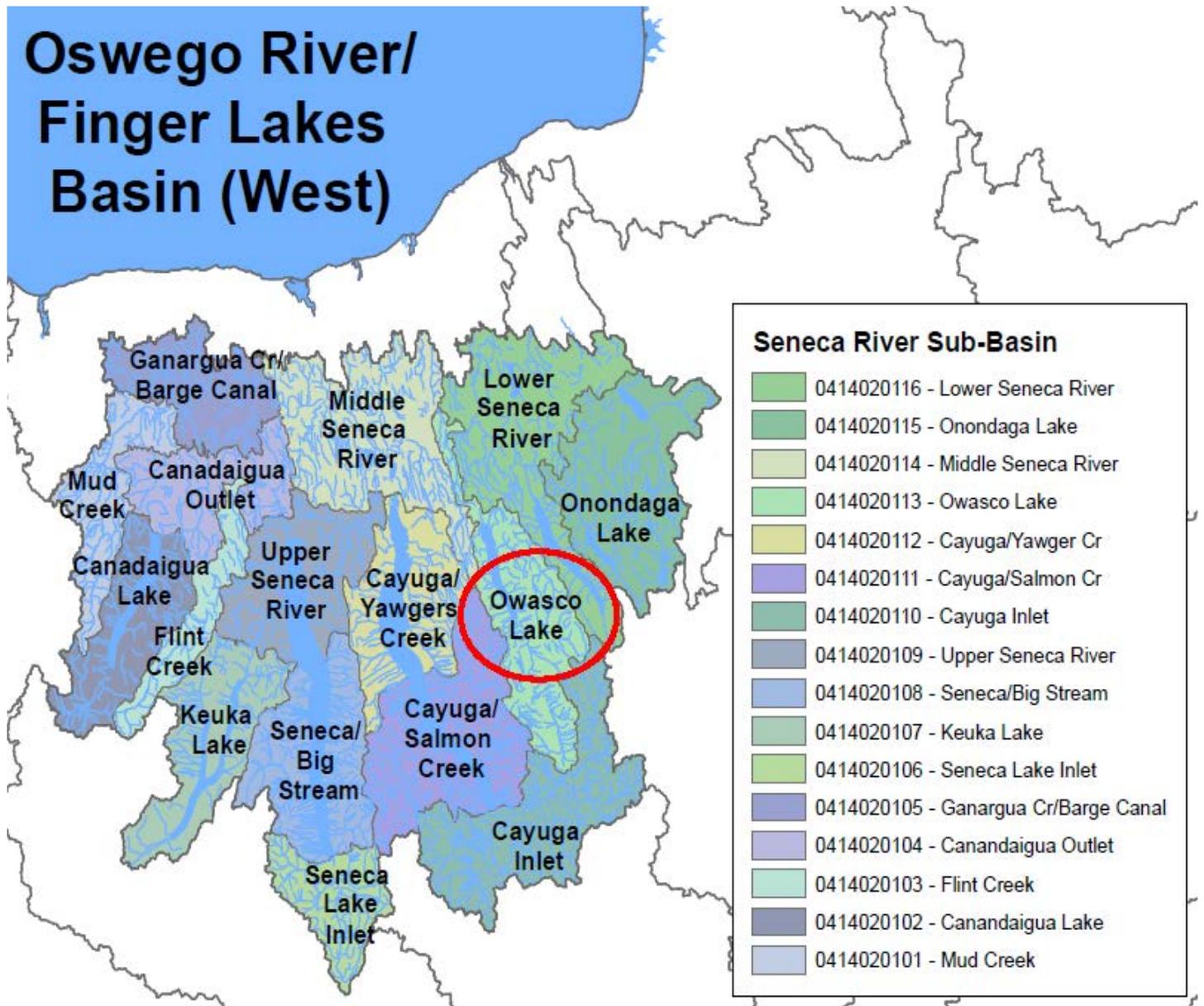


Oswego River/ Finger Lakes Basin (West)



Owasco Lake (0414020113)

Water Index Number

Ont 66-12-43
 Ont 66-12-43
 Ont 66-12-43-P212
 Ont 66-12-43-P212-
 Ont 66-12-43-P212- 3
 Ont 66-12-43-P212-28
 Ont 66-12-43-P212-28
 Ont 66-12-43-P212-28-17
 Ont 66-12-43-P212-28-17- 1
 Ont 66-12-43-P212-28-28
 Ont 66-12-43-P212-28-29

Waterbody Segment

Owasco Outlet, Lower, and tribs (0706-0008)
 Owasco Outlet, Upper, and tribs (0706-0001)
 Owasco Lake (0706-0009)
 Minor Tribs to Owasco Lake (0706-0010)
 Dutch Hollow Brook and tribs (0706-0003)
 Owasco Inlet, Lower, and minor tribs (0706-0002)
 Owasco Inlet, Upper, and tribs (0706-0014)
 Mill/Dresserville Creek and minor tribs(0706-0015)
 Decker Creek, Upper, and tribs (0706-0016)
 Unnamed Trib, Upper, and tribs (0706-0017)
 Hemlock Creek and tribs (0706-0018)

Category

MinorImpacts
 MinorImpacts
 Impaired Seg
 MinorImpacts
 MinorImpacts
 Impaired Seg
 NoKnownImpct
 NoKnownImpct
 UnAssessed
 UnAssessed

Owasco Outlet, Lower, and tribs (0706-0008)

Minor Impacts

Waterbody Location Information

Revised: 9/28/2016

Water Index No: Ont 66-12-43
Hydro Unit Code: Owasco Lake (0414020113)
Water Type/Size: River/Stream 18.2 Miles
Description: stream and tribs, from mouth to Throopsville

Water Class: C
Drainage Basin: Oswego-Seneca-Oneida
Reg/County: 7/Cayuga (6)

Water Quality Problem/Issue Information

Uses Evaluated	Severity	Confidence
Water Supply	Unassessed	-
Public Bathing	Unassessed	-
Recreation	Stressed	Known
Aquatic Life	Stressed	Known
Fish Consumption	Fully Supported	Unconfirmed

Conditions Evaluated

Habitat/Hydrology	Unassessed
Aesthetics	Unassessed

Type of Pollutant(s) (CAPS indicate Major Pollutants/Sources that contribute to an Impaired/Precluded Uses)

Known: Nutrients (phosphorus)
Suspected:
Unconfirmed: Low D.O./Oxygen Demand, Water Level/Flow

Source(s) of Pollutant(s)

Known: Agriculture
Suspected: Municipal Discharges (Port Byron WWTP), Urban/Storm Runoff
Unconfirmed: Hydro Alteration

Management Information

Management Status: Verification of Sources Needed
Lead Agency/Office: ext/WQCC
IR/305(b) Code: Water Attaining All Standards (IR Category 1)

Further Details

Overview

This portion of Owasco Outlet is assessed as having minor impacts due to recreational uses and aquatic life that are known to be stressed by nutrient enrichment and other pollutants from agricultural and other nonpoint sources and urban/municipal and industrial sources.

Use Assessment

Lower Owasco Outlet is a Class C waterbody, suitable for general recreation use and support of aquatic life, but not as a water supply or for public bathing.

Aquatic life is evaluated as supported but stressed based on biological sampling that shows slight impacts. This sampling can also be used to infer that there may be minor impacts to recreational (fishing) uses, although more specific sampling is necessary to confirm this is the case. (DEC/DOW, BWAM/SBU, December 2015)

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

Biological (macroinvertebrate) assessments of Owasco Outlet in Port Byron (at Rochester Street) and in Auburn (at Robinson Road) were conducted as part of the RIBS biological screening effort in 2011; the Auburn site was also sampled in 2008. Sampling results reflect fair to good water quality, with the macroinvertebrate community altered from what is expected under natural conditions. Some expected sensitive species are not present and overall macroinvertebrate species richness is lower than expected. Some changes in community composition have occurred due to replacement of sensitive ubiquitous taxa by more tolerant taxa, but overall there is still balanced distribution of all expected taxa. In spite of these minor impacts, aquatic life is considered to be supported. (DEC/DOW, BWAM/SBU, January 2015)

NYSDEC Rotating Intensive Basin Studies (RIBS) Intensive Network monitoring of Owasco Outlet in North Port Byron, Cayuga County, (at Central Road) was conducted in 2002. Intensive Network sampling typically includes macroinvertebrate community analysis, water column chemistry, sediment and invertebrate tissues analysis and toxicity evaluation. During this sampling the biological (macroinvertebrate) sampling results indicated slightly impacted water quality conditions. Nutrient enrichment from nonpoint sources is the most likely contributor to these impacts. Water column sampling revealed quantifiable level of mercury in one of five samples collected; there were no other parameters of concern noted. Toxicity testing of the water column showed no significant mortality or reproductive impacts. (DEC/DOW, BWAM/RIBS, January 2005)

A biological (macroinvertebrate) survey of Owasco Outlet at multiple sites along its entire length from the mouth to Owasco Lake was conducted in 2002. Sampling results indicated slightly impacted quality conditions at all six sites, including the three sites within this reach. Results of Impact Source Determination analysis identified the most likely primary sources influencing the fauna as being nutrients and urban municipal or industrial runoff. Water quality at two of the three sites in this reach improved from moderately impacted in 1990 to slightly impacted. Although improved from 1990 conditions, the most downstream site revealed impacts that could be attributed to the Port Byron WWTP. Completion of an upgrade to the City of Auburn WWTP in 1995 has resulted in dramatic improvements to the Outlet above this reach and likely contributes to the improvement in this segment as well. Although aquatic life is supported in the stream, nutrient biotic evaluation indicates the level of eutrophication is sufficient to stress aquatic life support. (DEC/DOW, BWAM/SBU, June 2005)

Concerns have also been raised regarding the impact of water level and flow fluctuations in the outlet due to operation of hydroelectric dam at outlet of the lake. There is a conflict over how dam should be operated – lake residents want water level high in lake, but flow maintenance is needed downstream.

Source Assessment

Based on the biologic community composition, surrounding land use and other knowledge of the waterbody, the most likely sources of impacts to the waterbody are nonpoint source nutrients, urban/storm runoff and municipal wastewater discharges.

Management Actions

Upgrades to the municipal wastewater treatment facilities in the City of Auburn in 1995 and the Villae of Port Byron in 2003 resulted in water quality improvements, though these improvements remain in the range of slightly impacted water quality.

Section 303(d) Listing

Lower Owasco Outlet is not included on the current (2016) NYS Section 303(d) List of Impaired/TMDL Waters. There are no impairments that would justify the listing of this waterbody. (DEC/DOW, BWAM/WQAS, January 2016)

Segment Description

This segment includes the portion of the stream and all tribs from the mouth to/including unnamed trib (-7) in Throopsville. The waters of this portion of the stream are Class C. Tribs to this reach/segment are Class C,C(T). Upper Owasco Outlet is listed separately.

Owasco Outlet, Upper, and tribs (0706-0001)

MinorImpacts

Waterbody Location Information

Revised: 07/12/2007

Water Index No: Ont 66-12-43
Hydro Unit Code: 04140201/330 **Str Class:** C
Waterbody Type: River
Waterbody Size: 12.6 Miles
Seg Description: stream and tribs, from Throopsville to Owasco Lake

Drain Basin: Oswego-Seneca-Oneida
Seneca/Clyde Rivers
Reg/County: 7/Cayuga Co. (6)
Quad Map: AUBURN (J-14-2)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Aquatic Life	Stressed	Known
Recreation	Stressed	Known

Type of Pollutant(s)

Known: NUTRIENTS (phosphorus)
Suspected: D.O./Oxygen Demand
Possible: Water Level/Flow

Source(s) of Pollutant(s)

Known: ---
Suspected: COMB. SEWER OVERFLOW (Auburn), MUNICIPAL (Auburn WWTP), URBAN/STORM RUNOFF, Agriculture
Possible: ---

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: ext/WQCC
TMDL/303d Status: n/a

Resolution Potential: Medium

Further Details

Aquatic life support and recreational uses in this portion of Owasco Outlet are known to experience minor impacts due to nutrient enrichment and other pollutants from various nonpoint and urban/municipal and industrial sources.

A biological (macroinvertebrate) survey of Owasco Outlet at multiple sites along its entire length from the mouth to Owasco Lake was conducted in 2002. Sampling results indicated slightly impacted quality conditions at all six sites, including the three sites within this reach. Results of Impact Source Determination analysis identified the most likely primary sources influencing the fauna as being nutrients and urban municipal or industrial runoff. Water quality at the two sites below the Auburn WWTP improved from moderately impacted in 1990 to slightly impacted. This improvement can be attributed to the 1995 upgrade of the WWTP to include activated sludge treatment, phosphorus removal, post-aeration and UV disinfection. Impacts at the site above the treatment plant also improved. Previous impacts attributed to CSOs and urban sources in Auburn were not as pronounced in the 2002 sample, although it is not

certain if this is the result of changes to the sewer system. Although aquatic life is supported in the stream, nutrient biotic evaluation indicates the level of eutrophication is sufficient to stress aquatic life support. (DEC/DOW, BWAM/SBU, June 2005)

Concerns have also been raised regarding the impact of water level and flow fluctuations in the outlet due to operation of hydroelectric dam at outlet of the lake. There is a conflict over how dam should be operated - lake residents want water level high in lake, but flow maintenance is needed downstream.

This segment includes the portion of the stream and all tribs from unnamed trib (-7) in Throopsville to Owasco Lake. The waters of this portion of the stream are Class C. Tribs to this reach/segment are Class C,C(T). Lower Owasco Outlet and Owasco Lake are listed separately.

Owasco Lake (0706-0009)

Impaired Seg

Waterbody Location Information

Revised: 04/01/2016

Water Index No:	Ont 66-12-43-P212	Drain Basin:	Oswego-Seneca-Oneida
Hydro Unit Code:	0414020113	Class:	AA(T)
Waterbody Type:	Lake	Reg/County:	Seneca/Clyde Rivers
Seg Description:	entire lake		7/Cayuga Co. (6)

Water Quality Problem/Issue Information

Uses Evaluated	Severity	Problem Documentation
Water Supply	Impaired	Suspected
Public Bathing	Impaired	Suspected
Recreation	Impaired	Suspected
Aquatic Life	Fully Supported	Known
Fish Consumption	Fully Supported	Unconfirmed

Conditions Evaluated	
Habitat/Hydrology	Fair
Aesthetics	Fair

Type of Pollutant(s) (CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Known: PATHOGENS, HARMFUL ALGAL BLOOMS, Algal/Plant Growth (native)
Suspected: Nutrients (phosphorus), Silt/Sediment
Unconfirmed: - - -

Source(s) of Pollutant(s)

Known: AGRICULTURE, OTHER SOURCE (waterfowl), Habitat Alteration
Suspected: Hydrologic Alteration, Municipal Discharges, Onsite/Septic Systems
Unconfirmed: - - -

Management Information

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

Further Details

Overview

Owasco Lake is currently assessed as impaired due to previously noted impacts to public bathing and recreation from pathogens. More recently, beach closures due to elevated pathogen levels have been reduced. However that may be misleading in that the beaches are now managed using pre-emptive closures due to wet-weather and turbid conditions. Also impacts from nutrients and associated algal blooms are an increasing concern. Although the overall water quality of the Lake is fairly good, in specific areas of the Lake a number of uses – including water supply use, public bathing and recreation – experience impacts that are suspected of being impaired, but have not been fully verified. Nutrient loadings, harmful algal blooms, excessive aquatic plant growth, sediment/clarity and pathogens are the pollutants of primary concern in the Lake. Pollutant sources include runoff from agricultural activities and wastewater discharges within the watershed and waterfowl/wildlife. Onsite/septic systems in close

proximity to the shore may also be contributing to impacts in the Lake, although there is no evidence of system failures.

Use Assessment

Owasco Lake is a Class AA(T) waterbody, suitable for use as a water supply, public bathing beach, for general recreation and support of aquatic life. The lake is also designated as a cold water (trout) fishery.

Regarding water supply use, note that the evaluation of this use focuses on the lake water prior to treatment, and does not necessarily reflect the quality distributed for use after treatment. Monitoring of water quality at the tap is conducted by local water suppliers and public health agencies. That being said, water supply use in Owasco Lake is considered to be stressed – and may be impaired – by elevated nutrient and chlorophyll levels that create the potential for the formation of disinfection by-products (DBPs) in finished potable water and make treatment to meet drinking water standards more difficult. However the severity of impact is not clear and additional evaluation of uses is needed. DBPs are formed when disinfectants such as chlorine used in water treatment plants react with natural organic matter (i.e., decaying vegetation) present in the source water. DBPs in drinking water can include trihalomethanes (TTHMs), haloacetic acids (HAAs), bromate, and chlorite. Currently municipal water systems drawing from the Lake – City of Auburn and Town of Owasco – do not exceed the MCLs for TTHMs or HAAs. However municipal systems that purchase water from these primary suppliers have exceeded the MCL for DBPs periodically over the past few years. The City of Auburn and Town of Owasco also use activated carbon to address taste and odor complaints likely associated with excessive algae. The elevated DBP levels and the use of activated carbon – Class AA waters should be suitable for potable water supply use without treatment beyond disinfection and removal of natural substances – indicate water supply use may be impaired in this portion of the lake, but the temporal and spatial extent of such impairment needs to be evaluated. (Cayuga County Health Department and DEC/DOW, BWAM, October 2014).

The recently implemented Safe Drinking Water Act Stage 2 Disinfection/DBP Rule imposes several additional measures for the protection of water supplies by public health agencies. These measures include the comparison of finished water quality monitoring data against Operational Evaluation Levels (OEL) regarding the formation of TTHMs and HAAs. If the OEL is triggered the operational evaluation must include an examination of system treatment and distribution operational practices that may contribute to TTHM and HAA formation, including sources of supply and source water quality. This evaluation must also identify what steps are needed to minimize future exceedences of the OEL. (USEPA Stage 2 DBPR OEL Guidance Manual, 2008).

A Source Water Assessment by the NYSDOH conducted in the early 2000s found “moderate” susceptibility (on scale of “very high,” “high,” “moderate,” and “low”) to contamination from pesticides and other contaminants due to the level of row crop agriculture and the number of point sources (permitted municipal wastewater discharges) in the watershed. However this assessment is more than 10 years old and may not be fully representative of current conditions. (NYSDOH, Source Water Assessment Program, 2005)

Concern for the water supply use of the lake is increased due to its AA(T) drinking water supply classification. This classification means the quality of the water is to be maintained to allow its use as a drinking water source with disinfection and additional treatment only to remove naturally present impurities. Water from Owasco Lake is used for human consumption and limited irrigation. The City of Auburn, the Town of Owasco, and some lakefront property owners draw water from the lake. In total approximately 55% of Cayuga County's population obtain their drinking water from the lake. In 2013, the combined users drew more than 1.6 billion gallons of water from the lake, serving more than 44,000 residents of Cayuga County. (Cayuga County WQMA, January 2000).

Public bathing and recreational uses are known to be stressed and impacts may rise to the level of being impaired due to occasional occurrence of elevated pathogen indicators and the increasing frequency of algal blooms. Previous assessment of the Lake cited impairment due to periodic elevated fecal coliform levels in the north end of the lake that resulted in closures of the public beach at Emerson Park. That assessment noted that 36% of samples

collected at the beach between 1993 and 1998 were above the geometric mean standard of 200 /100ml for fecal coliform. More recently the Cayuga County Health Department moved to statewide accepted use of a single sample E.coli value of 235 /100ml to manage the beach. In 2013 there was one single-day closure and in 2014 there were two separate one-day beach closures due to sample values above 235. However the beach is also closed proactively when lake turbidity is high and following rain events. The beaches at Emerson Park and the Yacht Club were also closed for a number of days in 2014 due to HAB events; similar closures occurred in many other central New York waterbodies during 2014. A previous (1998) study used DNA ribotyping techniques to determine the sources of fecal contamination. This study found that the major source of contamination at the Emerson Park beaches was from waterfowl, while agriculture was an intermediate source; humans and pets were deemed minor sources. (Cayuga County Health Department and DEC/DOW, LMAS, October 2014).

While reports of algal blooms in Owasco Lake go back many years, the occurrence of harmful algal blooms (HABs) have been reported at an increasing frequency in recent years. However it is worth noting that some of this increase coincides with the recent establishing of a NYSDEC HABs surveillance and notification program. Algae sampling was conducted in late summer to early fall of 2014, confirming the presence of blue green algae blooms in the lake, particularly along the northern and northeastern shorelines. Some of these blooms covered much of the northern portion of the lake, extending into the open water, and several late summer samples contained algal toxin (microcystin-LR) levels exceeding the World Health Organization (WHO) guidelines for protection of swimming. Blooms were also reported in other portions of the lake, but the temporal and spatial extent of blooms outside the northern end of the Lake have not been well documented. (DEC/DOW, LMAS, October 2014).

Aquatic Life is fully supported in Owasco Lake. The lake supports an excellent fishery with a variety of species, including lake trout, walleye, northern pike, smallmouth bass and panfish. The lake is actively managed for sport fishing. (DEC/DFWMR, Region 7, October 2014)

There are no health advisories in place regarding the consumption of fish from this waterbody beyond the general statewide advisory. Fish consumption is considered to be fully supported based on the absence of any waterbody-specific advisory, but this evaluation is noted as unconfirmed reflecting that there is no routine monitoring of contaminants in fish. People are also generally advised not to eat fish taken from waters experiencing harmful algal blooms, but such temporary conditions do not equate to fish consumption use impact. (DEC/DOW, BWAM, November 2014)

Habitat and hydrologic impacts are also thought to contribute to the weed and algal growth and the impact on recreational uses. Zebra mussel infestation of the lake has increased lake clarity. The increased clarity allows for greater penetration of light which supports plant growth into the lake. In addition mussels filter particulate-bound phosphorus and release soluble phosphorus that is more readily available for plant growth. Hydrologic modification of the inlet in 1948 and 1961 by the Army Corps of Engineers to bypass the Owasco Flats wetland complex at the southern end of the lake is also likely contributing to the water quality impacts on the lake. The value of wetlands in providing a buffer to reduce the runoff of pollutants into waters is well established. Conversely the loss of these wetlands results in increased loads, particularly during wet-weather high flow events. (Finger Lakes Institute, January 2006)

Aesthetics in the Lake are affected by algal growth, turbid plumes during wet-weather events and rooted plant growth. (DEC/DOW, BWAM and Region 7, October 2014)

Water Quality Information

Owasco Lake has been sampled by a number of agencies and investigators over recent years. NYSDEC issued a report on a synoptic study of the Finger Lakes, including Owasco Lake, in June 2001; additional data were collected by the NYSDEC from 2002 to 2005, and in 2007 and 2012 through other NYDEC monitoring programs. Researchers from the Finger Lakes Institute of Hobart and William Smith College have regularly monitored the lake since 2005. (DEC/DOW, BWAM, October 2014)

These studies indicate that the open water conditions in the Lake continue to be best characterized as mesoligotrophic, or moderately unproductive. Phosphorus, chlorophyll and clarity measurements are somewhat elevated but typically fall below levels that would suggest impacts to recreational uses. Reports of HABs in portions of the Lake have increased in recent years, though algal blooms in the Lake have long been noted and the increased reports may be at least partially the result of increased awareness. Due to a HAB that lasted two months in 2014, two public bathing beaches were closed and warnings to avoid recreational contact with the water in the lake were issued by the Cayuga County Health Department in 2014. Pathogen indicator monitoring at the public beach in Emerson Park at the north end of the Lake is conducted by the Cayuga County Health Department. Pathogens indicators and impacts have decreased since the Lake was first listed as being impaired by pathogens in 1998, but remain a concern in the north end of the Lake. (DEC/DOW, BWAM, October 2014)

Annual Water Quality Report (AWQR) data are also available to evaluate treated water conditions from water drawn from Owasco Lake for the city of Auburn and the town of Owasco, as well as for purchase water systems for the towns of Sennett, Throop, Brutus, Metz, Aurelius, Springport, Fleming and Montazuma, the Villages of Weedsport, Port Byron and Cayuga, and the Cayuga County Water and Sewer Authority which purchase treated water from the two primary sources.

Source Assessment

Nutrient and sediment sources to the Lake include point sources such as wastewater treatment facilities and non-point sources such as runoff from agricultural activities (both animal and crop agriculture), onsite/septic systems, soil erosion, stream bank erosion, fertilized lawns, roadside ditches and construction activities. Land application of liquid manure and other agricultural practices are suspected of contributing to water quality problems in the lake. A recent (2014) runoff event resulted in the release of liquid manure to a trib of the Lake after it was spread on frozen fields. Similar instances of manure runoff from frozen fields in other areas of the state in 2014 drew considerable attention to this practice. (DEC/DOW, BWAM, October 2014)

Owasco Inlet has been identified as a significant source of nutrients (phosphorus) and sediment to the south end of the Owasco Lake, both of which contribute to aquatic vegetation growth. A 2011 biological assessment of the Inlet revealed elevated nutrient impacts in the stream, though impacts attributed the Groton (V) municipal discharge were shown to be greatly reduced since the plant upgrade to reduce phosphorus. Other nonpoint sources remain as contributing sources. (DEC/DOW, BWAM/SBU and Region 7, December 2014).

Waterfowl (geese and gulls) has been identified as the primary source of pathogen indicators at the north end of the lake. Pathogen indicators from agricultural runoff was noted as a secondary source, while human and pet sources were considered to be minor. (Cayuga County WQMA, January 2000)

Management Action

DEC has worked with municipalities to address phosphorus loads to the southern Lake via Owasco Inlet. In 2008 DEC worked with the Village of Groton to install improved phosphorus treatment at its WWTP. Since then the village has significantly reduced the amount of phosphorous being discharged from its facility. The only other significant point source discharge in the watershed is the Village of Moravia Sewage Treatment Plant which already uses a high level of treatment to reduce phosphorus discharge. (DEC/DOW, Region 7, October 2014)

Owasco Lake benefits from a very engaged network of local stakeholders. This network – which includes the Owasco Lake Watershed Management Council, Owasco Watershed Lake Association, Cayuga County Health and Human Services, Cayuga County Planning and Economic Development, Cayuga County Water Quality Management Agency, the Finger Lakes Institute, Cayuga County Soil and Water District and Cornell Cooperative Extension of Cayuga County – oversees a comprehensive watershed approach necessary to reduce nutrients and other pollutants from various contributors throughout the watershed. Some of the highlights of these efforts include the Cayuga County septic system inspection program, the Owasco Lake Watershed Inspection Program staffed with

a Watershed Specialist and Seasonal Inspectors, the Owasco Flats Project to reconnect the Inlet with its floodplain and wetlands and provide riparian buffer, and an active and concerned lake association led by the Owasco Lake Watershed Management Council. (OLWA and DEC/DOW, Region 7, October 2014)

Section 303(d) Listing

Owasco Lake is included on the current (2016) NYS Section 303(d) List of Impaired/TMDL Waters. The waterbody is included on Part 3a for pathogens and Part 3b for impairments related to HABs. Impacts/impairments due to pathogen levels need to be verified in light of the reduced frequency of pathogen-related beach closures. This Part 3b listing is the result frequent harmful algal blooms (HABs) that impair recreational use (and threaten water supply use) in the Lake. Listings for waterbodies impaired due to HABs are not listed with HABs as the cause/pollutant because HABs is not a pollutant that can be regulated with a TMDL. More typically, listings of waterbodies impaired by HABs identify nutrients as the cause/pollutant however in this case the levels of phosphorus and chlorophyll-*a* in the open lake waters are low and indicate that something other than nutrient eutrophication is driving the occurrence of HABs. Therefore until there is a better understanding of the cause(s) of HABs in this situation, the most appropriate place to list this waterbody is Part 3b with the cause/pollutant noted as Unknown. In addition to these listings, the Lake is also categorized as an IR Category 4c water – Impaired, but for which TMDL development would not be appropriate – for HABs, because HABs is not a pollutant that can be addressed through a TMDL. (DEC/DOW, BWAM, April 2016)

Segment Description

This segment includes the entire area of the Lake.

Minor Tribs to Owasco Lake (0706-0010)

MinorImpacts

Waterbody Location Information

Revised: 07/02/2007

Water Index No: Ont 66-12-43-P212-
Hydro Unit Code: 04140201/320 **Str Class:** C
Waterbody Type: River
Waterbody Size: 89.4 Miles
Seg Description: total length of selected tribs to Owasco Lake

Drain Basin: Oswego-Seneca-Oneida
Seneca/Clyde Rivers
Reg/County: 7/Cayuga Co. (6)
Quad Map: AUBURN (J-14-2)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Aquatic Life	Stressed	Known
Recreation	Stressed	Suspected
Habitat/Hydrology	Stressed	Known

Type of Pollutant(s)

Known: NUTRIENTS (10), SILT/SEDIMENT
Suspected: ---
Possible: ---

Source(s) of Pollutant(s)

Known: STREAMBANK EROSION
Suspected: Agriculture, Urban/Storm Runoff
Possible: Construction, Roadbank Erosion

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: ext/WQCC
TMDL/303d Status: n/a

Resolution Potential: Medium

Further Details

Aquatic life support, recreational uses and habitat/hydrologic conditions in these tribs to Owasco Lake are known to experience minor impacts/threats due to silt/sediment and nutrients from streambank erosion and other nonpoint sources. The Impacts of increasing residential development in the watershed around the lake are a significant concern.

Stream banks in the lower reaches have lost significant amounts of soil. Visible sediment plumes and sediment deltas at the mouth of these tribs combined with increased runoff from development in its watershed result in flooding. The stream channel in Sucker Brook is inadequate. Flooding further compounds the stream's problems with increased scouring and erosion of streambanks and increased nonpoint source pollution as flood waters wash over the ground surface. Since most of the land through which Sucker Brook passes is active cropland or a golf course, this increases the nutrient loading. Similar conditions are noted in Veness Brook. Streambank erosion from rapid residential

development and agricultural activity and the primary sources of impact. When the lake level is lowered through the fall and winter, exposed stream banks are weakened, and undercutting and bank wasting are severe, especially during Spring flush. (Cayuga County SWCD, 2001)

A biological (macroinvertebrate) assessment of Sucker Brook in Auburn (at Route 72) was conducted in 2001. Sampling results indicated slightly impacted water quality conditions. Algal-feeding riffle beetles dominated the fauna. Nonpoint source nutrient enrichment was identified as the primary contributing source of impacts to the fauna. Although aquatic life is supported in the stream, nutrient biotic evaluation indicates the level of eutrophication is sufficient to stress aquatic life support. (DEC/DOW, BWAM/SBU, June 2005)

This segment includes the total length of selected/smaller tribs to Owasco Lake. Tribs within this segment, including Sucker Brook (-1), Long Point Stream (-5) and Veness Brook (-51) are primarily Class C,C(T),C(TS), with a small portion of unnamed trib (-4) designated Class AA. Dutch Hollow Brook (-3) and Owasco Inlet (-28) are listed separately.

Dutch Hollow Brook and tribs (0706-0003)

MinorImpacts

Waterbody Location Information

Revised: 07/02/2007

Water Index No: Ont 66-12-43-P212- 3
Hydro Unit Code: 04140201/310 **Str Class:** C(TS)
Waterbody Type: River
Waterbody Size: 68.5 Miles
Seg Description: entire stream and tribs

Drain Basin: Oswego-Seneca-Oneida
Seneca/Clyde Rivers
Reg/County: 7/Cayuga Co. (6)
Quad Map: AUBURN (J-14-2)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Habitat/Hydrology	Stressed	Known

Type of Pollutant(s)

Known: SILT/SEDIMENT
Suspected: Thermal Changes
Possible: - - -

Source(s) of Pollutant(s)

Known: - - -
Suspected: HABITAT MODIFICATION, STREAMBANK EROSION, Hydro Modification
Possible: Agriculture

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: ext/WQCC
TMDL/303d Status: n/a

Resolution Potential: Medium

Further Details

Habitat/hydrologic condition of Dutch Hollow Brook is thought to experience minor impacts due to silt/sedimentation from streambank erosion and stream disturbances related to flood control efforts.

Previously it was noted that significant bedload deposited in the lower end of the brook contributes to flooding and people use bulldozers to clean out the area for flood control. This has impact on the warm water fish spawning area. The removal of riparian vegetation and channel widening farther upstream impact trout spawning. However, the fishery of the stream includes a good rainbow and brown trout population. The sediment loading to and impact on Owasco Lake from this tributary are also a concern. (DEC/DFWMR, Region 7, 2001)

Biological (macroinvertebrate) assessments of Dutch Hollow Brook in Niles (at Old State Road) and in Owasco (at Route 38A) were conducted in 2000 and 2001, respectively. Sampling results indicated non-impacted water quality conditions. Other sampling at these and other sites along the stream since 1993 revealed generally non-impacted

condition, though some slight impacts occurred in 1994 and 1998. The fauna is diverse and criteria for waters having no known impacts are typically met. (DEC/DOW, BWAM/SBU, June 2005)

Source of Information: Regional Fisheries and Water This segment includes the entire stream and all tribs. The waters of the stream are Class C(TS). Tribs to this reach/segment are Class C.

Owasco Inlet, Lower, and minor tribs (0706-0002)

MinorImpacts

Waterbody Location Information

Revised: 07/03/2007

Water Index No: Ont 66-12-43-P212-28 **Drain Basin:** Oswego-Seneca-Oneida
Hydro Unit Code: 04140201/300 **Str Class:** C(T) Seneca/Clyde Rivers
Waterbody Type: River **Reg/County:** 7/Cayuga Co. (6)
Waterbody Size: 59.1 Miles **Quad Map:** MORAVIA (K-15-1)
Seg Description: stream and selected tribs, from mouth to Locke

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Aquatic Life	Stressed	Known

Type of Pollutant(s)

Known: NUTRIENTS (phosphorus)
Suspected: Silt/Sediment
Possible: - - -

Source(s) of Pollutant(s)

Known: AGRICULTURE, MUNICIPAL (Groton WWTP), Streambank Erosion
Suspected: - - -
Possible: - - -

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))

Verification Status: 4 (Source Identified, Strategy Needed)

Lead Agency/Office: ext/WQCC

TMDL/303d Status: n/a

Resolution Potential: Medium

Further Details

Aquatic life support in this portion of Owasco Inlet is known to experience minor impacts due to nutrients from municipal wastewater and agricultural and various nonpoint sources.

A biological (macroinvertebrate) survey of Owasco Inlet at multiple sites from the mouth at Owasco Lake to above Groton was conducted in 2006. Sampling results for all three sites within this segment indicated slightly impacted water quality conditions. Impact Source Determination identified nonpoint source nutrient enrichment as the primary cause of the impacts in this reach. However municipal discharges from the Village of Moravia at the downstream end of this reach and from the Village of Groton WWTP upstream of this segment also contribute nutrient loading to the stream. The impact of nutrient loading on uses is greater in the upstream segment than in this reach. In the lower Owasco Inlet, nutrient biotic evaluation determined the effects on the fauna to be minor and aquatic life support is considered to be fully supported in the stream. (DEC/DOW, BWAM/SBU, January 2007)

Previous assessments of this segment included concerns about the constant natural turbidity of the stream that impacts the cold water fishery. The natural erosion of exposed clay layers along the shore may not be easily resolvable. (Cayuga County WQCC, 2001)

This segment includes the portion of the stream and all tribs from the mouth to Hemlock Creek (-29) in Locke. The waters of this portion of the stream are Class C(T). Tribs to this reach/segment are primarily Class C, with a small portion of trib (-20) designated Class B. Upper Owasco Inlet, Mill/Dresserville Creek (-17), upper unnamed trib (-28) and Hemlock Creek (-29) are listed separately.

Owasco Inlet, Upper, and tribs (0706-0014)

Impaired Seg

Waterbody Location Information

Revised: 07/03/2007

Water Index No: Ont 66-12-43-P212-28
Hydro Unit Code: 04140201/300 **Str Class:** C(T)
Waterbody Type: River
Waterbody Size: 81.4 Miles
Seg Description: stream and tribs, above Locke

Drain Basin: Oswego-Seneca-Oneida
Seneca/Clyde Rivers
Reg/County: 7/Tompkins Co. (55)
Quad Map: GROTON (K-15-3)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
AQUATIC LIFE	Impaired	Known
Recreation	Stressed	Known

Type of Pollutant(s)

Known: NUTRIENTS (phosphorus)
Suspected: ---
Possible: ---

Source(s) of Pollutant(s)

Known: MUNICIPAL (Groton WWTP)
Suspected: Agriculture
Possible: ---

Resolution/Management Information

Issue Resolvability: 3 (Strategy Being Implemented)
Verification Status: 5 (Management Strategy has been Developed)
Lead Agency/Office: DOW/Reg7
TMDL/303d Status: 4b (Other Control(s) More Suitable than TMDL, Not Listed)

Resolution Potential: High

Further Details

Aquatic life support in this portion of Owasco Inlet is impaired due to nutrients from municipal wastewater discharges. Agricultural and various nonpoint sources also contribute.

A biological (macroinvertebrate) survey of Owasco Inlet at multiple sites from the mouth at Owasco Lake to above Groton was conducted in 2006. Sampling results for the 4 sites within this segment revealed waters quality that ranged from non-impacted to moderately impacted. The upstream site was found to be non-impacted, however a substantial decline in water quality occurred downstream of the Village of Groton WWTP discharge. The macroinvertebrate community at this site was dominated by tolerant aquatic worms and black fly larvae, and had high similarity to communities expected downstream of sewage treatment plant discharges. At sites farther downstream, water quality was assessed as slightly impacted. Based on the Biological Assessment Profile, the Nutrient Biotic Index, and phosphorus monitoring data collected by the Cornell Cooperative Extension of Cayuga County, the Village

of Groton WWTP had been identified as the major source of phosphorus in Owasco Inlet. (DEC/DOW, BWAM/SBU, January 2007)

Since these studies were conducted, NYSDEC has working with local partners toward reducing the amount of nutrient phosphorus discharged into Owasco Lake, both from the Groton WWTP as well as other significant sources. Since entering into a Consent Order with the DEC last year, the Village of Groton has reduced the amount of phosphorous discharge from the WWTP by two-thirds. In addition to requiring the implementation of new treatment technology to reduce phosphorus, the DEC has already set a more protective interim phosphorus discharge limit at the sewage treatment plant. DEC is currently working with Groton on a revised SPDES permit that will include even more stringent limits on phosphorus discharges to Lake Owasco. The limit now proposed to be included in a final permit will further reduce the total amount of phosphorus discharged from this plant. The proposed permit will also be available for public comment and review before DEC makes any final determination on its content. (DEC/DOW. BWC and Discharge Monitoring Reports, September 2007)

Excess phosphorus causes algae blooms that can, in turn, result in low levels of dissolved oxygen that harm fish and impact water odor and color restricting recreational uses. In drinking water supplies, phosphorus induced algae blooms raise a range of additional, serious concerns. It is important to note that to fully address concerns over Lake Owasco water quality, other communities in this watershed basin must contribute towards implementing a comprehensive approach to reduce phosphorus from various contributors. Runoff from developed areas, among other sources, continue to transport phosphorus into the lake, and have negative impacts on the quality of the this important water body.

This segment includes the portion of the stream and all tribs above Hemlock Creek (-29) in Locke. The waters of this portion of the stream are Class C(T). Tribs to this reach/segment are primarily Class C,C(T), with a small portion of unnamed tribs (-51) designated Class AA. Lower Owasco Inlet and Hemlock Creek (-29) are listed separately.

Mill/Dresserville Creek and minor tribs (0706-0015) NoKnownImpct

Waterbody Location Information

Revised: 07/02/2007

Water Index No: Ont 66-12-43-P212-28-17
Hydro Unit Code: 04140201/290 **Str Class:** C(T)
Waterbody Type: River
Waterbody Size: 33.2 Miles
Seg Description: entire stream and selected tribs

Drain Basin: Oswego-Seneca-Oneida
Seneca/Clyde Rivers
Reg/County: 7/Cayuga Co. (6)
Quad Map: MORAVIA (K-15-1)

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 **Resolution Potential:** n/a
TMDL/303d Status: n/a

Further Details

A biological (macroinvertebrate) assessment of Dresserville Creek in Moravia (at Route 38A) was conducted in 2001. Sampling results indicated non-impacted water quality conditions. The fauna was dominated by clean-water mayflies. (DEC/DOW, BWAM/SBU, June 2005)

This segment includes the entire stream and selected/smaller tribs. The waters of the stream are Class C(T),C(TS). Tribs to this reach/segment, including Lower Decker Creek, are Class C,C(T),C(TS). Upper Decker Creek (-1) is listed separately.

Decker Creek, Upper, and tribs (0706-0016)

NoKnownImpct

Waterbody Location Information

Revised: 07/02/2007

Water Index No: Ont 66-12-43-P212-28-17- 1 **Drain Basin:** Oswego-Seneca-Oneida
Hydro Unit Code: 04140201/290 **Str Class:** AA Seneca/Clyde Rivers
Waterbody Type: River **Reg/County:** 7/Cayuga Co. (6)
Waterbody Size: 30.5 Miles **Quad Map:** MORAVIA (K-15-1)
Seg Description: stream and tribs, above Wilson Corners

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 **Resolution Potential:** n/a
TMDL/303d Status: n/a

Further Details

A biological (macroinvertebrate) assessment of Decker Creek in Moravia (at Jugg Road) was conducted in 2001. Sampling results indicated slightly impacted water quality conditions, but results were very near the range of non-impacted. Nonpoint source nutrient enrichment was identified as the likely stressor to the stream. However, nutrient biotic evaluation determined these effects on the fauna to be minor. Aquatic life support is considered to be fully supported in the stream, and there are no other apparent water quality impacts to designated uses. (DEC/DOW, BWAM/SBU, June 2005)

Local agencies have expressed concerns regarding the impact of erosion and agricultural nonpoint sources. (Cayuga County WQMA, 2003)

This segment includes the portion of the stream and all tribs above the diversion dam near Wilson Corners. The waters of this portion of the stream are Class AA,AA(T). Tribs to this reach/segment are Class AA(T) and C,C(T).