Owasco Lake (0706-0009) Impaired Seg

Waterbody Location Information

Revised: 07/30/2007

Water Index No: Ont 66-12-43-P212
Hydro Unit Code: 04140201/320 **Str Class:** AA(T)
Waterbody Type: Lake
Waterbody Size: 6783.9 Acres
Seg Description: entire 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
Water Supply	Threatened	Possible
PUBLIC BATHING	Impaired	Known
RECREATION	Impaired	Known

Type of Pollutant(s)

Known: ALGAL/WEED GROWTH, PATHOGENS, Nutrients (phosphorus), Silt/Sediment
Suspected: - - -
Possible: - - -

Source(s) of Pollutant(s)

Known: HABITAT MODIFICATION, OTHER SOURCE (wildlife), Agriculture, Municipal (Groton WWTP), Streambank Erosion
Suspected: Hydro Modification, On-Site/Septic Syst
Possible: Construction

Resolution/Management Information

Issue Resolvability: 3 (Strategy Being Implemented)
Verification Status: 5 (Management Strategy has been Developed)
Lead Agency/Office: DOW/Reg7 **Resolution Potential:** Medium
TMDL/303d Status: 3a->1

Further Details

Public bathing and recreational uses in Owasco Lake are considered to be periodically impaired by pathogen contamination along the north shore and by excessive growth of aquatic vegetation and algae in other parts of the lake, particularly its southern end. The sources of pathogens include wildlife and waterfowl, agricultural runoff and to a lesser extent on-site wastewater treatment systems. Though nutrient (phosphorus) levels are generally low in much of the lake, elevated levels in the southern end of the lake may exacerbate the growth of aquatic vegetation. Water supply uses of the lake are also considered to be threatened due to the potential for the formation of disinfection by-products when the water is treated with chlorine for public water use.

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. More recently, researchers from the Finger Lakes Institute of Hobart and William Smith College issued A Preliminary Water Quality Study of Owasco Lake and its Watershed (Halfman, et.al., January 2006) . These studies indicate that the lake continues to be best characterized as mesoligotrophic, or somewhat productive. Phosphorus levels in the lake are typically below the state guidance values

that would indicate impacted/stressed recreational uses. Chlorophyll and clarity measurements also indicate no significant impacts to uses in the main lake. However, although water quality in Owasco Lake is generally found to be favorable and supportive of most recreational uses and aquatic life, there are a few specific water quality concerns. Public bathing in the northern end of the lake is restricted by pathogen levels that result in periodic beach closures. Along the lake shore and most notably at the southern end of the lake excessive rooted aquatic plant and algal growth restrict recreational uses such as bathing, boating and fishing. Elevated phosphorus loads and silt/sediment deposition from lake tributaries are thought to be contributing to and exacerbating this growth. The potential for formation of disinfection by-products that threatened water supply uses of the lake is also a concern.

The most specific impairment to uses of the lake are related to periodic elevated fecal coliform levels in the north end of the lake have resulted in closures of the public beach at Emerson Park. Of the 772 samples taken at Emerson Park beaches by the Cayuga County Environmental Health Division between 1993 and 1998, 36% (281) were above the NYSDOH fecal coliform density standard of 200 colonies/100 mL. In the fall 1998, a study used DNA ribotyping techniques to determine the sources of fecal contamination. This study determined that the major source of contamination at the Emerson Park beaches was from wildlife, while agriculture was an intermediate source, and humans and pets were minor sources. The study also showed that agriculture and wildlife were the major sources of contamination in the tributaries, while humans and pets were minor sources. (Cayuga County WQMA, January 2000)

Other recreational impairments in the lake are the result of excessive aquatic weed and algal growth, particularly in the southern end of the lake. A number of factors contribute to the weed and algal growth. Nutrient and sediment loads from Owasco Inlet and other tributaries are thought to promote this growth and efforts to reduce these loadings to the lake are encouraged. The sources of these loads include municipal wastewater treatment facility discharges, agricultural activities and associated runoff, on-site wastewater treatment systems, soil/streambank erosion, and various other nonpoint sources. Maintaining the quality of Owasco Lake into the future will require efforts to identify, quantify, address and reduce these sources of nutrient and sediment loads. (Finger Lakes Institute, January 2006)

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. Hydrologic modification of the inlet 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)

The potential formation of disinfection by-products (DBPs) also threatens water supply uses of the lake. 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. Different disinfectants produce different types and amounts of disinfection byproducts. Disinfection byproducts occurring in drinking water can include trihalomethanes, haloacetic acids, bromate, and chlorite. It is important to note that the study of DBPs on the lake to date focuses on the potential to form DBPs, rather than the actual levels in the finished water supply. Thus the impact on water supply use of the lake is considered to be threatened, rather than stressed. (DEC/DOW, BWAM, June 2007)

Owasco Inlet has been identified as a significant source of nutrients (phosphorus) to the south end of the Owasco Lake. Sampling and biological assessment of the Inlet in 2006 revealed elevated nutrient impacts in the stream. Municipal discharges to the stream were identified as primary sources, while nonpoint source nutrient enrichment were also identified as contributing sources. Subsequent to these findings, municipal discharges of phosphorus have been reduced. Water quality studies currently underway will evaluate whether additional municipal discharge reductions need to be evaluated. But it is important to note that to fully address concerns regarding Owasco Lake water quality, other communities in this watershed basin must contribute towards implementing a comprehensive approach to reduce contaminants from various other point and nonpoint contributors. (DEC/DOW, Region 7, June 2007)

In addition to the use impairments and threats outlined above, the lake is considered a highly valued water resource due

to its AA(T) drinking water supply classification. This classification means the quality of the water is to be maintain to allow its use as a drinking water source with minimal filtration. Water from Owasco Lake is used for both human consumption and irrigation. The City of Auburn, the Town of Owasco, and lakefront property owners all draw water from the lake. In fact, more than 70% of Cayuga County's population obtain their drinking water from the lake. In 1996, the combined users drew more than three billion gallons of water from the lake, serving more than 58,000 residents of Cayuga County. Homeowners along the lake may also use the lake as a water source for a variety of uses. The volume of water used for irrigation is unknown. (Cayuga County WQMA, January 2000)

Although there are no known water quality impacts to the drinking water use of Owasco Lake, a Source Water Assessment by the NYSDOH found a moderate susceptibility 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. (NYSDOH, Source Water Assessment Program, 2005)

Owasco Lake is included on the NYS 2006 Section 303(d) List of Impaired/TMDL Waters due to pathogens. The lake is included on Part 3a of the List as a Water Requiring Verification of Impairment, however this updated assessment indicate that the suspected impairments are confirmed and that the lake be moved to Part 1 of the List as Waterbody Requiring TMDL Development (or other strategy to attain water quality standards). As noted above, the lake is also impaired by excessive aquatic weed/algal growth. Waters impaired by weeds/algae are not included on the Section 303(d) List because weeds/algae are not easily addressed by a TMDL. However a watershed analysis and/or TMDL to evaluate sources and appropriate reductions of contributing pollutants, such as phosphorus, would be useful toward developing a whole-watershed strategy and protecting water quality in the lake. (DEC/DOW, BWAM, July 2007)

Minor Tribs to Owasco Lake (0706-0010) MinorImpacts

Waterbody Location Information

Revised: 07/02/2007

Water Index No: Ont 66-12-43-P212-
Drain Basin: Oswego-Seneca-Oneida
Hydro Unit Code: 04140201/320 **Str Class:** C
Seneca/Clyde Rivers
Waterbody Type: River
Reg/County: 7/Cayuga Co. (6)
Waterbody Size: 89.4 Miles
Quad Map: AUBURN (J-14-2)
Seg Description: total length of selected tribs to Owasco Lake

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

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

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
Hydro Unit Code: 04140201/300 **Str Class:** C(T)
Waterbody Type: River
Waterbody Size: 59.1 Miles
Seg Description: stream and selected tribs, from mouth to Locke

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

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/Cayuga Co. (6)
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 **Resolution Potential:** High
TMDL/303d Status: 4b (Other Control(s) More Suitable than TMDL, Not Listed)

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
Hydro Unit Code: 04140201/290 **Str Class:** AA
Waterbody Type: River
Waterbody Size: 30.5 Miles
Seg Description: stream and tribs, above Wilson Corners

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 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).