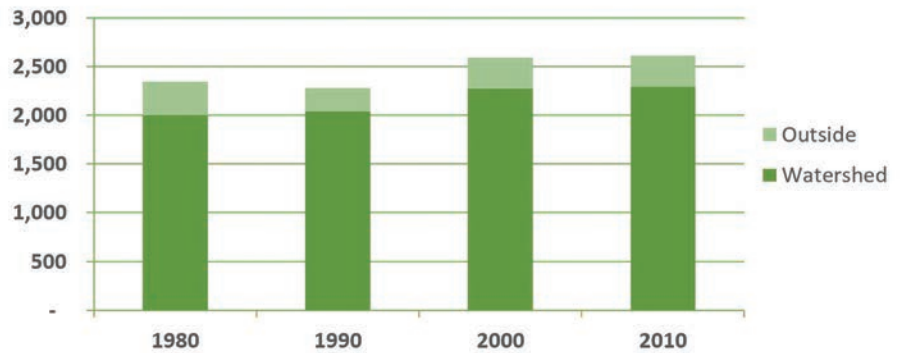
TOWN OF LAKE GEORGE

FAST FACTS

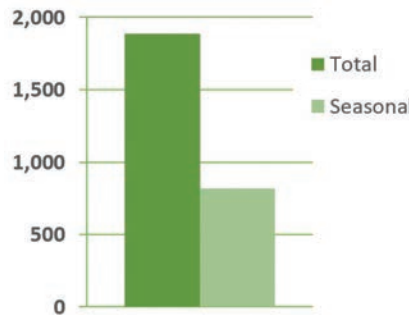
	TOWN	WATERSHED
ACRES:	19,029	14,266
POPULATION:	2,609	2,292
RESIDENTIAL VALUE:	\$672.7 Million	\$632.5 Million
COMMERCIAL VALUE:	\$189.2 Million	\$167.6 Million
MILES OF SHORELINE:	10.5	



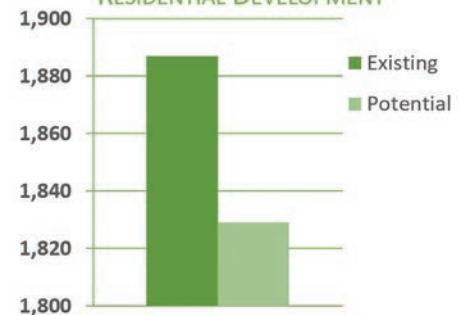
POPULATION CHARACTERISTICS



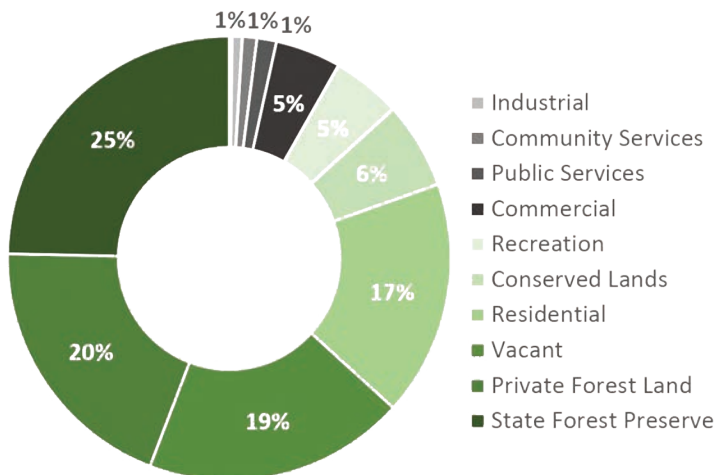
WATERSHED HOUSING



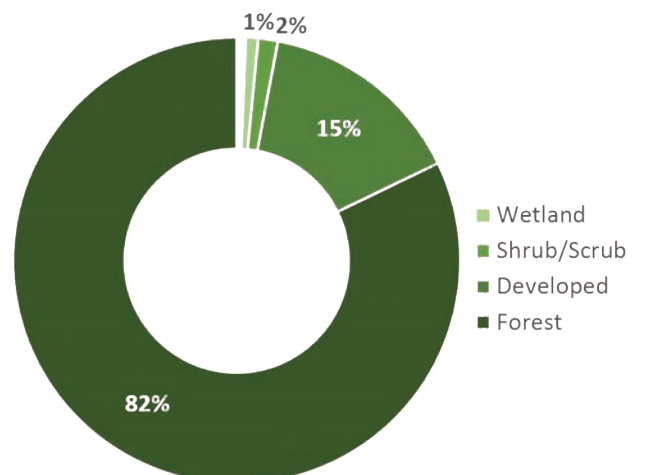
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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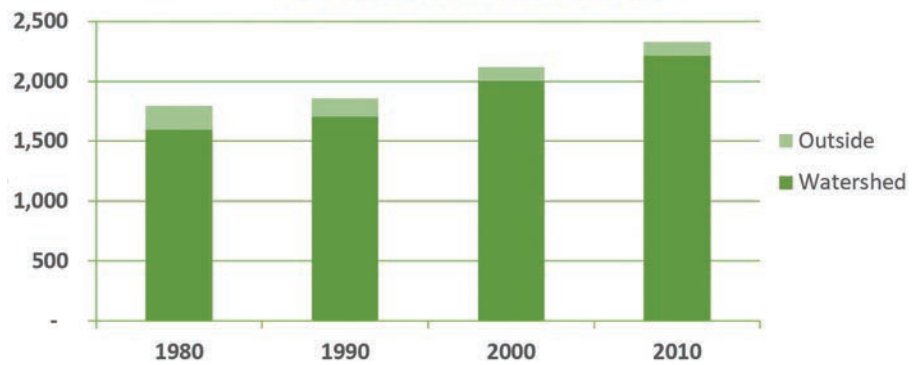
TOWN OF BOLTON

FAST FACTS

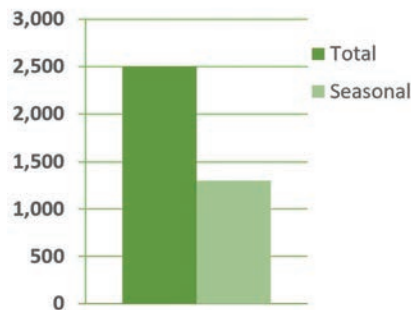
	TOWN	WATERSHED
ACRES:	41,107	32,835
POPULATION:	2,326	2,212
RESIDENTIAL VALUE:	\$1.26 Million	\$1.24 Million
COMMERCIAL VALUE:	\$170 Million	\$168 Million
MILES OF SHORELINE:	30.0	



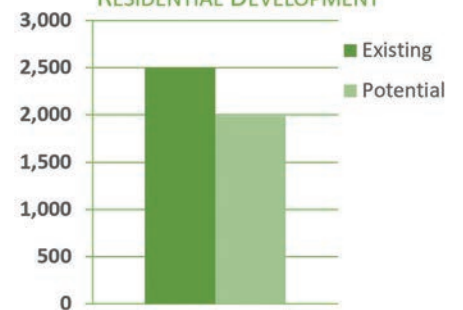
POPULATION CHARACTERISTICS



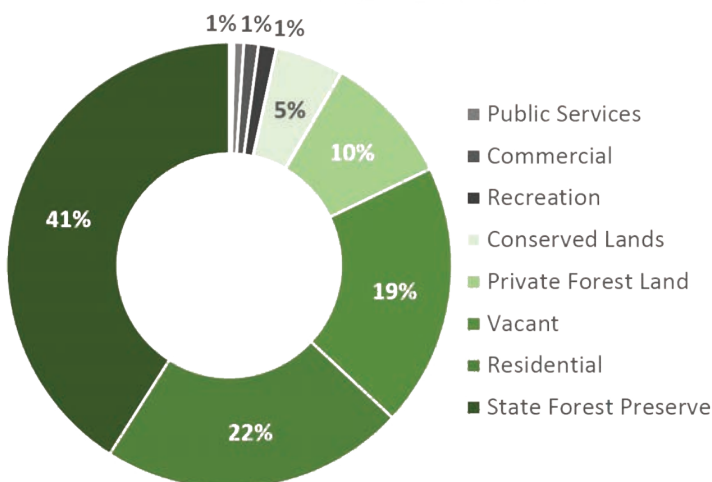
WATERSHED HOUSING



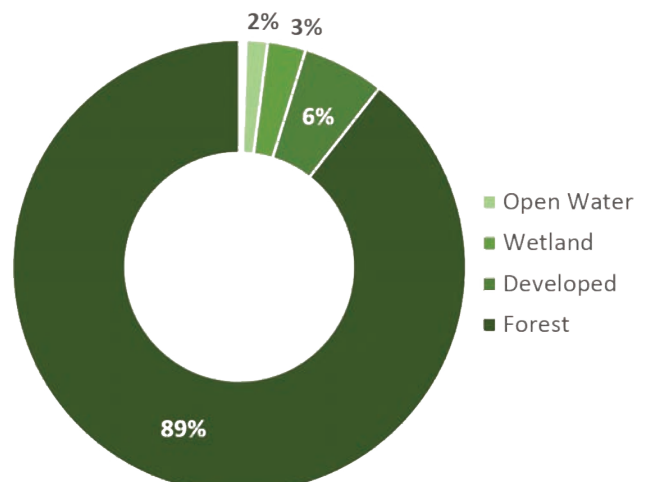
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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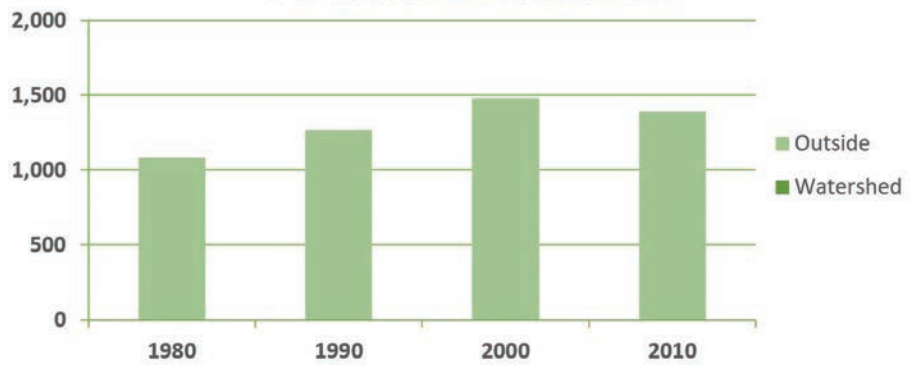
TOWN OF HORICON

FAST FACTS

	TOWN	WATERSHED
ACRES:	45,921	32,835
POPULATION:	1,389	0
RESIDENTIAL VALUE:	\$604.5 Million	\$0.78 Million
COMMERCIAL VALUE:	\$26.5 Million	\$0.18 Million
MILES OF SHORELINE:	-	-



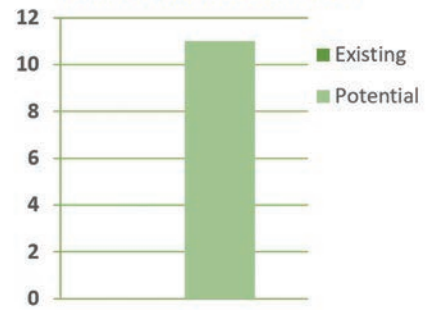
POPULATION CHARACTERISTICS



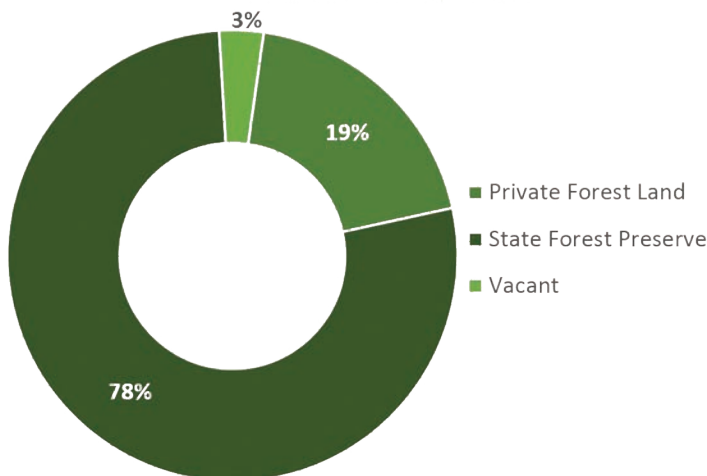
WATERSHED HOUSING



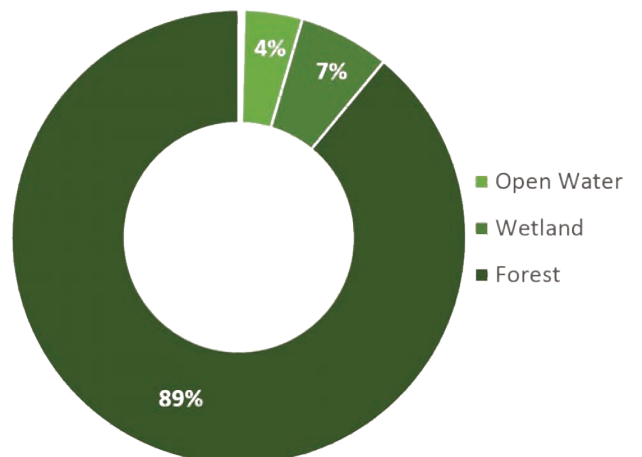
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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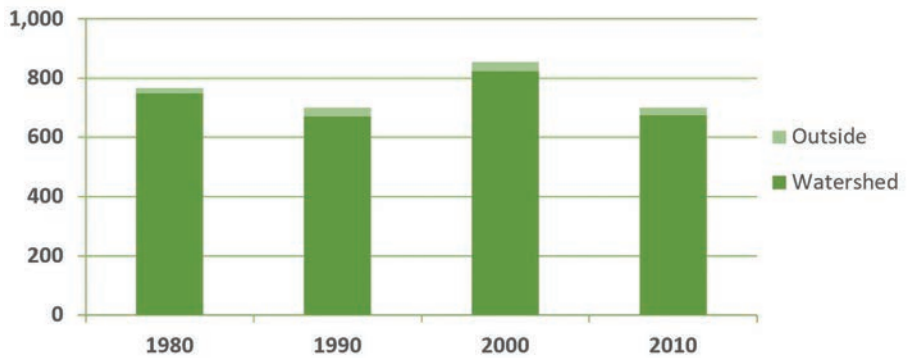
TOWN OF HAGUE

FAST FACTS

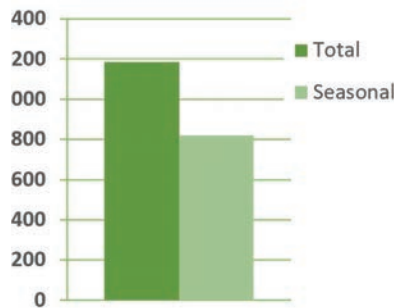
	TOWN	WATERSHED
ACRES:	41,088	32,835
POPULATION:	699	673
RESIDENTIAL VALUE:	\$391.2 Million	\$386.5 Million
COMMERCIAL VALUE:	\$23.2 Million	\$23.2 Million
MILES OF SHORELINE:	17.5	-



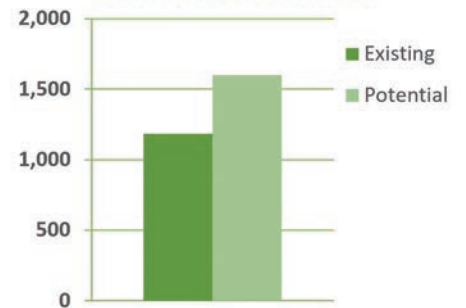
POPULATION CHARACTERISTICS



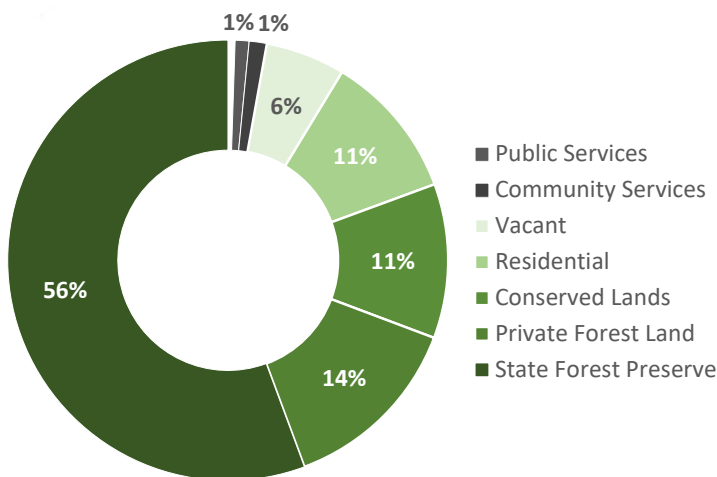
WATERSHED HOUSING



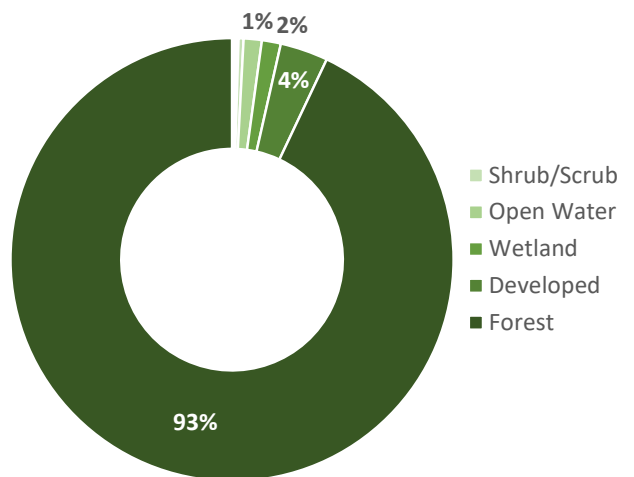
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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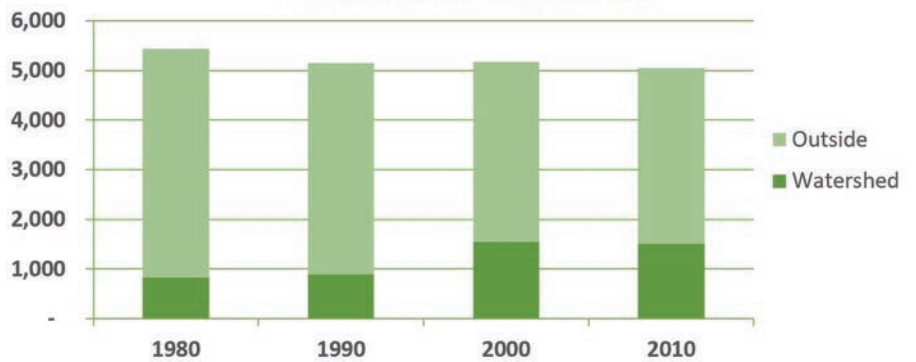
TOWN OF TICONDEROGA

FAST FACTS

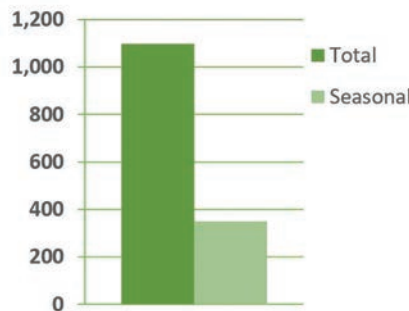
	TOWN	WATERSHED
ACRES:	56,372	2,979
POPULATION:	5,042	1,500
RESIDENTIAL VALUE:	\$397.6 Million	\$191.6 Million
COMMERCIAL VALUE:	\$118.7 Million	\$4.0 Million
MILES OF SHORELINE:	8.1	-



POPULATION CHARACTERISTICS



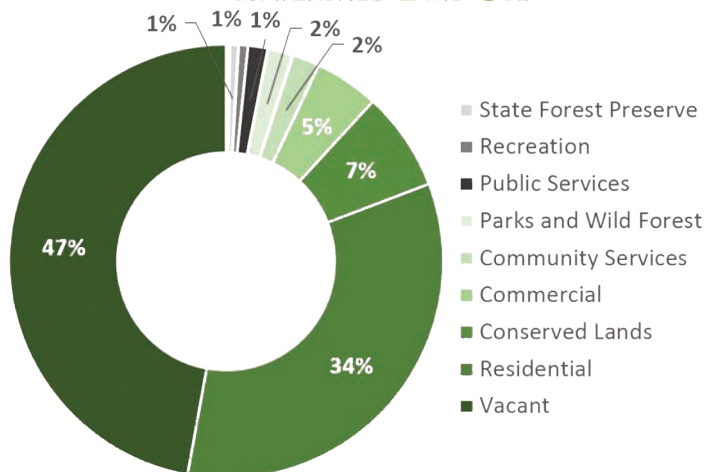
WATERSHED HOUSING



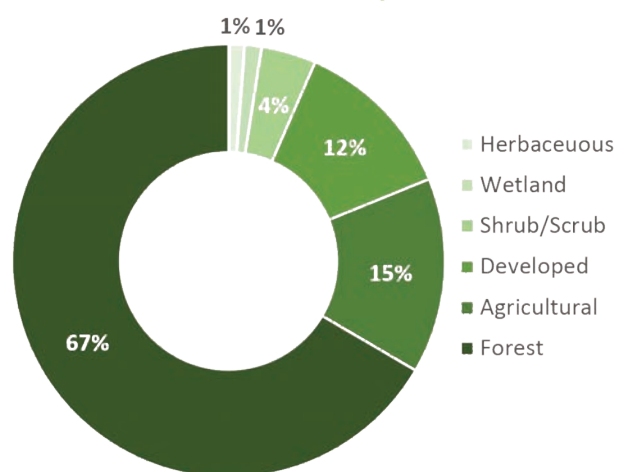
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



Note: Land use and land cover figures are based on total acreages. Municipal profile land cover is based solely on USGS National Land Cover Dataset (NLCD), which may vary slightly from the Land Use Characteristics section of this report due to the consolidation of select land coverages (e.g., developed and disturbed lands, etc.). Land use and land cover figures have been rounded to the nearest whole number for simplification purposes. As such, small percentages of additional land uses and land covers are likely present.

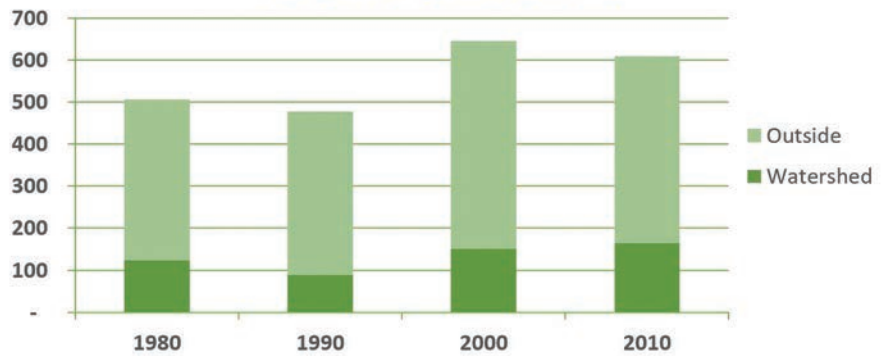
TOWN OF PUTNAM

FAST FACTS

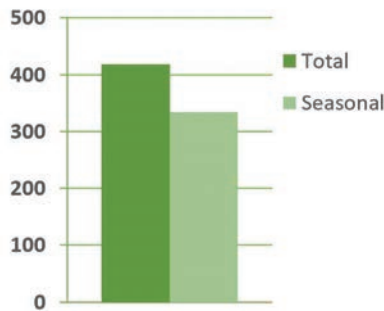
	TOWN	WATERSHED
ACRES:	22,702	5,528
POPULATION:	609	164
RESIDENTIAL VALUE:	\$261.3 Million	\$214.8 Million
COMMERCIAL VALUE:	\$3.5 Million	\$2.9 Million
MILES OF SHORELINE:	13.2	-



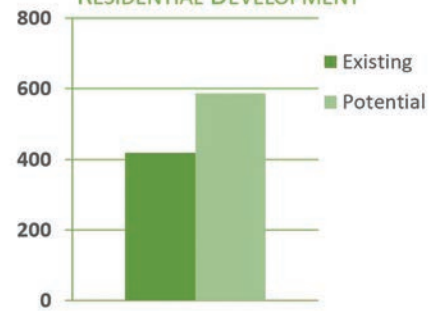
POPULATION CHARACTERISTICS



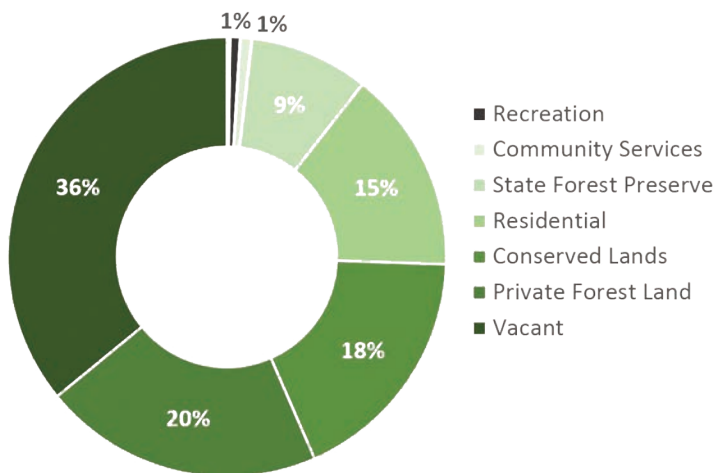
WATERSHED HOUSING



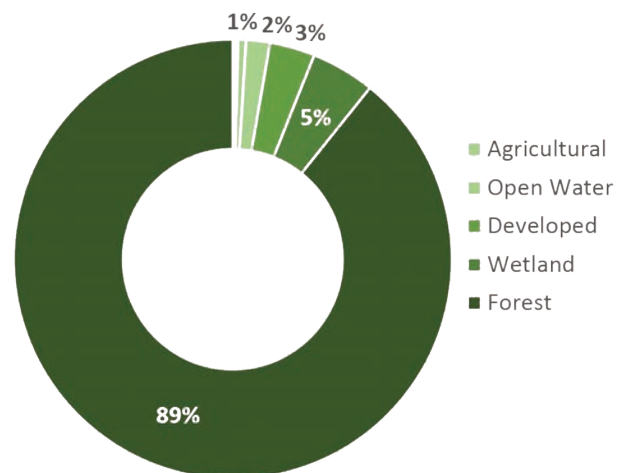
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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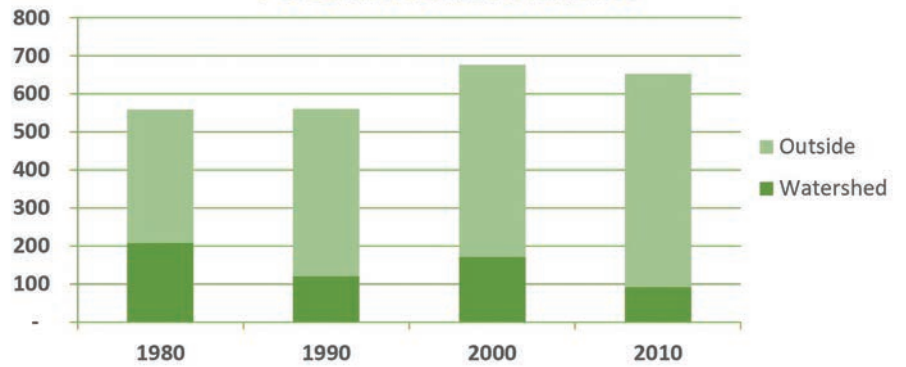
TOWN OF DRESDEN

FAST FACTS

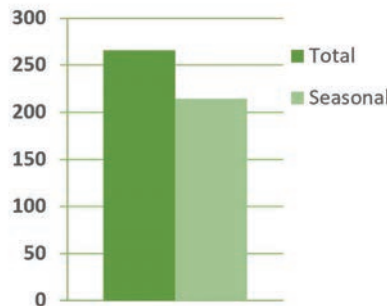
	TOWN	WATERSHED
ACRES:	36,296	9,272
POPULATION:	652	92
RESIDENTIAL VALUE:	\$96.9 Million	\$78.8 Million
COMMERCIAL VALUE:	\$3.5 Million	\$1.6 Million
MILES OF SHORELINE:	15.4	-



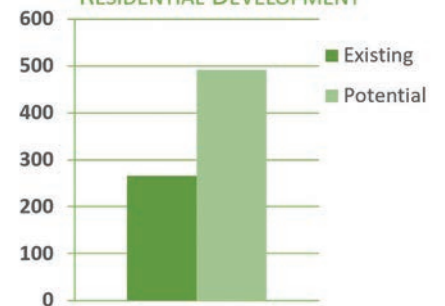
POPULATION CHARACTERISTICS



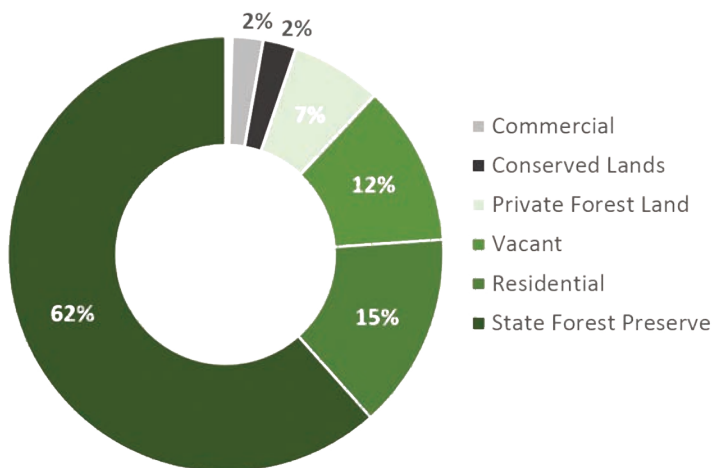
WATERSHED HOUSING



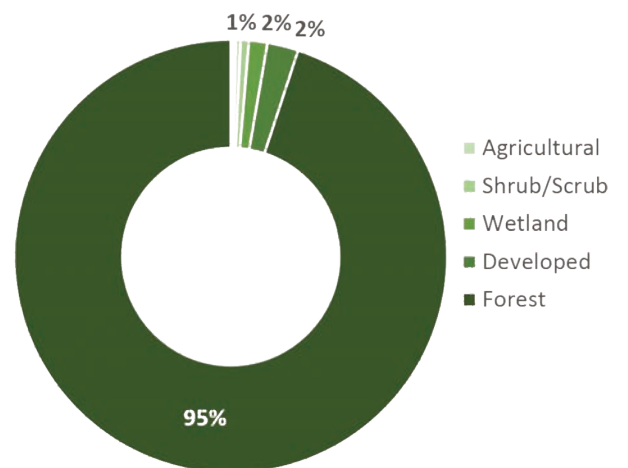
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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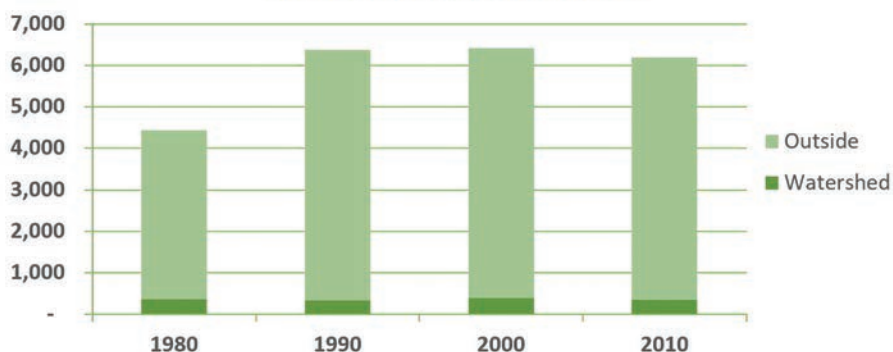
TOWN OF FORT ANN

FAST FACTS

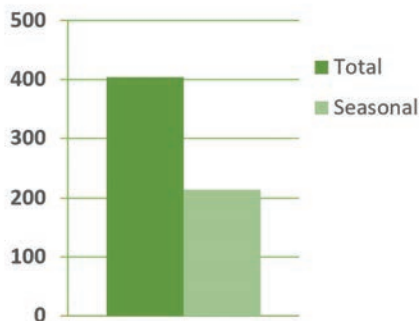
	TOWN	WATERSHED
ACRES:	69,735	11,521
POPULATION:	6,190	347
RESIDENTIAL VALUE:	\$522.1 Million	\$271.1 Million
COMMERCIAL VALUE:	\$23.9 Million	\$3.6 Million
MILES OF SHORELINE:	11.5	-



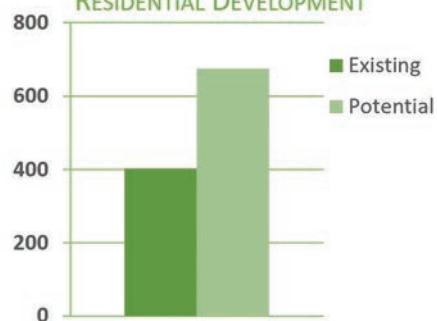
POPULATION CHARACTERISTICS



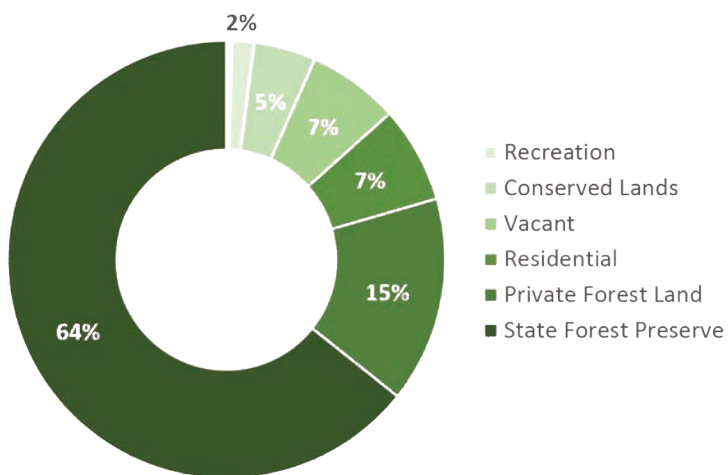
WATERSHED HOUSING



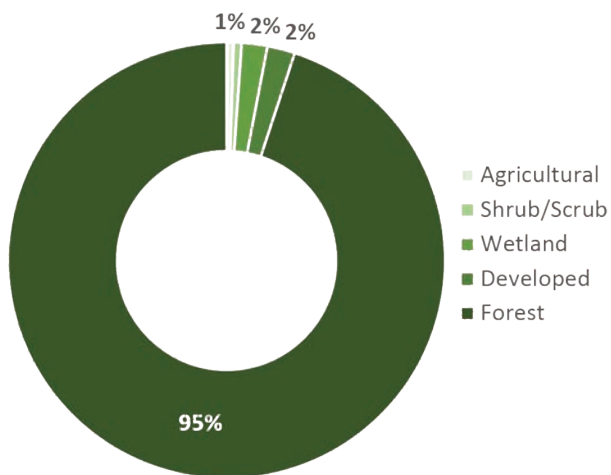
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



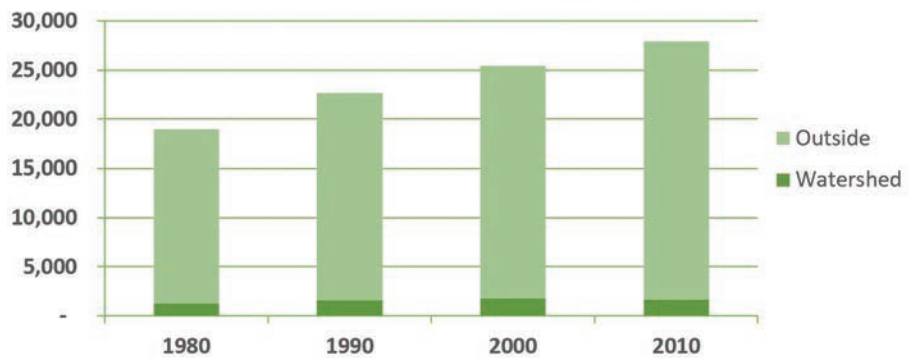
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TOWN OF QUEENSBURY

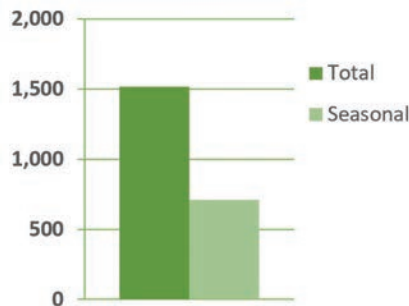
FAST FACTS

	TOWN	WATERSHED
ACRES:	41,455	8,623
POPULATION:	27,901	1,653
RESIDENTIAL VALUE:	\$2.89 Billion	\$853.8 Million
COMMERCIAL VALUE:	\$623 Million	\$41.4 Million
MILES OF SHORELINE:	15.1	-

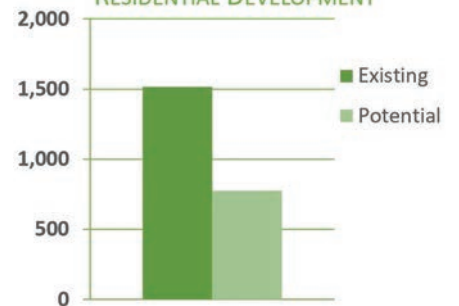
POPULATION CHARACTERISTICS



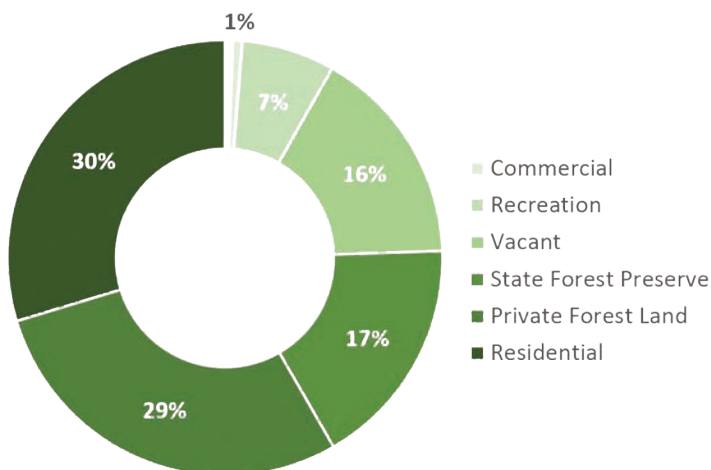
WATERSHED HOUSING



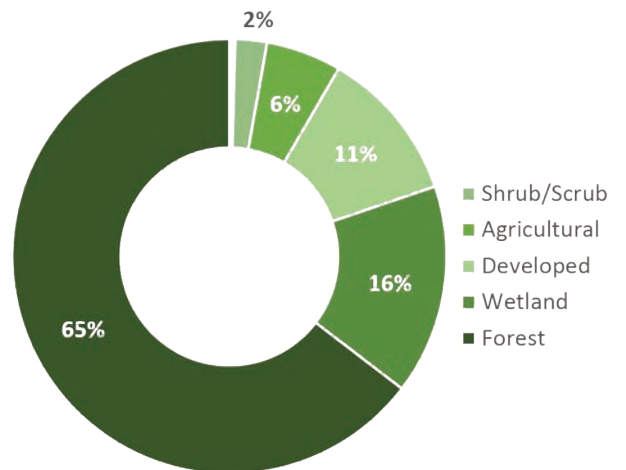
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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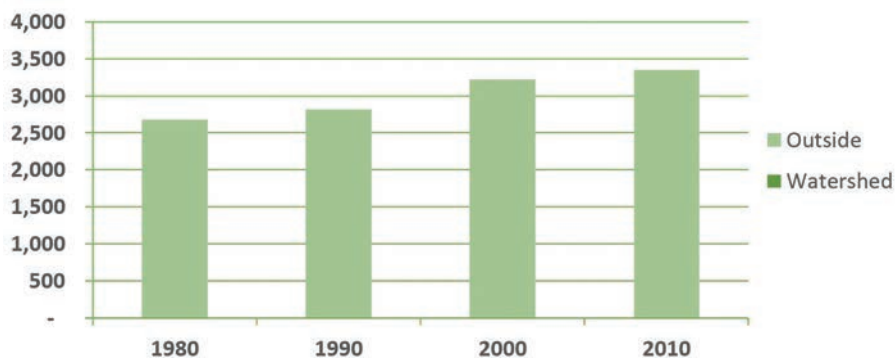
TOWN OF LAKE LUZERNE

FAST FACTS

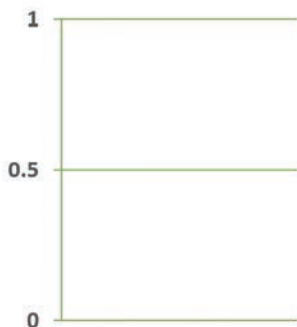
	TOWN	WATERSHED
ACRES:	34,565	223
POPULATION:	3,347	~0
RESIDENTIAL VALUE:	\$302.4 Million	\$1.2 Million
COMMERCIAL VALUE:	\$19.8 Million	\$0.5 Million
MILES OF SHORELINE:	-	-



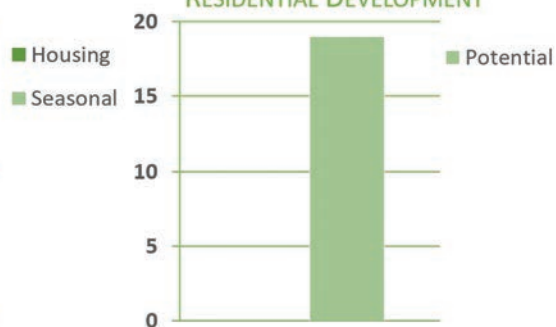
POPULATION CHARACTERISTICS



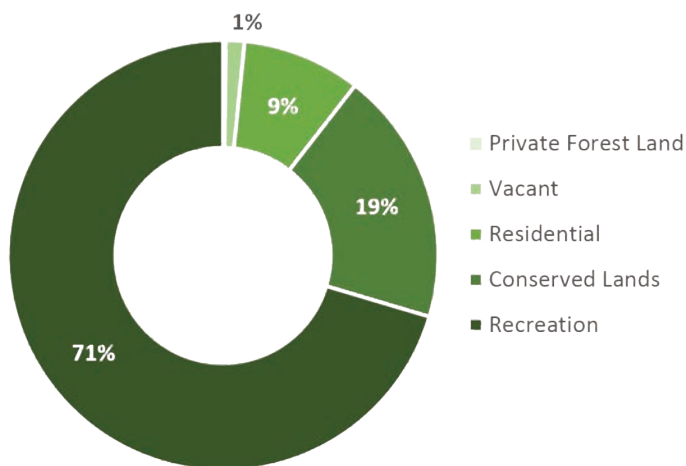
WATERSHED HOUSING



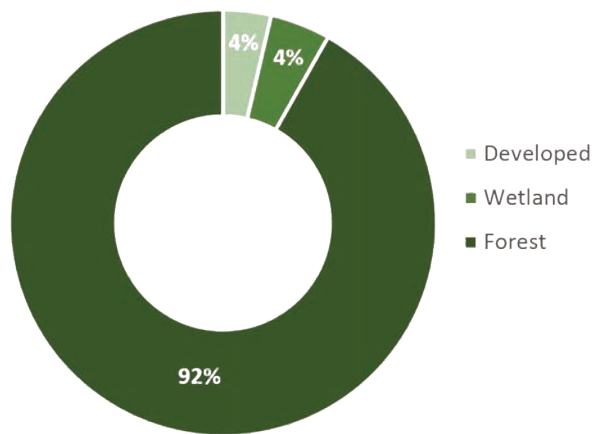
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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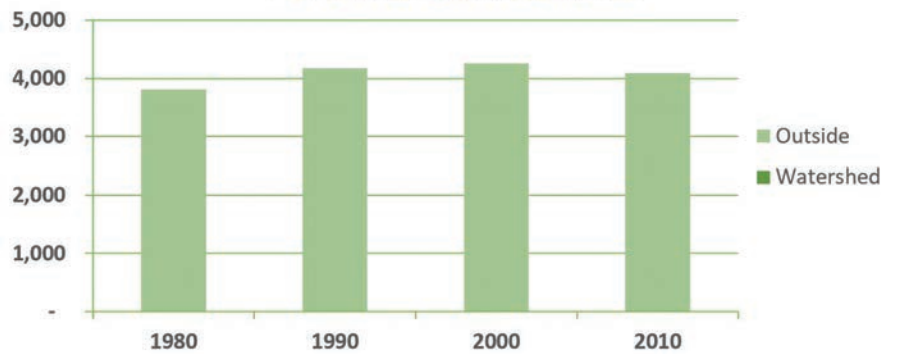
TOWN OF WARRENSBURG

FAST FACTS

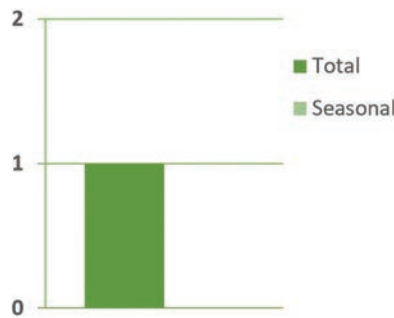
	TOWN	WATERSHED
ACRES:	41,430	1,864
POPULATION:	4,094	~2
RESIDENTIAL VALUE:	\$279.2 Million	\$1.9 Million
COMMERCIAL VALUE:	\$46.7 Million	\$0.47 Million
MILES OF SHORELINE:	-	-



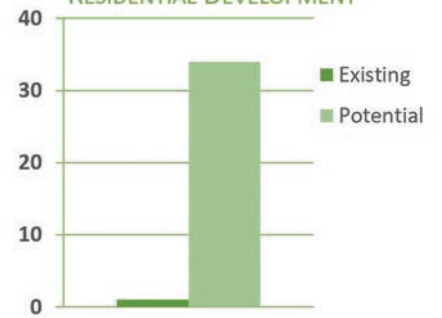
POPULATION CHARACTERISTICS



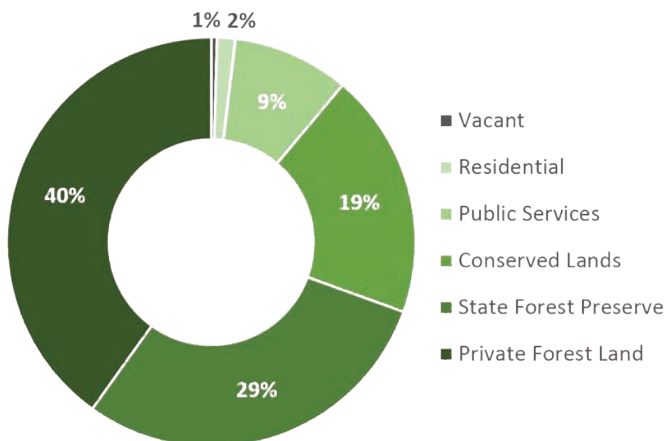
WATERSHED HOUSING



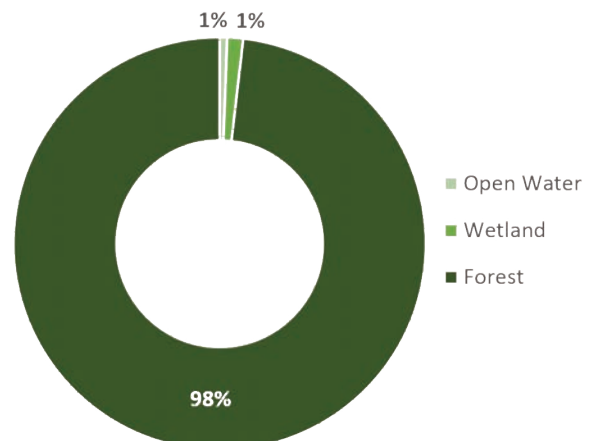
EXISTING & POTENTIAL RESIDENTIAL DEVELOPMENT



WATERSHED LAND USE



WATERSHED LAND COVER



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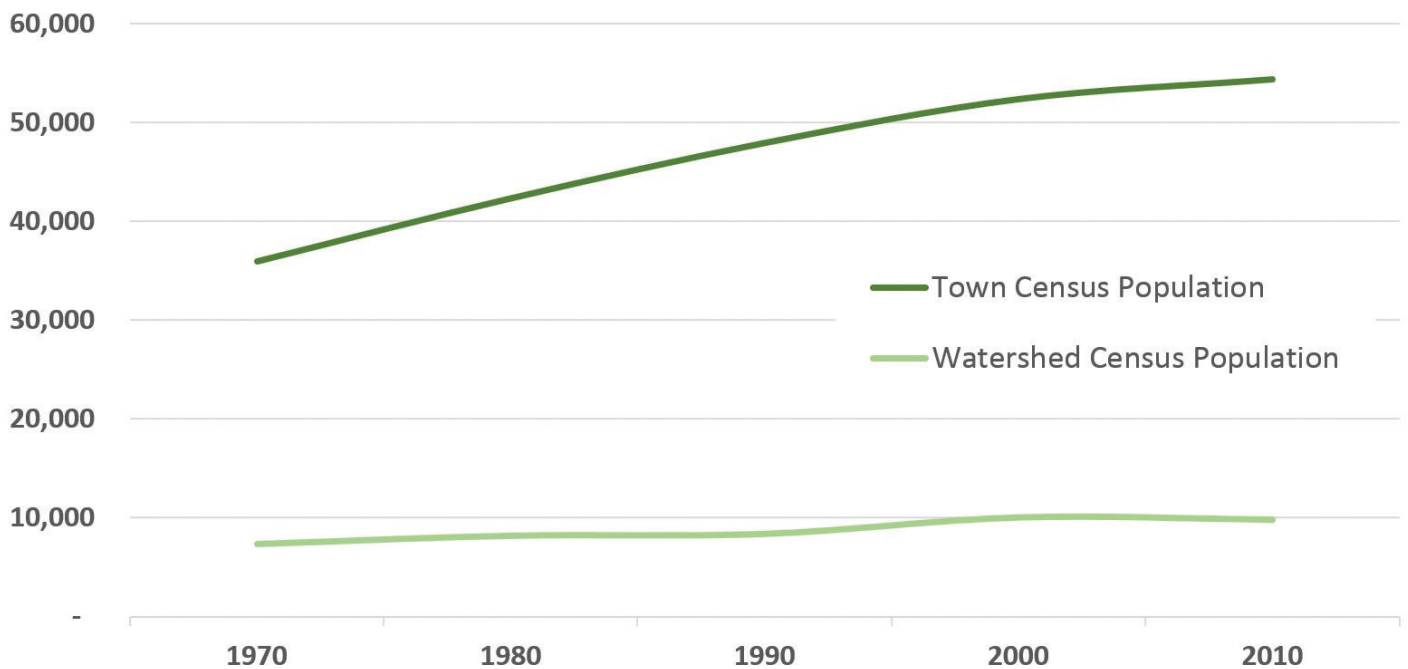
APPENDICES

POPULATION WITHIN TOWN & WATERSHED

	1970		1980		1990		2000		2010	
	Town	Water-shed*	Town	Water-shed	Town	Water-shed	Town	Water-shed	Town	Water-shed
Bolton	1,589	1,472	1,793	1,595	1,855	1,703	2,117	2,005	2,326	2,212
Lake George(t)	1,760	1,543	2,347	2,004	2,278	2,042	2,593	2,276	2,609	2,292
Lake George(v)	1,046	1,046	1,047	1,047	933	945	985	994	906	913
Queensbury	14,506	960	18,978	1,279	22,630	1,585	25,441	1,734	27,901	1,653
Fort Ann	3,749	234	4,425	355	6,368	340	6,417	384	6,190	347
Dresden	480	117	559	207	561	120	677	171	652	92
Putnam	579	135	506	124	477	89	645	150	609	164
Ticonderoga	5,839	951	5,436	833	5,149	888	5,167	1,541	5,042	1,500
Hague	910	878	766	748	699	670	854	823	699	673
Warrensburg	3,330	0	3,810	-	4,174	-	4,255	-	4,094	2
Lake Luzerne	2,174	0	2,672	-	2,816	-	3,219	-	3,347	-
Total	35,962	7,337	42,339	8,192	47,940	8,382	52,370	10,078	54,375	9,848

*Estimated population based on 30-year municipal census population and watershed census block group population trends.

Population within Town & Watershed



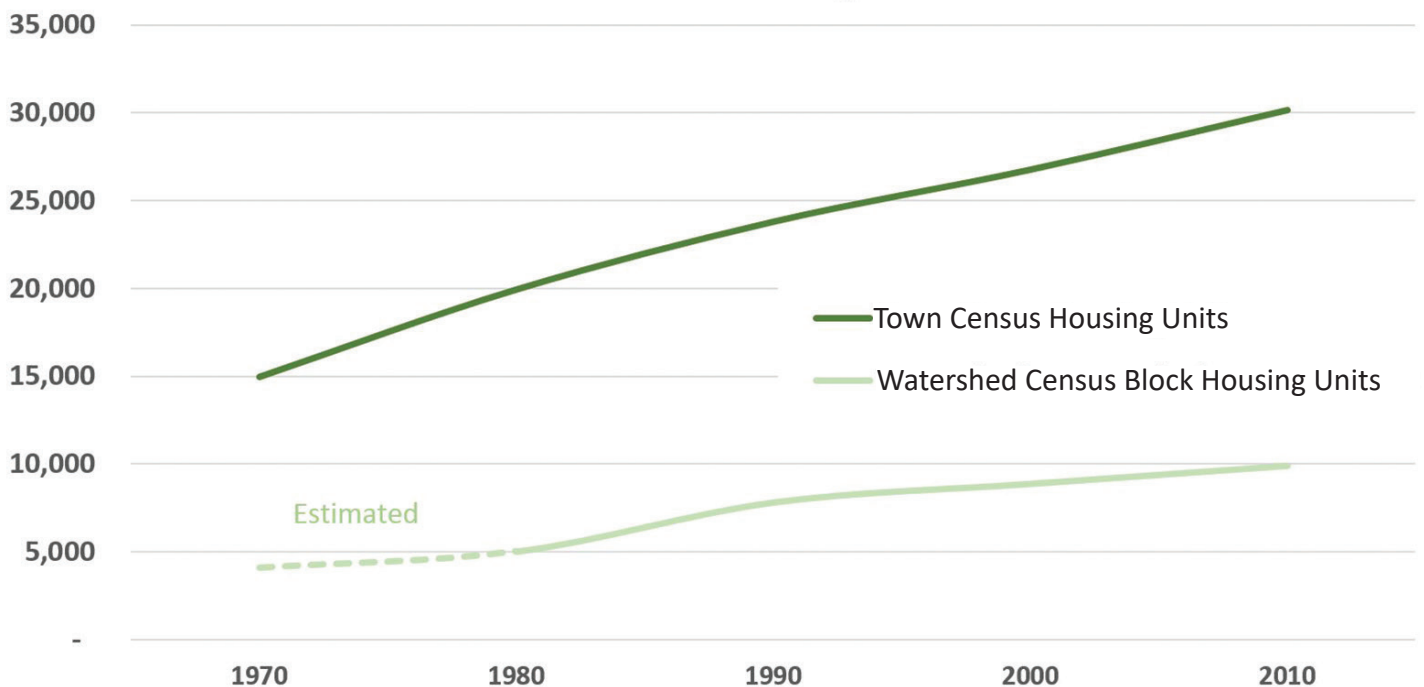
Data Source: US Census Bureau County Subdivision, Tract, and Block Group Data. The Town of Horicon was omitted from select sections of this report for data consistency purposes.

TOWN & WATERSHED HOUSING UNITS

	1970		1980		1990		2000		2010	
	Town	Water-shed*	Town	Water-shed	Town	Water-shed	Town	Water-shed	Town	Water-shed
Bolton	1,092	993	1,507	1,371	2,081	2,056	2,164	2,071	2,580	2,498
Lake George(t)	1,023	841	1,319	1,084	1,558	1,463	1,868	1,654	2,110	1,887
Lake George(v)	450	450	500	500	548	548	588	588	635	635
Queensbury	5,195	376	7,814	565	9,632	1,221	11,223	1,463	12,999	1,516
Fort Ann	1,246	197	1,629	258	1,667	322	1,957	426	2,077	404
Dresden	438	159	511	186	559	285	630	363	666	266
Putnam	441	117	496	132	581	371	611	384	674	418
Ticonderoga	1,964	293	2,272	339	2,445	586	2,581	905	2,911	1,097
Hague	710	694	603	589	985	968	1,047	1,027	1,126	1,184
Warrensburg	1,234	1	1,707	1	1,977	1	2,148	1	2,260	1
Lake Luzerne	1,148	0	1,569	-	1,762	-	1,949	-	2,126	-
Total	14,491	4,122	19,927	5,025	23,795	7,821	26,766	8,882	30,164	9,906

*Estimated housing units based on 30-year municipal census housing units and watershed census block group housing unit trends.

Town & Watershed Housing Units



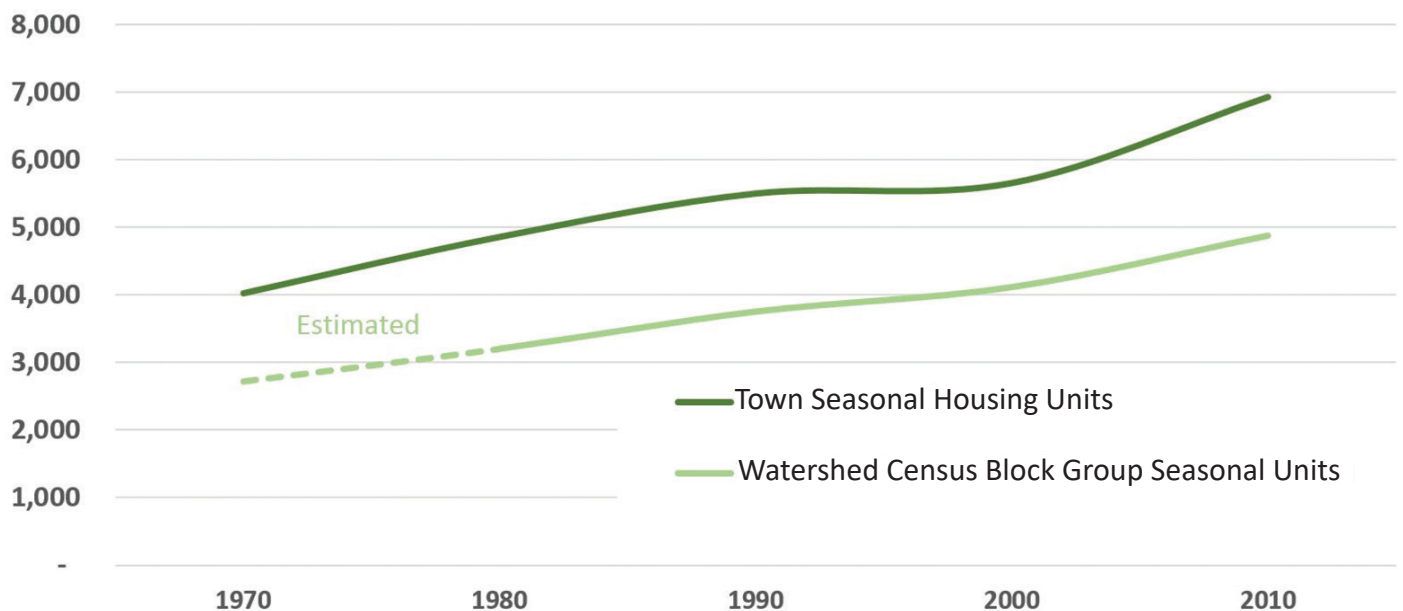
Data Source: US Census Bureau County Subdivision, Tract, and Block Group Data. The Town of Horicon was omitted from select sections of this report for data consistency purposes.

SEASONAL HOUSING WITHIN TOWN & WATERSHED

	1970		1980		1990		2000		2010	
	Town	Water-shed*	Town	Water-shed	Town	Water-shed	Town	Water-shed	Town	Water-shed
Bolton	556	548	828	815	1,127	1,145	1,135	1,091	1,329	1,299
Lake George(t)	481	427	439	390	594	510	681	604	891	819
Lake George(v)	U	U	U	U	U	U	83	83	113	113
Queensbury	930	676	860	626	817	538	837	683	1,005	711
Fort Ann	509	234	543	249	447	195	444	235	519	214
Dresden	260	179	304	209	341	232	324	265	379	214
Putnam	255	224	292	256	370	313	334	307	384	334
Ticonderoga	115	72	259	161	331	204	362	224	556	351
Hague	357	357	494	494	616	613	627	620	748	819
Warrensburg	114	-	247	-	258	-	268	-	354	-
Lake Luzerne	450	-	594	-	601	-	562	-	652	-
Total	4,027	2,716	4,860	3,201	5,502	3,750	5,657	4,112	6,930	4,874

*Estimated housing units based on 30-year municipal census housing units and watershed census block group housing unit trends. (U) = Unavailable.

Seasonal Housing within Town & Watershed



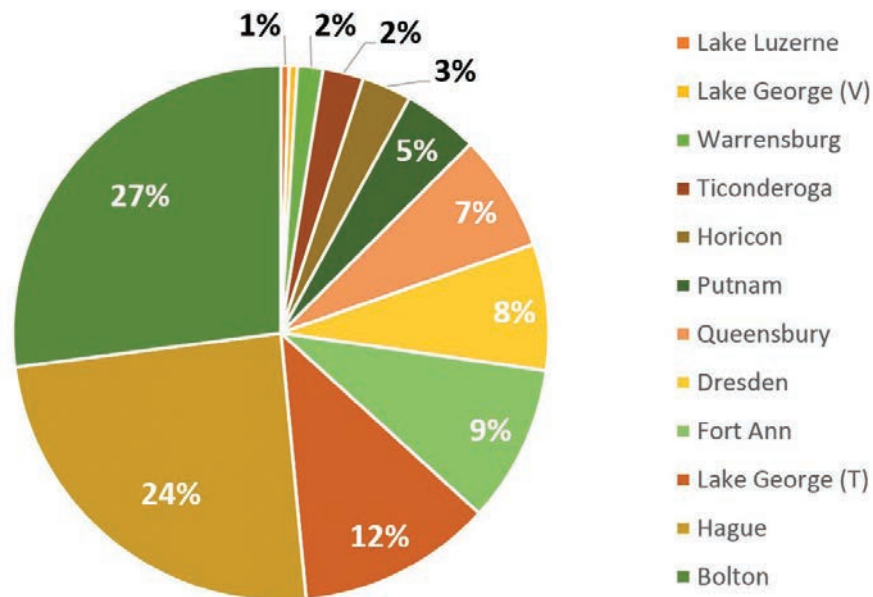
Data Source: US Census Bureau County Subdivision, Tract, and Block Group Data. The Town of Horicon was omitted from select sections of this report for data consistency purposes.

MUNICIPAL LAND AREA WITHIN WATERSHED

Town	Acres*	Percent of Watershed
Lake Luzerne	223	1%
Lake George (V)	387	1%
Warrensburg	1,864	2%
Ticonderoga	2,979	2%
Horicon	3,633	3%
Putnam	5,528	5%
Queensbury	8,623	7%
Dresden	9,272	8%
Fort Ann	11,521	10%
Lake George (T)	14,266	12%
Hague	29,728	25%
Bolton	32,835	27%

*Acres include all land and water within the watershed, excluding Lake George. The Town of Lake George excludes the Village of Lake George

Municipal Land Area within Watershed

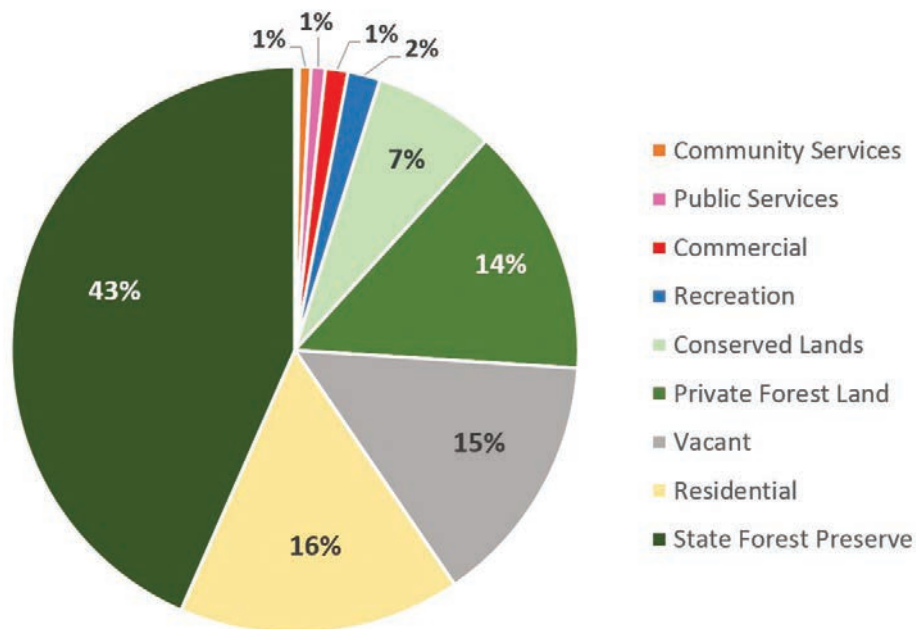


Data Source: NYS GIS Municipal Boundary Data; NYSDEC Watershed Boundary data

TOWN-WIDE & WATERSHED LAND USE CHARACTERISTICS

Land Use	Number of Parcels	Total Acres	Acres in Watershed	% Acres	% Acres in Watershed
Agricultural	2	211	13	1%	0%
Unclassified	12	37	37	0%	0%
Apartments/M.H. Par	46	53	50	0%	0%
Parks and Wild Forest	3	58	58	0%	0%
Industrial	4	144	144	0%	0%
Community Services	136	800	793	0%	1%
Public Services	54	1,478	962	2%	1%
Commercial	496	1,942	1,517	5%	1%
Recreation	105	2,585	2,193	2%	2%
Conserved Lands	92	12,523	8,184	4%	7%
Private Forest Land	296	22,017	16,855	19%	14%
Vacant	3,053	20,057	17,131	23%	14%
Residential	7,599	23,598	19,080	30%	16%
State Forest Preserve	496	57,657	51,441	15%	43%

Watershed Land Use Characteristics



Data Source: Warren and Washington County Real Property Tax GIS Data

DEVELOPED OR DISTURBED LAND COVER

Municipality	Watershed Acres	Impervious Category	Watershed Acres	(%) Town Watershed	(%) Total
Bolton	32,835	Built or Hardscape	1,190.8	3.6%	7.5%
		Maintained Landscape	206.0	0.6%	
		Dev. Open Space & Cleared	1,076.5	3.3%	
Dresden	9,273	Built or Hardscape	132.0	1.4%	3.3%
		Maintained Landscape	19.8	0.2%	
		Dev. Open Space & Cleared	152.7	1.6%	
Fort Ann	11,521	Built or Hardscape	132.8	1.2%	3.0%
		Maintained Landscape	3.4	0.0%	
		Dev. Open Space & Cleared	210.0	1.8%	
Hague	29,728	Built or Hardscape	652.7	2.2%	4.5%
		Maintained Landscape	52.1	0.2%	
		Dev. Open Space & Cleared	623.7	2.1%	
Horicon	3,633	Built or Hardscape	12.6	0.3%	0.4%
		Dev. Open Space & Cleared	0.9	0.0%	
Lake George (T)	14,270	Built or Hardscape	1,139.2	8.0%	16.9%
		Maintained Landscape	259.9	1.8%	
		Dev. Open Space & Cleared	1,017.2	7.1%	
Lake George (V)	383	Built or Hardscape	222.4	58.1%	95.1%
		Maintained Landscape	61.2	16.0%	
		Dev. Open Space & Cleared	80.6	21.0%	
Lake Luzerne	223	Built or Hardscape	5.3	2.4%	4.5%
		Dev. Open Space & Cleared	4.8	2.2%	
Putnam	5,528	Built or Hardscape	131.5	2.4%	5.2%
		Maintained Landscape	19.7	0.4%	
		Dev. Open Space & Cleared	135.6	2.5%	
Queensbury	8,623	Built or Hardscape	528.7	6.1%	18.6%
		Maintained Landscape	219.1	2.5%	
		Dev. Open Space & Cleared	860.2	10.0%	
Ticonderoga	2,979	Built or Hardscape	197.9	6.6%	27.1%
		Maintained Landscape	87.5	2.9%	
		Dev. Open Space & Cleared	522.3	17.5%	
Warrensburg	1,864	Built or Hardscape	7.8	0.4%	0.4%
Total Watershed	120,860	Built or Hardscape	4,353.8	3.6%	8.2%
		Maintained Landscape	928.6	0.8%	
		Dev. Open Space & Cleared	4,684.6	3.9%	

Data Source: See Land Use Characteristics Section for data sources

STATUS OF MUNICIPAL DOCUMENTS TO DATE

Municipality	Comprehensive Plan	Zoning	Site Plan Review	Subdivision
Town of Bolton	Town of Bolton Comprehensive Plan and Hamlet Strategic Plan, May 2003 and Appendices	Town Code of Bolton, Chapter 200: Zoning	See Town Code of Bolton, Chapter 200: Zoning	Town Code of Bolton, Chapter 150: Subdivision of Land
Town of Dresden	None	None	None	None
Town of Fort Ann	Town and Village of Fort Ann Joint Community Plan, DRAFT, February 2008	None	Town of Fort Ann, Local Law No. 4 and application	Town of Fort Ann, Local Law No. 5, as amended and application
Town of Lake George	Town of Lake George 2015 Comprehensive Plan, DRAFT November 8, 2015	Town Code of Lake George, Chapter 175: Zoning	See Town Code of Lake George, Chapter 175: Zoning	Town Code of Lake George, Chapter 150: Subdivision of Land
Village of Lake George	Village of Lake George Comprehensive Plan, DRAFT, January 2004 – not available online	Village Code of Lake George, Chapter 220: Zoning	See Village Code of Lake George, Chapter 220: Zoning	See Village Code of Lake George, Chapter 220: Zoning
Town of Hague	Town of Hague Comprehensive Plan, 2001 – not available online	Town Code of Hague, Chapter 160: Zoning	See Town Code of Hague, Chapter 160: Zoning	Town Code of Hague, Chapter 150: Subdivision of Land
Town of Horicon	Town of Horicon Comprehensive Plan, July 2010	Town of Horicon Zoning Ordinance	See Town of Horicon Zoning Ordinance	Town of Horicon Subdivision Regulations
Town of Lake Luzerne	Town of Lake Luzerne, NY Waterfront Revitalization Strategy and Comprehensive Plan, April 2010	Town of Lake Luzerne Zoning Ordinance	See Town of Lake Luzerne Zoning Ordinance	Town of Lake Luzerne Subdivision Regulations - not available online
Town of Putnam	None	None	Town of Putnam Site Plan Review	Town of Putnam Subdivision Regulations
Town of Queensbury	Town of Queensbury Comprehensive Plan, August 2007	Town Code of Queensbury, Chapter 179: Zoning	See Town Code of Queensbury, Chapter 179: Zoning	Town Code of Queensbury, Chapter A183: Subdivision of Land
Town of Ticonderoga	Town of Ticonderoga Comprehensive Plan, DRAFT, June 2006	Town of Ticonderoga Zoning Ordinance	Town of Ticonderoga, Local Law No. 4	Town of Ticonderoga Subdivision Regulations – not available online
Town of Warrensburg	Town of Warrensburg Comprehensive Plan and Waterfront Revitalization Strategy, March 2012	Town Code of Warrensburg, Chapter 211: Zoning	See Town Code of Warrensburg, Chapter 211: Zoning	Town Code of Warrensburg, Chapter 178: Subdivision of Land

LAKE GEORGE MUNICIPAL LAND USE TOOLS GLOSSARY

COMPREHENSIVE PLAN

In New York State, the comprehensive plan provides the backbone for local zoning law. Comprehensive plans establish the official land use policy of a community and presents goals and implementation methods to accomplish the vision of the community. The comprehensive plan includes a thorough catalogue of existing conditions within the community, including natural and open space/recreation resources, transportation network characteristics, housing characteristics, demographic and economic characteristics, and existing land use and zoning, among other resource areas. The comprehensive plan considers the strengths and weaknesses as well as opportunities and threats to the community. Development trends and issues are discussed, and community needs are considered with regard to available resources (public transportation, recreation, housing), and the need for additional resources.

Communities can prepare plans using either the New York State enabling statutes or common law rules. The State's enabling statute was updated in 1995, and provides a statutory definition for municipal comprehensive plans and a process and list of topics which are to be considered by the plans. The new law did not invalidate existing plans. These plans indirectly refer to the substantial body of court decisions which form the State's interpretation of comprehensive plans.

The development of a comprehensive plan is a discretionary action that requires environmental review under the State Environmental Quality Review Act (SEQRA), as contained within the Environmental Conservation Law (Article 8) and regulated

according to 6 NYCRR Part 617. The development of a comprehensive plan is considered a Type I action and is often accompanied by an environmental impact statement (EIS). The EIS, if prepared, considers the community's existing conditions and the future conditions after the implementation of proposed comprehensive plan. The analysis also considers other variables affecting future economic, social and cultural characteristics of a community, and assesses the potential for adverse impacts to the community and its resources. The environmental review process is generally completed over 12 – 18 months, and includes a public review process that encourages discourse on the study's various topics, and culminates in a final environmental impact statement that includes public comments and updates the original study to reflect issues raised over the course of the study.

Once the environmental review is complete and the comprehensive plan has been adopted (pending any changes requested by the community or advanced through the environmental review) by the local municipality the implementation schedule and/or plan set by the community is begun. Implementation may include changes to the local zoning code, subdivision regulations and site plan review. Implementation may also include an economic development work plan to encourage development and/or revitalization in certain areas of the community. Improvements to community services, housing affordability and supply, natural resource protections, and passive and active recreation spaces may also be advanced.

ZONING

Zoning laws regulate how land may be used (e.g. mixed-use, residential, etc.), the level of density with which it may be developed (e.g. one-verse three-acre minimum lot size), and how the existing characteristics of a site (e.g. streams, slopes, trees, etc.) will be protected or affected by the proposed development. The New York State zoning enabling statutes allow communities to enact zoning laws if they are adopted in accordance with a comprehensive plan. As noted in the comprehensive plan section, some communities may lack a formal comprehensive plan. If so, zoning laws in these communities have legal basis in historic case law thus meeting a more general comprehensive plan requirement.

A zoning law or ordinance is comprised of a zoning map and a set of zoning regulations. The zoning map defines different areas within a municipality by land use, such as mixed use, residential, commercial, industrial, manufacturing, open space/recreation, and institutional, with the objective of separating compatible and incompatible uses to protect property values and promote economic, public health, safety and welfare. The regulations define each district shown on the zoning map and provide regulatory direction on which land uses are permitted as-of-right or by special permit, and may indicate land uses that are not permitted. These districts may be general or may provide very specific district controls such as community commercial or regional commercial, or single-family residential or hamlet residential. The regulations also establish dimensional requirements, such

as distances from buildings to property lines, building heights, and density. Over time a community may need to amend its zoning law or ordinance. When this occurs the amendment must be pursuant to a comprehensive plan for the community.

Zoning laws or ordinances may be proactive in their approach and beyond screening out incompatible uses, this land use tool may be used to encourage certain land uses to meet the community's objectives. For instance, incentive zoning, transferable development rights, cluster development, planned unit development and overlay zoning elements can be used to encourage various goals such as tech industry growth and conservation and protection of natural resources.

The law provides relief through the granting of a variance to property owners when the strict application of the regulations affects economic viability of a parcel or obstructs reasonable dimensional expansion of a structure. In these instances, administrative, quasi-judicial bodies (zoning board of appeals) function as appellate entities to consider the appeal and granting of variances. There are two types of variances, use and area variances. A use variance allows property to be used for an activity which is not permitted in the zoning district, and an area variance allows relief from some dimensional requirements of the zoning regulations. The granting of variances must be weighed against the potential impediment to a municipality's goals, and trends in applications should be considered in the event an update to the zoning is warranted.

SITE PLAN REVIEW

According to Town Law Section 274-a, Village Law Section 7-725-a and General City Law Section 30-a of the State's enabling statutes, a municipality may require site plan review. The site plan shows the arrangement, layout and design of the proposed use on the site. Site plan review often requires that new developments feature certain elements, including parking, access/egress,

landscaping and buffering, particular location and dimensional elements, and protection of natural features. The reviewing board may be empowered to waive certain requirements if waiver process is stipulated in the regulations. Site plan review may be incorporated in to the zoning law or ordinance or may be conducted in its absence.

SUBDIVISION REVIEW

Projects undergoing subdivision review submit a "plat" which shows the layout of lots, roads, driveways, details of water and sewer facilities, and other useful information necessary to evaluate whether it is appropriate to divide a property into small units. Subdivision review ensures that the provisions of the comprehensive plan and zoning are followed as without this review, a property owner could create lots that do not conform to the dimensional requirements of zoning, or

other pertinent regulations. The resulting nonconformance is problematic as it may lead to ineligibility for building permits among other issues. The review is often conducted by the planning board, and requires a public hearing. Subdivision can induce development in a neighborhood through the creation of new available land. Similar to site plan review, subdivision review may be included as part of the zoning law or ordinance, but may also be conducted in its absence.

OTHER LAND USE TOOLS

Cluster Development: The cluster development is a subdivision in which the same number of housing units allowed in a conventional subdivision are concentrated—or clustered—at a higher density in the most appropriate portion of the property, leaving larger areas to remain open and undeveloped.

Ridgeline or Slope Protection: Protections introduced through zoning, site plan review, or subdivision review that consider the development plan with regard to the topography and soils to minimize erosion and other adverse natural resources impacts. Protections may also seek to protect visual and aesthetic resources.

Tree Clearing Provisions: Provisions introduced through zoning, site plan review, or subdivision review that consider the development plan with regard to the removal of trees (often a minimum diameter is set above which trees cannot be cut) to minimize erosion and other adverse natural resources impacts. Protections may also seek to protect visual and aesthetic resources.

Shoreline Protection: Protections introduced through zoning, site plan review, or subdivision review that consider the development plan with regard to the natural contours of the shoreline, the vegetation, topography and soils to minimize erosion and other adverse natural

resources impacts. Protections may also seek to protect visual and aesthetic resources.

Aesthetic or Visual Quality Provisions:

Provisions introduced through zoning, site plan review, or subdivision review that consider the development plan with regard to adverse impacts to the area's aesthetic and visual character. Adverse impacts may include impacts to natural resources, or the introduction of structures that are not consistent with the visual character, among other land use changes.

Stormwater Protection: Protections introduced through state regulations, zoning, site plan review, subdivision review, or

general municipal code that consider the development plan with regard to the flow of stormwater on the site and its ability to harm adjacent natural resources and/or adversely affect the built environment.

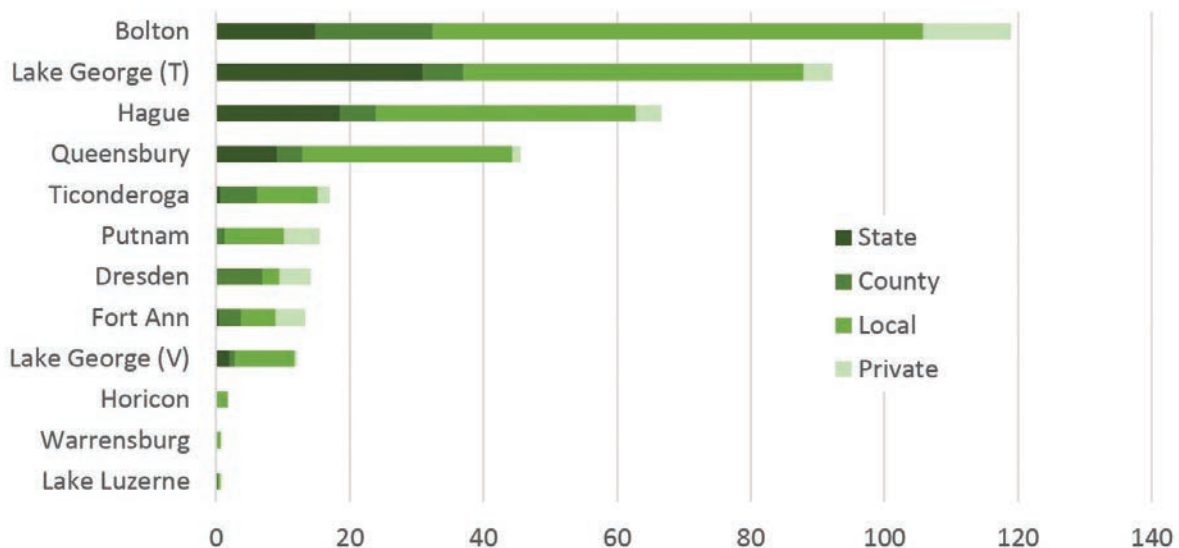
Stream Corridor Protection: Protections introduced through state regulations, zoning, site plan review, or subdivision review that consider the development plan with regard to the natural contours of the stream, the vegetation, topography and soils to minimize erosion and other adverse natural resources impacts, including adverse impacts to water quality. Protections may also seek to protect visual and aesthetic resources.

ROADS WITHIN THE WATERSHED

Town	State		County		Local		Private		Total Miles	Total Acres*
	Miles	Acres	Miles	Acres	Miles	Acres	Miles	Acres		
Dresden	0.0	0.0	6.9	58.2	2.5	17.8	4.7	22.1	14.1	98.1
Putnam	0.0	0.0	1.3	11.1	8.8	63.5	5.4	25.1	15.5	99.7
Fort Ann	0.4	3.2	3.3	28.5	5.1	36.6	4.5	21.4	13.3	89.8
Queensbury	9.1	87.8	3.8	32.4	31.4	222.3	1.2	5.3	45.5	347.8
Lake George (T)	30.8	285.3	6.1	51.0	50.9	359.2	4.3	20.2	92.2	715.6
Lake George (V)	1.9	18.3	0.8	5.1	9.0	60.4	0.2	0.9	12.0	84.7
Warrensburg	0.0	0.0	0.0	0.0	0.7	5.2	0.0	0.0	0.7	5.2
Lake Luzerne	0.3	2.5	0.0	0.0	0.3	2.2	0.0	0.2	0.6	4.9
Bolton	14.8	143.1	17.6	148.8	73.4	523.7	13.2	61.2	119.0	876.8
Hague	18.5	179.1	5.3	45.2	38.9	274.3	3.9	18.0	66.6	516.5
Horicon	0.0	0.0	0.0	0.0	1.7	12.4	0.0	0.0	1.7	12.4
Ticonderoga	0.6	5.6	5.5	46.7	9.1	62.5	1.8	7.9	16.9	122.7
Total	76.2	724.9	50.7	426.9	231.9	1,640.2	39.3	182.3	398.1	2,974.3

*Acres are based on estimated roadways widths

WATERSHED ROADWAY NETWORK: MILES OF ROADS BY TYPE



Data Source: NYSDOT GIS roadway data. Please note that NYSDOT uses the Local Highway Inventory (LHI) as the source to identify the local roads in each municipality. According to NYSDOT, “the process involves adjusting the existing information in the LHI to match actual roadway conditions based on very detailed and accurate aerial photography.” This process may result in categorizing private driveways as local roadways.

LAKE GEORGE WATERSHED BUILDOUT ANALYSIS METHODOLOGY

Prior to determining the number of potential dwelling units, environmental constraints were removed from the available buildable area. The constraints used in this analysis were as follows:

- Slopes > 25%
- NYSDEC wetlands and 100' buffer
- USNWI wetlands
- Surface water
- 50' buffer from stream centerlines
- 100-year flood zones
- Hydric soils
- Zero depth to bedrock (i.e. exposed rock)

There were also several types of parcels excluded from the analysis. They included:

- Cemeteries
- Schools
- Federal, State, County or municipal land
- Land owned by a Lake George Land Conservancy (LGLC)
- Land under easements
- Infrastructure/Utility lands
- Parcels smaller than 10,000 ft² in areas without sewer and 5,000 ft² with sewer
- Parcels coded as commercial, recreation, apartments, industrial or community services with over 25% lot coverage¹
- Developed parcels within approved subdivisions

For the determination of possible dwelling units, under existing zoning conditions or Adirondack Park land use regulations, the net available area for each lot, after removal of constraints, was divided by the minimum lot

size allowed. For districts with a density of 25 acre or larger, fractional lots were rounded up. If a lot already had development, that number was reduced by the number of existing units.²

For lots that fell in more than one district the lot was split into each respective district, unless the majority of the lot was in one district, in which case the full lot was assigned to that district. For lots that would yield over five (5) new units, the available land area was reduced by 20 percent to account for development of roadways and utilities.

Per Adirondack Park regulations, parcels under common ownership, within the same Adirondack land use class, were combined where doing so could result in more residential units than would otherwise be possible due to constraints on individual parcels.

Developed parcels that were less than twice the minimum lot size were excluded from the analysis. Vacant parcels, not excluded as defined above, were “allowed” at least one housing unit regardless of whether it met the minimum lot size. Vacant parcels within approved subdivisions were assigned one new potential housing unit regardless of size and constraints.

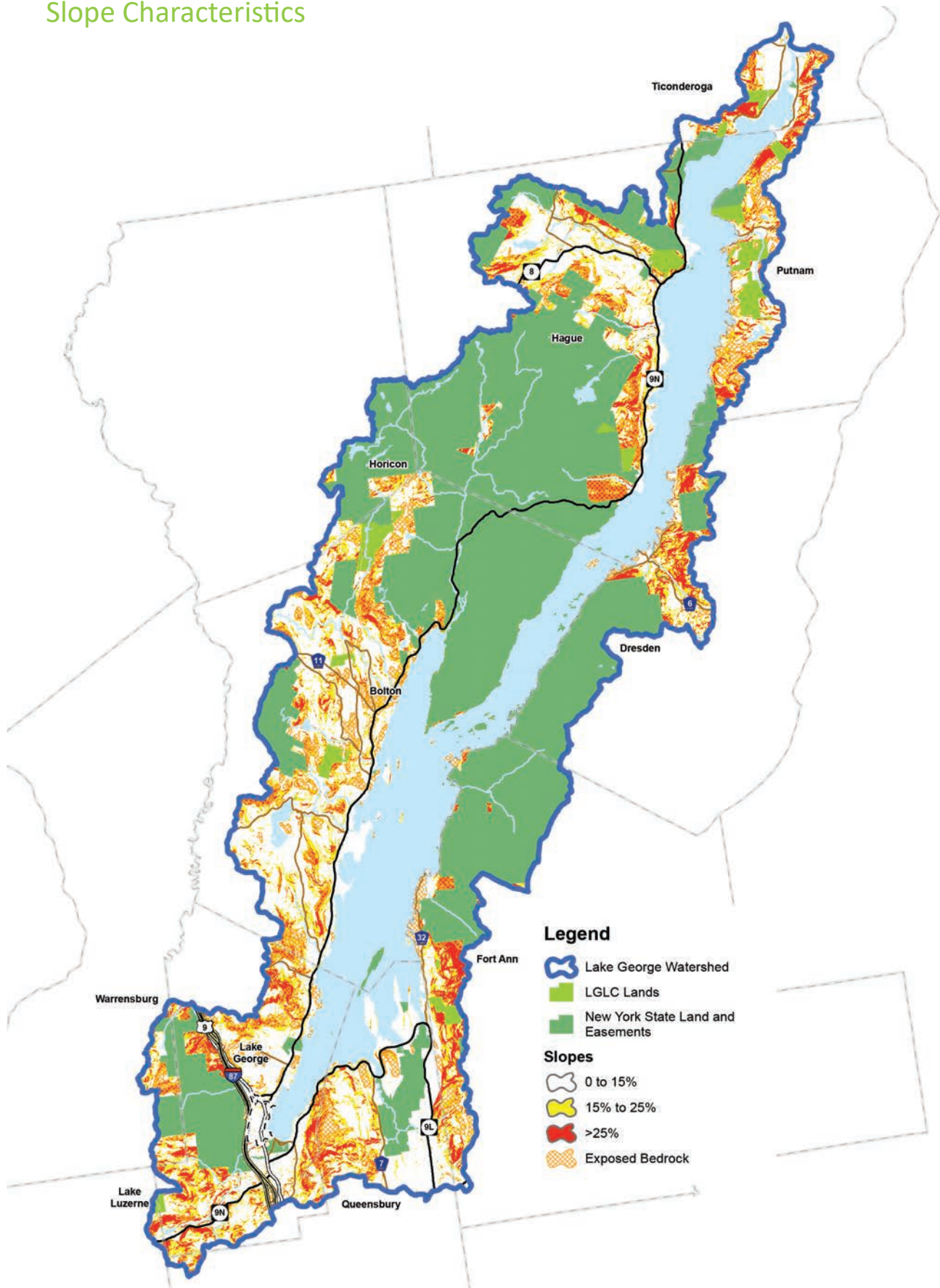
The remaining development potential within Planned Development Districts or Planned Unit Districts was examined individually and assigned the number of remaining units accordingly.

Placement of predicted housing units were randomly generated within the unconstrained area of each parcel. The “dots” shown on the map cover an area of approximately ½-acre to simulate the area of disturbance of a typical residential lot.

¹Lot coverage was determined from impervious surface data created by University of Vermont.

²Any developed property was assigned one existing housing unit. Parcels coded as two-family, apartments, or multiple residences were assigned two housing units, and parcels coded as three-family or mobile home parks were assigned three housing units.

Slope Characteristics



Legend

- Lake George Watershed
- LGLC Lands
- New York State Land and Easements

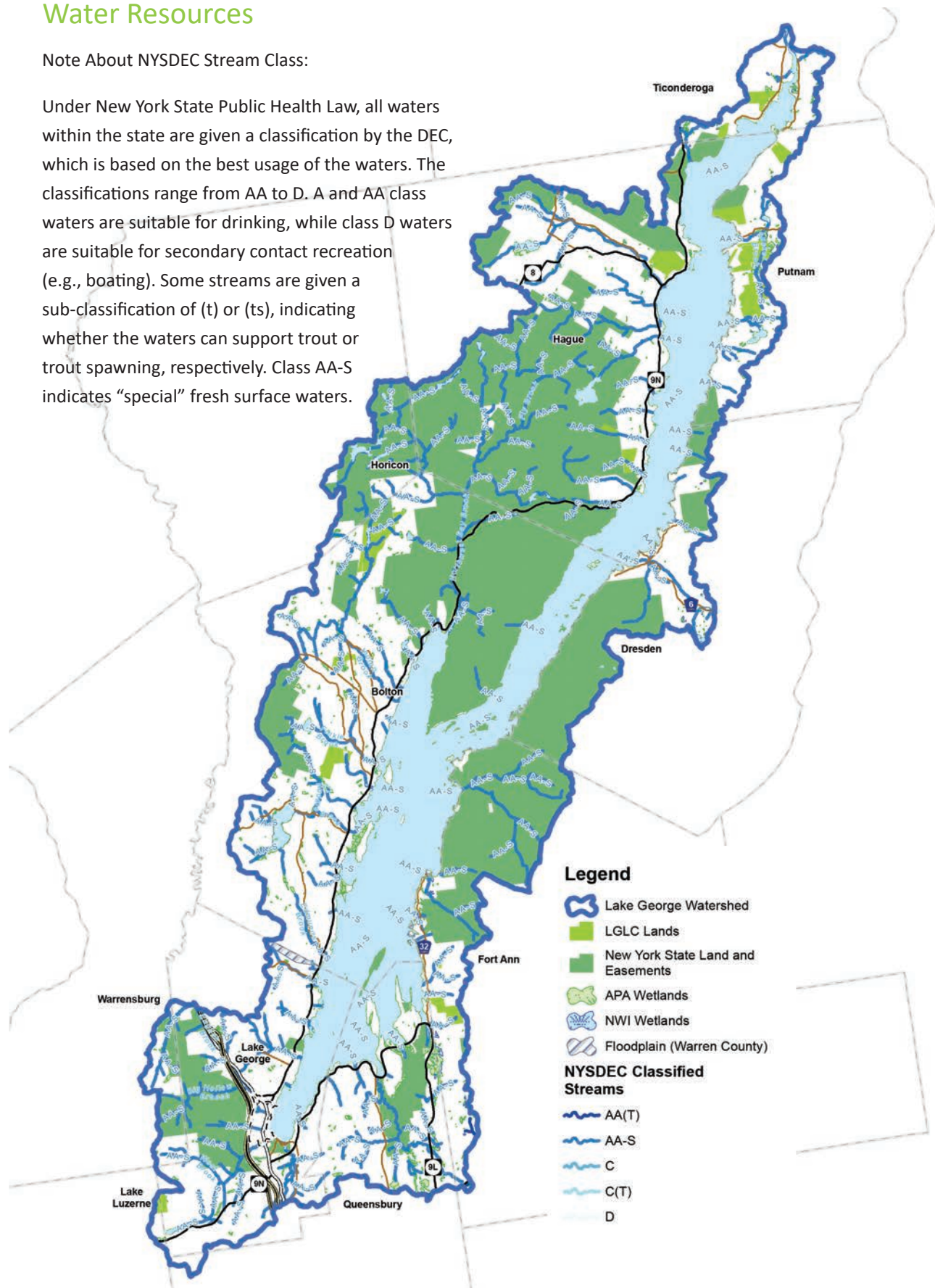
Slopes

- 0 to 15%
- 15% to 25%
- >25%
- Exposed Bedrock

Water Resources

Note About NYSDEC Stream Class:

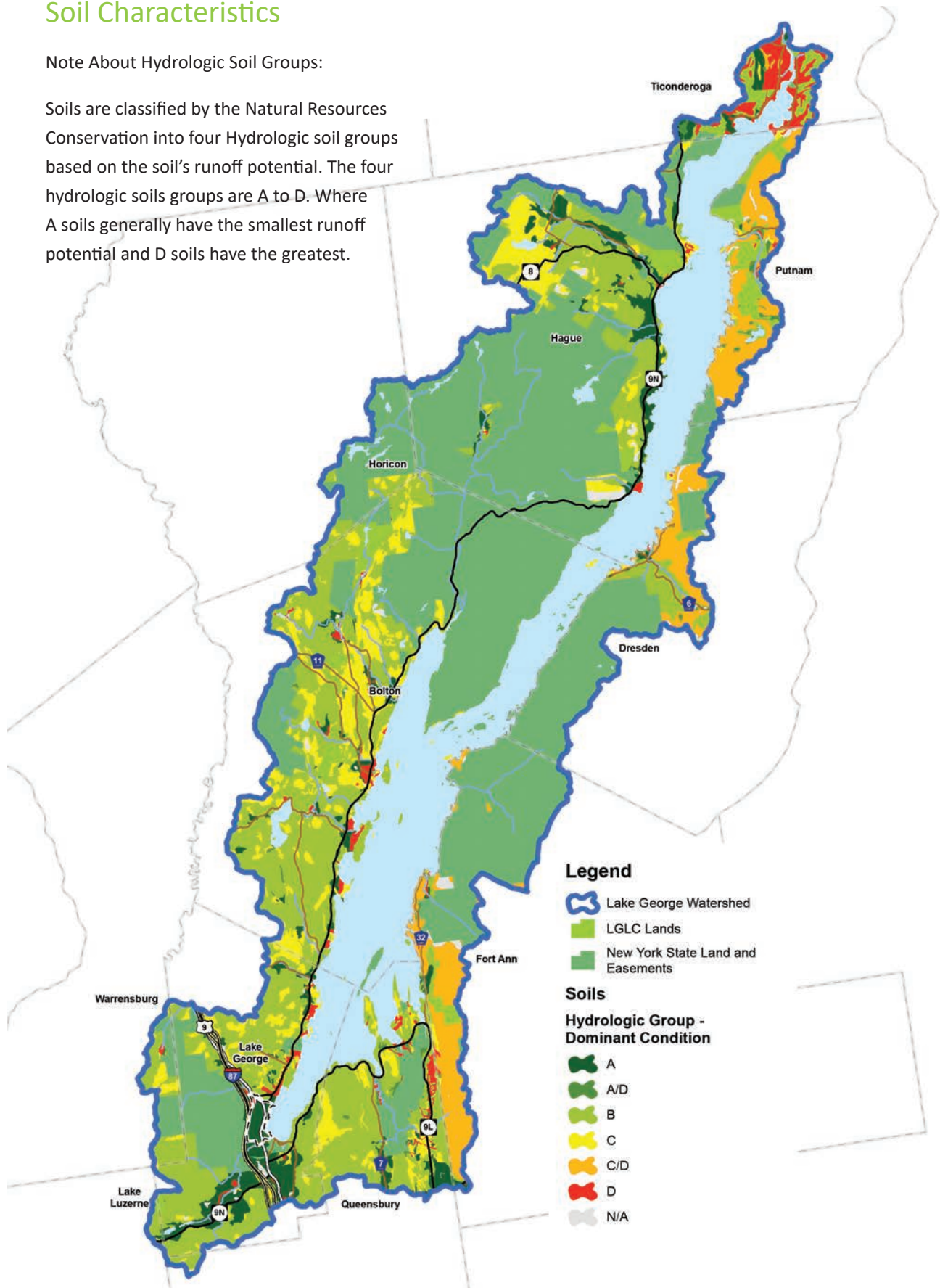
Under New York State Public Health Law, all waters within the state are given a classification by the DEC, which is based on the best usage of the waters. The classifications range from AA to D. A and AA class waters are suitable for drinking, while class D waters are suitable for secondary contact recreation (e.g., boating). Some streams are given a sub-classification of (t) or (ts), indicating whether the waters can support trout or trout spawning, respectively. Class AA-S indicates “special” fresh surface waters.



Soil Characteristics

Note About Hydrologic Soil Groups:

Soils are classified by the Natural Resources Conservation into four Hydrologic soil groups based on the soil's runoff potential. The four hydrologic soils groups are A to D. Where A soils generally have the smallest runoff potential and D soils have the greatest.





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