

Chapter 2. General Description



2. General Description of the Watershed

2.1 Watershed and Subwatershed

2.1.1 The Oswego River Basin

The Cayuga Lake Watershed is part of the Oswego River Basin. The Oswego River Basin in Central New York State is a diverse system made up of many hydrologic components that flow together. Water flows from (1) upland streams down to, (2) the Finger Lakes, then to (3) low-gradient rivers and the New York Barge Canal, and (4) ultimately to Lake Ontario (see Figure 2.1.1.1). Within the Oswego River Basin, Cayuga Lake is downstream of Keuka and Seneca Lake. Keuka Lake waters flow into Seneca Lake via the Keuka Lake Outlet. Seneca Lake waters flow into the extreme northern end of Cayuga Lake via the Seneca-Cayuga Canal.

The Oswego River Basin has an area of 5,100 square miles, and encompasses three physiographic provinces (see Figure 2.1.1.2). These include Appalachian Plateau (the area to the south of 1,000 foot contour); Tug Hill Plateau (the circular area to the northeast, within the 1,000 foot contour); and the Lake Ontario Plain (the area south of Lake Ontario). One additional, “unofficial” geographic area is significant in the flow regime of the Basin. This area is the “Clyde/Seneca River-Oneida Lake Trough”, a belt of lowlands running from west to east within the 500-foot elevation contour – Cayuga and Seneca Lakes are also part of this trough due to extensive glacial deepening of these two Finger Lake valleys. The Trough is key to understanding the Oswego River Basin flow system in its natural and human-altered condition.

The trough is a product of regional geology and glaciation. During and following the last Ice Age (ending about 14,000 years ago), glaciers carved out erodible shales which lie between the Lockport Dolomite bedrock “ridge” to the north and Onondaga Limestone bedrock “ridge” to the south and subsequently filled the trough with mixtures of clay, silt, sand, and gravel. The result was a very flat, low-lying area with many square miles of wetland, some of which are now farmed as muckland. The New York State Barge Canal was constructed within the trough, due to its exceptionally low gradient. Along the main stem of the canal, between Locks 27 and 24, the Canal surface elevation drops only 23 feet in 60 miles. Prior to the construction of the canal, the elevation change was about 0.4 feet/mile; with the canal, the elevation changes occur as steps at each of the canal locks. The very low gradient prior to and after canal construction poses a water-



Figure 2.1.1.1 Location of the Oswego River in Central NY



Figure 2.1.1.2 Generalized Land Surface Elevations in Oswego River Basin

resources management challenge, because it is very difficult to move large volumes of water through such a low-gradient area.

Surface water and groundwater flow from upland watersheds to receiving rivers and lakes and then to the New York State Barge Canal (see figure 2.1.1.3). As an example, the outlet of Keuka Lake is at a relatively high elevation in the western part of the basin (about 700 feet above sea level). Water flows from Keuka to Seneca Lake with a change in elevation of about 270 feet, and from the outlet of Seneca Lake the fall is only 60 feet to the northern end of Cayuga Lake. Water flows from Cayuga Lake to the Barge Canal through a gated-structure at Mudlock where the fall is only 9 feet. During some major storm-runoff periods the Barge Canal elevation near Montezuma, New York (just downstream of the Cayuga Lake outlet) has been higher than the Cayuga Lake elevation, and if the Mudlock gates were open, water would have flowed from the Barge Canal into Cayuga Lake.

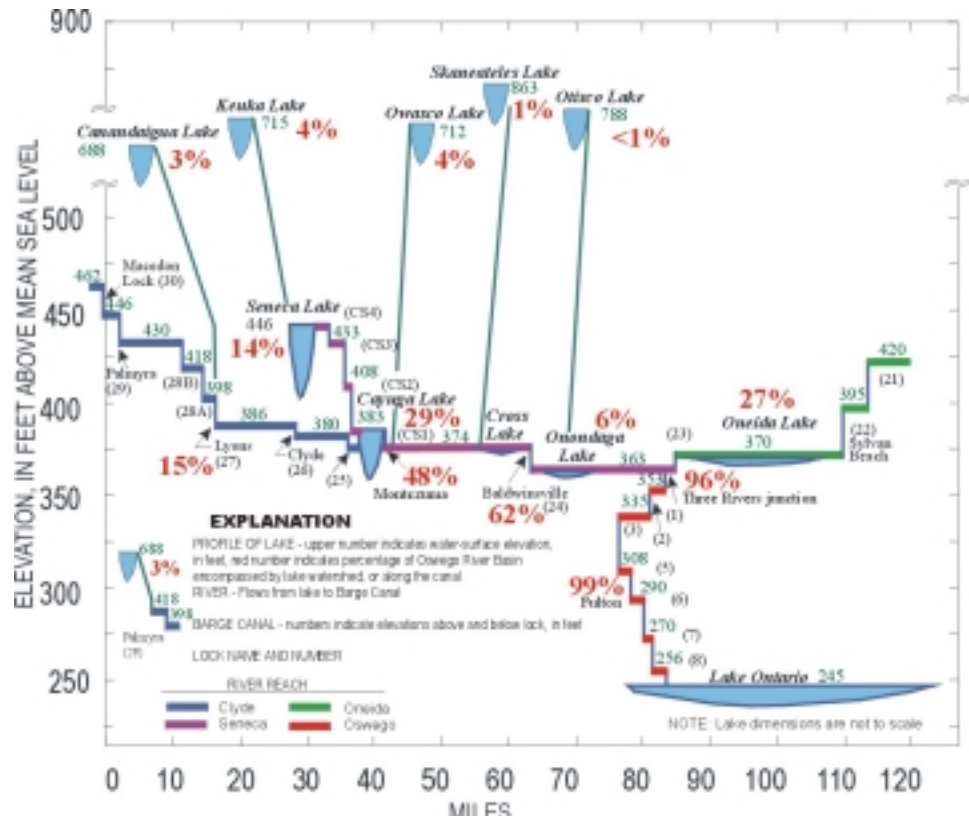


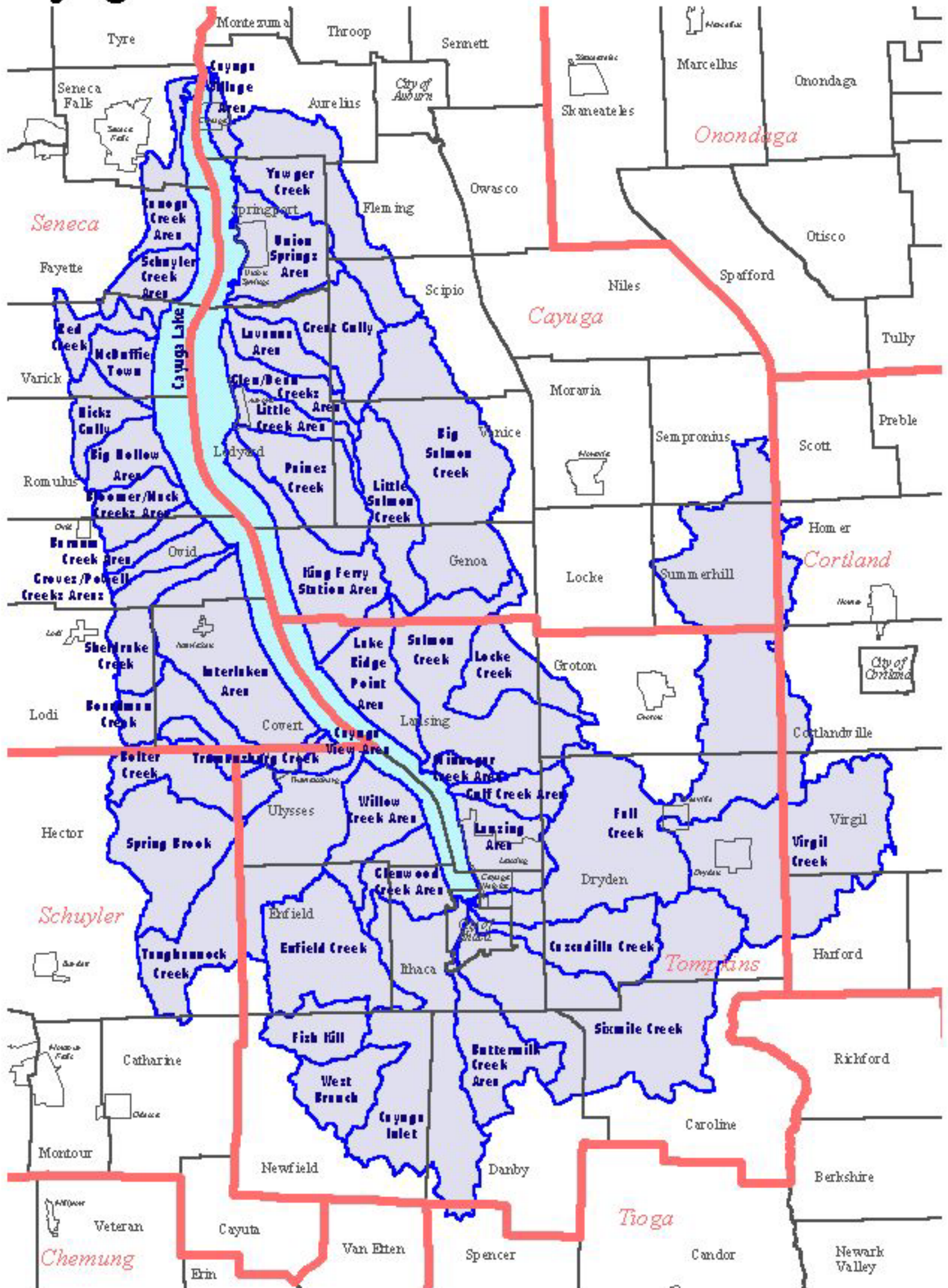
Figure 2.1.1.3. Water-feature elevations, lock location and number, and selected watershed areas.

Near Montezuma (just downstream of the Cayuga Lake outlet), 48 percent of the Oswego River Basin’s 5,100 square miles is represented. Further down the trough, water is added from Owasco, Skaneateles, and Otisco Lake watersheds, which, like the neighboring Finger Lakes, are at higher elevations and drain readily to the trough. In a similar fashion, the uplands around Oneida Lake drain to the eastern end of the trough from the surrounding watershed. The additive contribution of each stream and Finger Lake to the Barge Canal results in a bottleneck at the Three Rivers junction (the confluence of the Seneca, Oneida, and Oswego Rivers). At this junction, fully 96 percent of the Oswego River Basin is represented, paradoxically, this is the flattest, slowest moving stretch within the Oswego Basin. At times, the water discharges to the trough exceed the channel capacity, resulting in flooding within the Seneca and Cayuga Lakes and along the Seneca and Oneida Rivers. Once the water reaches the Oswego River, downstream of Fulton, the gradient increases markedly to 118 feet in 29 miles (4 feet/mile), and water has the potential to move more readily toward Lake Ontario (Kappel, 1999).

2.1.2. The Cayuga Lake Watershed

The Cayuga Lake Watershed covers 785 square miles. There are 44 municipalities and six counties that are all or partially in the watershed (see Figure 2.1.2.1). The watershed is home to over 120,000 people. For the purposes of this study the watershed has been divided into 19 major subwatersheds (18 tributary-based subwatersheds and the remainder in direct drainage) (see Map 4.1.1) and then further broken down into 46 minor subwatersheds based on the major tributaries of Cayuga Lake (see Map 2.1.1a and Map 2.1.1b).

Cayuga Lake Watershed and Subwatersheds



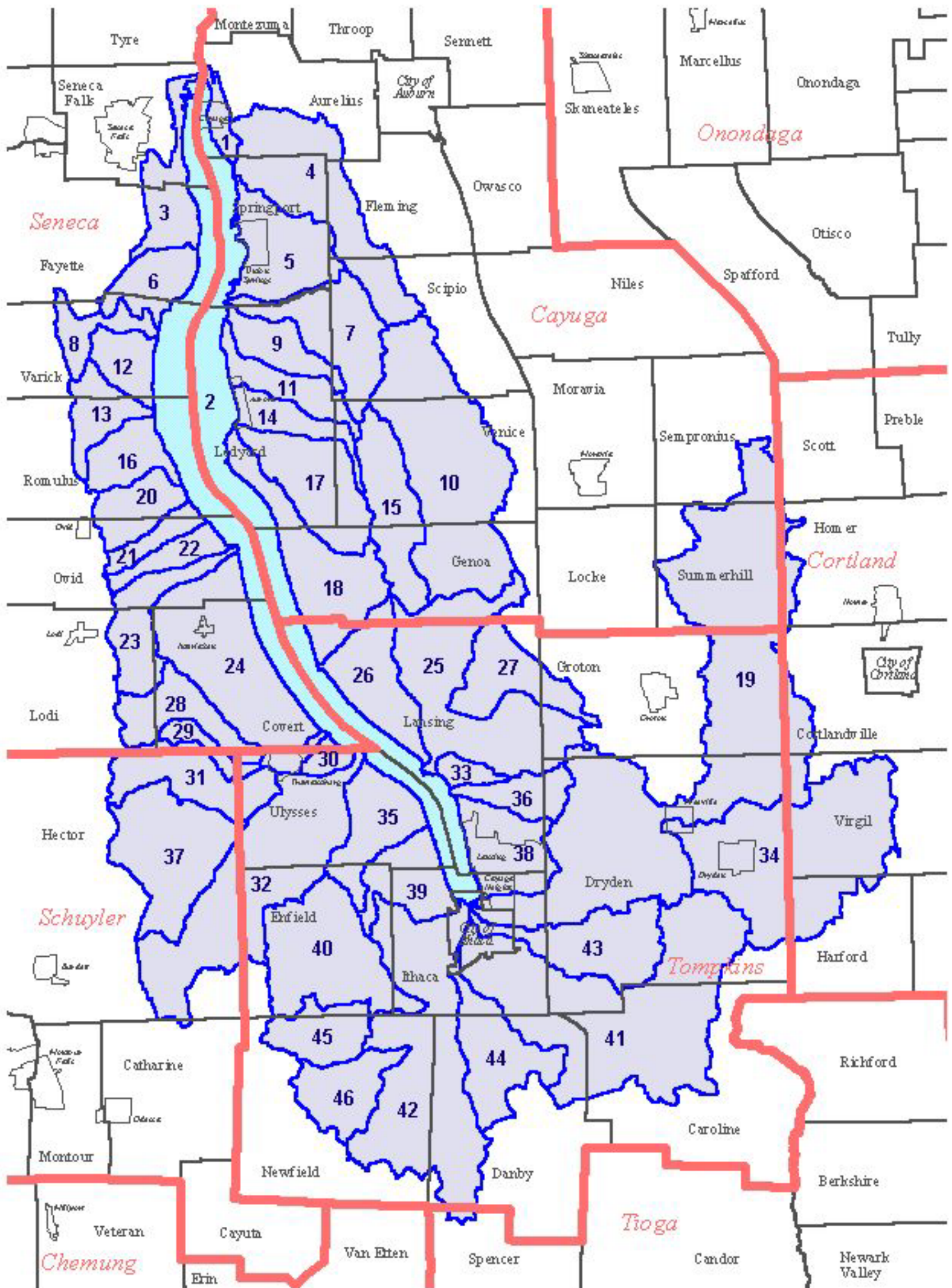
This map was prepared for the New York State Department of State with funding from the Environmental Protection Act. Additional funding was provided through the Empire State Development Corporation.

Source: Genesee/Finger Lakes Regional Planning Council, 1998.

Base Map: New York State Department of Transportation, February 1996.

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 Prepared by Genesee/Finger Lakes Regional Planning Council, 1998

Cayuga Lake Watershed



1:374863



This map was prepared for the New York State Department of State with funding from the Environmental Protection Act. Additional funding was provided through the Empire State Development Corporation.

Source: Genesee/Finger Lakes Regional Planning Council, 1998.

Base Map: New York State Department of Transportation, February 1996.

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Cayuga Lake Subwatersheds

- 1 Cayuga Village Area
- 2 Cayuga Lake
- 3 Canoga Creek Area
- 4 Yawger Creek
- 5 Union Springs Area
- 6 Schuyler Creek Area
- 7 Great Gully
- 8 Red Creek
- 9 Lavanna Area
- 10 Big Salmon Creek
- 11 Glen/Dean Creeks Area
- 12 McDuffie Town
- 13 Hicks Gully
- 14 Little Creek Area
- 15 Little Salmon
- 16 Big Hollow Area
- 17 Paines Creek
- 18 King Ferry Station Area
- 19 Fall Creek
- 20 Bloomer/Mack Creeks Area
- 21 Barnum Creek Area
- 22 Groves/Powell Creeks Areas
- 23 Sheldrake Creek
- 24 Interlaken Area
- 25 Salmon Creek
- 26 Lake Ridge Point Area
- 27 Locke Creek
- 28 Boardman Creek
- 29 Trumansburg Creek
- 30 Cayuga View Area
- 31 Bolter Creek
- 32 Taughannock Creek
- 33 Minnegar Creek Area
- 34 Virgil Creek
- 35 Willow Creek Area
- 36 Gulf Creek Area
- 37 Spring Brook
- 38 Lansing Area
- 39 Glenwood Creek Area
- 40 Enfield Creek
- 41 Sixmile Creek
- 42 Cayuga Inlet
- 43 Cascadilla Creek
- 44 Buttermilk Creek Area
- 45 Fish Kill
- 46 West Branch

The center of Cayuga Lake is located at latitude 42° 41' 30" N and longitude 76° 41' 20" W. Its altitude is 382 feet above sea level. Cayuga Lake is the longest, widest, and has the largest drainage basin and the most shoreline of the

eleven Finger Lakes. It has a length of 38.2 miles, a mean width of 1.75 miles, a maximum depth of 435 feet and a shoreline of 95.3 miles. It takes over 10 years for water to cycle through its system.

The Cayuga Lake Watershed has excellent natural resources including wildlife, parks, fisheries, wetlands, and forests. The watershed is an important link in the waterfowl flyway of the Atlantic Coast. Seasonal use includes approximately 314 bird species, including many shorebirds and waders. There are seven state parks and numerous county/town parks which provide public access to the lake as well as preserve the integrity of various natural resources. The watershed is an important habitat for both warm and cold water fisheries including lake trout and four species of salmonoids. There is over 6,000 acres of high quality wetlands and thousands of acres of valuable forests which are important for timber, wildlife, recreation, and water quality.

The Cayuga Lake Watershed has excellent cultural and historical resources. There are many unique historical and Native American sites that provide insight into the customs and activities that shaped the local landscapes and communities. Many of these activities are closely linked to Cayuga Lake and its tributaries.

The Cayuga Lake Watershed has some of the richest, fertile agricultural soils in the nation. The watershed sustains a flourishing fruit and wine industry as well as hundreds of cash crop, beef, and dairy farms, including millions of dollars in cash receipts annually (\$176,423,000 according to the 1992 Census of Agriculture).

In the Cayuga Lake Watershed, tourism and recreational activities include day visit boats; power, sail, and personal watercraft; marina, launching, and boat services; bicycling tours; fishing tournaments and recreational fishing visits; waterfowl hunting visits; bird watching; swimming and camping; and public and private golf courses.

Cayuga Lake is a public and private drinking water supply. Numerous communities and hundreds of households depend on Cayuga Lake and its watershed as a drinking water source from both surface and ground waters.

Figure 2.1.2.1
Municipalities in the Cayuga Lake Watershed

Tompkins County	Cayuga County
• Town of Carline	• Town of Summerhill
• Town of Danby	• Town of Genoa
• Town of Newfield	• Town of Sempronius
• Town of Dryden	• Town of Locke*
• Town of Ithaca	• Town of Venice
• Town of Enfield	• Town of Ledyard
• Town of Lansing	• Town of Scipio
• Town of Ulysses	• Town of Fleming
• Town of Groton	• Town of Aurelius
• City of Ithaca	• Town of Springport
• Village of Dryden	• Village of Aurora
• Village of Trumansburg	• Village of Union Springs
• Village of Lansing	• Village of Cayuga
• Village of Cayuga Heights	Tioga County
• Village of Freeville	• Town of Spencer
Schuyler County	Seneca County
• Town of Hector	• Town of Covert
• Town of Catharine*	• Town of Lodi
Cortland County	• Town of Ovid
• Town of Harford	• Town of Romulus
• Town of Virgil	• Town of Fayette
• Town of Cortlandville	• Town of Varick
• Town of Scott*	• Town of Seneca Falls
• Town of Homer	• Village of Interlaken

* Municipalities with small portion in watershed