



# City of Canandaigua Climate Vulnerability Assessment

**Draft Dated December 2021**

Prepared for the City of Canandaigua Climate Smart Community Committee  
2 North Main Street, Ontario, Canandaigua, NY 14424

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## Section 1: Introduction

### 1.1 About City of Canandaigua

The City of Canandaigua is located within Ontario County, 25 miles southeast of Rochester, NY. The City is situated on the north end of Canandaigua Lake and consists of an area of 4.6 square miles<sup>1</sup>. Canandaigua Lake is one of the 11 Finger Lakes in New York State (NYS). The name Canandaigua comes from the Native American word "Kanandarque", which means "chosen spot". The City was the site of the primary village of the Seneca Indians and is the legendary birthplace of these "People of the Hills"<sup>1</sup>.

The City of Canandaigua has a population of 10,156 people (as of 2019) and comprises 5,440 household units<sup>2</sup>. The median income of \$49,130 and 10.7% of the population consists of persons in poverty<sup>2</sup>. More information on the demographics of the City is noted in Section 4.4.

### 1.2 Overview and Purpose

The goal of a Climate Vulnerability Assessment (CVA) is to understand how climate hazards, defined as physical events or trends like extreme temperatures, droughts, or flooding, can impact assets owned by the City (buildings) or important systems (transportation or energy infrastructure), human populations, ecosystems, industries or an entire community<sup>3</sup>. This assessment will also identify vulnerable populations that are currently underserved and therefore most likely to be disproportionately impacted by climate impacts.

On April 23, 2019, the City of Canandaigua was designated as a Bronze Certified Climate Smart Community (CSC) by the New York State Department of Environmental Conservation (NYSDEC)<sup>3</sup>. The City was the 23rd municipality in the State to receive certification. A CVA is a priority action (PE07) for the NYS CSC program, so completion of this report is critical in helping the City to pursue Silver Certification<sup>3</sup>. Currently the City is also considered a regional leader in the New York State Clean Energy Communities (CEC) program earning 5,100 points for 11 actions it has taken so far<sup>4</sup>. The CVA can be used to develop a future climate adaptation plan as it identifies and understands the environmental, infrastructural, and social elements that require adaptive measures for the City of Canandaigua.

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<sup>1</sup> City of Canandaigua Comprehensive Plan: 2020 Update. Accessed [https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Comprehensive\\_Plan.CLEAN.08-27-2020.pdf](https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Comprehensive_Plan.CLEAN.08-27-2020.pdf)

<sup>2</sup> U. S. Census Bureau (2021). Accessed <https://data.census.gov/cedsci/profile?q=0600000US3606912144>

<sup>3</sup> NYS Climate Smart Communities Certification Actions. Accessed <https://climatesmart.ny.gov/actions-certification/actions/#open/action/85>

<sup>4</sup> NYS Clean Energy Communities Score Card. Accessed <https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Communities/Tracking-Progress/Scorecard>

## Section 2: Methods

### 2.1 Overview of the Process

The CVA was compiled by a team of consultants and researchers working with Impact Earth and GreenHows Consulting. This team also worked in collaboration with the City's CSC committee during the development of this inventory Report. The report was compiled between August 2021 to December 2021. The analysis in this report can be used as a starting point for developing a future climate adaptation strategy and/or input for future development projects.

The text of the CVA was primarily researched, written, and edited by consultants for the project from GreenHows Consulting and Impact Earth (Erinn Ryen, Cassidy Putney, Emily Robbins, and Abigael Rice). A copy of the draft of this report was also provided to the City's CSC Committee for their feedback. The consulting team integrated the CSC Committee edits to develop the final report. Thanks to much guidance from the CSC Committee, the existing Comprehensive Plan and the City's Manager, John Goodwin, this report was compiled in a short timeframe to meet the project's timeline goals.

The overall process to develop a CVA was aligned with NYS Energy Research and Development Authority (NYSERDA) Climaid program<sup>5,6</sup>. We also reviewed several CVA reports such as the ones completed for the City of Rochester<sup>7</sup> and the Village of Hastings on the Hudson<sup>8</sup>. Our analysis and reporting consisted of three phases:

1. Researching past and future climate trends and creating a climate profile,
2. Identifying key assets systems and subsystems owned and operated by the City, and
3. Evaluating the potential sensitivity and vulnerability of each asset system/subsystem.

### 2.2 Data Collection and Analysis

The current climate conditions are projected to change at the global, regional, and local levels, which in turn will impact the City of Canandigua's key assets. Using data from the

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<sup>5</sup> NYS Energy Research and Development Authority (NYSERDA), Responding to Climate Change in New York State: Technical Report (ClimAID) (2011).Final Report No. 11-18

<sup>6</sup> NYSEDA (2014, September). Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information Supplement to NYSEDA Report 11-18.ISBN: 978-1-936842-08-7 Final Report 14-26.

<sup>7</sup> City of Rochester (2018, November, 1). *Climate Vulnerability Assessment Report*. Accessed <https://www.cityofrochester.gov/CVA/>

<sup>8</sup> Village of Hastings on Hastings (2020). 2020 Climate Vulnerability Assessment and Future Predictions. Accessed

[https://www.hastingsgov.org/sites/g/files/vyhlif3241/f/uploads/climate\\_vulnerability\\_assessment\\_report.pdf](https://www.hastingsgov.org/sites/g/files/vyhlif3241/f/uploads/climate_vulnerability_assessment_report.pdf)

Intergovernmental Panel on Climate Change (IPCC), NYSERDA, and other documents, we first identified how the climate will change at the Global and Regional scale. To understand historical trends at the local scale, we gathered data points from the National Oceanic and Atmospheric Administration (NOAA)<sup>9</sup> weather monitoring station, ‘Canandaigua 3 S, NY US.’ Data points from the weather station were from 1944 to 2020. The data was analyzed to develop historical trends that illustrate average winter temperatures, annual coldest day temperatures, average summer temperatures, and annual hottest day temperatures for the local scale. Data from the weather station was also compiled and analyzed to determine the total amounts of winter and total summer precipitation for the same period of time. Finally, using data from the NYSERDA Climaid Reports and documents by NYS DEC, we summarize the primary climate hazards that the City of Canandaigua is projected to face in the future.

To identify the key assets that may be impacted by future changes in the climate, we reviewed the NYSERDA’s Climaid Reports<sup>5-6</sup> and focused on three asset areas: Infrastructure, environmental and natural resources and socio-economic resources. For each of the asset areas, we met with the CSC committee to identify the systems and subsystems that could be potentially impacted by future changes in our climate. Information was also gathered from reports produced by the City of Canandaigua including, but not limited to, the Comprehensive Plan 2020 Update, Parks Master Plan, data from NYS Climate Change Science website, other reports and information from the City website. In a few cases, we reached out to key stakeholders for additional information. For each we focused on how one or two climate hazards could be affected by future climate changes. Finally, we summarize our findings by mapping each asset area with a summary of strengths, challenges, and opportunities.

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<sup>9</sup> NOAA (n.d.). Accessed <https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00301152/detail>

## Section 3: Climate profile and Summary of Hazards

### 3.1 Global and Regional Climate

According to the IPCC report (AR5) completed in 2014<sup>10</sup> and one of their most recent reports completed in 2021,<sup>11</sup> human activity is considered to be the leading contribution to the warming global climate, increases in GHG emissions since 1750, changes in precipitation patterns. “It is unequivocal that human influence has warmed the atmosphere, ocean and land”<sup>11</sup>. Also according to the IPCC, the last four decades has become warmer than any decade that preceded it since 1850 and the “likely” total human-caused global surface temperature has risen from 0.8 to 1.3 degree celsius, with a best estimate of 1.07 degree celsius from the periods 1850–1900 to 2010–2019<sup>11</sup>.

According to the IPCC<sup>10</sup>, climate change impacts are occurring now and additional ones highly likely in the future. In New York State, the average annual temperature has risen 2.4°F since 1970 and annual precipitation has shifted to fall primarily during the winter rather than summer.<sup>12</sup> The Nature Conservancy in New York estimates that temperatures will increase by an addition 5°F by the end of the century. As global temperatures rise, and precipitation patterns change, sea levels are predicted to rise one to three feet, putting the major coastal cities in the state at risk. Concurrently, rising temperatures in New York State will increase evaporation rates causing Lake Erie and Ontario to experience a decrease in water level.<sup>13</sup>

In New York, hurricanes have increased in frequency and severity in the area. In 2011, Hurricane Irene caused the destruction of roads and bridges, knocked out power, and forced many to evacuate. While Hurricanes are not an immediate threat to the City of Canandaigua and other communities in the Finger Lakes region, the region would be impacted by the associated precipitation and winds. According to the NYSEDA, precipitation is projected to increase steadily across New York: 1-8% by the 2020s, 3-12% by the 2050s, and 4-15 % by 2080<sup>6</sup>. Ice cover on Lake Ontario has decreased below average and remained under 30% coverage since 2006 with the only exception being the 2013-2014 winter<sup>14</sup>.

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<sup>10</sup> IPCC (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.

<sup>11</sup>IPCC (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

<sup>12</sup> NYS DEC (2021). Impacts of Climate Change in New York 2021. Accessed <https://www.dec.ny.gov/energy/94702.html>

<sup>13</sup> The Nature Conservancy (2006). Climate Change Impacts in New York. Accessed [https://www.nature.org/media/initiatives/new\\_york\\_factsheet\\_5.pdf](https://www.nature.org/media/initiatives/new_york_factsheet_5.pdf)

<sup>14</sup> NYS DEC (2021, August). *Observed and Projected Climate Change in New York State: An Overview*. Accessed [https://www.dec.ny.gov/docs/administration\\_pdf/ccnys2021.pdf](https://www.dec.ny.gov/docs/administration_pdf/ccnys2021.pdf)

These changes have caused seasonal changes such as spring starting approximately a week earlier than in the 1950's. Migrating animals are returning to the area earlier in the year, and breeding ranges for animals are shifting northward.<sup>12</sup>

### **3.2 Local Climate**

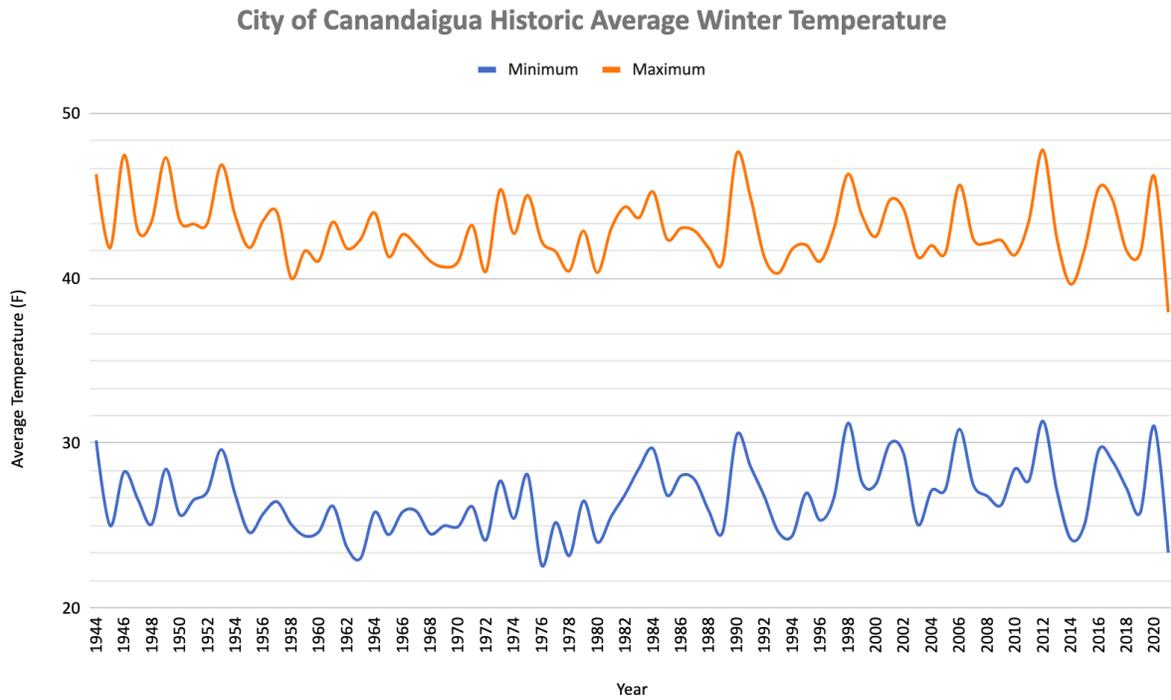
The National Oceanic and Atmospheric Administration (NOAA) weather monitoring station 'Canandaigua 3 S, NY US' was established December 01, 1942<sup>9</sup>. This is the closest weather station and is technically located in the Town of Canandaigua on the east side of Canandaigua Lake (42.84505°, -77.28071°)<sup>9</sup>. However, consistent data wasn't produced until the spring of 1944. Using available data from this station's record, Figures 1 through 6 were developed. There was no 'snow' data available for the years 1964-2014 as reported values were either '0' or '-9999' signifying an error and assumed to be zero for the purpose of this report.

For this section, winter is assumed to be October-March and summer April-September.

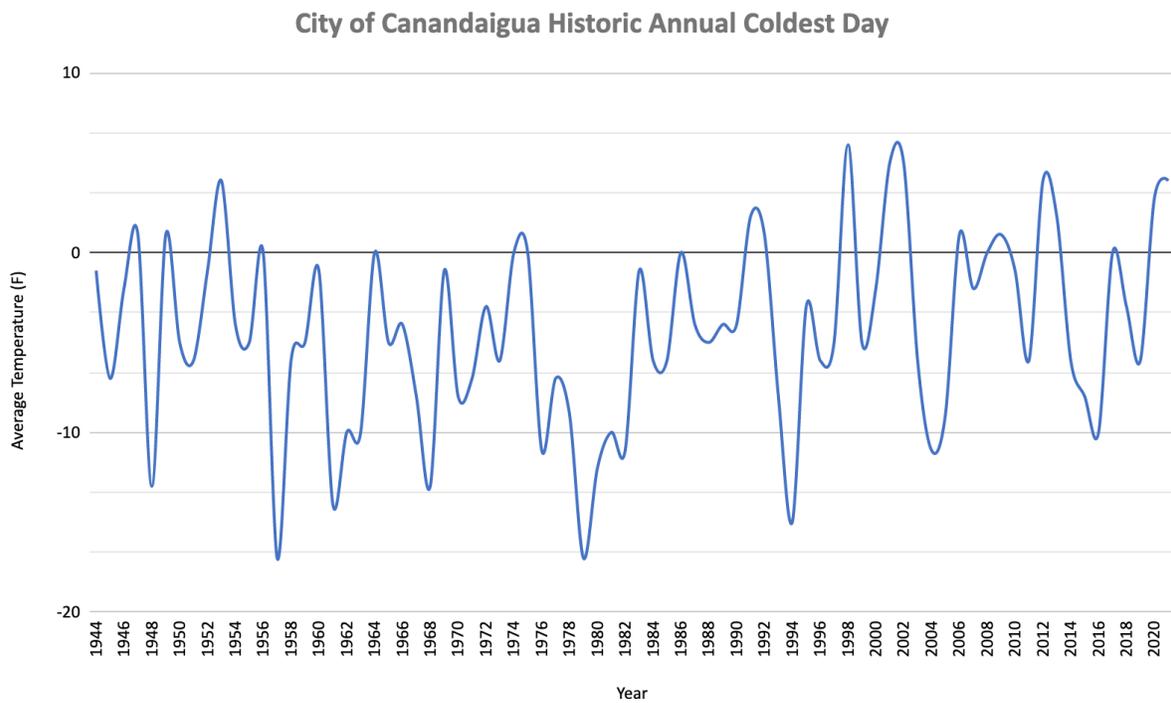
#### Winter temperatures

As shown in Figure 1, over the last 80 years, average winter minimum and maximum temperatures have fluctuated as a result of climate change. Most notably is the year-to-year variability in both average highs and average lows. From 1944 to 1988, year-to-year differences in temperature ranged from 2-5 degrees, with few exceptions. Beginning in 1988, however, more drastic year-to-year swings have been observed with 7-9 degree differences.

Also shown in Figure 1, in the early 1980s there's an observable increase in average temperature. Between 1944 and 1983, there are two years in which the average low was nearly 30°F. Between 1983 and 2020, there are eight winters in which the average low was near or greater than 30°F. Similarly, prior to 1983, approximately eleven of the coldest winter days were below -10°F while there were only three such days between 1983 and 2020 (See Figure 2).



**Figure 1:** Local Historic Average Winter Temperatures 1944 to 2020

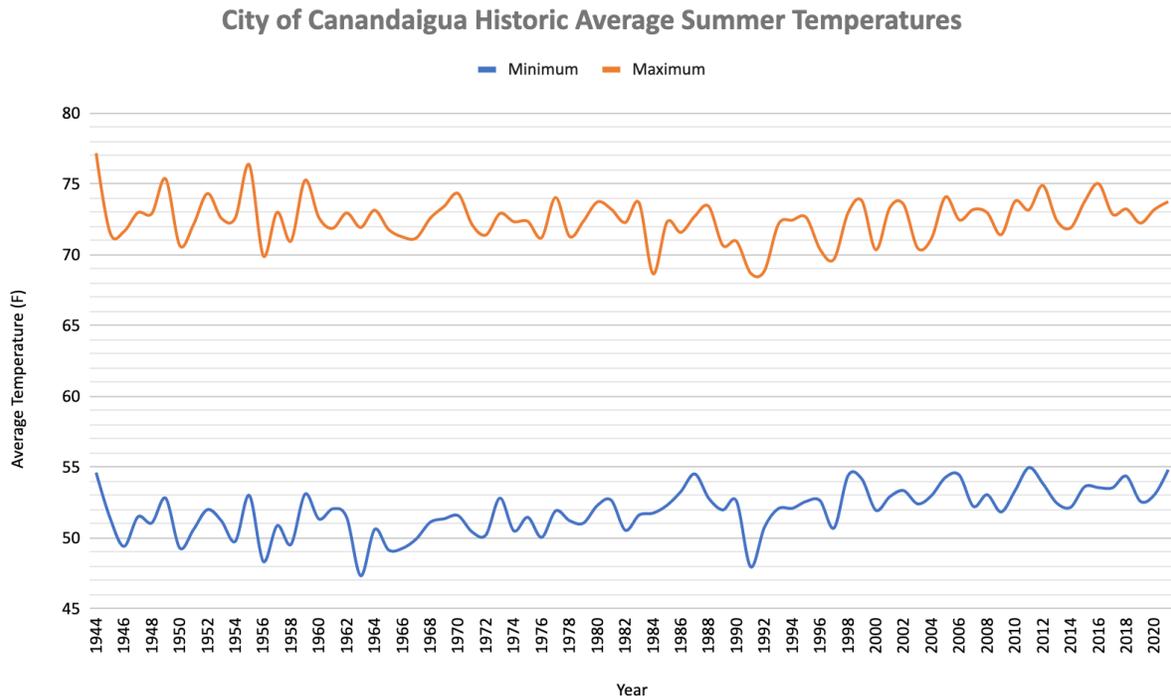


**Figure 2:** Local Historic Annual Coldest Day Temperature 1944 to 2020

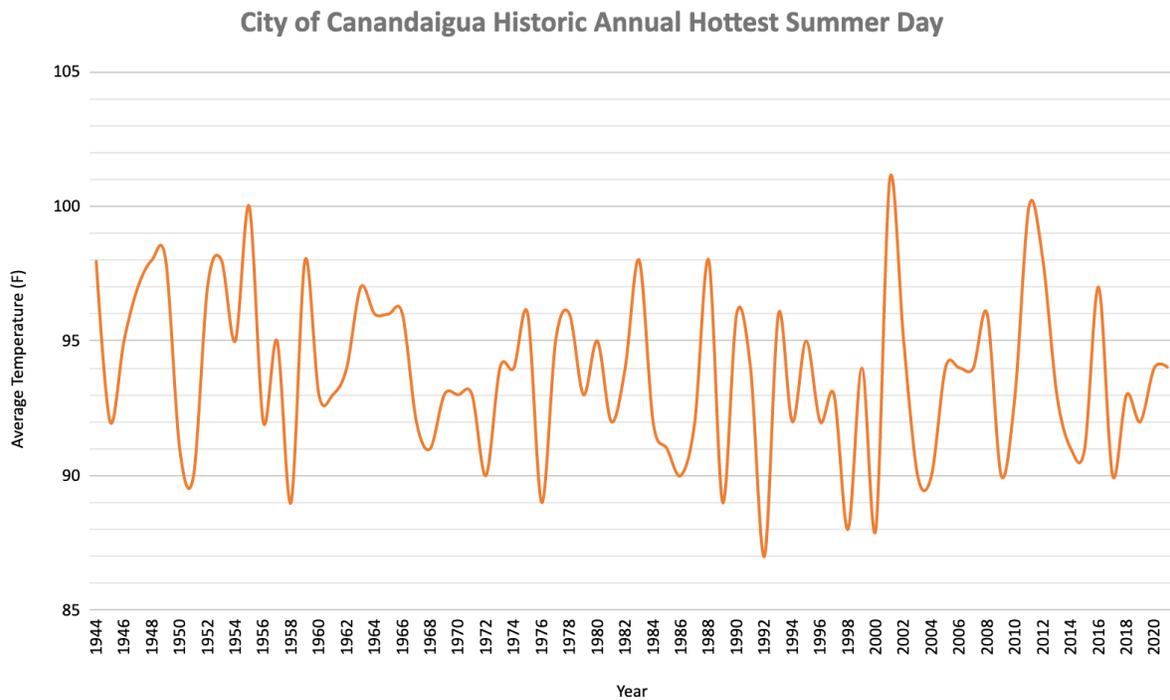
## Summer temperatures

As shown in Figure 3, average summer high temperatures have remained consistently between 70°F and 75°F. However, the average low temperature has steadily increased over the eighty years. In the mid 1900's, summer low temperatures averaged between 48°F and 56°F. Since 1977, only 1991 saw an average below 50°F, with all other years ranging from 52°F to 55°F. Since 1999, the coolest averages were 54°F. Based on this data, we see a trend in warming temperatures affecting the City of Canandaigua.

As shown in Figure 4, average summer high temperatures have remained consistent for much of the last eighty years. Before 2000, six summers had an average high temperature at or below 88°F and only one summer has an average high temperature near 100°F. Since 2000, every summer has been warmer than 88°F and two warmer than 100°F.



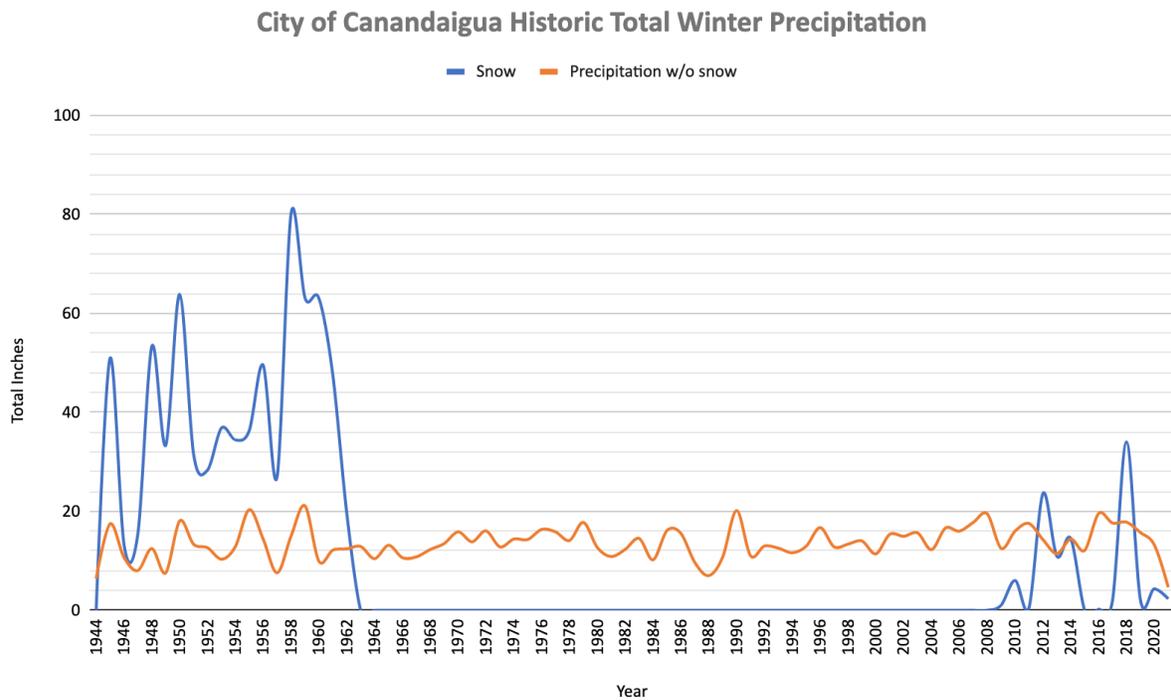
**Figure 3:** Historic Summer Temperatures 1944 to 2020



**Figure 4:** Annual Hottest Summer Day 1944 to 2020

Seasonal precipitation

Climate change has especially affected precipitation in the City of Canandaigua. While data for snowfall between 1963 and 2009 is unavailable, the data from years prior and after shows a clear decrease in snowfall throughout the year and an increase in precipitation, excluding snow, during the summer (See Figure 5). From 1946 to 1963, snowfall ranged from 28 inches to as much as 80 inches. Most years during this timeframe saw between 50 and 60 inches of snow during the winter. After 2009, snowfall during the winter drastically decreased, with the maximum snowfall in one winter being just 36 total inches, with all other years being at or below 24 inches.



**Figure 5:** Annual Total Winter Precipitation 1994 to 2020. Snowfall data is not available from 1963 to 2009.

As shown in Figure 6, late spring and early fall snowfall has also decreased, with regular snowfall accumulating to as much as 5 inches in the 1940's to just two inches in 2016 and 2020. During summer months, annual precipitation excluding snowfall has increased significantly. Before 1984, the average daily precipitation was approximately 0.08 inches with only 7 years receiving more than 20 inches of precipitation and just one year receiving more than 25 inches. After 1984, this average increased to 0.09 inches with 17 years receiving more than 20 inches and 7 years receiving more than 25 inches.

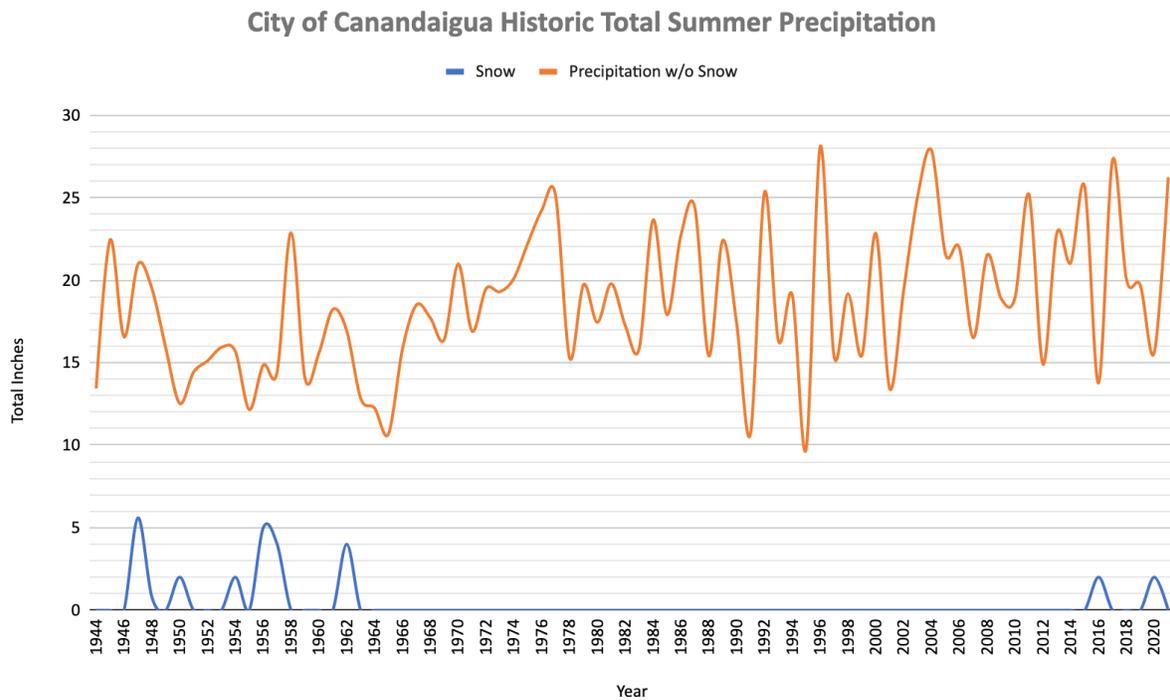


Figure 6: Total Summer Precipitation: 1944 to 2020. Snowfall data is not available from 1963 to 2009.

### 3.3. Other Climate Related Issues

According to the NYS DEC<sup>12</sup>, the warmer temperatures that the State (and the City) have and will continue to experience will have several potential impacts to the City. The extended season of warmer temperatures enables a longer season of disease-carrying insects, increases pollen growth and air pollution. For the citizens and visitors of the City of Canandaigua, increased pollen and air pollution increases the risks to asthma sufferers and longer, warmer seasons can result in greater risk of transmission of diseases carried by mosquitoes and tick bits (Lyme or West Nile). As noted in the recently completed Natural Resource Inventory (NRI<sup>15</sup>), an emerging threat to the City is the loss of biodiversity. The habitat and biodiversity losses are a result of several contributing factors such as by development (within and/or the nearby the City), invasive species, and extreme weather change caused by climate change such as flooding, droughts, and more.

<sup>15</sup> City of Canandaigua (2021), *Natural Resource Inventory*, completed December 2021..

### **3.4 Summary of Climate Hazards**

Based on the data from the weather station over the past 76 years, the City of Canandaigua is experiencing more extreme temperature swings and a trend in warming temperatures. Furthermore, these trends are resulting in less snowfall accumulation throughout the year and increasing amounts of precipitation not related to snowfall. At the state level, concentrations of GHG emissions will continue to contribute to significant increases in the frequency, intensity, and duration of extreme heat events, and overall the region will likely continue to experience frequent Intense precipitation events and less frequent outbreaks of cold air<sup>6</sup>. These climate hazards will pose uncertain challenges to both the City and State level.

## Section 4: Summary of Key Assets and Climate Change Vulnerabilities and Sensitivities

### 4.1 Overview

In this section, we identify and provide information about the key assets located in the city of Canandaigua. We focus on three categories: infrastructure, environment and natural resources and socio-economic. For each area we delve deeper to identify and discuss the systems and subsystems located within and then analyze how the sensitivity and vulnerability of the systems are to a few key climate hazards noted in Section 3. The listing of categories, associated systems, and subsystems discussed in this section are noted in Table 1. A summary of key strengths, challenges, and opportunities are noted for each asset area.

**Table 1:** Overall Listing of Assets categories, systems and subsystems

Asset Category	System	Subsystem
Infrastructure		
	Transportation	Highway, local roads, and bridges Public transportation Bike/pedestrian network Marinas Railways
	Energy/Utilities	Telecommunication Energy generation and distribution (including the solar array)
	Water	Water supply Wastewater and stormwater management Flood-protection infrastructure Dams
	Buildings	Commercial and businesses Residential Industrial Municipal, public, and critical Others (institutional, places of workshop)
Environmental and Natural Resources		
	Environmental	Waterbodies (Canandaigua Lake, inlets, outlets, rivers), aquifers, floodplain wetlands, urban forest canopy, nature preserves
	Natural habitat	Sensitive and rare habitats

	Recreational	Open space, public parks and facilities
Socioeconomic Resources		
	Socio-economic resources	Key population demographics Key industries/employers Jobs/workforce
	Public health resources	Health services Citizen health/public health (vulnerable populations focus) Emergency services
	Cultural and historical resources	Historic and cultural buildings and other resources

**4.2. Infrastructure Assets**

As shown in Table 1, the City of Canandaigua Infrastructure assets consist of four main systems: transportation, energy/utilities, water, and buildings.

**4.2.1 Transportation Assets**

**4.2.1.A. Highways, Local Roads, Bridges, and Railways**

According to the 2018 Street index, there are 78 public and private roads located in the City of Canandaigua<sup>1</sup> (See Figure 7). The road network consists of three state routes: Route 332 (also known as Main street), Routes 5 & 20 (also known of Eastern and Western Boulevard), and Route 21 (Gibson Street). Main street (NYS Route 332) is a north-south corridor that divides the City of Canandaigua into two equal sections. Eastern and Western Boulevard (NYS Routes 5 & 20) is considered a limited access highway and located in Wards 2 and 3 (See Figure 7). NYS Routes 5 and 20 are the primary east-west travel corridor. Local roads (Pearl Street) serve as a secondary north-south collector on the west side (there is no such clear one on the east side). Other local roads that serve as east-west collectors include Buffalo Street and Chapel Street, Gibson Street (NY Route 21), and West Gibson Street, Bristol Street, and Parrish Street. While development has remained relatively stable in the City, development in the adjacent communities has resulted in increased traffic on these roads, Ontario County road networks also funnels most regional trips through the City.

According to the City’s Comprehensive Plan<sup>1</sup> most daily traffic occurs downtown, North Main Street (332), South Main Street (332) and Eastern Boulevard (5 & 20). The average number of vehicles on these streets per day range on average from 19,608 to 30,799<sup>1</sup>.



In the City there is one railroad line (Canandaigua Sec) that is owned by the Finger Lakes Railway Corporation<sup>16</sup>. There are also 12 bridges that were built between 1935 (one located on the Canandaigua outlet, near the lake) to 2010<sup>1</sup>.

#### **4.2.1. Bike/Pedestrian/Trail Network**

The City has been working actively to improve multi-modal paths in order to ensure pedestrian safety. In 2005 and 2009, improvements were made to crosswalks, Main Street was restriped to narrow the moving lanes and provide a buffer lane between the moving lane and on-street parking<sup>18</sup>. This buffer lane cannot be designated as an official bike lane because it is only 4 feet wide<sup>18</sup>. Regional Transit Service (RTS) received a grant for a BikeShare program in Monroe County and if successful may be a good opportunity to explore for the City of Canandaigua, assuming a bike lane can be established on Main Street<sup>19</sup>. Pedestrian crossings mid-block are currently available with lighted signals and cautionary signs<sup>18</sup>.

According to the Comprehensive Plan<sup>1</sup>, the City is considered to be accessible by walking, but it recognizes there are some areas that need sidewalks and other bike/pedestrian linkages to ensure connections between the schools, shopping, recreational facilities, and the hospital<sup>1</sup>. For example, some crossings on the main east-west and North-side coordinates can be a challenge for pedestrians/cyclists<sup>1</sup>. The Comprehensive Plan<sup>1</sup> includes recommendations to improve pedestrian/bicycle networks such as increasing safety for bike and pedestrian access to the Lakeshore, expanding the network of bicycle trails and pedestrian pathways that link neighborhoods to activity centers in the City, and developing a regional system that links to the adjacent communities<sup>1</sup>.

City of Canandaigua parks that have walking trails include<sup>17</sup>:

- Frank Baker Park has a mile walking trail/jogging path that loops around the park and connects to Holiday Lane and Buffalo Street.
- Lagoon Park serves as a wildlife preserve and consists of mostly wetlands and has walking trails.
- Sonnenberg Park is located at located on Howell and Charlotte Streets has ½ mile walking trail
- Atwater Meadows Park is located on West Lake Drive and is mostly undeveloped with natural trails

In addition to the above parks with trails, a private non-profit organization, Ontario Pathways owns and provides maintenance of a 23-mile rails-to-trails project that is free for the public to use.

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<sup>16</sup> NYS Climate Change Science Clearinghouse (2021). Accessed <https://www.nyclimatescience.org>

<sup>17</sup> City of Canandaigua (2015). *Draft Park Inventory and Master Plan*. Accessed [https://www.canandaiguanewyork.gov/vertical/Sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Parks\\_Master\\_Plan\\_9.24.2015.pdf](https://www.canandaiguanewyork.gov/vertical/Sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Parks_Master_Plan_9.24.2015.pdf)

The rails-to-trails network is used for hiking, bicycling, horseback riding, and cross-country skiing<sup>18</sup>. The western trailhead of the system is located on Ontario Street, near Leicester Street. A bike/pedestrian trail from downtown to the lakefront per the Lakefront Active Transportation Plan is in the process of being planned. Currently, the Active Transportation Plan that was developed in 2009 suggested several opportunities for improving bike and pedestrian pathways and infrastructure<sup>18</sup>. Other pedestrian/bike/trails being considered for future development noted by the CSC committee<sup>19</sup> include:

- Reestablish a rail line trail adjacent to the Gallo Winery (formerly Canandaigua Wine), along the building.
- Develop the Canal greenway, behind old Wegmans plaza to be a multi modal path along the Canandaigua outlet.
- Develop a trail along 5 & 20 right away, West Lake road, and New York State boat launch. This would involve connecting to an existing trail called the “Switch Back Trail”. The cost of building a bridge over Sucker Brook is a financial challenge for this project.

#### **4.2.1.C. Public Transportation**

RTS is a bus service that provides a public transportation alternative within the City of Canandaigua. It is operated by Rochester Genesee Regional Transportation Authority. Ontario County RTS offers Route Service (fixed bus service) within the City of Canandaigua and connections to other nearby counties: EastView Mall (RTS Route 253), Geneva (Via NYS Route 21 and 96) (RTS Route 298) and Geneva/Lyons (RTS Route 298) in Ontario County<sup>20</sup>. RTS Ontario also provides service within the City of Geneva (RTS Route 261). There are two routes within the City of Canandaigua operated by RTS: North on NYS Route 332 (RTS Route 250) and South along Eastern Boulevard on (RTS Route 252)<sup>20</sup>.

There is a mini transportation hub located near the center of the City on West Avenue in the shopping plaza. The buses used to line up on Main, but because of traffic disruption and safety hazards, they were moved to this plaza<sup>20</sup>. The West Avenue Plaza mini transportation hub has a bus shelter with three sides and the open side faces the parking lot of the plaza<sup>20</sup>. There are also bike racks<sup>20</sup>. The plaza itself only has a few open stores<sup>20</sup>. One opportunity to enhance usage of public transportation would be considering making improvements to the West Avenue Plaza in order to enhance the utilization of this mini transit hub<sup>19</sup>. Improvements to the transportation hub and/or plaza itself may enable increased ridership across the City and county<sup>19</sup>.

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<sup>18</sup> City of Canandaigua (2009). Draft Active Transportation Plan. Accessed <https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/%7BA06D635A-DB75-4AEB-9DA9-7889923DB0B6%7D.PDF>

<sup>19</sup> CSC Monthly Meeting, October 14, 2021

<sup>20</sup> Maguire, B., video call, November 2, 2021

Rides within the City cost \$1 per way and only \$0.50 for seniors and disabled persons and all buses are ADA compliant<sup>20</sup>. Due to Covid-19, Route Service (Routes 250, 252, 253, 255, 261, and 298) no longer provide weekend service and only run during the week<sup>21</sup>. For the two routes within the city, Route Service is offered every hour on the hour between the hours of 7:00 am to 7:00 PM, but the service connecting to other neighboring counties is offered every 2 hours<sup>20</sup>. RTS provided service to 67,174 community members in 2019 and 34,202 in 2020<sup>22</sup> for Route 250, 252, Ontario County Office of the Aging (OFA) Dial-A-Ride service, and OFA Shopping Shuttle service. The 2020 levels are 49% less than 2019 levels because service for Routes 250 and 252 was suspended from 4/6/2020-8/2/2020 due to the pandemic<sup>22</sup>.

In addition to the fixed routes noted above, RTS also provides more flexible service for travel within the City for its community members such as Dial a Ride and Deviated Route Service<sup>20</sup>. Dial a Ride provides curbside service if the customers travel from *outside* of  $\frac{3}{4}$  of mile the route service<sup>20</sup>. This is an additional cost of \$5-10.00 each way and requires 48 hour in advance reservation<sup>20</sup>. Deviated Route Service provides curbside service for people living within three quarters of a mile of the City Route Service, requires a reservation in advance (48 hours to one week), and costs \$2.00 each way<sup>20-21</sup>.

In addition to the above services, RTS has partnerships with Wegmans to provide subsidized round trip service for low income seniors for grocery shopping at Wegmans<sup>20-21</sup>. The service is offered to 4 senior living facilities located in the City a few times a day on a certain weekday (Monday or Tuesday) between the hours of 9:00 am to 2:00 PM<sup>21</sup>. RTS also has a partnership with OFA that provides free on demand service to eligible community members<sup>20</sup>. This service is for those over 60 years old, who qualify for Medicaid but not the transportation service under Medicaid, and do not have a car or way to get around within the City of Canandaigua<sup>20</sup>. Rides are to be used for medical appointments, agency support service appointments (OFA or the DSA), visiting family members in the hospital, and grocery shopping at other places besides Wegmans<sup>20</sup>.

RTS buses are operated using clean diesel otherwise known as ultra low sulfur fuel. This type of fuel allows for efficient combustion and lower emissions and is considered cleaner than gasoline engines<sup>22</sup>. To address the NYS Climate Leadership Goals, Monroe County is currently transitioning its fleet from clean diesel to electric buses, but it requires considerable infrastructure (space for charging stations), purchase of electric buses, and requires new maintenance procedures<sup>20</sup>. Typically, major changes at RTS start with Monroe County and then are transitioned to other subsidiaries<sup>20</sup>. It appears that bus drivers and community members like the electric buses being used in Monroe County because they drive quietly and provide additional comfort for passengers and the drivers<sup>20</sup>. The adoption of these quiet electric vehicles also has the unexpected and indirect benefit related to climate change mitigation actions.

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<sup>21</sup> RTS website (n.d.). Accessed <https://www.myrts.com/ontario/maps-and-schedules>

<sup>22</sup> Maguire, B. (2021, November 3). Email correspondence.

#### **4.2.1.D Marinas and City Pier**

The City of Canandaigua has a pier that is also a City Park located off Lakeshore Drive and initially constructed in 1847 for a Steamboat dock for produce and then tourists<sup>8-9</sup>. The pier houses a group of historic boathouses, temporary boat docks (3), seasonal restroom, drinking fountain and parking<sup>1</sup>. Two private marinas are located at the north end of the Lake near the City Pier (Seagars and Sutters)<sup>1</sup>. New York State operates a public boat launch facility and provides fishing access called the Canandaigua Lake State Marine Park on the north shore of the lake at 620 South Main Street near the intersection with 5 & 20<sup>1</sup>. Over 10,000 boats per year are launched at this site. In the Lakefront Park, the City also operates a small boat launch<sup>1</sup>.

#### **4.2.1.E. Overview of Climate Hazards Related to Transportation**

According to the NYSERDA<sup>5-6</sup>, the types of climate hazards that can potentially impact transportation infrastructure include increases in annual average temperatures, changes in precipitation, and other factors (flooding, increasing storm intensities, and droughts). Extreme temperature changes and temperatures closer to the freeze/thaw cycle will damage and/or result in the need for repairs to the City's roadways and the bike/pedestrian system. Roadway and/or bike/pedestrian pathway material will need to be resilient to extreme temperature changes. The need for roadway maintenance and construction activities may result in traffic disruptions and delays. Extreme temperatures (heat) may cause railways to buckle. Power outages (noted in Section 4.2.2) may affect roadway and railway traffic signals, also causing traffic delays and disruptions. Increased frequency of heavy rain events and extreme storm events may cause more flooding or standing water in the roadways, disruptions or delays in traffic, and the continued need for effective storm drainage to address peak events. Erosion to roadway embankments or bridge foundations is a potential concern. Droughts or extreme storm events impact the lake level, which may cause damage to private and public structures along the lake, and potentially negatively impact tourism. Public transportation will face similar challenges associated with roadway disruptions, so quality of service and operations depends on roadway conditions. Riders within the City could potentially experience issues associated with extreme temperature changes (heat and cold) and increased precipitation events while waiting at bus stops.

### **4.2.2. Energy/Utility Assets**

#### **4.2.2.A. Energy and Telecommunications**

As shown in Figure 8, the City's energy infrastructure consists of a solar array, electric transmission lines, and one regulated well. There are no natural gas pipelines in the City. The installation of a 4.1 MW solar array consisting of 13,200 panels was completed by December 2016 at the old

transfer station located at County Road 46 and County Road 10<sup>23</sup>. Over 25 years, the array is expected to provide \$3.5 million in electricity cost savings, annually produce 5.3 million kWh, which is expected to offset the emissions from 824 passenger vehicles per year<sup>23</sup>. This array provides a large portion of the energy needed to operate City facilities such as City hall, police station and the fire station and was developed using a \$1 million grant approved by NYSERDA in 2014<sup>23</sup>. As of March 2017, the panels covered 82% of the City's electricity needs<sup>24</sup>. In April 2020, the City of Canandaigua implemented a Community Choice Aggregation (CCA) program to provide the City residents and small businesses with 100% clean energy sources and an opt-in community solar program to support the development of local solar farms<sup>25-26</sup>.

There are two electric vehicle charging stations in the City located at 105 South Main Street and 330 Eastern Boulevard. The City has been considering expanding electric vehicle charging<sup>27-28</sup>. The CSC committee is currently discussing potential locations for level 2 and 3 charging stations<sup>19</sup>. The CSC committee noted that there is not sufficient space for an alternative energy utility like the Village of Fairport<sup>19</sup>. The current solar array is partially located in the City and Town. Approximately 20 acres of the solar array are located in the Town of Canandaigua<sup>19</sup>. A potential project that would enhance the use of onsite renewable energy for the City to consider is promoting the use of mini solar arrays or rooftop solar development via project or policy<sup>19</sup>. The City has already adopted the New York State Unified Solar Permit to help developers more effectively and efficiently site and install renewable energy<sup>19</sup>.

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<sup>23</sup> Murphy, M. (2017). "Here Comes the Solar Power." *Daily Messenger*. Accessed

<https://www.mpnnow.com/story/news/politics/county/2017/05/26/here-comes-solar-power/20789911007/>

<sup>24</sup> City of Canandaigua (2017). *2016-2017 City Strategic Plan*. Accessed

[https://www.canandaiguaneconomy.org/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/September\\_2017\\_2016-2017\\_City\\_Strategic\\_Plan\\_as\\_of\\_8.29.17.pdf](https://www.canandaiguaneconomy.org/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/September_2017_2016-2017_City_Strategic_Plan_as_of_8.29.17.pdf)

<sup>25</sup> Shaw, D. (2020, June 25). "Canandaigua Offers City Residents Cleaner Energy Option." *Finger Lakes Times*. Accessed

[https://www.fltimes.com/news/canandaigua-offers-city-residents-cleaner-energy-option/article\\_77571418-5090-5213-a5e8-9f94bbf847d3.html](https://www.fltimes.com/news/canandaigua-offers-city-residents-cleaner-energy-option/article_77571418-5090-5213-a5e8-9f94bbf847d3.html)

<sup>26</sup> Gateway Community Power (n.d.). Accessed

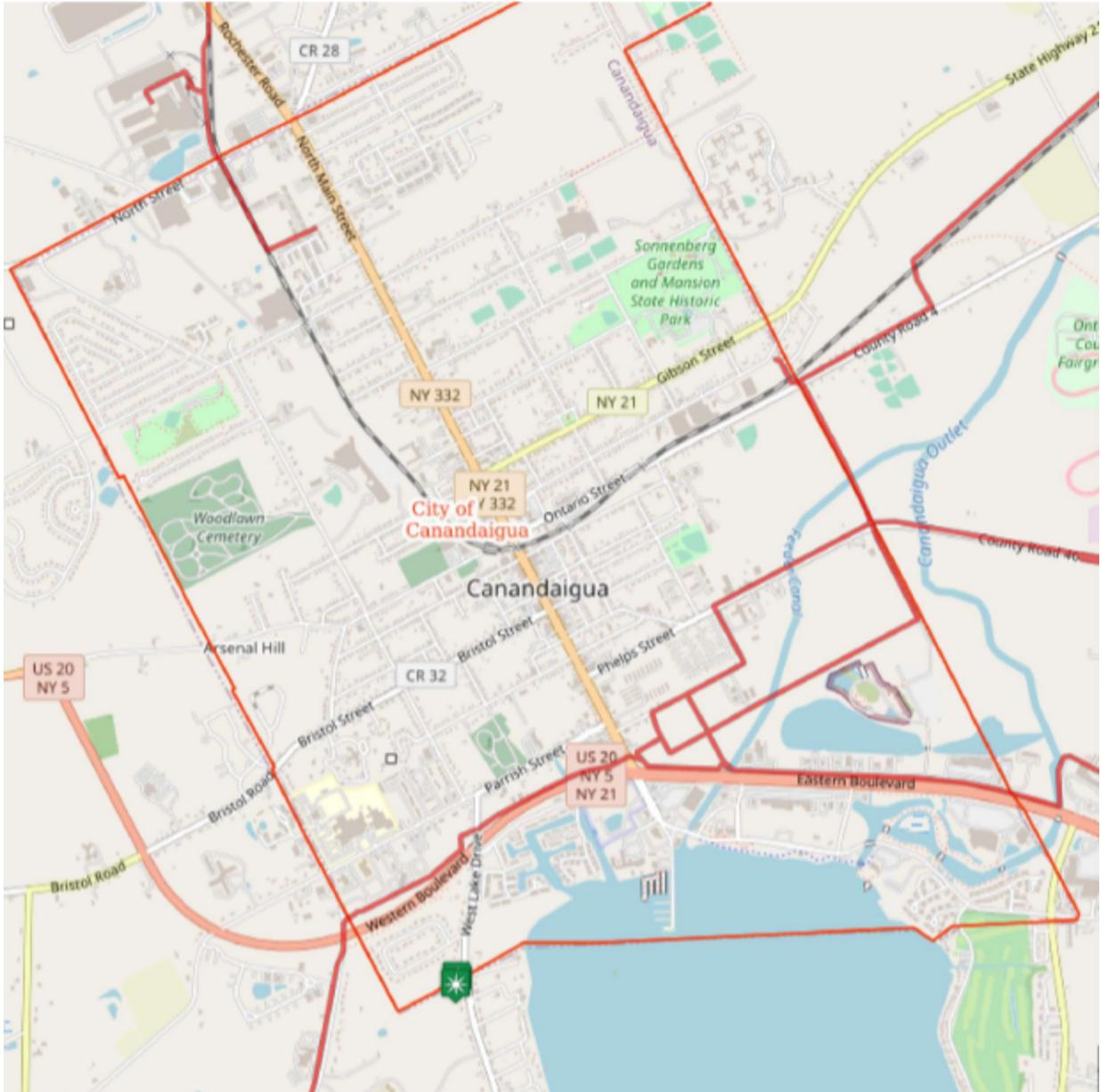
[https://www.canandaiguaneconomy.org/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/FAQ\\_CCA\\_Gateway.pdf](https://www.canandaiguaneconomy.org/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/FAQ_CCA_Gateway.pdf)

<sup>27</sup> City of Canandaigua (2019). *2019 CSC Annual Progress Report*. Accessed

<https://www.canandaiguaneconomy.org/csc>

<sup>28</sup> City of Canandaigua (2020). *2020 CSC Annual Progress Report*. Accessed

<https://www.canandaiguaneconomy.org/csc>



**Figure 8:** City of Canandaigua Energy and Utility Infrastructure. Dark red lines represent transmission lines, the green mark represents the solar array, and one regulated well is near the hospital (gray circle with clear inside)<sup>16</sup>.

The coverage of fiber optic cable service being provided by Empire Access is shown in Figure 9. Currently the City of Canandaigua is working with Empire Access to continue to expand this service, and explore developing a franchise agreement to ensure cable sufficient coverage. T-Mobile has a cellular broadband wireless internet. Also spectrum is on every street.



**Figure 9:** Empire Access Fiber Optic Coverage in the City of Canandaigua<sup>29</sup>.

#### 4.2.B.2 Overview of Climate Hazards Related to Utilities

Precipitation changes, temperature changes, and extreme weather are the key factors that may cause vulnerabilities to the City of Canandaigua’s telecommunication and energy infrastructure. Examples of potential vulnerabilities include reduced or disrupted telecommunication services resulting from extreme heat power outages or severe weather (wind, icing, snow, lightning, flooding etc.), damage to telecommunication and power lines and other infrastructure from increased heavy precipitation events (wet snow, heavy precipitation, freezing rain), increased emergency communications during extreme weather events that in turn reduce and/or the system capacity, damage to trees and utility lines from wet snow and other extreme weather

<sup>29</sup> Empire Access (n.d.). Check your location. Accessed <https://www.empireaccess.com/where-we-are/check-location>.

events, damage to any infrastructure can lead to service disruptions/outages and increased equipment maintenance and replace costs<sup>16</sup>. Currently the City is not experiencing any utility related flooding.

### 4.2.3 Water Assets

#### 4.2.3.A Water Supply

The City of Canandaigua withdraws 100% of its water locally (rather than imports) from Canandaigua Lake<sup>30</sup>. The amount of raw vs. finished water withdrawn from the lake from 2019 to July 2021 is shown in Table 2. The population in the City has decreased by 0.3% (see Section 4.4), but the demand for water continues to increase. The City experienced a 10% increase in the amount of water withdrawn from the lake between 2019 and 2020. The City continues to maintain and upgrade water supply lines.

**Table 2:** Amount of Water Withdrawn and Distributed to the City of Canandaigua

Year	Amount of Raw Water Withdrawn (Gallons)	Amount of Finished Water (Gallons)
2019	1,516,260,000	1,437,540,000
2020	1,555,030,000	1,480,210,000
2021 (as of July 13)	791,065,000	743,961,000

#### 4.2.3.B Water Resource Recovery, Stormwater Management, and Flood Protection

A single *Water Resource Recovery Facility (WRRF)* (formerly referred to as a wastewater treatment plant) is located in the southeastern quadrant of the City off of Green street. This facility is owned and operated by the City. The facility has a permitted average monthly effluent discharge flow of 6.5 million gallons per day (MGD)<sup>31</sup>. The City reports an average for 2021 (as of December 1) to be 3.8 MGD with the highest monthly average of 5.4 MGD in October 2021<sup>31</sup>. The City is required by permit to maintain a minimum flow of 35 cubic feet per second through the Feeder Canal which meets up with the Canandaigua Outlet south of the Canandaigua Junior Baseball and Softball fields on Ontario Street<sup>31</sup>.

Currently, the City has excess capacity, but if other Towns continue to grow the City will need to expand. Additionally, the City is in the process of changing the solids handling process by switching from anaerobic to aerobic digestion (also known as Autothermal Thermophilic Aerobic Digestion or ATAD). The ATAD technology changes the classification of the material output from the WRRF. The process change will enable 3,200 wet tons of *Class B material* being sent to the

<sup>30</sup>Virkler, P. (2021, July 14). Personal correspondence with the Chief Operator Canandaigua WRRF.

<sup>31</sup>Email correspondence from WRRF representatives (2021, December 10).

landfill to be converted into a *Class A biosolid* material that in theory can be diverted from the landfill and used for land top cover<sup>19,31</sup>. The ATAD project should allow for replacement of facilities for no cost to taxpayers.

*Stormwater management* is an active area that the City is working on addressing. The City and Town of Canandaigua have partnered to work on a variety of stormwater facilities to share upstream. There are two to three retention ponds built by the Town near North Road and 5 & 20 that help manage stormwater flowing towards the City. Many retention ponds are located along or near Sucker Brook areas that are either privately or publicly maintained. Stormwater eventually all goes to Sucker Brook. As noted in the Comprehensive Plan, the City had improved stormwater management in 2012 with a New York State Green Innovation Grant and installed several rain gardens and planting zones to assist in the collection and treatment of stormwater runoff<sup>1</sup>. This project also provided an added benefit of beautifying the business improvement district. According to the CSC committee<sup>19</sup>, future development requires publicly maintained basins for stormwater. Because of private ownership along Sucker Brook, it has been a challenge to ensure that the banks or walls are maintained. Addressing stormwater flow is critical to prevent erosion as the number one pollutant is sediment.

Two small dam structures, Canandaigua Lake Dam and William Muar Dam, that provide minimal *flood protection* are located in and adjacent to Lagoon Park that help protect the city from flooding. The hazard risk for these dams is null according to the NYS Climate Change Science Clearinghouse<sup>16</sup>. Technically these are not being used as dams, more so to regulate flow, so this dam infrastructure has limited vulnerability to climate changes such as precipitation. Charlotte and Gorham streets have had flooding in the past, but the City has made the appropriate improvements. The City currently has sufficient flood protection in place to address precipitation events of 3 inches per hour. The Northeast quadrants consist of several wetlands, which limits development but provides critical flood protection service for the City.

The CSC committee noted the following strategies are needed to continue to improve adaptive capacity and reduce potential future vulnerability to climate change. This includes:

- Maintaining stormwater retention ponds along Sucker Brook
- Maintaining ponds in private subdivisions
- Addressing water flow from inlets and outlets to prevent flooding, and erosion
- Enhancing wetland protection and management in the northeast quadrant
- Exploring expansion of the WRRF facility in 20 years to ensure adequate capacity and keep up with pressure from surrounding Town developments
- Continuing to maintain sewer and water infrastructure.

### **4.2.3.C Overview of Climate Risks to Water Assets**

According to the NYSERDA<sup>5-6</sup>, increasing air temperatures and changes in precipitation are the top climate risks to water. Increasing air temperatures will result in higher lake temperatures. Projected increases in temperatures will result in warmer water temperatures, increase algae blooms, and may threaten water supply quality. Extreme storm events that result in power outages may disrupt the operation of the WRRF and distribution systems and the delivery of water to the City.

According to NYSERDA<sup>5-6</sup>, communities like the City of Canandaigua that depend on the Finger Lakes for water supply have low vulnerability to climate changes. However, there are other vulnerabilities to the City's water supply resources that are not related to climate changes such as the continued demand for water resources and aging infrastructure (a New York State wide issue)<sup>5</sup>.

Flood protection systems may be vulnerable to temperature changes. Warmer winter temperatures can increase the amount of precipitation and snowmelt in the winter, which can cause earlier peak flows<sup>5</sup>. Temperature changes can also impact flood protection infrastructure, as more drought periods threaten the health of vegetation and trees near the dams; any tree falls or debris blockage may impact the dam operations<sup>5</sup>.

## **4.2.4 Building Assets**

### **4.2.4.A Buildings**

Main street is the 'Downtown' of the City of Canandaigua. According to the Comprehensive Plan<sup>1</sup> the downtown area has nearly 500,000 square feet of commercial space, averaging 3,000 square feet per building. Also according to the Comprehensive Plan<sup>1</sup>, over half of the spaces are rented and half are owner-occupied. There were 80 storefronts, and about seven turn over each year and seven or so remain vacant at any given time<sup>1</sup>. This vacancy and turnover rate is not uncommon for similar traditional downtown districts and is lower than the County level<sup>1</sup>. The CSC committee noted the following key buildings of interest<sup>19</sup>:

- West Avenue Plaza
- Old Post Office
- Labelon building
- Pinnacle North property redevelopment
- Tom's Mobil

The West Avenue Plaza property is discussed earlier in Section 4.2.A.3. The Old Post office is a historic structure that currently houses the YMCA. YMCA will be moving to a new building, possibly not in the City. The Old Post Office needs to be properly taken care of. The Labelon

building is also historic, but has been vacant for many years. The City has been trying to redevelop the property for many years. Pinnacle North is the development along the Lakefront and consists of five phases. Only Phase 1 has been completed so far and progress on the remaining stages of development has since stalled. Tom’s Mobile, a former gas station, has been remediated by the NYS DEC. The City is working to develop this property, along with the nearby Old Pizza Hut building so a new structure can be built.

As shown in Table 3, the housing stock is old, as over 45% was built prior to 1939. The oldest homes are located on North Main Street as well as side-streets such as Howell Street, Gibson Street, and Gorham Street<sup>1</sup>. Of the 2,500 residential units, half or 1,280 units are located in apartment complexes<sup>1</sup>. According to the CSC committee, the storefront turnover rate is consistent and approximately 5%<sup>19</sup>. The downtown area is vibrant and there doesn't appear to be any environmental or weather hazards causing turnovers. It is possible that some of the upper floors of privately owned buildings that haven’t been renovated in a while could have a possible lead or asbestos hazard, but currently unknown at this time<sup>19</sup>.

**Table 3: Building Stock in the City of Canandaigua**

<b>Building Stock Variables</b>	<b>2019 Data Points</b>
Number of Housing Units	5,590
Percentage Built Before 1939 (2017)	45.7%
Percentage Built After 2014 (2017)	1.3%
Owner Occupancy rate (2015-2019)	55.5%
Vacancy Rate for Housing Units	9.3%
Cost of Home ownership >30% household income (2017)	10.6%
Cost of Home ownership <30% household income (2017)	42.6%
Median Value of Owner-Occupied Housing Units (2015-2019)	\$164,400

Sources: U.S. Census Bureau<sup>2,32</sup> and City of Canandaigua *Comprehensive Plan*<sup>1</sup>. Data is for 2019 unless otherwise noted.

Community resources and facilities in the City include a YMCA and 11 senior living facilities. There is no homeless shelter or other care facilities or battered women shelters run by the City,

<sup>32</sup> U.S. Census Bureau (2021). *Quick Facts Canandaigua City, New York; United States*. Accessed <https://www.census.gov/quickfacts/fact/table/canandaiguacitynewyork,US/PST045219>

but Family Promise is an example of a non profit working across faith groups in Ontario County that provides shelter. The Salvation Army is another source of services such as food access. Other critical facilities include fire and police stations, public libraries, schools, the VA, and health service facilities associated with the hospital. These facilities provide vital services, especially during natural disaster emergencies.

As noted in the Greenhouse Gas Inventory there are seven municipal buildings: City Hall, Department of Public Works, Police Station, Fire Station 1 & 2, Water Treatment Plant, and the WRRF. There are three buildings associated with the Canandaigua City School District (CCSD) that are located within the City: Primary Elementary school on West Gibson Street, Middle School on Granger Street, Canandaigua Academy (High School) on East Street, and the District Office on North Pearl Street<sup>33</sup>. The CCSD serves residents in the City and some from the surrounding communities. Two additional buildings, the CCSD Operations Building and the Lynne H. Erdle Canandaigua Academic and Career Center are located in the Town of Canandaigua. According to the CSC committee, the school buildings lack cooling technology. Conversations with representatives from the CCSD<sup>34</sup> noted that the buildings have undergone improvements, one of the most recent capital improvement projects involved replacing 20-30 HVAC units throughout the district. In 2012, each of the three school buildings installed rooftop solar panels that are capable of generating 32-50 Kw of energy and reduce the CCSD's reliance on the Grid for electricity<sup>34-35</sup>. The project improved drainage and irrigation for the fields in the high school field and installed an all weather track and multipurpose artificial turf fields<sup>34</sup>.

#### **4.2.4.B Overview of Climate Risks to Building Assets**

Because the building stock is old, the changing extreme temperatures and frequency of severe storm events will continue to wear down building exteriors. Flooding due to increased precipitation and intense storm events have the potential to damage critical systems and equipment located in basements or lower levels of buildings located in the floodplain. The partnership with the Town of Canandaigua and Watershed Council has been critical in managing stormwater.

In general, increased temperatures could affect the internal building temperatures in older buildings without ventilation. This could be an issue for the school district, as the buildings lack cooling technologies. This may result in heat-related illness to building occupants. Older buildings are vulnerable to developing mold growth due to inadequately sealed building envelopes, poor HVAC systems. Exposure to mold could present health and safety issues to

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<sup>33</sup> Canandaigua School District (n.d.). Accessed <https://www.canandaiquaschools.org>

<sup>34</sup> Video call with CCSD representatives (Director of Facilities Mike McClain, Director of Transportation Seth Clearman, and Assistant Superintendent for Business Matt Fitch), April 8, 2021

<sup>35</sup> Canandaigua School District (n.d.).District Capital Projects. Accessed, <https://www.canandaiquaschools.org/district/capital-projects>.

building occupants. Low-income homeowners who lack the resources to address this problem and renters who live in properties that are not maintained are most vulnerable.

The City has been active in trimming tree branches in the right of way and proactively removing trees that are considered public safety hazards like dying Ash trees<sup>19</sup>. The City has two arborists on staff<sup>19</sup>. At this time, municipal roofs are not vulnerable to storm damage, but routine maintenance associated with aging<sup>19</sup>.

#### 4.2.5 Summary of Climate Hazards

As noted in each previous subsection section, the primary climate risks that will potentially impact the City of Canandigua’s infrastructure include increasing air temperatures, variability in precipitation, and severe storm events. Overall, the committee<sup>19</sup> believes at this moment the City’s infrastructure assets have a low level of vulnerability to changes to climate change as it has been working on making improvements on its own assets and working with other municipal partners to ensure a resilient future infrastructure system.

#### 4.2.6 Summary of Findings for Infrastructure Assets

Based on the research and discussions with the CSC committee, the City has the following strengths, challenges, and opportunities associated with its infrastructure assets (See Table 4).

**Table 4:** Key Strengths and Challenges Facing Infrastructure Systems and Subsystems

System	Strengths	Challenges	Opportunities
Transportation	<p>Many multimodal pathways developed or in the process of development</p> <p>Buffer lane stripped on Main street to encourage biking</p>	<p>Buffer lane on Main Street too narrow to be a bike lane</p> <p>Public transportation is underutilized and mini transportation hub needs improvements</p> <p>Roadways vulnerable to climate hazards, which can impact usage.</p>	<p>Multimodal trails and transportation hubs create connections within City and to the County</p> <p>Enhance use of public transportation</p>
Energy/Utilities	<p>City has access to 100% renewable energy and clean energy sources from its 4.1 MW solar array and CCA</p>	<p>No room to expand solar array</p>	<p>Charging stations to encourage electrification transitions for municipality fleets and private vehicles</p>

	School installed rooftop solar.		Installation of solar on building or carport rooftops
Water, water recovery, stormwater, flood protection	<p>No Scope 3 emissions because water supply is local and from Finger Lakes Region</p> <p>Partnership with Town and current retention ponds in place managing stormwater runoff</p> <p>Infrastructure in place to provide sufficient protections from flooding</p>	<p>100% reliance may cause future vulnerability if water quality changes</p> <p>Water supply and stormwater lines are old and need to be replaced.</p>	<p>Undeveloped land in northeast quadrant provide important wetland protection ecosystem services</p> <p>New technology will enable material from water recovery facility to be diverted from landfill and potentially be used as land cover</p>
Building and facilities	<p>Historic 19th Century homes and tree lined downtown area</p> <p>City active in trimming trees to limit/prevent climate hazard impacts</p> <p>School district has made improvements</p>	<p>Older housing stock and percentage of housing rented may be vulnerable to climate impacts</p> <p>Lack of affordable housing</p>	<p>Need for climate resilient, affordable housing for low to moderate low income families</p> <p>Redevelop/update buildings of interest</p>

**4.3 Environmental and Natural Resources Assets**

As shown in Table 1, the City of Canandaigua Environmental and Natural assets consist of three main systems: environmental, natural habitat, and recreational.

### **4.3.1. Environmental Assets**

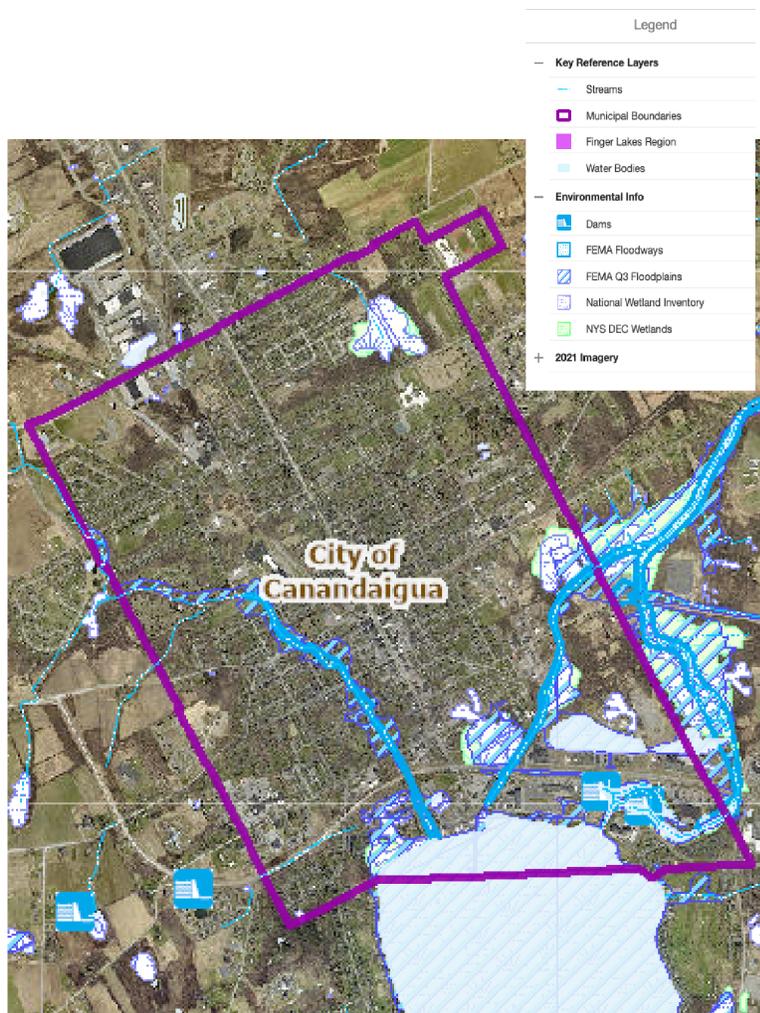
#### **4.3.1.A Waterbodies, Aquifers, Floodplains, and Wetlands**

The water bodies in and around the City of Canandaigua include Canandaigua lake, tributaries, wetlands, smaller lakes, and the FEMA floodplains. Canandaigua lake is 15.5 miles long, an average of 1.1 miles wide, and a depth of around 270 feet. The watershed is made up of hundreds of tributaries and two gates. Both gates are controlled by the City of Canandaigua and are within the City's boundary<sup>36</sup>. One gate flows through Lagoon Park, controlling the eastern flow and the other gate controls the western flow. The majority of the wetlands in the city's boundaries are in the southeast of the city including the only two dams in the city. There is also a wetland in the northeast corner of the city. Smaller water bodies include Muir lake, Blue Lagoon, and other small lakes in Canandaigua Lake State Marine Park and Roseland Water Park. The Parks Department does not indicate any environmental concerns for the lakes.

The City of Canandaigua's waterways are shown in the following map (Figure 10). The map shows the main inlets and outlets from Canandaigua lake. Floodplains coincide with these waterways, the wetlands, and the lakes. Flooding occurs in this region from stormwater. Natural stormwater retention occurs when native plants and habitats are sufficient and thus retain the excess water. Flooding is seen in Kershaw Park, the Battlefields, and Lakefront Park.

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<sup>36</sup> Canandaigua Lake Watershed Council (2017), Physical Setting. Accessed <https://www.canandaigualake.org/setting>



**Figure 10:** Inlets and Outlets from Canandaigua Lake and to the City.

The City of Canandaigua Watershed Council is actively pursuing ways to improve the health of the water and protection from floods through research and water testing<sup>37</sup>. Although levels are not exceeded currently, phosphorus and other nutrients are monitored to protect the stability of aquatic ecosystems. The DEC has banned phosphorus pesticides to ensure that phosphorus runoff does not leak into waterways. Erosion is also a concern for Canandaigua Lake, as it increases the phosphorus levels and other nutrients too. The City of Canandaigua has a street sweeper that removes sediment that can get into waterways.

Other water quality issues that the Watershed Council monitors are pesticides, algal blooms, invasive species, pathogens, toxic substances, and legacy pollutants<sup>37</sup>. Preventative measures include the City’s Turf Management Policy, volunteer algal bloom monitoring, the Watercraft Steward Program which monitors aquatic invasive species, weekly water sampling for bacteria,

<sup>37</sup> Canandaigua Lake Watershed (2017). Water Quality Issues. Accessed <https://www.canandaigualake.org/water-quality-issues>

an annual hazardous waste collection day run by Ontario County, and the testing of hydrocarbons in the groundwater.

The City releases a water quality report yearly to inform residents of the safety of the drinking water. As stated in the NRI<sup>15</sup>, the water quality is generally affected by increased flooding. The city's flooding occurs by excess stormwater and decreased wetlands.

#### **4.3.1.B Urban Forest Canopy**

As identified in the City of Canandaigua's Natural Resource Inventory, the urban forest canopy makes up about 35% of the land cover in the City<sup>15</sup>. Being a Tree City USA, the city formed a Tree Advisory Board in 2011. As stated on the Tree Advisory Boards main website page<sup>38</sup>:

“The mission of the City of Canandaigua is to increase, protect, strengthen, and maintain the health, beauty, quantity, diversity, and vitality of Canandaigua's urban forest for the benefit of its citizens and future generations.

Tree Committee duties include:

- Develop and recommend a Public Tree Management Plan.
- Work with the parks division of the Department of Public Works governing the management of the City's public trees.
- Seek grants and conduct fund-raising to assist the committee's mission.
- Oversee adherence to State and local laws governing trees in parks and on public ways.
- Educate the community regarding issues related to the urban forest.
- Make a yearly report to the City Council.”

The board is currently working to maintain the trees in the parks, reduce the reconstruction of sidewalks to protect trees, create replanting plans, and increase the diversity of tree species within the city boundaries<sup>15</sup>. There are around 14 species of tree varieties within the City boundary, with 25% of them being Maple trees<sup>15</sup>. Their goal is to increase the diversity by having no more than 5% of each tree species<sup>15</sup>.

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<sup>38</sup> City of Canandaigua (n.d.) Tree Advisory Board. Accessed [https://www.canandaiguanewyork.gov/index.asp?SEC=426A76EB-DF5D-41D1-B839-5A7E9CE2D7B4&Type=B\\_BASIC](https://www.canandaiguanewyork.gov/index.asp?SEC=426A76EB-DF5D-41D1-B839-5A7E9CE2D7B4&Type=B_BASIC)

### 4.3.1.C Nature Preserves

There are two nature preserves in the City of Canandaigua, Squaw Island and Lagoon Park. Squaw Island was just recently renamed to Skenoh Island, meaning Peace in Seneca. It is a fish and wildlife management area and is the smallest State Park at only a quarter of an acre in size<sup>39</sup>.



Figure 11: View of Skenoh Park<sup>40</sup>

Skenoh Park has reduced in size over the years. It once was two acres and is now only one-fifth of an acre. Waves and water levels are the reason for the continued erosion of the park. The protection of the shoreline could be one of the only ways to prevent further erosion of this unique preserve. Stabilization projects have been completed prior to the early 2000's.

Lagoon Park contains the Canandaigua Outlet, wetlands, and tourist amenities such as hiking, kayaking, and fishing. The park has 34 acres of wetlands and is a wildlife refuge. The current and ongoing issue is the infestation of the invasive bush known as European buckthorn. The volunteer efforts to remove the invasive species is seeing results which allows native species to thrive and feed the local wildlife<sup>41</sup>. The concern is the use of herbicides in the park which has led to a temporary halt in removing buckthorn from the park.

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<sup>39</sup> NYS DEC (n.d.). Skenoh Island Wildlife Management Area. Accessed <https://www.dec.ny.gov/outdoor/101178.html>

<sup>40</sup> Town of Canandaigua (n.d.). Squaw Island: A Pictorial History. Accessed <http://www.townofcanandaigua.org/page.asp?id=220>

<sup>41</sup> Murphy, M (2021, January 21). *Daily Messenger*, "Canandaigua's Lagoon Park program to deplete invasive buckthorn meets resistance". Accessed <https://www.mpnnow.com/story/news/2021/01/21/lagoon-park-canandaigua-ny-invasive-buckthorn-issue-under-discussion/4210987001/>

#### **4.3.1.D Overview of Environmental Assets**

Increased stormwater is the most prominent risk to the City currently. Water bodies are beginning to erode and blue algal is increasing each year. Flooding is occurring in and around the floodplain, as well as on ballfields, as some residents have noted. Water quality is being monitored, but is not at risk at the moment. While monitoring water quality, flood zones, and algal blooms is helpful, preventative measures are required in order to remediate the risks. The City has begun to build retention gardens to reduce flooding. An increase in remediation measures similar to retention gardens should be implemented and reinforcing lakefront shores are opportunities to reduce the effects of increased stormwater.

The main risks to the urban forest are invasive species, development, and a lack of tree diversity. The Tree Advisory Board is making strides in improving the diversity of tree species which will in turn reduce the risk of invasive species such as the lantern fly. The board still has a ways to go in increasing the diversity of species and should consider choosing low risk, easy to maintain, local tree species to ensure high yield. All new development projects should be approved by the Tree Advisory Board as well. This will reduce the risk of excess trees being taken down for development. Monitoring invasive species, although a mitigation measure, is a good practice to reduce the death of mature trees.

Nature preserves are meant to be protected, but can be over-visited, contributing to the erosion and introduction of invasive species. The main purpose of a preserve should be to minimize human traffic and help maintain the native species active in the ecosystem. Continued efforts to reduce buckthorn and other invasive species should consider the appropriate removal procedure that will have the least impact on the environment. Similar efforts should be considered for Skenoh Park while also including the reestablishment of a Preservation Society and further stabilization projects.

#### **4.3.2 Natural Habitat**

##### **4.3.2.A Sensitive and Rare Habitats**

Also identified in environmental assets under nature preserves, sensitive and rare habitats found in the City of Canandaigua are in Skenoh Park and Lagoon Park. Canandaigua lake is considered a sensitive habitat because it is affected by multiple towns and cities that border the lake making it a challenge to enforce or enact remediation measures. Continued efforts by the Canandaigua Lake Watershed Council provide potential for remediation efforts to be possible.

While Skenoh Park is known for being small, it is also known for being one of the only places worldwide that has water biscuits<sup>39</sup>. The biscuits are fresh water mineral formations that look like small flat pebbles. Inside is typically a twig or stone and overtime lime deposits build around the object. Where once there were many to be found, now the erosion of the sandbar and the park's

shoreline, have made them harder to find<sup>42</sup>. By protecting the island and its shoreline from erosion, water biscuits continue to form.

Lagoon Park holds 34 acres of wetlands. Wetlands are known to be a natural prevention to flooding and are also home to a diverse ecosystem<sup>15</sup>. The Canandaigua Lake Watershed Council encourages the banking, creation, restoration, and conservation of wetlands as noted in the Canandaigua Lake Watershed Plan<sup>43</sup>. Another less common effort is to reestablish stream and wetland connections. With most of the wetlands being at the southern end of Canandaigua Lake, the focus will be there and not within the city limits. The city of Canndaigua should imitate the initiatives set forth by the watershed council to protect and increase the wetlands in Lagoon Park and elsewhere in the city.

The land cover for Canandaigua lake is composed of the following: forest (41%), agriculture (27%), old field/shrub land (16%), residential (8%), wetlands (5%) and commercial (1%)<sup>44</sup>. Residential and city development is growing on the lake as towns are experiencing population growth. As development increases it's important to monitor erosion, protect wetlands and open spaces, and build rain gardens.

#### **4.3.2.B Overview of Natural Habitat Assets**

While both park habitats are protected as wildlife preserves, protection of these rare and sensitive habitats takes time and energy. Invasive species and erosion are risks that are challenging to eradicate, let alone mitigate. Wetland rehabilitation and protection is vital to improving water retention and in turn, flooding issues. Finding proper solutions to removing invasive species will prevent further reentree and minimize the spread while also maintaining a healthy native environment.

Although the City of Canandaigua touches only a portion of the lake, the health of the water affects the city and other towns around. Continued water quality checks will ensure that contaminants, pesticides, toxic substances, and pathogens are kept at bay and dealt with promptly if the quality was at risk.

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<sup>42</sup> Fallbrook Cove Canandaigua Blog(2020, June 23). "In Search of Squaw Island Water Biscuits". Accessed

<https://canandaiguacottagerental.com/f/squaw-island-water-biscuits>

<sup>43</sup> Canandaigua Lake Watershed Council (2014). Comprehensive update of the Canandaigua Lake Watershed Management Plan. Accessed

[https://www.canandaigualakeassoc.org/wp-content/uploads/2017/06/Watershed-Plan\\_public\\_12-20.pdf](https://www.canandaigualakeassoc.org/wp-content/uploads/2017/06/Watershed-Plan_public_12-20.pdf)

<sup>44</sup> Canandaigua Lake Watershed Council (n.d.), Land Use. Accessed

<https://www.canandaigualake.org/land-use>

### 4.3.3 Recreational

#### 4.3.3.A Public Parks and Facilities and Open Spaces

There are thirteen parks in total within the City limits. This list is as follows<sup>45</sup>:

- *Atwater Meadows Park*- is an 18 acres forested park with minimal access. The park just recently had a parking lot added and has a few trails. In general the park acts more like a preserve in that human activity is limited. Minimal maintenance is required and no concerns are noted.
- *City Pier Park*- is well known for its historical boathouses. The pier is located off of Lakeshore drive and has ample parking, seating, a restroom, and fishing accessibility. The park has minimal flora and fauna. The maintenance of the park includes streets, garbage, and restrooms.
- *Frank Baker Park*- is a 23 acre family friendly park with amenities such as parking, a playground, trails, seating, restrooms, and grills. It is a popular park for events and general family time. The facilities include basketball courts, tennis courts, soccer fields, a football field, and an indoor and outdoor pavilion. With the amount of activity at the park, maintenance is on the high end; cleaning, keeping up with facility and trail maintenance, and the parking lots.
- *Gibson Street Park*- is only 1 acres and is used mainly for recess and gym at a nearby school. The park has many trees. There is minimal maintenance and concerns are noted.
- *Jefferson Memorial Park*- is 8 acres with amenities packed into the available space. There is a year round facility, restrooms, baseball fields, playground, basketball courts, playground, lights, and a skate park. There is a long list of maintenance requests including extended land, general upkeep of facilities, and upgraded courts.
- *Kershaw Park*- is the most well known and popular park in the City. The park is at the southern end of the city on the lake. Residents and tourists enjoy this 9 acre lakefront park with diverse trees, benches, pavilions, a playground, fishing, a launch, and bike repair station. Lakefront park is connected by a bridge and in between is a boathouse. The maintenance of Kershaw Park is on the higher end due to the number of facilities and the popularity of the park.
- *Lagoon Park*- is the largest park in the city with 34 acres of wetlands, trails, wildlife preserve, and the Canandaigua Outlet. The park requires minimal maintenance. The main concern is the increase in invasive species.
- *Lakefront Park*- is filled with amenities such as a public dock, picnic areas, and walking paths. The facilities at the park are low maintenance. Trees in the park were recently assessed and some have been removed and new trees planted to replace them (2021, City of Canandaigua Natural Resources Inventory, pp.46).
- *Northeast Park*- was developed by the City, Town, and School District in 2009. There is a

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<sup>45</sup> City of Canandaigua (2016, March). Park Inventory and Master Plan. Accessed [https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Parks\\_Master\\_Plan\\_3.3.2016.pdf](https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Parks_Master_Plan_3.3.2016.pdf)

small section of forested land, restrooms, and soccer fields. The maintenance is minimal with the potential for new facilities to add in the future.

- *Sonnenberg Park*- is an 8 acre park with tennis and basketball courts, a playground, sports fields, a pavilion with restrooms, parking, picnic area, and trails. There are education and historical signs throughout the park as well. General maintenance is needed for the facilities.
- *Telyea Street Tot Park*- is a small 1 acre lot in a neighborhood with a swing set and partial basketball court. No further facilities are requested and the maintenance is minimal.
- *The Commons*- is used for events downtown. The park is very small with a stage, water feature, and tables. There is hope for a restroom to be added, but space is tight. General maintenance is needed on the facilities.
- *Triangle Park*- is a small space downtown with a monument in it and a few trees. This park has the least maintenance required.

All parks identified have relatively low maintenance of facilities aside from Kershaw, Lagoon, and Lakefront park. The risks to parks include flood damage, increasing facility maintenance, and invasive species control.

Open spaces are not common within the City limits, but there are a few. There is a wetland in the Northeast section of the city. It would be wise to preserve this space due to it being a rare habitat. As noted in the Natural Resource Inventory<sup>15</sup>, wetlands are a valuable habitat for birds, freshwater plants, and amphibians. The other open space in the city is a parcel of land near Kershaw Park. The land was set for development, but the development is currently on hold.

#### **4.3.3.C Overview of Recreational Assets**

Recreational assets include the parks, facilities, and open spaces within the City of Canandaigua. There are minimal open spaces left in the city. The only open space that should be protected at this time is the wetland in the northeast corner of the city. Wetlands are valuable to the wellbeing of the species that live there and they reduce flooding issues.

The parks in the City are well maintained and require minimal upkeep. Risks to the parks include flooding and invasive species. Increased flooding will cause more facility maintenance and habitat damage. Building rain gardens (i.e., retention gardens) in high risk locations within the parks will minimize the damage to facilities. Invasive species must continue to be monitored so as to eliminate the spread sooner. The ideal removal technique does not require herbicides or pesticides as per City rules.

#### 4.3.4 Summary of Climate Risks to Environmental and Natural Resources

Increased stormwater, flooding, and invasive species are the current climate risks to the City’s Environmental and natural resource assets. Development pressures are also another risk to these assets. Nature preserves, urban forestry canopy, and wetland resources provide important species habitat and protection from increased stormwater and flooding.

#### 4.3.5 Summary of Findings for Environmental and Natural Resource Assets

Based on the research and discussions with the CSC committee, the City has the following strengths, challenges, and opportunities associated with its environmental assets.

**Table 5:** Key Strengths and Challenges Facing Environmental and Natural Resource Systems and Subsystems

System	Strengths	Challenges	Opportunities
Environmental	Yearly water quality reports, volunteer monitoring of algal blooms, a Tree Advisory Board, tree canopy covers 35% of the land cover, tree City USA, rain/retention gardens	Lakefront erosion, flooding in parts of the City  Invasive species management and lack of tree diversity  Nature preserves over-visited, resulting in erosion and introduction of invasive species and a challenge to manage	Implement remediation measures like the rain/retention gardens to reinforce lakefront shores and reduce the impact of increased stormwater  Tree Advisory Board help monitor invasive species, be more involved in project development, identify diverse, low risk and easy to maintain native species and reduce the death of mature trees.  Create a preservation society to provide the right balance of human interaction and preservation.
Natural habitat	Invasive species monitoring, volunteer removal of invasive	Erosion, invasive species, minimal open spaces, and several	Wetland banking and other projects similar to the Watershed Council

	<p>species</p> <p>Nature preserves and wetlands have diverse ecosystem, provide critical habitat and enable growth rare species (water biscuit)</p> <p>Wetlands provide flooding protection</p>	<p>municipalities involved with management of nature preserves, loss of species and habitat</p>	<p>Use invasive species removal techniques that do not require herbicides or pesticides</p> <p>Water quality of Lake needs continual monitoring</p> <p>Build rain gardens to minimize damage from climate risk.</p>
Recreational	<p>The Tree Advisory Board monitors City trees</p> <p>Well maintained and diverse parks and recreational areas require minimal upkeep</p>	<p>Flood damage, increasing facility maintenance, and invasive species control.</p>	<p>Identify more preserve land in the City, protect and monitor trees in parks and throughout the city, build rain gardens in high risk flood zones, and continue to monitor and stabilize risks from invasive species</p>

## 4.4 Socio-economic Assets

As shown in Table 1, the City's critical socio-economic resources discussed in this section include the socio-economic data and resources, public health resources, emergency services, and cultural and historical resources.

### 4.4.1. Socio-economic data and resources

The economy of the City is focused on primarily on the health care, education, and government industry sectors, and the top three employment sector consist of the following<sup>1</sup>:

- 1) educational services, health care, and social assistance sector (32.8%),
- 2) entertainment, recreation, accommodation, food service (13.2%) and
- 3) retail trade (12.4%).

Healthcare industry is one of the strengths of the City as the University of Rochester Medicine (URM) Thompson Health Hospital is a key employer and service provider. Besides the hospital, it provides some alternatives to traditional nursing homes including, an adult day care program and an assisted living facility<sup>46</sup>.

Tourism has played a significant role in the economy for over the past 100 years, but most of the jobs are low paying and seasonal<sup>1</sup>. Tourism and recreation generates approximately \$100 million in revenue and its lake-influenced tax base is valued at nearly \$1 billion<sup>1</sup>. There are 1,291 "firms" located in the City of Canandaigua<sup>32</sup> and tourism is driven by the wineries and the lake<sup>46</sup>. The U.S. Census Bureau defines a firm as "a business organization or entity consisting of one or more domestic establishment locations under common ownership or control"<sup>32</sup>. Strong employers in the City include: URM Thompson Hospital, VA Medical Center, Canandaigua Wine, Pactiv, Wegmans, Gatehouse Media, Smart System Technology, Commercialization Center, and AJay Glass<sup>1,46</sup>. Also of note, the Ontario County seat is located in the City of Canandaigua. Adjacent to the City is the Finger Lakes Community College and the Constellation Brands-Marvin Sands Performing Arts Center (formerly the Finger Lakes Performing Arts Center).

The workforce development pipeline (training the future workforce to meet the needs of the City and County) is an important issue for both the City and County as a whole<sup>19</sup>. This includes ensuring the development of a nursing program at the Fingerlakes Community Community so

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<sup>46</sup> City of Canandaigua (2012, March). The Canandaigua Economic Development Partnership: An Integrated Approach to Prosperity The Strategic Economic Development Plan for the City of Canandaigua, NY. Accessed [https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Canandaigua\\_Economic\\_Development\\_Partnership.pdf](https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Canandaigua_Economic_Development_Partnership.pdf)

there are nurses who can work at the local ICU. Another important industry that needs to grow in the future is viticulture<sup>19</sup>.

The unemployment rate in the City is approximately 5.8%, which is slightly higher than the Finger Lakes and New York State five year average rates of 5% and 5.5% for those aged 16 and older<sup>47,48</sup>. However, a majority of persons over the age of 18 are employed in the civilian workforce (61.9%)<sup>32</sup>.

According to the U.S. Census Bureau, the population of the city has decreased 0.3% between 2010 and 2020 from 10,576 to 10,545<sup>32</sup>. The majority of the population describes its race as white (95.7%) and 5.6% describes itself as a person of color or latinx<sup>32</sup>. Over half the population identifies as female ( 53.5%), 23% is persons over the age of 65, and 18.9% is under 18<sup>32</sup>. The population is educated with 94.4% attaining a high school degree or higher<sup>32</sup>.

The median household income (based on a five year average of 2015 to 2019) is \$49, 130 and 10.7% of persons live in poverty<sup>32</sup>. While this data is prior to COVID-19 health pandemic, the City's economic well being appears to be improving as the median household income increased from \$43,777 in 2010 and the poverty rate decreased from 13.5% in 2010<sup>1</sup>. Only 4.7% of the City's population is without health insurance, which is low compared to the U.S. rate of 10.2%<sup>32</sup>.

#### **4.4.2. Public Health Resources**

Although Ontario County provides social services for the citizens living within the City, caring for an aging and other vulnerable populations will be an important issue for the and continual need for the City to address. Nearly a quarter of the population is over 65, so it will be important to ensure this vulnerable population has sufficient and affordable living spaces, resources and skilled nursing services, and access to transportation.

As noted in Section 4.2, there are four nursing homes in the City (80 Parrish Street, Fort Hill Apts, Wilcox Lane, and Thompson Apts) that have partnerships between RTS and Wegmans. RTS has partnerships with Ontario County and private businesses to ensure transportation for those who are over 65 and need access to transportation for basic needs (food and medical appointments). There are no cooling or emergency shelters located in the City, but the Salvation Army and possibly the school district could serve as back ups. URM Thompson Health Hospital is a strong part of the economy and provides a variety of high quality, full range of health services that

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<sup>47</sup> NYS Department of Labor (n.d.). Demographics of the Civilian Labor Force 2015 - 2019 American Community Survey (ACS) Five-Year Estimates (n.d.). Accessed <https://dol.ny.gov/system/files/documents/2021/03/unemployed-demographics-by-region-table-2015-to-2019.xlsx>

<sup>48</sup> Best Places (n.d.). "Economy in Canandaigua, New York". Accessed [https://www.bestplaces.net/economy/city/new\\_york/canandaigua#:~:text=Canandaigua%20has%20an%20unemployment%20rate,The%20US%20average%20is%206.0%25](https://www.bestplaces.net/economy/city/new_york/canandaigua#:~:text=Canandaigua%20has%20an%20unemployment%20rate,The%20US%20average%20is%206.0%25).

includes, but is not limited to skilled nursing, three urgent care centers, independent senior living, and a 315 bed hospital facility<sup>49</sup>. URM Thompson Health serves more than 215,000 residents in the City and surrounding Finger Lakes area<sup>49</sup>. The hospital was founded in 1904 and its mission is “to continuously improve the health of the residents and communities of the Finger Lakes and the surrounding region”<sup>49</sup>. Currently the hospital has over 450 practitioners, 1,600 associates, and 200 community volunteers<sup>49</sup>.

#### *4.4.b.1 Potential Climate Sensitive Diseases and health Issues*

According to NYS, people who have compromised health conditions are more likely to be impacted by changing climate impacts<sup>5</sup>. Three diseases that are considered sensitive to climate impacts highlighted by NYS include asthma, cardiovascular, and infectious (including vector borne) diseases<sup>5</sup>. Data is only available at the County level, but for asthma, Ontario County experiences 5.8% hospitalization rate per 10,000 for children and adolescents age 0 to 17<sup>50</sup>. This rate is considered low in comparison to other counties in NY.

Lyme disease and West Nile are vector borne illnesses that are of concern to NYS. Ontario county’s incident rate for Lyme disease (18.8 per 100,000) is considered to be low in comparison to other counties in the State<sup>51</sup>. West Nile is another potential vector-borne illness of concern in NYS, but data is not available on West Nile. While the global health crisis caused by the COVID-19 virus is not directly related to climate change, it is a reminder of the importance of our local communities needing resilient health systems for future health crises<sup>52</sup>. According to the World Bank, the vulnerable populations who were at high risk for COVID-19 are expected to be impacted the most by the health impacts of climate change<sup>52</sup>. According to the CSC committee, the health system within the City has been able to manage the COVID pandemic. As of January 15, 2022, since the start of the pandemic, Ontario County has experienced 17,249 positive cases and 163 deaths<sup>53</sup>. The CDC Social Vulnerability Index identifies communities that may need support before, during, or after a natural disaster (e.g., major weather related or disease outbreak) or human-induced event (chemical spill) using 15 U.S. census variables<sup>54</sup>. Social vulnerability refers to the resilience of a community or its ability to withstand potential negative effects on communities caused by external stresses on human health. It is important to reduce

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<sup>49</sup>University of Rochester Medicine (URM) Thompson Health (n.d.). Accessed <https://www.thompsonhealth.com/About-Us>

<sup>50</sup> NYS (n.d.). Health Data NY. Community Health: Asthma Hospitalization Rate per 10,000 Accessed <https://health.data.ny.gov/Health/Community-Health-Asthma-Hospitalization-Rate-per-1/g4s7-6fn9>

<sup>51</sup> NYS (n.d.). Health Data NY. Community Health: Lyme Disease Incidence Rate per 100,000 Accessed <https://health.data.ny.gov/Health/Community-Health-Lyme-Disease-Incidence-Rate-per-1/6sxr-cqij>

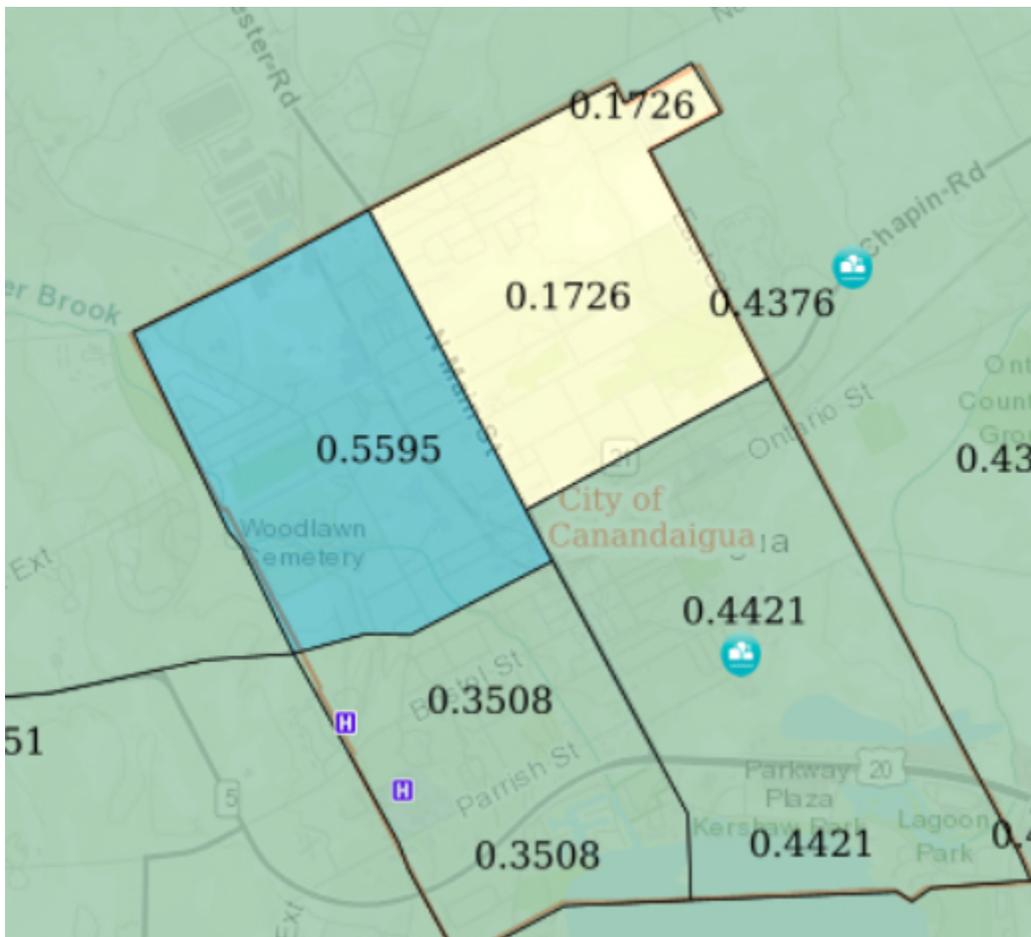
<sup>52</sup> World Bank (2021, November 3). “COVID-19 Responses Could Help Fight Climate Change”. Accessed <https://www.worldbank.org/en/news/press-release/2021/11/03/covid-19-responses-could-help-fight-climate-change>

<sup>53</sup> Ontario County (n.d.). Public Health. Accessed <https://ontariocountyny.gov/101/Public-Health>

<sup>54</sup> Agency for Toxic Substances and Disease Registry (n.d.). CDC/ATSDR SVI Fact Sheet Accessed [https://www.atsdr.cdc.gov/placeandhealth/svi/fact\\_sheet/fact\\_sheet.html](https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/fact_sheet.html)

social vulnerability as these types of events may cause economic losses and human suffering. The variables used to create this index include socioeconomic status, household composition/disability, minority status/language, and household type/transportation<sup>54</sup>. The index ratings are from 0 to 1, 1 being the highest vulnerability and 0 being lowest vulnerability).

The City of Canandaigua Social Vulnerability Index results is shown in Figure 12 and ranges from 0.17 to 0.56<sup>16</sup>. The northwest quadrant (Ward 4) is considered to have a population with a moderate to high vulnerability, while the rest of the City has a low or low to moderate level of vulnerability. Understanding Social Vulnerability can be used to develop evaluation plans for elderly persons or people without access to vehicles, areas that may need emergency shelters, estimate food supplies or number of emergency personnel.



**Figure 12:** Social Vulnerability Index Results for the City of Canandaigua<sup>16</sup>

#### 4.4.C. Emergency Services

The City has a very efficient police department as noted by the low crime rates in the area<sup>46</sup> ). The police department has been operating in the City since 1913 and is able to respond to a variety of events and ready to protect/assist residents, visitors, and business owners. If other expertise or manpower is needed, the City has arrangements with the Ontario County Sheriff's Office, Geneva Police Department and the New York State Police<sup>55</sup>. According to the Annual Report, the Police department responded to 8,400 calls to 911 and with an average response time of 2 min and 59 seconds<sup>56</sup>. The police department also responded to over 60,745 calls for service in 2020<sup>56</sup>. According to the NCS Survey, 7 of 10 residents rated the quality of services provided by the Police Department as excellent or good and 9 in 10 residents rated each aspect of the Fire Department as excellent or good<sup>57</sup>.

Fire department was founded in 1816 Canandaigua Fire Department was founded in 1816 and is composed of 9 full-time, 5 part-time, and a handful of volunteer firefighters<sup>58</sup>. In 2017, the Fire Department responded to a total of 1,433 incidents, an average of 3.9 per day, an increase of 32.2 % since 2013<sup>59</sup>. The VA hospital located within the city has its own full-time fire department with a total of 12 personnel<sup>59</sup>. Findings from this report recommend renegotiating their fire services agreement and delete the stipulation that Station 2 be staffed 24/7 and that the Canandaigua Fire Department deploy both on-duty firefighters on a single unit, responding from Station 1 (rather than one from each station), and providing more support to encourage the recruitment of more volunteer firefighters<sup>59</sup>.

A challenge related to emergency services is that there are many volunteer departments but not a sufficient number of volunteers. Sharing fire services is an opportunity to explore to ensure the quality of services provided to the City.

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<sup>55</sup> City of Canandaigua Police Department (n.d.). Accessed [https://www.canandaiguanewyork.gov/index.asp?SEC=7904BBAC-8D94-4F6D-BF04-2AFC97907993&Type=B\\_BASIC](https://www.canandaiguanewyork.gov/index.asp?SEC=7904BBAC-8D94-4F6D-BF04-2AFC97907993&Type=B_BASIC)

<sup>56</sup> Canandaigua Police Department (2020). 2020 Annual Report. Accessed [https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/2020\\_Annual\\_Report.pdf](https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/2020_Annual_Report.pdf)

<sup>57</sup> National Citizen Survey™ (The NCS) 2018. Canandaigua, NY Livability Report. Accessed [https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/The\\_NCS\\_Community\\_Livability\\_Report\\_Canandaigua\\_2018.pdf](https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/The_NCS_Community_Livability_Report_Canandaigua_2018.pdf)

<sup>58</sup> City of Canandaigua Fire Department (n.d.) Accessed [https://www.canandaiguanewyork.gov/index.asp?SEC=72E27579-52CE-41E7-BAA3-4193F87AEC86&Type=B\\_BASIC](https://www.canandaiguanewyork.gov/index.asp?SEC=72E27579-52CE-41E7-BAA3-4193F87AEC86&Type=B_BASIC)

<sup>59</sup> Center for Public Safety Management (CPSM) (2018). Fire and Operational Analysis Report: City and Town of Canandaigua, NY. Accessed [https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Canandaigua\\_Final\\_Report\\_Fire\\_Analysis\\_07082018\(1\).pdf](https://www.canandaiguanewyork.gov/vertical/sites/%7BA388F052-E1B1-4CA4-8527-A8BB46320BB9%7D/uploads/Canandaigua_Final_Report_Fire_Analysis_07082018(1).pdf)

### **4.4.3. Cultural and Historical Resources**

As noted in the NRI<sup>15</sup>, the City has 26 locations (including private homes) that are on the state or national historic registry. The City of Canandaigua has cultural resources that include a historic downtown district, a variety of museums such as Ontario County Historical Society (OCHS), Sonnenberg Gardens, Granger House, and the Fort Hills Performing Arts Center. Several other buildings are highlighted in the NRI including the Ontario County Courthouse where Susan B. Anthony was found guilty and fined for voting illegally in 1873<sup>15</sup>. More information on the cultural and historical resources can be found in the NRI<sup>15</sup>.

There is a non profit roundtable that used to support cultural resources, but is currently not active. The CSC committee noted it is important to encourage the non profit organizations to collaborate, coordinate and support one another. Arts are important to the community members in the City of Canandaigua, and there are also many public statutes and monuments that need to be maintained, but part of the City's cultural resources. A challenge for the City is ensuring the support of these resources, as they are interconnected with tourism and economic growth.

From a social/human resource perspective, the CSC committee<sup>19</sup> notes the importance of maintaining quality workforce housing, keeping prices affordable and properties in good repair. It is also important for the community to have a broad range of restaurant choice, styles, and options (carryout/ sit down). Finally, the CSC committee<sup>19</sup> notes an opportunity to reconsider developing community gardens again. Some concerns from a cultural resource perspective is that private but historic homes may be subject to tree damage and flooding is currently considered more of a nuisance and not causing a significant risk of loss. The Sonnenberg Garden is an important resource and tourism draw for the City. The changing climate (extreme temperatures, increased precipitation, etc.) could impact the gardens negatively and therefore impact tourism and the economy.

### **4.4.4 Summary of Climate Risks to Socioeconomic Assets**

Climate change can have both positive and negative impacts to the economy, as tourism and therefore the local economy may benefit from extended warmer days, as people enjoy more outdoor recreational activities like hiking, boating, etc. However, warmer weather may hurt traditional winter recreational or snow-dependent businesses like skiing, ice fishing, and so forth.

Climate change effects that cause disruption or delays to transportation, which in turn impact or disrupt emergency services, access to healthcare services, access to food pantries or grocery stores. Heat waves may also impact the quality of life of vulnerable residents (seniors or those living in poverty). Impacts from future changes in the climate may cause more stress on existing healthcare resources and emergency services.

As noted in Section 4.2, increased amounts of precipitation may potentially lead to the development of mold in certain older homes and buildings. Projected increase in extreme precipitation and storm events will increase the risk of physical damage to buildings.

Extreme weather can impact employees that work outside or in buildings without sufficient heating and cooling. Extreme weather events could impact employees' ability to get to and from work.

The increasing number of extreme temperature days may increase the risk of heat-related illnesses, longer seasons for ticks and mosquitoes to breed, carry, and potentially infect the City population and visitors with vector borne illnesses like West Nile virus and Lyme disease. People who work outdoors may be more vulnerable to new or shifting vector borne diseases from the warming temperatures.

#### 4.4.5. Summary of Findings for Socio-economic Assets

As noted in Table 6, the City has strong healthcare resources, a healthy economy rooted in the healthcare industry, tourism and public service sectors, and vibrant arts and cultural historical resources. There are several potential challenges for the City such as ensuring a quality workforce, keeping housing prices affordable, and maintaining resilient medical and emergency resources. The City also needs to continue to work with partners like FLCC, the County, RTS, nonprofit association, and private companies to find opportunities to diversify the economy, caring for elderly population, protect historical and cultural resources

**Table 6:** Key Strengths and Challenges Facing Socioeconomic Systems and Subsystems

Subsystem	Strengths	Challenges	Opportunities
Socio-economic resources	Tourism, healthcare and public service industries  Health economy, educated workforce, and low unemployment	Need for a diverse economy  Need for workforce development pipeline for healthcare and viticulture industries  Need for maintaining quality workforce housing  Aging population  Keeping prices	Partnerships with FLCC and County to ensure workforce pipeline

		<p>affordable and properties in good repair</p> <p>Maintaining a broad range of restaurant choice, style, carryout, sit down</p>	
Public health resources	<p>Healthcare services</p> <p>Ontario County provides social services</p> <p>Efficient emergency services</p>	<p>Care for aging population, living spaces, resources, more skilled nursing</p> <p>Need volunteers for fire department</p>	Shared fire services
Cultural and historical resources	Vibrant arts and historical/culture resources	<p>Maintaining historic district</p> <p>Supporting historic and cultural resources as they are interconnected with tourism</p> <p>Sonnenberg gardens may experience negative impact from climate changes</p>	<p>Consider developing community gardens</p> <p>Engage non profit roundtable</p>

## **Section 5: Conclusions and Recommendations**

This document identifies and analyzes the effects of relevant climate hazards on major assets in the City of Canandaigua. The report was informed by both the science, staff of the City, and discussions with the CSC committee. Feedback of the CSC committee has been critical to the development of the report.

This information in this report will be helpful input for future community development projects and municipal development planning. This report, along with additional community input, research, and re-assessment may also serve a foundation for a future Climate Action Plan. A Climate Action Plan can be critical in helping the City of Canandaigua identify and implement additional climate mitigation and adaptation efforts in a cost-effective and efficient manner.