



## Chapter 2: Basin Overview

### General Overview<sup>1</sup>

The Genesee River drains about 2,500 square miles in the states of New York and Pennsylvania (See Map 1, page 6). Roughly elliptical in shape, with a major north-south axis of about 100 miles and a maximum width of about 40 miles, its drainage area encompasses parts of nine counties in New York and one in Pennsylvania. The basin is split into two primary hydrologic units—Upper and Lower—at the Mount Morris Dam, built and operated by the US Army Corps of Engineers in 1952. The Genesee River has a total length of about 157 miles, originating in the Allegheny Mountains in Potter County, Pennsylvania, at an elevation of about 2,500 feet. It flows generally northwest to approximate river mile 106 near Houghton, New York, and then shifts to the northeast to its mouth on Lake Ontario, entering the lake at an elevation of about 247 feet.

The topography of the southern portion of the basin (Upper Basin), upstream of the dam, is steep and rugged, while the northern portion (Lower Basin) is gently rolling. Geologically, the Upper Basin is in an early stage of development, while the Lower Basin has reached a relatively mature stage with considerable meandering, a wide flood plain, and numerous oxbows. Upstream of the Mount Morris Dam the river drops from an elevation of about 1,080 feet to 768 feet over three successive falls. Known as the “Grand Canyon of the East,” the land surrounding this portion of the river has been preserved as the 14,350-acre Letchworth State Park, offering visitors spectacular views of the gorge and falls below. After exiting the park, the river flows through narrow valleys and gorges to enter the broad Genesee Valley in the village of Mount Morris. From this point to the City of Rochester, the river valley is a flat alluvial plain up to three miles wide, an area that was subject to frequent flooding before the construction of the Mt. Morris Dam. At Rochester, the river drops over three falls from an elevation of 513 to 247 feet. Between Letchworth State Park and the headwaters, the average stream slope is 8.9 feet per mile, while between Rochester and Mount Morris the average stream slope is 0.8 feet per mile.

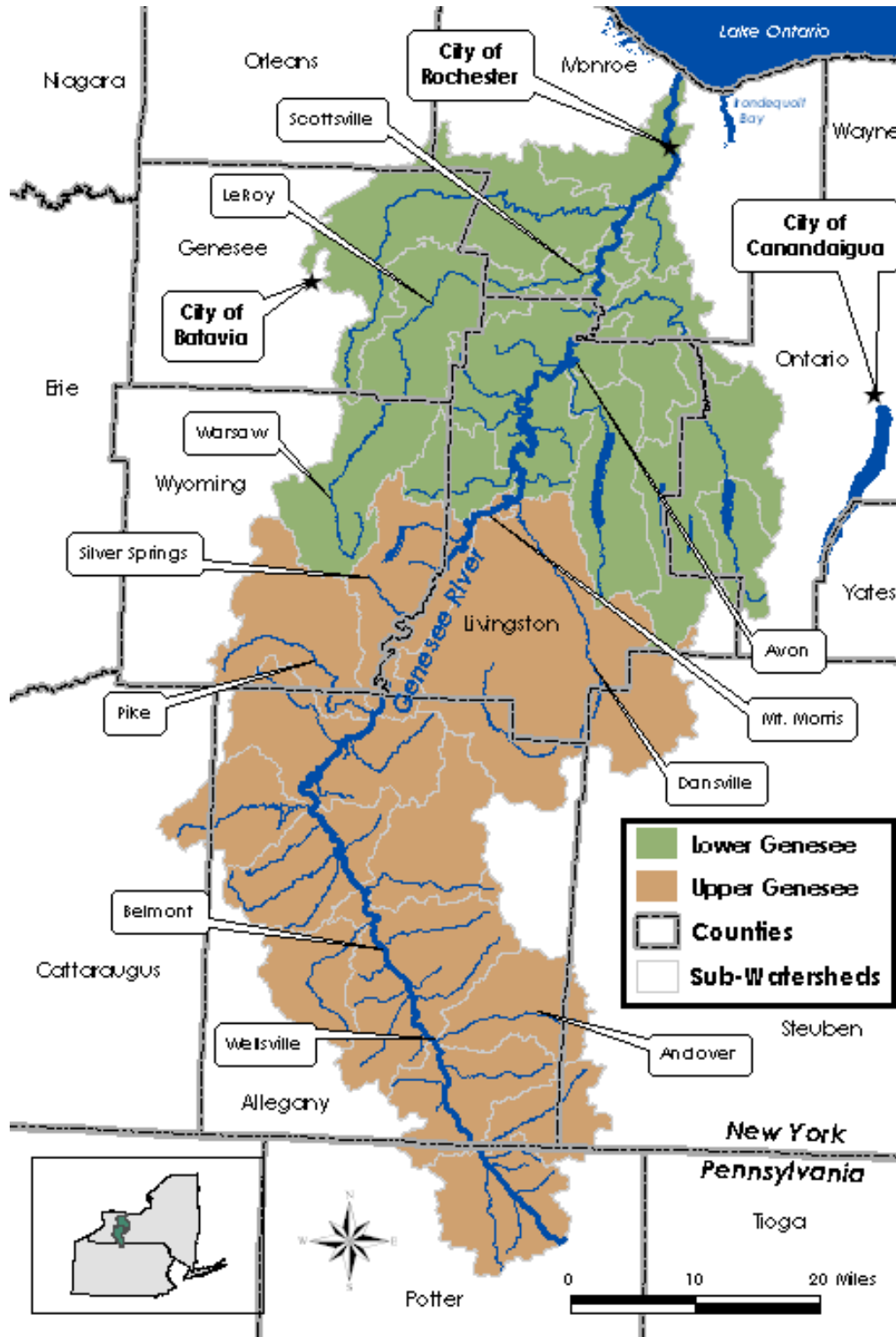
The largest tributary of the Genesee River is Canaseraga Creek (See Map 2, page 7). It has a drainage area of 334 square miles and joins the Genesee River near Jones Bridge, just downstream of Mount Morris at approximate river mile 62. It resembles the Genesee River in that its upper reaches, above the Village of Dansville, are steep and rugged, while its lower valley is a flat alluvial plain that is frequently flooded for long durations of time. Above Dansville, the main stem of the creek has a slope of about 40 feet per mile, while from Dansville to its mouth the slope is about 3 feet per mile. The Canaseraga Creek basin is roughly square in shape, about 20 miles across at its widest point. The main stem, which rises at an approximate elevation of 1,900 feet, has a length of 42 miles and joins the Genesee River at approximate

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<sup>1</sup> Adapted from US Army Corps of Engineers, Anthony Friona, *Scoping Report for the Genesee River 516(e) Sediment Transport/Delivery Model*, 2003.

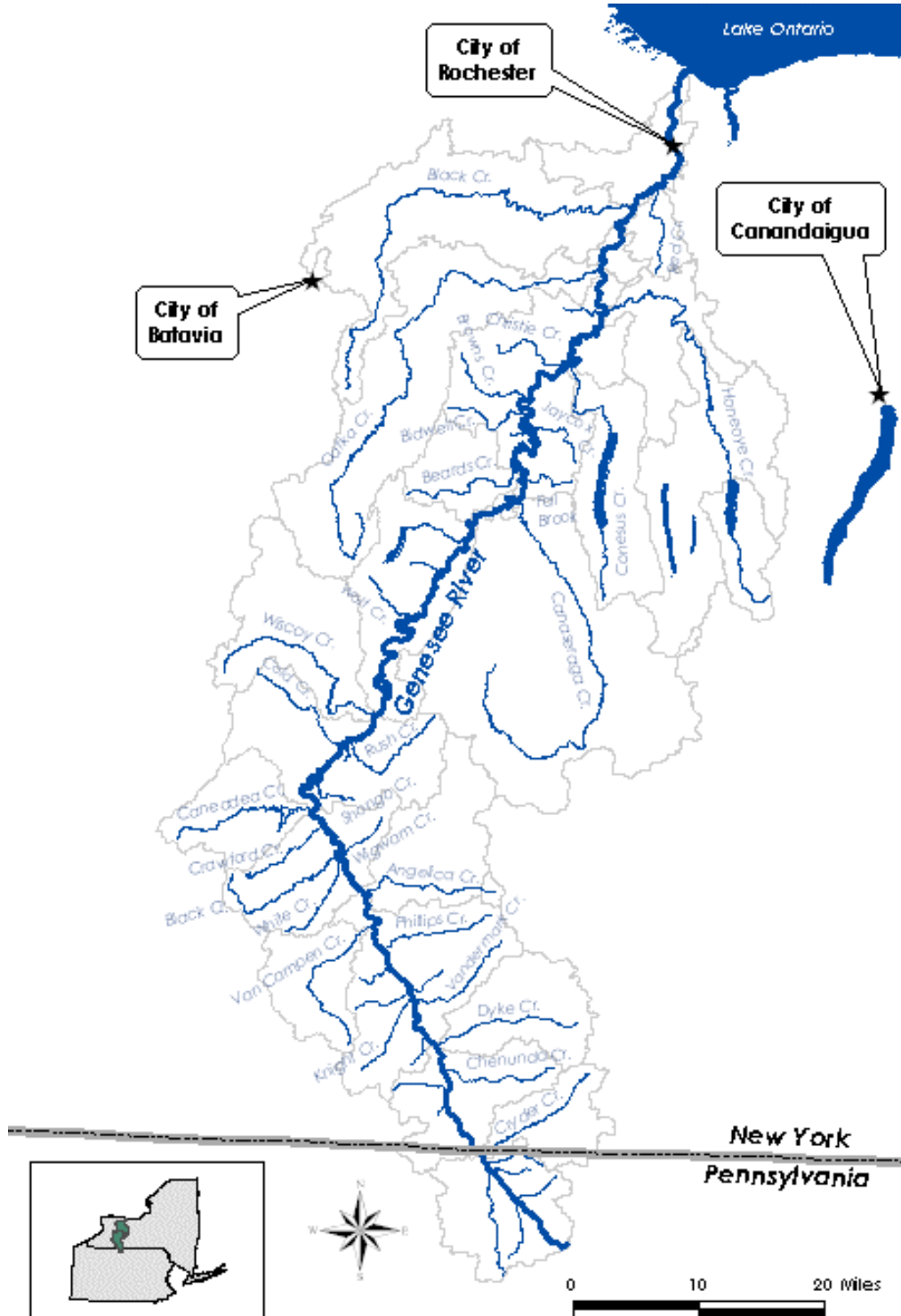


**Map 1: Overview of the Genesee River Basin**





Map 2: Genesee River Basin Hydrography





## GENESEE RIVER BASIN ACTION STRATEGY

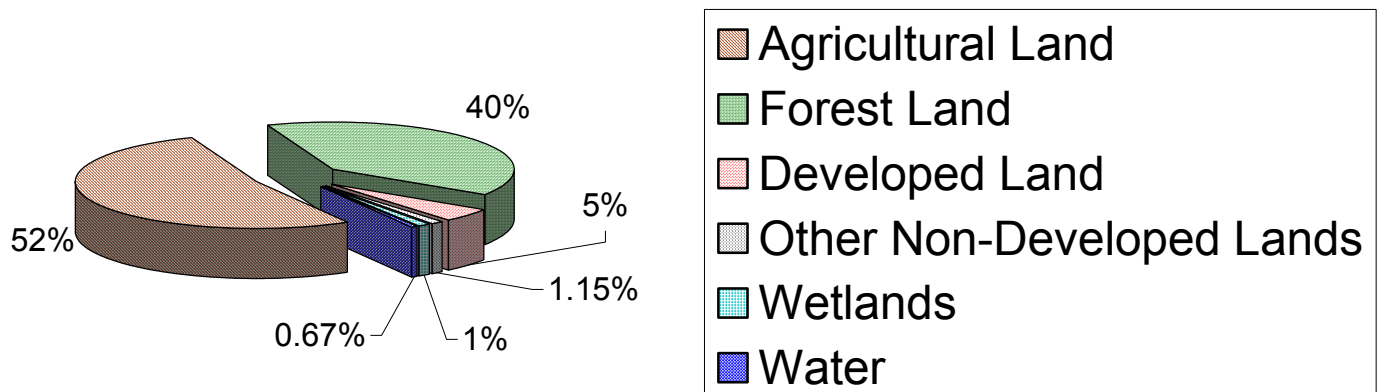
elevation of 548 feet. Other tributaries of the Genesee have a wide range in size and topographic characteristics. For example, Angelica Creek, located in the upper basin, has a drainage area of 85 square miles and is topographically rugged, with a main-stream slope of 38 feet per mile. Conversely, Black Creek, located in the lower basin, has a drainage area of 214 square miles. Its basin is relatively level and marshy with a main-stream slope of 6.5 feet per mile. Similar variations can be found throughout the entire Genesee River Basin.

### Land Use

A wide range of land use patterns may be found in the Genesee River Basin. As one travels north-to-south through the Basin, the predominant urban land use typology gradually gives way to more rural/agrarian uses. The City of Rochester and its surrounding suburbs, concentrated in the northern-portion of the Basin, comprise the most significant area of urban/developed land. The suburban fringe gradually gives way to agricultural land in the fertile Genesee River Valley, which is the predominant land use throughout much of Livingston, Genesee, Wyoming and Allegany Counties. Further south near the New York/Pennsylvania border, forested lands gradually become more common. Numerous enclaves and population centers provide exceptions to these land use typologies throughout the Basin.

Approximately 52 percent of the land in the Basin is used for agriculture, while 40 percent is forested (Figure 2-1).<sup>2</sup> Approximately 4.6 percent of land in the watershed is classified as developed land, falling within either *residential*, *commercial*, *industrial*, *transportation/utilities*, *industrial/commercial*, or *mixed urban* categories. The final major land use/land cover categories are wetlands and water, comprising just under 2 percent of the total coverage area. There are about 42,000 acres of state regulated wetlands, 5,048 miles of rivers and streams and 13,288 acres of significant lakes, ponds and reservoirs within the basin.<sup>3</sup>

**Figure 2-1: Genesee River Basin Land Use (GIRAS, 1998)**



<sup>2</sup> Data obtained from the Geographic Information Retrieval and Analysis System (GIRAS), 1998 data. For more information on GIRAS, refer to <http://gis.esri.com/library/userconf/proc03/p0904.pdf>. Retrieved 13 August 2004.

<sup>3</sup> NYSDEC, Division of Water. *The 2001 Genesee River Basin Waterbody Inventory and Priority Waterbodies List*. 2001. Available online at <http://www.gflrpc.org/GeneseeRiver.htm>. Retrieved 13 August 2004.



## Water Quality

The summary below uses data derived from the *2001 Genesee River Basin Waterbody Inventory and Priority Waterbodies List (WI/PWL)*. As stated in the New York State Water Quality Monitoring Strategy:

The *Waterbody Inventory (WI)* refers to the listing of all waters, identified as specific individual waterbodies, within the state that are assessed... The *Priority Waterbodies List (PWL)* is the subset of waters in the WI that have documented water quality impacts, impairments or threats. The PWL provides the candidate list of waters to be considered for inclusion on the [federal] Section 303(d) List.

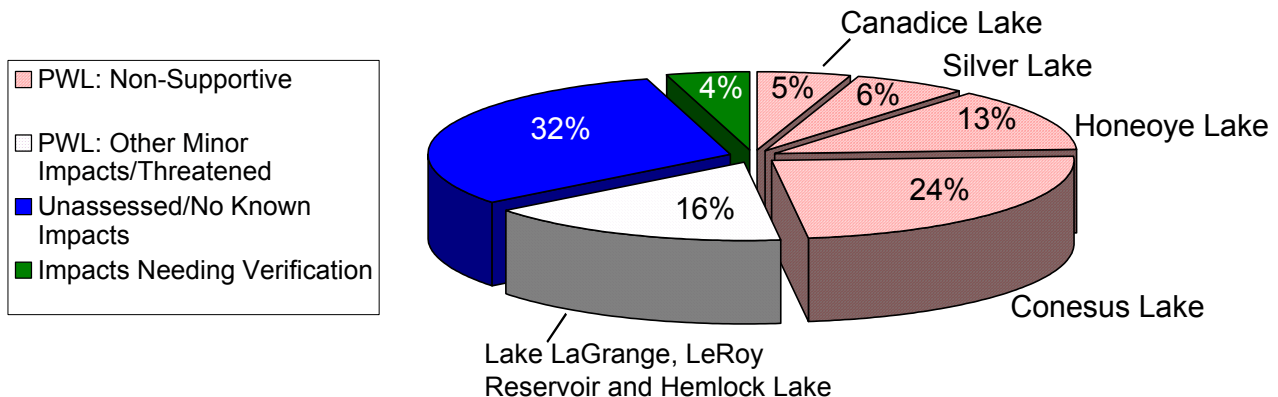
The WI/PWL is periodically drafted by the DEC in order to fulfill the requirements mandated by the Federal Clean Water Act. Data used in the WI/PWL is drawn from information provided by a number of programs and sources both within and outside the DEC.<sup>4</sup>

### Extent of Impairment

#### Lakes, Ponds and Reservoirs

Of the 31 large water bodies located within the basin (i.e. lakes, reservoirs and large ponds), nine are listed in the PWL, six of which require *Total Maximum Daily Load (TMDL)* development. There are a total of 13,288 lake acres within the Genesee River basin, 64% of which are included on the PWL (Figure 2-2). The majority of PWL water acres are classified as *not supporting uses* and are dispersed among four relatively large lakes: Canadice, Silver, Honeoye, and Conesus. Two large water bodies are listed as having *other minor impacts*—Lake LaGrange and the LeRoy Reservoir. Hemlock Lake is listed as *threatened*, placing it within this PWL category as well.

**Figure 2-2: 2001 PWL Water Quality Assessment for Lakes, Reservoirs and Ponds of the Genesee River Basin (Percentage of Total Surface Water Acres)**



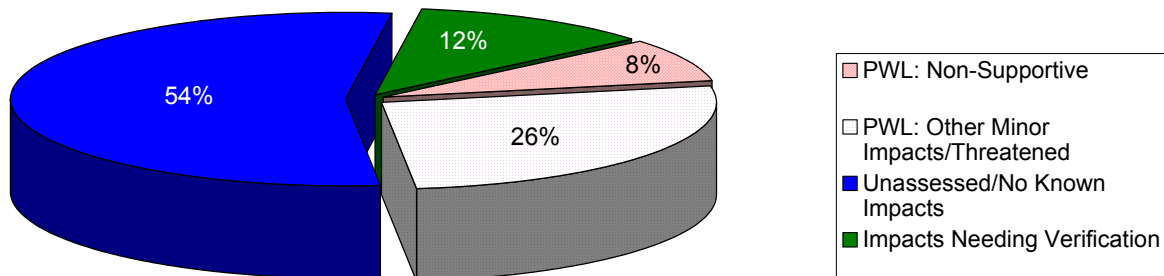
<sup>4</sup> Visit <http://www.gflrpc.org/GeneseeRiver.htm> for the WI/PWL and supplemental Basin water quality data.



### Rivers and Streams

Of the 5,048 stream miles in the Genesee River basin, 1,733 miles (34%) are included on the DEC's 2001 PWL, 8% of which is listed as *non-supportive* (i.e. not supporting one or more appropriate uses, such as bathing or fishing) and the remaining 26% is listed as having *other minor impacts* or as *threatened* (Figure 2-3). The majority of these segments are along the Genesee River, Black Creek, Oatka Creek and the Canaseraga Creek. The vast majority of river and stream miles in the basin, 2,723.9 miles (54%), have either not been assessed or have no known impacts. There are 591.3 miles (12%) of river and stream segments in the basin listed as *needing verification*. These segments are thought to have water quality problems or impacts but lack sufficient or definitive documentation necessary for verification.

**Figure 2-3: 2001 PWL Water Quality Assessment for River and Stream Segments of the Genesee River Basin (Percentage of Total River Miles)**



### Sources of Impairment<sup>5</sup>

#### Lakes, Ponds and Reservoirs

Shoreline development is intense around certain area lakes. For example, almost the entire shoreline of Conesus Lake has been converted to residential development. This 70 square mile watershed encompasses four towns (Geneseo, Livonia, Conesus, and Groveland), the village of Livonia and the Hamlet of Lakeville. Much of the lake development and recreational pressures occurred relatively early, and the lake consequently served as a sink for municipal wastes and septage as well as agricultural runoff.<sup>6</sup> Other area lakes have not experienced the density of development seen on Conesus Lake. For example, land use in the Hemlock Lake watershed is strictly regulated by the City of Rochester, which owns the entire lake shoreline, and uses the lake as a drinking water supply. Hemlock Lake experiences impairments as a result of water

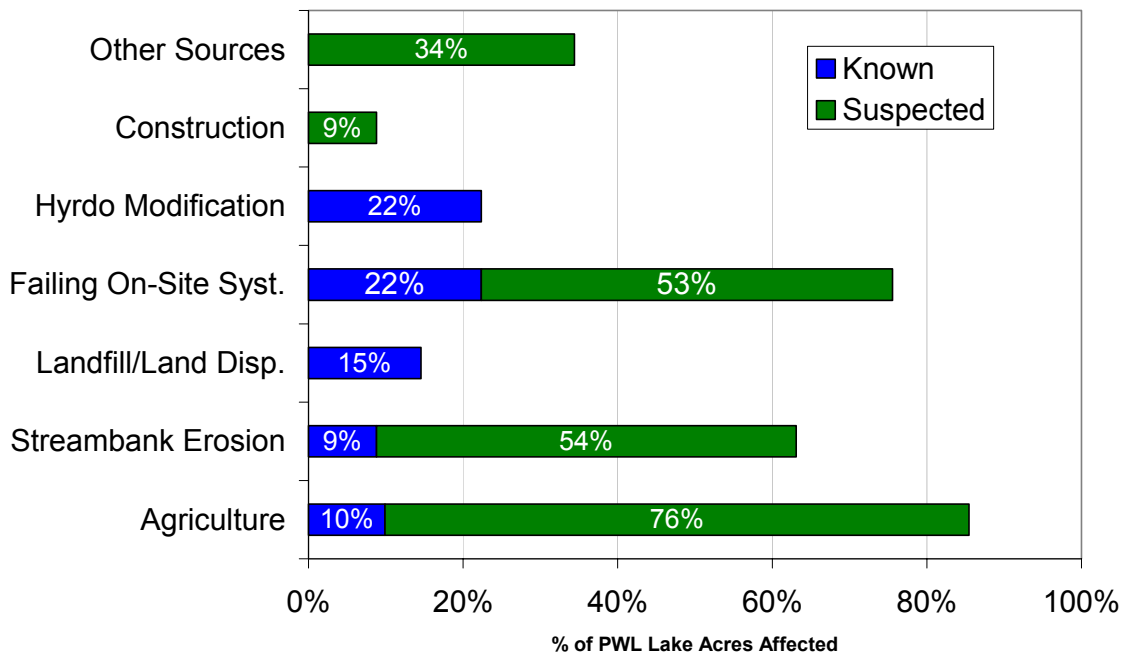
<sup>5</sup> "Sources of Impairment" data considers only *Priority Waterbodies*; i.e. those listed as *non-supportive*, with minor impacts, or as *threatened*

<sup>6</sup> Bloomfield, J.A., Ed, Lakes of New York State: Volume 1. Ecology of the Finger Lakes. New York. Academic Press, 1978.



level fluctuations, accounting for all of the 22% of the total lake acres impaired by hydrological modification in this basin (Figure 2-4).

**Figure 2-4: Sources of Impairment within Priority Lakes, Ponds and Reservoirs of the Genesee River Basin<sup>7</sup>**



### Rivers and Streams

Given that 52% of the land within the Genesee River Basin is devoted to agriculture, it is not surprising that this is the most significant source of impairment in the basin. Included among the stream segments most heavily impaired as a result of agricultural activities are Black Creek (194 total miles impaired), Jaycox Creek (34 miles impaired) and Bigelow Creek (11.8 miles impaired) (Figure 2-5, following page). High levels of nutrients and silt/sedimentation adversely affect a range of uses in these water bodies to varying degrees, primarily recreation, aquatic life and aesthetics. As with impaired water bodies, those with known minor impacts attributable to agricultural activities tend to be on smaller tributaries (e.g. Oatka Creek, East Koy Creek, and Wiscoy Creek).

<sup>7</sup> In Figure 2-4, the category “Other Sources” refers to pollutants of an unknown source or of a specific, anomalous source.



## GENESEE RIVER BASIN ACTION STRATEGY

**Figure 2-5: Sources of Impairment within Priority River and Stream Segments of the Genesee River Basin**

