Cayuga Lake, Northern End (0705-0030) NoKnownImpct

Waterbody Location Information

Revised: 08/14/2007

Water Index No: Ont 66-12-P296 (portion 1)
Hydro Unit Code: 04140201/150 **Str Class:** B(T)
Waterbody Type: Lake
Waterbody Size: 888.2 Acres
Seg Description: portion of lake, as described below

Drain Basin: Oswego-Seneca-Oneida Seneca/Clyde Rivers
Reg/County: 8/Seneca Co. (50)
Quad Map: CAYUGA (J-14-1)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
NO USE IMPAIRMNT		

Type of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: - - -

Source(s) of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: - - -

Resolution/Management Information

Issue Resolvability: 8 (No Known Use Impairment)
Verification Status: (Not Applicable for Selected RESOLVABILITY)
Lead Agency/Office: n/a
TMDL/303d Status: n/a
Resolution Potential: n/a

Further Details

Cayuga Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2002 and continuing through the present. An Interpretive Summary report of the findings of this sampling was published in 2006. Over the years, CSLAP sampling of this large lake has been conducted at four separate site, referred to as the North, Mid-North, Mid-South and South sites; the most recent (2005) sampling was conducted at the North and Mid-South sites. All of these sites are located outside the bounds of this segment of the lake, but are considered generally representative of conditions. These data indicate that the lake continues to be best characterized as mesotrophic to oligotrophic, or moderately productive to unproductive. With the exception of higher clarity and lower algae levels in the mid- north basin, there does not appear to be a statistically significant difference among the results from the different sampling sites. Phosphorus levels in the lake consistently fall below the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements consistently meet what is recommended for swimming beaches. Measurements of pH occasionally fall above the state water quality range of 6.5 to 8.5 but these results appear to be a result of naturally hard water and does not seem to limit the ecology of the lake. The lake water is weakly colored, which considered to be reflective of natural conditions. (DEC/DOW, BWAM/CSLAP, March 2006 and Water Quality Study of the Finger Lakes, DEC/DOW, July 2001)

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates

recreational suitability of the lake to be very favorable since the lake was first evaluated and continuing through the most recent assessment. The recreational suitability of the lake is described most frequently as "could not be nicer." The lake itself is most often described as "not quite crystal clear," an assessment that is slightly more favorable than in other lakes with similar water quality conditions, although perhaps also typical of lakes in which water clarity showed an increase. Both the north and mid-south sites are occasionally described as "slightly" or "substantially" impacted for recreational uses, although these assessments do not correspond to "poor water clarity" or "excessive weed growth" and may be more closely associated with poor weather or other non-water quality factors. (DEC/DOW, BWAM/CSLAP, March 2006)

Invasive species remain a concern in the lake, though there are currently no significant impacts on recreational or other uses. Excessive growth of macrophytic vegetation including Eurasian water milfoil has been previously cited as a problem in the north end of the lake. However the appearance of the European Aquatic Moth (Acentria nivea) has dramatically reduced the impact of milfoil and the aquatic macrophyte community is dominated by lower and later growing native species of plants which have improved the recreational use and aesthetics of the lake. The introduction of the zebra mussel into the lake in the early 1990's has led to a dramatic increase in water clarity. Since 1993, algae blooms have become less frequent. However other potential changes to the ecology of the lake due to zebra mussels should be monitored. (Cayuga County WQMA, 2001)

This segment includes the portion of the lake south of Lock 1 in Mud Lock and north of an east-west line extending from Bridgeport-Seneca Falls Road on the west shore to the Village of Cayuga on the east shore.

Cayuga Lake, Main Lake, Mid-North (0705-0025) Threat(Poss)

Waterbody Location Information

Revised: 08/14/2007

Water Index No: Ont 66-12-P296 (portion 2)
Hydro Unit Code: 04140201/150 **Str Class:** A(T)
Waterbody Type: Lake
Waterbody Size: 7861.1 Acres
Seg Description: portion of lake, as described below

Drain Basin: Oswego-Seneca-Oneida Seneca/Clyde Rivers
Reg/County: 8/Seneca Co. (50)
Quad Map: CAYUGA (J-14-1)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Water Supply	Threatened	Possible

Type of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: OTHER POLLUTANTS

Source(s) of Pollutant(s)
Known: - - -
Suspected: ON-SITE/SEPTIC SYST
Possible: OTHER SOURCE, Agriculture, Atmosph. Deposition, Industrial, Landfill/Land Disp., Municipal, Roadbank Erosion, Streambank Erosion, Urban/Storm Runoff

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: DEC/DOW **Resolution Potential:** High
TMDL/303d Status: n/a

Further Details

Water supply uses in this portion of Cayuga Lake may experience minor threats due to various activities in the watershed. The designation of this waterbody as a threatened water is reflective of a need to protect its particular resource value, rather than specifically identified threats.

Cayuga Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2002 and continuing through the present. An Interpretive Summary report of the findings of this sampling was published in 2006. Over the years, CSLAP sampling of this large lake has been conducted at four separate site, referred to as the North, Mid-North, Mid-South and South sites; the most recent (2005) sampling was conducted at the North and Mid-South sites. The North site is located within this portion of the lake. While it is not appropriate to assume homogeneity of water quality throughout this large lake, it is assumed that results at these two sites are generally reflective on conditions in this portion of the lake. These data indicate that the lake continues to be best characterized as mesotrophic to oligotrophic, or moderately productive to unproductive. With the exception of higher clarity and lower algae levels in the mid- north basin, there does not appear to be a statistically significant difference among the results from the different sampling sites. Phosphorus levels in the lake consistently fall below the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements consistently meet what is

recommended for swimming beaches. Measurements of pH occasionally fall above the state water quality range of 6.5 to 8.5 but these results appear to be a result of naturally hard water and does not seem to limit the ecology of the lake. The lake water is weakly colored, which considered to be reflective of natural conditions. (DEC/DOW, BWAM/CSLAP, March 2006 and Water Quality Study of the Finger Lakes, DEC/DOW, July 2001)

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates recreational suitability of the lake to be very favorable since the lake was first evaluated and continuing through the most recent assessment. The recreational suitability of the lake is described most frequently as "could not be nicer." The lake itself is most often described as "not quite crystal clear," an assessment that is slightly more favorable than in other lakes with similar water quality conditions, although perhaps also typical of lakes in which water clarity showed an increase. Both the north and mid-south sites are occasionally described as "slightly" or "substantially" impacted for recreational uses, although these assessments do not correspond to "poor water clarity" or "excessive weed growth" and may be more closely associated with poor weather or other non-water quality factors. (DEC/DOW, BWAM/CSLAP, March 2006)

Invasive species remain a concern in the lake, though there are currently no significant impacts on recreational or other uses. Excessive growth of macrophytic vegetation including Eurasian water milfoil has been previously cited as a problem. However the appearance of the European Aquatic Moth (Acentria nivea) has dramatically reduced the impact of milfoil and the aquatic macrophyte community is dominated by lower and later growing native species of plants which have improved the recreational use and aesthetics of the lake. The introduction of the zebra mussel into the lake in the early 1990's has led to a dramatic increase in water clarity. Since 1993, algae blooms have become less frequent. However other potential changes to the ecology of the lake due to zebra mussels should be monitored. (Cayuga County WQMA, 2001)

The NYSDOH Source Water Assessment Program (SWAP) compiles, organizes, and evaluates information regarding possible and actual threats to the quality of public water supply (PWS) sources. The information contained in SWAP assessment reports assists in the oversight and protection of public water systems. It is important to note that SWAP reports estimate the potential for untreated drinking water sources to be impacted by contamination. These reports do not address the safety or quality of treated finished potable tap water. Drinking water supplies in this waterbody include the Village of Cayuga and Village of Seneca Falls water supplies. This assessment found an elevated susceptibility to contamination for this source of drinking water. Specifically the amount of agricultural lands in the assessment area results in elevated potential for phosphorus, DBP precursors, and pesticides contamination. In addition, the moderate of density of CAFOs in the assessment area may add to the potential for contamination. While there are some facilities present, permitted discharges do not likely represent an important threat to source water quality based on their density in the assessment area. However, it is appears that the total amount of wastewater discharged to surface water in this assessment area is high enough to seriously raise the potential for contamination. Some susceptibility associated with other sources, such as landfills, was also noted. (NYSDOH, Source Water Assessment Program, 2004)

Although there are no significant known water quality impacts in this portion of Cayuga Lake, the segment is considered a highly valued water resource due to its drinking water supply classification. The inclusion of this waterbody on the DEC/DOW Priority Waterbodies List as a Threatened water is a reflection of the particular resource value reflected in this designation and the need to provide additional protection, rather than any specifically identified threats.

This segment includes the portion of the lake south of an east-west line extending from Bridgeport-Seneca Falls Road on the west shore to the Village of Cayuga on the east shore and north of an east-west line extended from Coonley Corners Road in Coonley Corners.

Cayuga Lake, Main Lake, Mid-South (0705-0050) Threat(Poss)

Waterbody Location Information

Revised: 08/14/2007

Water Index No: Ont 66-12-P296 (portion 3)
Hydro Unit Code: 04140201/150 **Str Class:** AA(T)
Waterbody Type: Lake
Waterbody Size: 33082.7 Acres
Seg Description: portion of lake, as described below

Drain Basin: Oswego-Seneca-Oneida Seneca/Clyde Rivers
Reg/County: 8/Seneca Co. (50)
Quad Map: UNION SPRINGS (J-14-4)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Water Supply	Threatened	Possible

Type of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: OTHER POLLUTANTS (24)

Source(s) of Pollutant(s)
Known: - - -
Suspected: - - -
Possible: OTHER SOURCE

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: DEC/DOW
TMDL/303d Status: n/a
Resolution Potential: High

Further Details

Water supply uses in this portion of Cayuga Lake may experience minor threats due to various activities in the watershed. The designation of this waterbody as a threatened water is reflective of a need to protect its particular resource value, rather than specifically identified threats.

Cayuga Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2002 and continuing through the present. An Interpretive Summary report of the findings of this sampling was published in 2006. Over the years, CSLAP sampling of this large lake has been conducted at four separate site, referred to as the North, Mid-North, Mid-South and South sites; the most recent (2005) sampling was conducted at the North and Mid-South sites. The Mid-North, Mid-South and South sites are all located within this portion of te lake. These data indicate that the lake continues to be best characterized as mesotrophic to oligotrophic, or moderately productive to unproductive. With the exception of higher clarity and lower algae levels in the mid- north basin, there does not appear to be a statistically significant difference among the results from the different sampling sites. Phosphorus levels in the lake consistently fall below the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements consistently meet what is recommended for swimming beaches. Measurements of pH occasionally fall above the state water quality range of 6.5 to 8.5 but these results appear to be a result of naturally hard water and does not seem to limit the ecology of the lake. The lake water is weakly colored, which considered to be

reflective of natural conditions. (DEC/DOW, BWAM/CSLAP, March 2006 and Water Quality Study of the Finger Lakes, DEC/DOW, July 2001)

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates recreational suitability of the lake to be very favorable since the lake was first evaluated and continuing through the most recent assessment. The recreational suitability of the lake is described most frequently as "could not be nicer." The lake itself is most often described as "not quite crystal clear," an assessment that is slightly more favorable than in other lakes with similar water quality conditions, although perhaps also typical of lakes in which water clarity showed an increase. Both the north and mid-south sites are occasionally described as "slightly" or "substantially" impacted for recreational uses, although these assessments do not correspond to "poor water clarity" or "excessive weed growth" and may be more closely associated with poor weather or other non-water quality factors. (DEC/DOW, BWAM/CSLAP, March 2006)

Invasive species remain a concern in the lake, though there are currently no significant impacts on recreational or other uses. Excessive growth of macrophytic vegetation including Eurasian water milfoil has been previously cited as a problem. However the appearance of the European Aquatic Moth (Acentria nivea) has dramatically reduced the impact of milfoil and the aquatic macrophyte community is dominated by lower and later growing native species of plants which have improved the recreational use and aesthetics of the lake. The introduction of the zebra mussel into the lake in the early 1990's has led to a dramatic increase in water clarity. Since 1993, algae blooms have become less frequent. However other potential changes to the ecology of the lake due to zebra mussels should be monitored. (Cayuga County WQMA, 2001)

Although there are no significant known water quality impacts in this portion of Cayuga Lake, the segment is considered a highly valued water resource due to its drinking water supply classification of AA(TS). This designation indicates the lake is to be maintained so as to provide a potable water supply with a minimum of treatment. The inclusion of this waterbody on the DEC/DOW Priority Waterbodies List as a Threatened water is a reflection of the particular resource value reflected in this designation and the need to provide additional protection, rather than any specifically identified threats.

This segment includes the portion of the lake south of an east-west line extended from Coonley Corners Road in Coonley Corners and north of an east-west line through McKinneys Point in McKinneys.

Cayuga Lake, Southern End (0705-0040) Impaired

Waterbody Location Information

Revised: 03/11/2015

Water Index No:	Ont 66-12-P296 (portion 4)	**Drain Basin:**	Oswego-Seneca-Oneida Seneca/Clyde Rivers
Unit Code:	04140201 **Class:** A		
Water Type/Size:	Lake 965.3 Acres	**Reg/County:**	7/Tompkins Co. (55)
Description:	southern portion, as described		

Water Quality Problem/Issue Information

Uses Evaluated	**Severity**	**Confidence**
Water Supply	Threatened	Known
Public Bathing	Impaired	Known
Recreation	Impaired	Known
Aquatic Life	Fully Supported	Suspected
Fish Consumption	Fully Supported	Unconfirmed
Conditions Evaluated		
Habitat/Hydrology	Fair	
Aesthetics	Fair	

Type of Pollutant(s)

Known:	ALGAL/WEED GROWTH, NUTRIENTS (phosphorus), SILT/SEDIMENT, AQUATIC INVASIVE SPECIES (Hydrilla)
Suspected:	- - -
Unconfirmed:	- - -

Source(s) of Pollutant(s)

Known:	- - -
Suspected:	AGRICULTURE, URBAN/STORM RUNOFF, Municipal, Power Generation Discharges, Habitat Modification, Streambank Erosion
Unconfirmed:	- - -

Management Information

Management Status:	Verification of Sources Needed
Lead Agency/Office:	DOW/BWAM
IR/305(b) Code:	Impaired Water Requiring a TMDL (IR Category 5)

Further Details

Overview

Public bathing and recreational uses in the Southern End of Cayuga Lake are impaired by periodic algal blooms and aquatic plant growth along the shore. Nutrient (phosphorus) and silt/sediment loads from various sources throughout the watershed result in the algal/plant growth. Aquatic invasive species (Hydrilla) have also been identified in the South End of the Lake and its tributaries. Water supply uses are also considered to be threatened as well.

Use Assessment

This portion of the Lake is a Class A waterbody, suitable for use as a water supply, public bathing beach, for general

recreation and support of aquatic life.

Since the 1960s, Stewart Beach along the southern shore of Cayuga Lake has been closed to public bathing due to limited water clarity and corresponding safety issues. Aesthetic concerns including nuisance algal blooms, extensive rooted aquatic plant growth, and odors from decaying plants also discourage recreational use of the lake. Sediment loads to the lake contribute to the water clarity issues and also support rooted plant growth. Monitoring data has found that while phosphorus levels in the main lake consistently fall below the state guidance value, concentrations in the shallow southern end of the lake approach and regularly exceed the guidance value of 20 ug/l indicating impacted/stressed recreational uses. (DEC/DOW, BWAM/CSLAP, March 2006 and Water Quality Study of the Finger Lakes, DEC/DOW, July 2001)

Aquatic life is considered to be fully supported based on the support of a healthy fishery. The main lake supports warm and cold water species. Gamefish include lake trout, rainbow trout, landlocked salmon, brown trout, northern pike, chain pickerel, largemouth and smallmouth bass. Panfish include crappies, bluegill, pumpkinseed, yellow perch and bullheads. Carp, channel catfish and longnose gar are also found in the lake. The main forage base is alewives, smelt and yellow perch. Cayuga is stocked annually with approximately 60,000 lake trout, 25,000 brown trout and 40,000 landlocked salmon. Cayuga's tributaries are stocked with 50,000 rainbow trout. (DEC/DFWMR, Region 7 Fisheries, December 2014)

Hydrilla verticillatum (hydrilla, or water thyme) was discovered in Cayuga Inlet in August of 2011. Hydrilla restricts recreational activities and has created significant ecological and economic problems throughout the country, and is particularly challenging to control due to abundant and persistent modes of reproduction, spread, and transport.

The NYSDOH Source Water Assessment Program (SWAP) compiles, organizes, and evaluates information regarding possible and actual threats to the quality of public water supply (PWS) sources. The information contained in SWAP assessment reports assists in the oversight and protection of public water systems. It is important to note that SWAP reports estimate the potential for untreated drinking water sources to be impacted by contamination. These reports do not address the safety or quality of treated finished potable tap water. Drinking water supplies in this waterbody include the Southern Cayuga Lake Intermunicipal Water Commission water supply. This assessment found a moderate susceptibility to contamination for this source of drinking water. Specifically the amount of agricultural lands and the number of CAFOs in the assessment area results in elevated potential for pesticides and other contamination. While there are some facilities present, permitted discharges do not likely represent an important threat to source water quality based on their density in the assessment area. However, it is appears that the total amount of wastewater discharged to surface water in this assessment area is high enough to seriously raise the potential for contamination. Some susceptibility associated with other sources, such as salt mines, was also noted. (NYSDOH, Source Water Assessment Program, 2004)

There are no health advisories in place limiting the consumption of fish from this waterbody (beyond the general advice for all waters). Fish consumption is considered to be fully supported based on the absence of any waterbody-specific advisory, but is noted as unconfirmed since routine monitoring of contaminants in fish is limited. (NYS DOH Health Advisories and DEC/DOW, BWAM, January 2014)

Water Quality Information

Cayuga Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 2002 and continuing through the present. An Interpretive Summary report of the findings of this sampling was published in 2006. Over the years, CSLAP sampling of this large lake has been conducted at four separate site, referred to as the North, Mid-North, Mid-South and South sites; the most recent (2005) sampling was conducted at the North and Mid-South sites. None of these sites are located within the bounds of the shallower Southern End of the lake and are not thought to be fully representative of conditions in this segment. (DEC/DOW, BWAM/CSLAP, March 2006)

As part of a more comprehensive effort to address algal growth and other recreational impairments in the South End of the lake, a water quality/modeling study of Cayuga Lake to support the development of a phosphorus TMDL began in 2013. The Cayuga Lake Modeling Project (CLMP) includes considerable lake and watershed monitoring components (completed in 2013), and associated model development efforts that are anticipated to continue through 2016. (DEC/DOW, BWAM and BWP, January 2015)

The lake and watershed has been the focus of on-going monitoring by a number of other groups, including the Finger Lakes Institute and the Community Science Institute. A significant NYSDEC monitoring effort, entitled Water Quality Study of the Finger Lakes (Callinan, NYSDEC, 2002), provides a previous comparison of water quality in all the Finger Lakes. (DEC/DOW, BWAM, January 2015)

Source Assessment

The sources of pollutant loadings to this segment of Cayuga Lake are numerous. Agricultural activity in the Southern Cayuga Lake watershed is significant and includes, dairy farming, poultry farms and cropland. This portion of the lake also receives discharges from three large point sources: The Ithaca Area WWTP, Cayuga Heights WWTP, and the Cornell Lake Source Cooling Facility. Urban/storm runoff from the City of Ithaca also impacts the lake. Increasing development and stream erosion are also identified as contributors of pollutant loadings to the tribs and to the lake. (Tompkins County Planning Department, 2003)

Management Action

An effort to develop a Total Maximum Daily Load (TMDL) plan to address the phosphorus impairment to the southern end of Cayuga Lake is currently underway. The Cayuga Lake Modeling Project (CLMP) represents the first step in this effort. At the end of the CLMP, NYSDEC will begin a TMDL development process that will look at all sources of nutrients to the lake and determine necessary reductions to restore uses in the South End. The model development component of the CLMP is expected to continue through 2016, with formal development of a TMDL by NYSDEC to commence at that time. (DEC/DOW, BWAM, January 2014)

The CLMP/TMDL effort evolved from negotiations for a final SPDES permit to address water releases from Cornell University's Lake Source Cooling (LSC) facility. The permit includes a limit on the amount of phosphorous the Cornell LSC facility draws from the deeper lake and discharges to the shallower southern shelf. An interim limit holds Cornell's discharge of phosphorus at its then-current levels. Once the TMDL is completed, a final limit will be developed based on the results of the TMDL. The permit includes a requirement outlining Cornell's commitment to fund the water quality/modeling study of Cayuga Lake to assist NYSDEC with the development of the TMDL for the South End of the Lake. (DEC/DOW, BWAM, January 2014)

The discovery of the highly invasive aquatic plant Hydrilla in Cayuga Inlet in 2011 prompted immediate and forceful action, due to the great concern that this plant could move into Cayuga Lake and the Great Lakes ecosystem. A state and local Task Force was quickly established to delineate the hydrilla populations, identify appropriate management actions, and proceed with an aggressive strategy to eradicate the 166 acre infestation found in the Inlet and some connected waterways, using federal, state, and local resources. Key members of the Task Force include the City of Ithaca, the Tompkins County Soil and Water Conservation District and Department of Health, Racine-Johnson Aquatic Ecologists, NYSDEC, Canal Corps, and other local and state organizations. Recommendations of the Task Force led NYSDEC to conduct emergency rule-making to allow for a Hydrilla infestation treatment effort. The Task Force is presently engaged in a multi-pronged eradication strategy, including the use of aquatic herbicides, hand removal, boat inspections, and extensive public education, outreach and monitoring. (DEC/DOW, BWAM/LMAS, January 2014)

Section 303(d) Listing

The Southern End of Cayuga Lake is included on the current (2014) NYS Section 303(d) List of Impaired Waters. The waterbody is included on Part 1 of the List as a waterbody segment requiring the development of a TMDL or other

strategy to attain water quality standards; the segment is listed for phosphorus and silt/sediment. These waterbody/pollutants were first listed on the 2002 List. The waterbody had also been listed for pathogens (since 2008), but this pollutant was removed from the List in 2014, based on data indicating that pathogen criteria were not being exceeded and that the original listing appeared to be unjustified. (DEC/DOW, BWAM, January 2015)

Segment Description

This segment includes the portion of the lake south of an east-west line through McKinneys Point in McKinneys.