

CHAPTER 8. FINDINGS: PROBLEMS AND NEEDS

Seneca Lake's water quality is generally very good. The lake supports its designated best use as a public drinking water supply and recreational resource; the fish community is diverse and productive. However, Seneca Lake has not been well characterized. Additionally, there is much less information available to characterize the tributaries. Only a few long-term tributary monitoring programs are in place.

General findings include the following:

- **Water Quality.** Seneca Lake provides Class AA drinking water to 70,000 residents within its watershed. The water is chloride rich and hard but is not acidic and is believed pollutant free. This assessment however, is based on a limited amount of data, especially historical data.
- **Trophic Status.** Biological parameters indicate that Seneca Lake is borderline oligotrophic/mesotrophic. Very low nutrient concentrations, especially low phosphate concentrations, prevents unsightly algae blooms and associated green coloration observed in smaller lakes of the region, and prevents dissolved oxygen depletion in the hypolimnion during the late summer.
- **Lakeshore Residents.** A Home*A*Syst Survey was done to get a sense of the impacts of lakeshore residents on Seneca Lake (see Chapter 7L: Lakeshore Residential Environmental Risk Survey and Assessment (Home*A*Syst). The findings of the survey include the following:

Drinking Water

65% of respondents do not treat their drinking water

77% of respondents claim they have never noticed anything unusual about their drinking water

54% of respondents stated that they have never tested their drinking water

37% of respondents indicated that they drink bottled water

37% of respondents indicated that they take water from the lake

Waste Water

88% of survey sites had septic systems

Average age of surveyed septic systems was 17.6 years

25% of respondents use septic system additives

95% of residences surveyed are within 500 feet of the lake, 42.5% within 50 feet of the lake

Zebra Mussels

89% of respondents had observed zebra mussels on the lakeshore

92% of respondents stated that they have not taken control measures

Yard and Garden

More than 80% of surveyed sites have lawns with complete vegetation

69% of surveyed sites are not fertilizing

Miscellaneous Household Items

- 90.5% of respondents recycle their household waste
 - 80% of respondents indicated no presence of lead
 - 47% of lakefront respondents heat their homes with fuel oil or gas furnace
 - 39% of respondents stored their home heating fuels in above ground storage tanks
- Residential perspective. As part of this project a residential survey was done. More than half of those surveyed felt that water quality had a major impact on property values
 - 38% of respondents have seen deterioration in the lake's water quality
 - 50% of respondents believe there is an aquatic weed problem
 - Respondents rating of various means of dealing with excessive loading of nutrients into the lake
 - Highest – increased inspection of lakeshore property septic systems and requiring farmers to use Best Management Practices
 - Respondents rated land use regulations and their effect on water quality
 - 2.7% of the respondents felt that current land use regulation very adequately protected the water quality of the lake, 23.4% felt they were simply adequate, and 24.5% felt they were not adequate.
 - Respondents ranked the appropriate level of government for controlling land use in the watershed
 - Highest – watershed-wide/multi-county district
 - Respondents rated who should pay for the cost of keeping the lake clean
 - What respondents would be willing to spend on a household level
 - 35% unwilling to contribute
 - 29% would pay up to \$25
 - 9% would pay over \$100
 - Based on total residential properties this potentially totals \$434,726
 - Appropriate groups to pay to keep the lake clean
 - 25% felt it should be those who cause the problem
 - 10% felt business and industry should pay everything
 - 9% felt that state government should pay for entire cleanup
 - 3% felt that everyone living in the watershed was responsible
 - ***Socio-Economic and Demographics.*** Population has remained essentially the same from 1970 through 1990 in the municipalities in the watershed. For the most part cities and villages have had low increases or have lost population whereas some towns have shown significant increases in population. All municipalities in the watershed have a lower per capita income than the New York State average.

Despite the conclusion that water quality is high, a number of specific areas of concern are evident:

- ***Limnological changes over time.*** Changes in the Secchi disk depths, nutrient concentrations and chlorophyll *a* concentrations from the early 1990's to 1998 suggest that zebra mussels have decreased the algal concentrations in Seneca Lake and increased the water clarity. In 1998, these trends reversed. In addition, nitrate and phosphate concentrations increased in 1998, especially after the middle of the summer. Perhaps decomposition of dead zebra mussels during this unusually warm year triggered the observed limnological changes but other hypotheses are possible.
- ***Nutrient concentrations.*** Nutrient concentrations in monitored streams are larger than the lake concentrations suggesting that nutrient runoff significantly impacts the water quality of the streams in the watershed. The PWL lists nutrients as a type of pollutant in segments of Catharine, Kashong, and Hector Falls Creeks and Punch Bowl, Upper Dam, Whites Hallow, and Seneca Lakes.
- ***Tributaries.*** Bedrock and agriculture seem to control the water quality of the streams within the watershed. Calcium and atrazine concentrations appear to reflect nonpoint sources, specifically bedrock composition and agricultural land use practices, respectively.
- ***Chloride Concentrations.*** While the measured chloride concentrations in the lake do not pose an immediate health risk to the majority of the population it is a concern in that it is 2 to 10 times larger than the chloride concentration of the other smaller Finger Lakes.
- ***Agriculture.*** Based on computer modeling there are several subwatersheds listed as high for agricultural loading potential (See Section 7A: Agriculture). Additionally the PWL lists agriculture as a source of pollutants in segments of Catharine Creek, Kashong Creek, Keuka Outlet, and Hector Falls Creek and Seneca, Punch Bowl, Upper Dam, and Whites Hallow Lakes.
- ***Forests.*** With only 41% of the watershed in forest, Seneca Lake Watershed has less forest than many other Finger Lakes. Problems associated with lack of forest cover such as increased intensity of stream flow, increased erosion rates, increased streambank instability, prolonged periods of no-flow, and decreased infiltration of groundwater may accompany the lower percentage of forest cover in the Seneca Lake Watershed. The most significant problem with timber harvest relative to water quality is the lack of application of best management practices to the actual harvest.
- ***Bulk Storage.*** Some subwatersheds ranked high in terms of amount, and therefore potential for leaks, of chemical and petroleum bulk storage (see Section 7B and 7H).
- ***Roadbank Erosion*** inventory found that there are 1279 miles of public roads in the watershed. From that total, 4.18 miles of roads were identified as having very severe

bank erosion, 42.40 miles were identified with severe bank erosion, and 67.92 miles were identified as having moderate bank erosion. The PWL lists roadbank erosion as a source of pollutants in segments of Catharine and Kashong Creek, and Seneca Lake.

- **Road Deicing** rates by municipality varied from 0.19 to 16.43 tons/mile/year, averaging 7.50 tons/mile/year in the watershed. The rates and presence of exposed deicing material produced a ranking by subwatershed. Data suggests that Big Stream, Catharine Creek, Geneva Drainage, Kashong Creek, Keuka Lake Outlet, Reading, Sixteen Falls Creek, and Wilson Creek Subwatersheds ranked as relatively high contributors of deicing material to Seneca Lake. The PWL lists deicing agents as a source of pollutants in the Schuyler County portion of Seneca Lake.
- **Lakeshore residences.** Although reported incidence of environmental concerns through the Home*A*Syst survey was low, this may be related to the homeowners lack of knowledge about a potential problem. More than 70% of wells have not been inspected, 54% of water supplies have not been tested, and 94% of septic systems show no visible sign of failure, and fewer than 10% of the residents are taking active measures to combat zebra mussels.
- **Streambank Erosion** (see Section 7N). Subwatersheds and direct drainages with a high ranking for streambank erosion include Catharine Creek, Big Stream, Keuka Lake Outlet, Reading, Starkey, Long Point and Satterly Hill. Subwatersheds and direct drainages with a moderate ranking for streambank erosion include Rock Stream, Kashong Creek, Sawmill/Bullhorn Creek, Glen Eldridge, Hector Falls, Lamoreaux Landing and Valois. The PWL lists streambank erosion as a source of pollutants in segments of Catharine Creek and Kashong Creek, and in Punch Bowl Lake, Upper Dam Lake, and Whites Hollow Lake.
- **Onsite-Septic Systems.** The quality of surface and groundwater resources within the watershed can be influenced by private sewage disposal systems. Systems that are poorly maintained, improperly sited, overloaded and/or have exceeded their design life expectancy can cause surface or groundwater contamination. Nutrients and pathogens from failed systems, which are not buffered by contact with the proper soil environment and its associated bacteria are transported beyond the intended treatment site. The PWL lists on-site septic systems as a source of pollutants in portions of Catharine Creek and Seneca Lake.

In order to better understand these areas of concern more data and information are needed. The following information/data gaps have been detected:

- **Sampling and Monitoring** of the water quality of Seneca Lake, especially in regards to chloride, hardness and selected pollutants. Some data and information are available (see Chapter 6), however more spatial and temporal data is necessary so as to analyze lake water quality

- ***Exotic Species.*** The variability of algal, phosphate, and nitrate concentrations indicates that continued research is essential to statistically prove and completely understand the extent of zebra mussel impact on the ecology of the lake.
- ***Pesticides.*** Data are not available to exclude a full range of potential pollutants in the watershed and/or detail changes in these water quality parameters over time. Research on a number of neighboring lakes indicates that spatial and temporal data needs to be collected on organic compounds (including pesticides) in the lake. Additionally, data on distribution of pesticides can be used and correlated to water quality data.
- ***Tributaries.*** In general data on the tributaries to Seneca Lake is lacking. As more data can be collected and analyzed more can be understood about the link between each parameter and the land use in each subwatershed contributing to a particular tributary. Some data is available on the following water quality parameters, however more is needed: calcium, chloride, atrazine, nutrients, dissolved oxygen, turbidity, and conductivity. Information on additional parameters like heavy metals, polychlorinated organics and other pollutants are not available at the present time.
- ***Forestry.*** Limited information is available to assess the impact of forest harvest activities on water quality in the watershed, although studies of other watersheds in the northeast suggest that harvest activities, particularly logging road construction, have dramatic short-term impacts on water quality through the introduction of nutrients and sediments to surface water.
- ***Landfills, Dumps, Junkyards and Hazardous Waste Sites.*** There are no complete records for the opening and closure of local municipal dumps. The importance of dating the period of operation provides an indication of the methods of operation and closure. Additionally data should be collected on all public and private dumps not listed in the NYSDEC database.
- ***Mines.*** Only in the last twenty years has the NYSDEC required permits for mining operations and reclamation. Many gravel pits in the watershed were worked and abandoned before the Mining Law was activated in 1975. The mines abandoned prior to 1975 are not subject to the Law and the reclamation requirements and in many cases would need additional work just to identify them.
- ***Bulk Storage.*** NYSDEC databases were used for the identification of chemical and petroleum bulk petroleum storage sites. However this database does not identify unpermitted sites or sites that were in operation prior to current permitting and database practices. Additional work needs to be done to identify these sites.

- ***Onsite Septic Systems.*** The Home*A*Syst project (Section 7L) gained valuable insight into the lakeshore homeowners perspective in relation to septic systems and it did point out the need for septic system education throughout the watershed. However, the project did not physically inspect the systems. More data and information on septic systems in the watershed is needed so as to assess environmental and water quality impacts.
- ***Well Drilling Operations.*** Include data on gas, oil, brine and solution wells.
- ***Recreation data*** generated through a recreation inventory and survey of the watershed.
- ***Biosolids Inventory*** for use and content.
- ***Programmatic Environment.*** Inventory and description of federal, state and local laws effecting land use regulation and control, nonpoint source pollution and water quality
- ***Effectiveness of mitigating measures*** (Best Management Practices) in reducing export of sediment and nutrients from subwatersheds. Before and after monitoring is lacking on tributaries where remedial measures such as streambank stabilization, agricultural best management practices, or stormwater controls has been implemented. Monitoring should occur over a range of hydrologic conditions, particularly high flow events.

Based on the information presented above and the information and data in this report the following recommendation are being made:

- ***Municipal Ordinances*** (see *Summary of Seneca Lake Pure Water Association Suggested Minimum Municipal Ordinances* in Chapter 4: Existing Land Use and Trends
- ***Increase the level of sampling and monitoring*** in the lake and its tributaries (see Data Gaps). The watershed chapter of this report (Chapter 6B) was very limited in scope because the data to write a complete analysis are not available at the present time. We recommend a focused effort on each of the 29 subwatershed to assess their contribution to the nutrient, pollution and other loads to the lake. Once the data are available, then the field data can be compared to the model results presented in another chapter of this report. We also recommend that the fieldwork should not stop after one field season as well because the lake does change in significant ways over seasonal, annual and longer time scales.

- ***Agriculture.*** Farm planning (agricultural best management practices) and implementation activities should target areas indicated by computer modeling as high for agricultural loading potential.
- ***Forestry.*** Develop a watershed-wide forest management policy. Forest management options include the following: 1) deny/ignore the existence of water quality problems associated with timber harvest; 2) acknowledge problems and try to solve them which includes providing private property owners and loggers with more and better information about timber harvest practices; 3) provide incentives to encourage the use of timber harvest best management practices; and 4) if education and incentives prove to difficult, regulation of timber harvest may be necessary.
- ***Roads.*** Institute best management practices for control of pollutants originating on roads and in road ditches (stormwater management). Management practices could include items listed in Section 7J: Roadbank Erosion.
- ***Onsite Septic Systems.*** Implement a watershed-wide on-site septic inspection program.
- ***Streambank Stabilization.*** A streambank stabilization program should be designed. The Seneca Lake Watershed Streambank Inventory could serve as a prioritization for areas of implementation.
- ***Access and Open Space.*** Set aside lake frontage for permanent national habitat and wildlife. Maintain open space and acquire public access. Control and manage shoreline building and development
- ***Education.*** Attendee at the public forums held during the development of this report recommended that more people needed to be educated and involved including school age children. Some suggestions were to hold workshops for highway superintendents and people interested in land use regulation and control, development of school curriculum, development of web site.
- ***Promote Intermunicipal Action.*** Attendee at the public forums held during the development of this report recommended that this be done on several fronts including planning, regulation, municipal operations, communication between towns, and public-private partnerships.
- ***County Recycling Programs.*** Increase effectiveness of programs
- ***Well Drilling Registration.*** Institute a well drilling registration program in order to better understand the hydrogeology and groundwater flow in the watershed.
- ***Stormwater management and erosion and sediment control***

- *Hazardous Waste Collection*
- *More pump out facilities for boats*
- *Watershed Management Plan.* A draft State of the Lake Report should be open for municipal, stakeholder, and public input before being finalized. Then, using the final State of the Lake Report as the existing state, fully involve municipalities, stakeholder organizations, and the general public in developing a watershed management plan that is based on the desired state for the watershed and implementation strategies to get from the existing state to the desired state.